

Oklahoma
School Testing Program / College-
and Career-Readiness Assessment
Grades 3–8, 11

2020–21 Technical Report

Prepared by Cognia and the Oklahoma
Department of Education

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OKLAHOMA

STATE DEPARTMENT *of* EDUCATION

— JOY HOFMEISTER —

STATE SUPERINTENDENT *of* PUBLIC INSTRUCTION



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Preface

The following is the technical documentation for SY 2020–2021 administration of the OSTP ELA, mathematics and science and CCRA science programs. It follows the standard format for technical documentation from previous years’ technical reports. From a technical standpoint, the SY 2020–2021 administration was consistent with previous years’ administrations. Test design, development, and administration were all conducted according to standard operating procedure. Analysis of the results also, for the most part, followed standard operating procedure. A few procedural adjustments were necessary to appropriately consider issues resulting from: 1) the gap in the year-to-year assessment as the SY 2019–2020 assessment was not administered, and 2) effects on opportunity to learn, mode of learning, access to grade-level content, attendance, course grades, etc. caused by COVID-related disruptions. These issues necessitated that some analyses be modified, added, or skipped in the SY 2020–2021 administration in order to maintain fairness and interpretability and, in some cases, to attempt to understand the causes and effects of potential changes in assessment performance relative to previous years. As such, it is particularly important this year to consider other information when interpreting state test scores from the SY 2020–2021 administration as well as the technical information contained within this report. We urge caution in drawing any specific inferences about reasons for any changes in year-to-year assessment performance or differences between schools when examining this or other reports.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

While this technical report follows Oklahoma and Cognia’s traditional format for technical documentation, it is important to recognize any changes in technical procedures or outcomes when they were conducted or observed within this document. To that end, each chapter will be prefaced with a note highlighting important differences in procedure, if any.

Chapter 1 Overview of the Oklahoma School Testing Program

Purposes for administering the OSTP and CCRA assessments include measuring student proficiency relative to standards. Because these standards did not change across administrations, differences in student performance may help explain effects or differences in SY 2020-2021, should they occur.

Another stated purpose of the OSTP and CCRA is use of assessment results for state and federal accountability and reporting. However, interpretations cannot be made in the same way as previous years. The disruptions due to COVID-19 and the non-uniform instructional delivery, makes drawing inferences or comparisons inappropriate. The OSDE requested a waiver of federal accountability requirements for SY 2020-2021, and also waived the 95% assessment participation requirement. Because of changes in assessment administrations (e.g., late evenings, weekends) in SY 2020-2021, reporting and interpretation of assessment results required different methods.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

The Validation Framework in section 1.3 asserts four claims. None of these claims are threatened by differences in education or assessment between SY 18–19 and SY 20–21, and it is the robustness of these claims that allows us to contextualize some of these differences and assert the validity of certain interpretations and uses and qualify or disclaim validity of other interpretations and uses in this academic year.

1.1 PURPOSE AND USES OF THE OKLAHOMA SCHOOL TESTING PROGRAM

The Oklahoma School Testing Program (OSTP) assessments are state-mandated, criterion-referenced tests that measure student proficiency in specific content areas. Each test measures the student's knowledge relative to the Oklahoma Academic Standards (OAS)—Oklahoma's content standards for public schools (Appendix A). OSTP assessments are also used for state and federal accountability and reporting. In spring 2021, the OSTP assessments were administered to all eligible students in grades 3–8 and grade 11. The OSTP included mathematics and English language arts (ELA) testing for grades 3–8



and science testing for grades 5 and 8. The OSTP also included College-and Career-Readiness Assessment (CCRA) for grade 11 students in science and U.S. History. The U.S. History portion was a field test this year; therefore, no student scores were provided. Test forms included operational tests (OP), breach forms (replacement forms used in cases of large-scale security breaches or cheating), Braille forms, and large-print forms, which were administered when such accommodations were needed. Spanish forms were also available in paper format (for grades in which paper was the only form of administration) and online.

The Oklahoma State Department of Education (SDE) contracted Cognia to develop and administer the OSTP.

1.2 PURPOSE OF THIS REPORT

This technical report is intended to be one source of information for Oklahoma K–12 educational stakeholders (including testing coordinators, educators, parents and guardians, and other interested citizens) about the development, implementation, scoring, reporting, and technical attributes of the 2020–21 OSTP Grades 3–8 and College-and Career-Readiness Assessment (CCRA): Science and U.S. History content. Other sources of information regarding the OSTP include the administration manual *OSTP 2020–21 Test Preparation Manual*; interpretation materials; implementation materials; training materials for administrators, schools, and teachers; and parent guides found at ok.gov/sde/assessment-administrator-resources-administrators. Technical manuals from previous assessment administrations may be found at sde.ok.gov/sde/documents/2014-08-29/OSTP-technical-manuals-archive.

This technical report summarizes development and administration procedures, along with the research data analyses conducted on the OSTP Grades 3–8 and CCRA Science and U.S. History test administrations. The report provides data-based evidence that supports the validity and reliability of the tests. The purpose of this report is to provide objective information regarding technical aspects of the OSTP Grades 3–8 and CCRA science and assessments in support of score interpretations (AERA, APA, & NCME, 2014). This report is an overview of the technical aspects of the construction and administration of the OSTP Grades 3–8 and CCRA science assessments between fall 2020 and scoring in 2021. Appendix B provides a glossary of assessment terms as an aid to understanding the report. As the interpretations of test scores, and not the test itself, are evaluated for validity, each chapter is an important component in the investigation of score validation: test design and development (Chapter 3); test administration (Chapter 4); scoring (Chapter 5); item analysis (Chapter 6); scaling and equating (Chapter 7); reliability (Chapter 8); and score reporting (Chapter 9).

1.3 VALIDATION FRAMEWORK

The *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014) refers to validity as the degree to which “evidence and theory support the interpretations of test scores entailed by



proposed uses of tests.” Additionally, Messick (1989) defines validity as “an integrated evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores and other modes of assessment.” Both definitions emphasize evidence and theory to support inferences and interpretations of test scores.

In addition to the statements above, the Oklahoma SDE made specific assertions about the OSTP assessments. These assertions, or claims, are statements that connect aspects of the assessment process to the intended purposes of the assessments. Statement and identification of these claims lead into organization and presentation of supporting evidence from across the entire testing process, which begins to form a validation framework inspired by argument-based validation approaches (Bachman & Palmer, 2010; Mislevy, Almond, & Lukas, 2004).

- Claim 1: The assessments are reliable, valid, and aligned with the OAS.
- Claim 2: Student performance resulting from the assessments is comparable to results of other high-quality, large-scale assessments.
- Claim 3: The assessment results facilitate norm-referenced and criterion-referenced score interpretations.
- Claim 4: The OSTP assessments provide a measure of future academic performance to assessments administered in high school.

Chapter 10 summarizes the validity evidence in support of these claims, as provided throughout this technical report.

1.4 TECHNICAL ADVISORY COMMITTEE

The Technical Advisory Committee (TAC) makes suggestions to the OSDE on issues regarding field-test design, item analysis, linking and equating, item response theory models, data reporting, standard setting procedures, and other relevant psychometric concerns. The TAC includes experts from national, state, and local organizations. A complete list of TAC members can be found in Appendix C.

Chapter 2 Current and Recent Years' Updates

This chapter provides historical and legal context for the intended purposes, uses, and interpretations of the OSTP and CCRA science and U.S. history programs, and their statistical defensibility. The OSDE requested a waiver of federal accountability requirements for SY 2020–2021, and also waived the 95% assessment participation requirement. Because of changes in assessment administrations (e.g., late evenings, weekends) in SY 2020–2021, reporting and interpretation of assessment results required different methods.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

On July 1, 2016, a new Oklahoma legislative bill (HB 3218) went into effect that made several changes to Oklahoma's student assessment and accountability system, including high school graduation requirements. The most significant change is that it is no longer a state requirement for Oklahoma students to pass End-of-Instruction exams in order to graduate with a standard high school diploma. HB 3218 directed the Oklahoma State Board of Education (OSBE) to establish a new system of assessments that students entering Grade 9 in 2017–2018 will be required to take in order to graduate with a standard diploma. The End-of-Instruction (EOI) exams and Achieving Classroom Excellence (ACE) graduation requirements were repealed as of July 1, 2016. During the 2016–17 academic year, tenth graders took assessments in ELA, mathematics, and science. The tenth-grade test will not be given in future years. Beginning with the 2017–18 year, grade 11 students took either the ACT or the SAT and a grade 11 science content assessment to determine college-and career-readiness (CCR) and high school accountability. In 2019, a grade 11 U.S. History content assessment was also added.

As the 2020–21 assessment for grade 11 U.S. History was a field test, information from that assessment will not be included in a technical report for this year.

In addition, the United States Department of Education Office of Elementary and Secondary Education issued a determination letter based on OSDE's January 2018 Title I Assessment Peer Review submission. According to the October 2018 determination letter issued by Frank T. Brogan, Assistant Secretary for Elementary and Secondary Education, OSDE's assessment system "substantially meets requirements" for OSTP 3–8 reading/language and mathematics and OSTP science general assessments in grades 5 and 8 in accordance with section 1111(b)(1) and (3) of the Elementary and



Secondary Education Act (ESEA). For a copy of the determination letter, see the following:
<https://www2.ed.gov/admins/lead/account/nclbfinalassess/ok3.pdf>.

2.1 EXCERPTS FROM THE ASSESSMENT SYSTEM AND ASSESSMENT REQUIREMENTS REPORT

Please see the following link for the full report: [Assessment System and Assessment Requirements Full Report](#).

2.1.1 Executive Summary

The Oklahoma Legislature directed the State Board of Education (OSBE) to evaluate Oklahoma's current state assessment system and make recommendations for its future. As a result, the Oklahoma State Department of Education (OSDE) held regional meetings across the state and convened the Oklahoma Assessment and Accountability Task Force to deliberate over many technical, policy, and practical issues associated with implementing an improved assessment system. The 95 Task Force members met four times between August 4 and October 18, 2016.

This report presents the results of those deliberations in the form of recommendations from the OSDE to the Oklahoma State Board of Education (OSBE).

2.1.2 House Bill 3218

In June 2016, Oklahoma Governor Mary Fallin signed House Bill 3218 (HB 3218), which relates to the adoption of a statewide system of student assessments. HB 3218 required the OSBE to study and develop assessment recommendations for the statewide assessment system. The House Bill specifically tasks the OSBE, in consultation with representatives from the Oklahoma State Regents for Higher Education, the Commission for Educational Quality and Accountability, the State Board of Career and Technology Education, and the Secretary of Education and Workforce Development, to study and develop assessment requirements. Additionally, HB 3218 requires the State Board to address accountability requirements under ESSA, which will be presented in a separate report for accountability. This report focuses specifically on the assessment requirements of HB 3218, which include the degree to which the Oklahoma assessment:

- Aligns to the Oklahoma Academic Standards (OAS);
- Provides a measure of comparability among other states;
- Yields both norm-referenced and criterion-referenced scores;
- Has a track record of statistical reliability and accuracy; and
- Provides a measure of future academic performance for assessments administered in high school.

2.1.3 Collecting Feedback from Regional Engage Oklahoma Meetings and the Oklahoma Task Force

Prior to convening Oklahoma’s Assessment and Accountability Task Force, the OSDE held regional meetings in Broken Arrow, Sallisaw, Durant, Edmond, Woodward, and Lawton. These meetings yielded responses on various questions addressing the desired purposes and types of assessments. This regional feedback was incorporated in the discussions with the Oklahoma Assessment and Accountability Task Force. The Task Force included 95 members who represented districts across the state, educators, parents, business and community leaders, tribal leaders, and lawmakers. Additionally, members from the Oklahoma State Regents for Higher Education, the Commission for Educational Quality and Accountability, the State Board of Career and Technology Education, and the Secretary of Education and Workforce Development were also represented on the Task Force. For a complete list of Task Force members, please refer to the [Assessment System and Assessment Requirements Full Report](#).

On four occasions, the members of the Task Force met with experts in assessment and accountability to consider each of the study requirements and provide feedback to improve the state’s assessment and accountability systems. Two of those experts also served as the primary facilitators of the Task Force: Juan D’Brot, Ph.D., from the National Center for the Improvement of Educational Assessment (NCIEA) and Marianne Perie, Ph.D., from the University of Kansas’ Achievement and Assessment Institute. These meetings occurred on August 4 and 5, September 19, and October 18, 2016. At each meeting, the Task Force discussed the elements of HB 3218, research and best practices in assessment and accountability development, and feedback addressing the requirements of HB 3218. This feedback was subsequently incorporated into OSDE’s recommendations to the OSBE.

2.1.4 Key Summative Assessment Recommendations

Oklahoma’s Assessment and Accountability Task Force and the OSDE recognized that assessment design is a case of optimization under constraints¹. In other words, there may be many desirable purposes, uses, and goals for assessment, but they may be in conflict. Any given assessment can serve only a limited number of purposes well. Finally, assessments always have some type of restrictions (e.g., legislative requirements, time, and cost) that must be weighed in finalizing recommendations. Therefore, a critical early activity of the Task Force was to identify and prioritize desired characteristics and intended uses for a new Oklahoma statewide summative assessment for OSDE to consider.

Upon consolidating the uses and characteristics, the facilitators returned to the Task Force with draft goals for the assessment system. The Task Force provided revisions and input for these goals. Facilitators then presented the final goals to the Task Force. Once goals were defined, the desired uses

¹ To view this footnote, please review the [Assessment System and Assessment Requirements Full Report](#).

and characteristics were clarified within the context of the Task Force’s goals. The members of the Task Force agreed to the following goals for OSDE to consider for Oklahoma’s assessment system:

1. Provide instructionally useful information to teachers and students with appropriate detail (i.e., differing grain sizes for different stakeholder groups) and timely reporting;
2. Provide clear and accurate information to parents and students regarding achievement and progress toward college-and career-readiness (CCR) using an assessment that is meaningful to students;
3. Provide meaningful information to support evaluation and enhancement of curriculum and programs; and
4. Provide information to appropriately support federal and state accountability decisions.

Following discussion of the Oklahoma assessment system’s goals, the Task Force worked with the facilitators to articulate feedback for both the grade 3–8 and high school statewide summative assessments. This feedback was subsequently incorporated into the OSDE’s recommendations to the State Board. These recommendations are separated into those for grades 3–8 and those for high school.

2.1.5 Recommendations for Assessments in Grades 3–8

The feedback provided by the Task Force and subsequently incorporated by the OSDE for grades 3–8 can be grouped into four categories: Content Alignment and Timing, Intended Purpose and Use, Score Interpretation, and Reporting and State Comparability. The OSDE’s recommendations are presented below.

2.1.5.1 CONTENT ALIGNMENT AND TIMING

- Maintain the focus of the new assessments on the Oklahoma Academic Standards (OAS) and continue to administer them at the end of grades 3–8; and
- Include an adequate assessment of writing to support coverage of the Oklahoma English Language Arts (ELA) standards.

2.1.5.2 INTENDED PURPOSE AND USE

- Ensure the assessment can support calculating growth for students in at least grades 4–8 and explore the potential of expanding growth to high school depending on the defensibility of the link between grade 8 and high school assessments and intended interpretations; and
- Ensure the assessment demonstrates sufficient technical quality to support the intended purposes and current uses of student accountability (e.g., promotion in grade 3 based on reading and driver’s license requirements on the grade 8 ELA assessments).

2.1.5.3 SCORE INTERPRETATION

- Provide a measure of performance indicative of being on track to college-and career-readiness (CCR), which can inform preparation for the Oklahoma high school assessment;



- Support criterion-referenced interpretations (i.e., performance against the OAS) and report individual claims including but not limited to scale score², Lexile³, Quantile⁴, content cluster⁵, and growth⁶ performance; and
- Provide normative information to help contextualize the performance of students statewide, such as intra-state percentiles.

2.1.5.4 REPORTING AND STATE COMPARABILITY

- Support aggregate reporting on claims including but not limited to scale score, Lexile, Quantile, content cluster, and growth performance at appropriate levels of grain size (e.g., grade, subgroup, teacher, building/district administrator, state); and
- Utilize the existing National Assessment of Educational Progress (NAEP) data to establish statewide comparisons at grades 4 and 8. NAEP data should also be used during standard-setting⁷ activities to ensure the CCR cut score is set using national and other state data.

2.1.6 Recommendations for Assessments in High School

The feedback provided by the Task Force and subsequently incorporated by the OSDE can be grouped into four categories: Content Alignment and Timing, Intended Purpose and Use, Score Interpretation, and Reporting and State Comparability. The OSDE’s recommendations are presented below.

2.1.6.1 CONTENT ALIGNMENT AND TIMING

- Use a commercial off-the-shelf college-readiness assessment (e.g., SAT, ACT) in lieu of state-developed high school assessments in grades 9 or 10; and
- Consider how assessments measuring college-readiness can still adequately address assessment peer review requirements, including but not limited to alignment.

2.1.6.2 INTENDED PURPOSE AND USE

- Ensure the assessment demonstrates sufficient technical quality to support the need for multiple and differing uses of assessment results;
- Explore the possibility of linking college-readiness scores to information of value to students and educators (e.g., readiness for postsecondary, prediction of STEM readiness, remediation risk);

2 A scale score (or scaled scores) is a raw score that has been transformed through a customized set of mathematical procedures (i.e., scaling and equating) to account for differences in difficulty across multiple forms and to enable the score to represent the same level of difficulty from one year to the next.

3 A score developed by MetaMetrics that represents either the difficulty of a text or a student’s reading ability level.

4 A score developed by MetaMetrics that represents a forecast of or a measure of a student’s ability to successfully work with certain mathematics skills and concepts.

5 A content cluster may be a group of items that measures a similar concept in a content area on a given test.

6 Growth can be conceptualized as the academic performance of the same student over two or more points in time. This is different from improvement, which is change in performance over time as groups of students matriculate or when comparing the same collection of students across time (e.g., Grade 3 students in 2016 and Grade 3 students in 2015).

7 The process through which subject matter experts set performance standards, or cut scores, on an assessment or series of assessments.

- Maintain a focus on rigorous expectations of college-and career-readiness that are not lessened by tying assessments to graduation requirements or course grades; and
- Ensure that all students in the state of Oklahoma can be provided with a reliable, valid, and fair score, regardless of accommodations provided or the amount of time needed for a student to take the test.
- Ensure that scores reflecting college-readiness can be provided universally to the accepting institution or employer of each student.

2.1.6.3 SCORE INTERPRETATION

- Support criterion-referenced interpretations (i.e., performance against the OAS) and report individual claims appropriate for high school students;
- Provide evidence to support claims of college-and career-readiness. These claims should be (1) supported using theoretically related data in standard-setting activities (e.g., measures of college readiness and other nationally available data) and (2) validated empirically using available postsecondary data linking to performance on the college-readiness assessment; and
- Provide normative information to help contextualize the performance of students statewide such as intra-state percentiles.

2.1.6.4 REPORTING AND STATE COMPARABILITY

- Support aggregate reporting on claims at appropriate levels of grain size for high school assessments (e.g., grade, subgroup, teacher, building/district administrator, state); and
- Support the ability to provide norm-referenced information based on other states that may be administering the same college-ready assessments if unreasonable administration constraints do not inhibit those comparisons.

2.1.7 Key Considerations for Summative Assessment Recommendations

While the Task Force addressed a targeted set of issues stemming from HB 3218, the facilitators were intentional in informing Task Force members of three key areas that must be considered in large-scale assessment development and/or selection:

1. **Technical quality**, which serves to ensure the assessment is reliable, valid for its intended use, and fair for all students;
2. **Peer Review**, which serves as a means to present evidence of technical quality; and
3. **Accountability**, which forces the issue of intended purpose and use.

In the time allotted, the Task Force was not able to consider all the constraints and requirements necessary to fully expand upon their feedback to the OSDE. The facilitators worked to inform the Task Force that the desired purposes and uses reflected in their feedback would be optimized to the greatest extent possible in light of technical- and policy-based constraints. As historically demonstrated, we can expect that the OSDE will continue to prioritize fairness, equity, reliability, and validity as the agency

moves forward in maximizing the efficiency of Oklahoma’s assessment system. A more detailed explanation of the context and considerations for adopting OSDE’s recommendations is provided in the full report below.

2.1.8 Conclusion

The conversations that occurred among Task Force members, assessment and accountability experts, and the OSDE resulted in a cohesive set of goals for an aligned comprehensive assessment system which includes state and locally selected assessments designed to meet a variety of purposes and uses. These goals are listed on page 9 of this report (to view page 9 please review the [Assessment System and Assessment Requirements Full Report](#)). The feedback provided by the Task Force and the recommendations presented by the OSDE, however, are focused only on Oklahoma’s statewide summative assessments.

While the OSDE’s recommendations can be grouped into the four categories of (1) Content Alignment and Timing, (2) Intended Purpose and Use, (3) Score Interpretation, and (4) Reporting and State Comparability, it is important to understand how these recommendations address the overarching requirements outlined in HB 3218.

2.1.8.1 ALIGNMENT TO THE OAS

Summative assessments used for accountability are required to undergo peer review to ensure the assessments are reliable, fair, and valid for their intended uses. One such use is to measure student progress against Oklahoma’s college-and career-ready standards. The Task Force and OSDE believe it is of vital importance that students can demonstrate their mastery of the state’s standards. However, there is also a perceived need to increase the relevance of assessments, especially in high school. The Task Force and OSDE believe a state-developed set of assessments for grades 3–8 and a college-readiness assessment in high school would best support teaching and learning efforts in the state.

2.1.8.2 COMPARABILITY WITH OTHER STATES

Throughout feedback sessions, Task Force meetings, and OSDE deliberations, the ability to compare Oklahoma performance with that of other states was considered a valuable feature of the assessment system. However, there are tensions among administration constraints, test design requirements, and the strength of the comparisons that may make direct comparisons difficult. Currently, Oklahoma can make comparisons using statewide aggregated data (e.g., NAEP scores in grades 4 and 8, college-readiness scores in grade 11), but is unable to support comparisons at each grade. Task Force feedback and OSDE recommendations suggest leveraging available national comparison data beyond its current use and incorporating it into assessment standard-setting activities. This will allow the OSDE and its stakeholders to determine college-and career-readiness cut scores on the assessment that reflect nationally competitive expectations.

2.1.8.3 NORM-REFERENCED AND CRITERION-REFERENCED SCORES

Based on Task Force feedback, the OSDE confirmed that reported information supporting criterion-referenced interpretations (e.g., scale score, Lexile, Quantile, content cluster, and growth performance) are valuable and should continue to be provided in meaningful and accessible ways. Additional feedback and OSDE's recommendations note that norm-referenced interpretations would enhance the value of statewide summative assessment results by contextualizing student learning and performance. By working with a prospective vendor, the OSDE should be able to supplement the information provided to stakeholders with meaningful normative data based on the performance of other Oklahoma students.

2.1.8.4 STATISTICAL RELIABILITY AND ACCURACY

The technical quality of an assessment is an absolute requirement for tests intended to communicate student grade-level mastery and for use in accountability. The Standards for Educational and Psychological Testing⁸ present critical issues that test developers and test administrators must consider during assessment design, development, and administration. While custom state-developed assessments require field testing and operational administration to accumulate evidence of statistical reliability and accuracy, the quality of the processes used to develop those assessments can be easily demonstrated by prospective vendors and the state. In contrast, off-the-shelf assessments should already have evidence of this, and the state can generalize their technical quality if the assessment is given under the conditions defined for the assessment. The technical quality of an assessment is a key factor in ensuring assessment results are reliable, valid, and fair.

2.1.8.5 FUTURE ACADEMIC PERFORMANCE FOR ASSESSMENTS ADMINISTERED IN HIGH SCHOOL

As noted earlier in the report, there is a clear value in high school assessment results being able to predict future academic performance. Based on OSDE's recommendation of using a college-readiness assessment in high school, the state and its prospective vendor should be able to determine the probability of success in early post-secondary academics based on high school assessments.

However, the state and its prospective vendor should amass additional Oklahoma-specific evidence that strengthens the claims of likely postsecondary success. This can be supported both through standard-setting activities and empirical analyses that examine high school performance based on postsecondary success. The recommendations made to the OSDE in the previous section offer relatively fine-grain suggestions that can be interpreted through the lens of the HB 3218 requirements. These recommendations also reflect the Task Force's awareness of the three areas of technical quality, peer review requirements, and accountability uses, which were addressed throughout deliberations. Through regional meetings and in-depth conversations with the Task Force, the OSDE was able to critically

⁸ AERA, APA, & NCME. (2014). *Standards for Educational and Psychological Testing*. Washington, DC: AERA

examine the feedback provided and present recommendations to support a strong statewide summative assessment that examines the requirements of HB 3218 and seeks to maximize the efficiency of the Oklahoma assessment system in support of preparing students for college and careers.

2.1.8.6 ISSUES IN SUBSCORE REPORTING

Subscores serve as achievement reports on subsets of the full set of knowledge and skill represented by a total score. For example, many ELA summative assessments produce a total score for ELA, subscores for at least reading and writing, and often finer-grained subscores for topics such as informational and literary reading. Similarly, a mathematics test typically yields an overall mathematics score and potential subscores in topics such as numbers and operations, algebraic reasoning, measurement and geometry, and statistics and probability. One of the greatest challenges in current large-scale summative assessment design is to create tests that are no longer than necessary to produce a very reliable total score (e.g., grade 5 mathematics) while yielding adequately reliable subscores to help educators and others gain more instructionally-relevant information than could be gleaned from just the total score.

Unfortunately, there is a little-known aspect of educational measurement (outside of measurement professionals) that large-scale tests are generally designed to report scores on a “unidimensional” scale. This means the grade 5 mathematics test, for example, is designed to report overall mathematics performance, but not to tease out differences in performance on things like geometry or algebra because the only questions that survive the statistical review processes are those that relate strongly to the total score of overall mathematics. If the test was designed to include questions that better distinguish among potential subscores, the reliability (consistency) of the total score would be diminished. There are “multidimensional” procedures that can be employed to potentially produce reliable and valid subscores, but these are much more expensive and complicated to implement to ensure the comparability of these subscores and the total score across years. The National Assessment of Educational Progress (NAEP) is the one example of a well-known assessment designed to produce meaningful results at the subscore level, but NAEP has huge samples to work with and more financial resources and psychometric capacity at its disposal than any state assessment. In other words, it is not realistic at this time to consider moving away from a unidimensional framework for Oklahoma’s next statewide summative assessment, which means the subscores will unfortunately be much less reliable estimates of the total score than useful content-based reports. This is true for essentially all commercially-available interim assessments as well, so despite user reports they like assessment X or Y because it produces fine-grain subscores useful for instructional planning, any differences in subscores are likely due to error rather than anything educationally meaningful.

Despite this widely-held knowledge by measurement professionals, every state assessment designer knows they need to produce scores beyond the total score; otherwise, stakeholders would complain they are not getting enough from the assessment. Recall producing very reliable total scores is critical for

accountability uses of statewide assessments and, all things being equal, the reliability is related to the number of questions (or score points) on a test.

Therefore, most measurement experts recommend having at least 10 score points for each subscore to achieve at least some minimal level of reliability, so statewide summative tests tend to get longer to accommodate subscore reporting. Therefore, one way to lessen the time required on the statewide summative assessment is to focus the summative assessment on reporting the total score and use the optional modules for districts that would like more detailed and accurate information about particular aspects of the content domain.

Chapter 3 Test Design and Development

There were no changes in test design or development for the SY 2020–2021 administration of the OSTP and CCRA programs. The adherence to previous years' blueprints allows for defensible comparisons of where students are relative to grade-level expectations as outlined in the Oklahoma Academic Standards and in light of the COVID-related learning disruptions.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

3.1 GRADES 3–8—OSTP ELA ASSESSMENTS

3.1.1 Develop/Review/Approve Test Blueprints with DOK Percentages

All items on the OSTP ELA grades 3–8 tests were developed specifically for Oklahoma and are directly linked to the OAS. The standards are the basis for the reporting categories developed for each content area and were used to help guide the development of test items. Each item was designed to measure a specific standard and objective. The test blueprints were developed by the SDE, and test specifications were done in collaboration between Cognia and the SDE.

The test blueprints identify the amount of content covered on the tests and are based on the importance and coverage of the OAS in Oklahoma schools. The ideal test blueprints are provided by the SDE at their website: <https://sde.ok.gov/assessment-material> or see Appendix D.

The distribution of emphasis for the OSTP ELA grades 3–8 content standards is shown in Tables 3-1 through 3-3. As indicated in Tables 3-1 through 3-4 below, the actual and ideal distributions of content standards on each assessment match perfectly. The ideal number of items aligned to each standard can be found in Appendix D.

Table 3-1. Distribution of Emphasis in Terms of Target Percentage of Test by Grade Grades 3–5 OAS ELA Standards

Standard						
2: Reading and Writing Process	38-42%	38%	30-34%	32%	30-34%	31%
3: Critical Reading and Writing	12-18%	14%	18-22%	24%	22-26%	25%
4: Vocabulary	22-26%	22%	22-26%	24%	18-22%	20%
5: Language	12-18%	12%	12-18%	14%	12-18%	12%
6: Research	12-18%	14%	12-18%	14%	12-18%	12%
Total	100%	100%	100%	100%	100%	100%

Table 3-2. Distribution of Emphasis in Terms of Target Percentage of Test by Grade Grades 6–8 OAS ELA Standards

Standard						
2: Reading and Writing Process	34-38%	34%	34-38%	36%	24-30%	27%
3: Critical Reading and Writing	18-22%	22%	18-22%	22%	24-30%	29%
4: Vocabulary	18-22%	20%	14-20%	14%	14-20%	16%
5: Language	12-18%	12%	12-18%	12%	12-18%	14%
6: Research	12-18%	12%	12-18%	16%	12-18%	14%
Total	100%	100%	100%	100%	100%	100%

Each item on the OSTP ELA grades 3–8 tests was assigned a Depth of Knowledge (DOK) level according to the cognitive demand of the item. DOK is not synonymous with difficulty. The DOK level rates the complexity of the mental processing a student must use to answer the question. Items at each DOK level can be found in the Test and Item Specifications here: <https://sde.ok.gov/assessment-material>.

DOK 1—RECALL: requires students to recall, observe, question, or represent facts or simple skills or abilities. It requires only surface understanding of text, often verbatim recall. Level 1 activities include supporting ideas by reference to details in the text; using a dictionary to find meaning; identifying figurative language in a passage; and identifying the correct spelling or meaning of words.

DOK 2—SKILL/CONCEPT: requires processing beyond recall and observation; requires both the comprehension and subsequent processing of text; and involves ordering and classifying text, as well as identifying patterns, relationships, and main points. Level 2 activities include using context to identify unfamiliar words; predicting logical outcomes; identifying and summarizing main points; applying knowledge of conventions of Standard American English; composing accurate summaries; and making general inferences and predictions for a portion of a text.

DOK 3—STRATEGIC THINKING: requires students to go beyond the text; requires students to explain, generalize, and connect ideas; involves inferencing, predicting, elaborating, and summarizing; and requires students to support positions using prior knowledge and to manipulate themes across passages. Level 3 activities include determining the effect of the author’s purpose on text elements; summarizing information from multiple sources; critically analyzing literature; composing focused, organized, coherent, and purposeful prose; and making explanatory and descriptive inferences and interpretations across an entire passage.

Tables 3-3 and 3-4 show that for each DOK level, the actual percentages of items on the test fell within the recommended range for each grade level.

Table 3-3. ELA DOK Levels by Grade—Form A

Grade						
3	15-30%	18%	65-80%	72%	5-10%	10%
4	10-20%	16%	65-75%	70%	5-15%	14%
5	5-15%	14%	70-85%	72%	5-20%	14%
6	5-15%	14%	70-85%	74%	5-20%	12%
7	5-15%	12%	70-85%	72%	5-20%	16%
8	5-10%	16%	60-75%	64%	20-30%	20%

Table 3-4. ELA DOK Levels by Grade—Breach Form

Grade						
3	15-30%	18%	65-80%	70%	5-10%	12%
4	10-20%	16%	65-75%	68%	5-15%	16%
5	5-15%	18%	70-85%	70%	5-20%	12%
6	5-15%	10%	70-85%	80%	5-20%	10%
7	5-15%	8%	70-85%	74%	5-20%	18%
8	5-10%	10%	60-75%	66%	20-30%	24%

3.1.2 Test and Item Specification Development

Multiple-choice items that were developed for administration in grades 3–8 in ELA require approximately one minute for most students to answer. This item type affords efficient use of limited testing time and allows coverage of a wide range of knowledge and skills. At grades 5 and 8, the writing portion of the ELA tests included extended responses that were associated with passages. Responses were scored with rubrics that assessed ideas and development; organization, unity, and coherence; word choice; sentences and paragraphs; and grammar, usage, and mechanics. Previous test items released for public use are provided by the SDE at <http://sde.ok.gov/sde/assessment-material>.

The test framework for grades 3–8 in ELA was based on the OAS, and each item was designed to measure a specific standard and objective. The measure of Oklahoma students' level of proficiency responding to a variety of items linked to grade-level ELA content standards are identified in the OAS. The OAS are organized into five content standards, as shown in Table 3-5.

Table 3-5. OAS ELA Content Standards

Grades 3–8
Standard 2 Reading and Writing Process
Standard 3 Critical Reading and Writing
Standard 4 Vocabulary
Standard 5 Language
Standard 6 Research

3.1.3 Passage Development

Grade-level passages contain identifiable key concepts with relevant supporting details. Each passage is appropriate for determining the purpose for reading, such as analyzing character traits; comparing and contrasting; problem and solution; interpreting; application; analyzing; synthesizing; drawing conclusions; making an inference; being conducive for vocabulary analogies; and other relevant reading tasks as defined by the OAS for the specific grade level.

The passages have a variety of sentence types and lengths. They include dialogue, reflect Oklahoma's cultural diversity, and possess sufficient structural integrity to allow the passages to be self-contained.

Passages reflect a balance of genres from literary to expository texts, as shown in Table 3-6. The majority of passages selected for the ELA test include authentic literature; a minor portion have been selected from commissioned works. Passages have been reviewed by both SDE and Cognia not only for content, but also to eliminate cultural or other forms of bias that might disadvantage any group(s) of students. Further, passages were reviewed by teacher committees who had received bias and sensitivity training. The passages avoid subject matter that might prompt emotional distress. Permissions to use selections from copyrighted material were obtained as necessary.

The readability level of all passages was evaluated using recognized readability formulas. The formulas chosen for each grade vary according to the purpose for which the formula was developed. Appropriate readability formulas for all ELA passages include the Flesch-Kincaid Rating, the Dale-Chall Readability Formula, and other formulas considered reliable.

In addition, sentence structure, length, vocabulary, content, visuals, and organization were reviewed when selecting appropriate grade-level passages during the 2016–17 administration. The teacher panel that reviewed the passages provided the final evaluation used to decide on the readability of a passage.

The vocabulary words tested in OSTP come directly from the passage content. Words used for vocabulary items have sufficient surrounding context clues for the reader to determine the meaning. Students may encounter words in the text that are not tested but are above the student's grade placement. In grades 3–5, these challenging words and their definitions may appear in a word box above the story or article. In grades 6–8, the definitions of challenging words may appear in footnotes.

No single source is available to determine the reading level of various words. Therefore, the appropriateness and difficulty of a word is determined in different ways. Vocabulary words were checked in the following sources: *EDL Core Vocabularies in Reading, Mathematics, Science, and Social Studies* (Taylor, 1989); *Basic Reading Vocabularies* (Harris & Jacobson, 1982); or other reliable readability sources. In addition to using these resources to assist in creating vocabulary items, each vocabulary item was approved by Oklahoma's Content Review Committee. The committee, composed of Oklahoma educators from across the state, reviewed proposed vocabulary items for grade-level appropriateness. ELA tests have vocabulary at grade level; in all other tests, the vocabulary level is below the grade being tested, except for content words. Grades 3 and 4 are one grade level below, and grades 5, 6, 7, and 8, are two grade levels below.

New passages were developed for 2020–2021 ELA administration. Grades 3–4 each had a single narrative and informational passage. Grade 5 had a single narrative and an informational pair. Grade 6 had a single narrative and a single informational passage. Grades 7 and 8 each had a narrative pair and an informational pair. Where necessary, the passages used to assess Standard 5 (Language) were selected from commissioned works developed specifically for that standard. Otherwise, Standard 5 items were written to the same passages as the other standards. All the passages assessing Standards 2 (Reading and Writing Process), 3 (Critical Reading and Writing), 4 (Vocabulary), and 6 (Research) were individually selected to eliminate cultural or other forms of bias that might disadvantage any group(s) of students.

Table 3-6. Grades 3–8 and Passage Types

Grades		
3–5	contemporary realistic fiction, historical fiction, modern fantasy, poetry, drama, and traditional stories (legends, myths, fairy tales, and fables)	informational, biography, autobiographies, and functional text
6–7	short story, novel excerpt, drama, poetry, fable, folk tale, mystery, and myth	informational, biography, autobiographies, and functional text
8	short story, novel excerpt, drama, lyric poetry, historical fiction, fable, folk tale, mystery, myth, limericks, tall tales, and plays	informational, biography, autobiographies, and functional text

3.1.4 Item Development

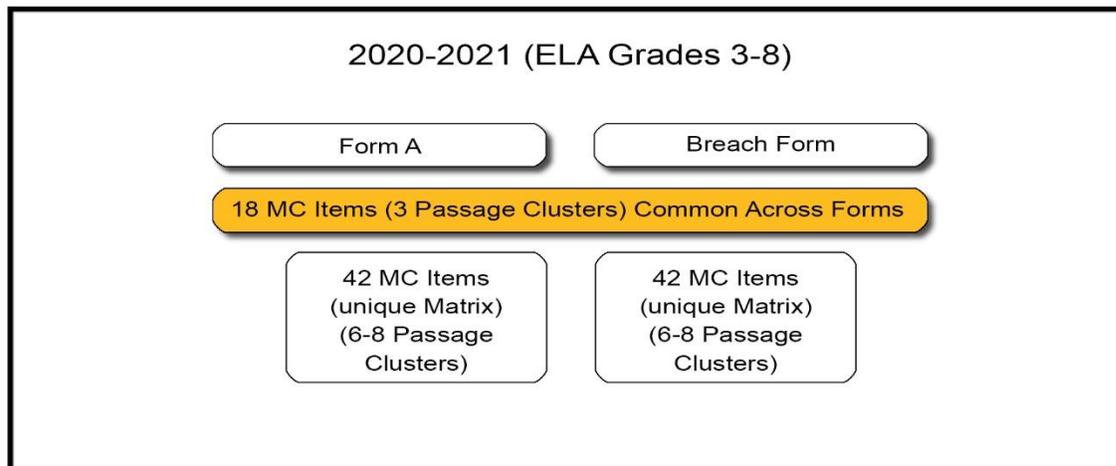
In preparation for the 2018–19 administration for ELA OSTP 2017–18, a gap analysis of the existing Oklahoma item bank was conducted. The purpose of this analysis was to identify any deficits for particular standards and objectives, and item counts were determined to address those deficits during development. An ELA Item Writing Workshop was held in spring 2018. Oklahoma teachers wrote constructed response items to assess writing in grades 3, 4, 6, and 7. The teacher workshops were held in Oklahoma with a committee of teachers for each grade. Committee members were tasked with writing constructed response items that could be field tested and used operationally during the contract term. Additional multiple choice items were developed by Cognia for field testing in spring 2018.

3.1.5 Spring 2021 Test Design and Development

The 2020–21 OSTP ELA tests were structured using both operational items (designated to contribute to the student’s score) and embedded field-test items (not designated to contribute to the student’s score), as noted in figure 3-1. Operational items were taken by all students in a given grade level. Across the operational and breach forms that were constructed, there were common linking items that both forms shared, and unique items associated with each particular form. Student scores were based only on operational items. Breach forms were a reuse of spring 2020 forms.

In the 2020–21 administration, each form included 60 items: 50 items contributed to the student’s score and 10 were field-test items (did not contribute to the student’s score). Eighteen items were common across both operational and breach forms, and 42 of the 60 items were unique to each form. Figure 3-1 below illustrates the ELA test designs for grades 3–8.

Figure 3-1. ELA Grades 3–8 Test Design



The student experience for the 2020–21 OSTP ELA tests for grades 3–8 is shown in Tables 3-7 through 3-9. In grades 3–8, all students experienced 60 items addressing either single or paired passages. Students in grades 5 and 8 experienced 60 multiple choice items and also experienced a writing prompt addressed to a paired passage. Students in grades 3, 4, 6, and 7 experienced 56 multiple choice items and four constructed response items.

Table 3-7. ELA Grades 3–8 Student Test Experience: Operational Items Across Forms

Grades	Writing Prompt		Multiple-Choice		Constructed Response		Total	Total
	Single	Paired	Single	Paired	Single	Paired		
3-4	0	0	48	48	2	4	50	52
5	1	4	50	50	0	0	51	54
6-7	0	0	48	48	2	4	50	52
8	1	4	50	50	0	0	51	54

WP = Writing Prompt, MC = Multiple-Choice, CR = Constructed Response

Table 3-8. ELA Grades 3–8 Student Test Experience: Field-Test Items Across Forms

Grades	Writing Prompt		Multiple-Choice		Constructed Response		Total	Total
	Single	Paired	Single	Paired	Single	Paired		
3-4	0	0	8	8	2	4	10	12
5	0	0	10	10	0	0	10	10
6-7	0	0	8	8	2	4	10	12
8	0	0	10	10	0	0	10	10

WP = Writing Prompt, MC = Multiple-Choice, CR = Constructed Response

Table 3-9. ELA Grades 3–8 Student Test Experience: Combined Operational and Field-Test Items Across Forms

Grades								
3–4	0	0	58	58	2	4	60	62
5	1	4	60	60	0	0	61	64
6–7	0	0	58	58	2	4	60	62
8	1	4	60	60	0	0	61	64

WP = Writing Prompt, MC = Multiple-Choice, CR = Constructed Response

3.1.6 Writing (Grades 5 and 8)

Student essays in grades 5 and 8 were assessed according to a holistic writing rubric on a 1–4 scale, with 4 as the highest possible score. All student responses were scored using grade-specific rubrics which assessed idea development, organization (including unity and coherence), word choice, sentence structure and grammar, usage, and mechanics. Students were asked to demonstrate these skills by integrating them in producing a unified essay. The final score represents the overall writing performance to a mode-specific prompt and its associated passages; students were expected to address the task appropriately and incorporate ideas from the passages to connect with the audience. To help guide students, a reference sheet that contained a writer’s checklist was made available. Previous test items released for public use are provided by the SCS at <http://sde.ok.gov/sde/assessment-material>.

3.1.7 Reading Sufficiency Act (RSA)

The purpose of the Reading Sufficiency Act (RSA) is to ensure that all Oklahoma students are reading at grade level at the end of third grade (a critical juncture that occurs when students go from learning to read to reading to learn). As part of meeting the requirements of the RSA, student performance on a subset of 32 items on the OSTP ELA will be used as one of the criteria to determine student readiness to be promoted to the fourth grade. These 32 items measure ELA Standard 2: Reading and Writing Process and Standard 4: Vocabulary. Separate performance level descriptors (PLDs—see Appendix E) were developed to support standard setting and score reporting for RSA requirements as follows:

- **Meets RSA Criteria**—Third grade students meeting the RSA criteria are performing at grade level on the reading portion of the OSTP Grade 3 English language arts assessment.
- **Does Not Meet RSA Criteria**—Third grade students not meeting the RSA criteria are not performing at grade level on the reading portion of the OSTP Grade 3 English language arts assessment.

3.1.8 Data Review

A conference call/WebEx between the SDE and Cognia was conducted to review the content of spring 2021 ELA field-test items that were flagged due to psychometric criteria. Table 3-10 shows the criteria used for reviewing the flagged items.

Table 3-10. ELA Flagged Item Criteria

Statistic		
Item Difficulty (p-value)	Below 0.2 may be too difficult; Above 0.9 may be too easy	Below 0.2 may be too difficult; Above 0.9 may be too easy
Item Discrimination (corrwtotal)	Generally, 0.20 or higher is desired; Must be >0.10; Negative or zero values should not be used. For values between 0.10 and 0.20, difference between corrwtotal and any distractor option correlation value must be \geq 0.09	Must be \geq 0.40
Differential Item Functioning (DIF)	Values +/-C are serious DIF that must be looked at closely; +/-B values indicate moderate DIF that may warrant inspection	Values +/-C are serious DIF that must be looked at closely; +/-B values indicate moderate DIF that may warrant inspection

Statistics for flagged field-test items were reviewed by considering item difficulty (p -value), item discrimination (corrwtotal), and differential item functioning (DIF). (Section 3.1.9 drills down into the DIF statistical testing.) Decisions were made whether flagged items should be included in the Oklahoma item bank for future operational use. Results of the Data Review meeting are presented in Table 3-11. A total of 65 ELA items were flagged for review due to psychometric criteria with 57% of the flagged items being accepted for operational use in spring 2022 and beyond.

Table 3-11. ELA Data Review Results for 2020–2021

Grade				
3	4	4	2	10
4	7	5	3	15
5	3	0	3	6
6	6	0	4	10
7	10	2	2	14
8	7	2	1	10
Total	37	13	15	65

3.1.9 Differential Item Functioning

Following the classical item analyses, differential item functioning (DIF) analyses were performed. One goal of test development is to assemble a set of items that provides an estimate of student ability that is as fair and accurate as possible for all groups within the population. DIF statistics are used to identify items in which focal groups (e.g., Females, African Americans, Hispanics) of students with the same underlying level of ability have different probabilities than those of reference groups (e.g., Males, Whites) of answering correctly. If the item is more difficult or easier for an identifiable focal subgroup, the item may be measuring something different from the intended construct.

For the 2020–21 OSTP and CCRA, 10 demographic subgroup comparisons were evaluated for DIF:

- Male versus female
- White versus Hispanic or Latino
- White versus Black/African American
- White versus American Indian/Alaskan Native
- White versus Pacific Islander
- White versus two or more races
- Non-EL versus EL(English Learner)
- Non-IEP versus IEP (Individualized Education Program)
- Non-Economically Disadvantaged versus Economically Disadvantaged

Cognia uses two DIF detection methods: the Mantel-Haenszel method for dichotomously scored items (Dorans & Holland, 1993) and the standardization method for polytomously scored items (Dorans & Kulick, 1986). For dichotomously scored items, as part of the Mantel-Haenszel procedure, the statistic described by Holland & Thayer (1988), known as MH D-DIF, is used.

The MH D-DIF statistic is expressed as the difference between the focal and reference group performance on an item after conditioning on total test score. Negative MH D-DIF statistics favor the reference group, and positive values favor the focal group. The classification logic used for flagging items is based on a combination of absolute differences and significance testing. Items that are not significantly different based on the MH D-DIF ($p \geq 0.05$) are considered to have similar performance between the two studied groups and to be functioning appropriately. For items for which the statistical test indicates significant differences ($p < 0.05$), the effect size is used to determine the direction and severity of the DIF. Based on this DIF statistic, items are classified into one of three categories:

- Category A items contain negligible DIF,
- Category B items exhibit slight or moderate DIF, and
- Category C items have moderate to large DIF.

Negative values imply that, conditional on the matching variable, the focal group has a lower mean item score than that of the reference group. In contrast, a positive value implies that, conditional on the matching variable, the reference group has a lower mean item score than that of the focal group.

For polytomously scored items, the standardization procedure (Dorans & Kulick, 1986) is used in conjunction with the Mantel chi-square statistic. In the standardization method, the matching variable is the total score on all items; the differences in the item score between the two comparison groups are calculated for each item. The standardized mean difference for the item is the weighted average of these differences, where the relative frequency of the focal group at each score point serves as the weighting function. Analogous flagging rules were developed to classify the polytomously scored items into A, B, or C DIF categories. The flagging criteria for polytomously scored items are listed below. Positive values favor the focal group and negative values favor the reference group.

- The item is classified as negligible DIF (A), if the Mantel Chi-square p -value ≥ 0.05 ; or the Mantel Chi-square p -value < 0.05 , and the Standardized Mean Difference $|SMD/SD| \leq 0.05$.
- The item is classified as moderate DIF (B), if the Mantel Chi-square p -value < 0.05 , and $|SMD/SD|$ is between 0.05 and 0.1.
- The item is classified as severe DIF (C), if the Mantel Chi-square p -value < 0.05 , and $|SMD/SD| > 0.1$.

It is important to recognize that DIF-flagged items might be related to actual differences in relevant knowledge or skill (item impact) or to statistical Type I error. Therefore, DIF results are included during data reviews by SDE and Cognia content experts to investigate the source and meaning of evidence differences.

3.2 GRADES 3–8—OSTP MATHEMATICS ASSESSMENTS

3.2.1 Develop/Review/Approve Test Blueprints with DOK Percentages

Items on the OSTP mathematics assessments for grades 3–8 were developed specifically for Oklahoma and are directly linked to the OAS. The standards are the basis for the reporting categories developed for each content area and are used to help guide the development of test items. Each item is designed to measure a specific standard and objective. The test blueprints were developed by the SDE, and test specifications were done in collaboration between Cognia and the SDE.

The test blueprints identify the amount of content covered on the tests and are based on the importance and coverage of the OAS in Oklahoma schools. The ideal test blueprints are provided by the SDE at their website: <https://sde.ok.gov/assessment-material> or see Appendix D.

The distribution of emphasis for the OSTP grades 3–8 mathematics content standards is shown in Tables 3-12 and 3-13. As indicated in the tables below, the actual and ideal distributions of content standards on each assessment match perfectly. The ideal number of items aligned to each standard can be found in Appendix D.



Table 3-12. Distribution of Emphasis in Terms of Target Percentage of Test by Grade Grades 3–5 OAS Mathematics Standards

Standard						
Number and Operations	44-48%	46%	42-46%	44%	44-48%	46%
Algebraic Reasoning	12-16%	14%	14-18%	16%	16-20%	18%
Geometry and Measurement	26-30%	28%	26-30%	28%	22-26%	24%
Data and Probability	12-16%	12%	12-16%	12%	12-16%	12%
Total	100%	100%	100%	100%	100%	100%

Table 3-13. Distribution of Emphasis in Terms of Target Percentage of Test by Grade Grades 6–8 OAS Mathematics Standards

Standard						
Number and Operations	38-40%	40%	18-22%	18%	16-18%	18%
Algebraic Reasoning	20-24%	22%	28-32%	30%	44-48%	46%
Geometry and Measurement	22-26%	24%	28-32%	30%	18-22%	20%
Data and Probability	12-16%	14%	18-22%	22%	14-18%	16%
Total	100%	100%	100%	100%	100%	100%

Each item on the OSTP grades 3–8 mathematics tests was assigned a DOK level according to the cognitive demand of the item. DOK ranges are based on the DOK of the OAS. As discussed earlier, DOK is not synonymous with difficulty. Instead, the DOK level rates the complexity of the mental processing a student must use to answer the question. The standards increase grade-level expectations and rigor and set expectations for students to be college- and career-ready. Items at each DOK level can be found in the Test and Item Specifications here: <https://sde.ok.gov/assessment-material>.

DOK 1 RECALL AND REPRODUCTION: requires the student to recall facts, terms, definitions, or simple procedures, and to perform simple algorithms or apply formulas. One-step, well-defined, or straight algorithmic procedures should be included at this level.

DOK 2 SKILLS AND CONCEPTS: requires the student to make some decisions as to how to approach the problem or activity. Level 2 activities include making observations and collecting data; classifying, comparing, and organizing data; and organizing and displaying data in tables, charts, and graphs.

DOK 3 STRATEGIC THINKING: requires reasoning, planning, using evidence, and a higher level of thinking. Level 3 activities include making conjectures, drawing conclusions from observations, citing evidence, and developing a logical argument for concepts, explaining phenomena in terms of concepts, and using concepts to solve nonroutine problems.

At each grade level, the actual percentage of items at each DOK level fell within the recommended range except for three instances, as shown below in Table 3-14 and 3-15.

Table 3-14. Mathematics DOK Levels by Grade—Form A

Grade						
3	40–50%	44%	45–55%	46%	5–10%	10%
4	25–35%	32%	60–70%	60%	5–15%	8%
5	20–30%	22%	65–75%	68%	5–15%	10%
6	15–25%	24%	65–75%	66%	10–20%	10%
7	15–25%	22%	65–75%	66%	10–20%	12%
8	10–20%	18%	65–75%	66%	15–25%	16%

Table 3-15. Mathematics DOK Levels by Grade—Breach

Grade						
3	40–50%	42%	45–55%	50%	5–10%	8%
4	25–35%	34%	60–70%	60%	5–15%	6%
5	20–30%	21%	65–75%	66%	5–15%	13%
6	15–25%	26%	65–75%	64%	10–20%	10%
7	15–25%	26%	65–75%	63%	10–20%	11%
8	10–20%	13%	65–75%	76%	15–25%	11%

3.2.2 Test and Item Specification Development

Multiple-choice items were administered in grades 3–8 mathematics assessments. Multiple-choice items require students to demonstrate a wide range of knowledge and skill. Each item requires approximately one minute for most students to answer. This item type affords efficient use of limited testing time and allows coverage of a wide range of knowledge and skills. In addition, technology-enhanced items (TEIs) were developed for grades 3–8. TEIs are used to address some aspects of the OAS performance expectations more authentically and/or to provide more opportunity for students to construct rather than select their response.

Interaction types are: match, hot-spot, drag-and-drop, and drop-down. Each TEI contains only one interaction type per item. Examples of test items released for public use are provided by the SDE in the Test and Item Specifications (see <https://sde.ok.gov/assessment-material>).

The test framework for mathematics at grades 3–8 was based on the OAS. Each item on the grades 3–8 OSTP tests was designed to measure a specific standard and objective. The measure of Oklahoma students’ level of proficiency in responding to a variety of items linked to grade-level mathematics content standards are identified in the OAS. The mathematics objectives are organized into four content strands:

- Number and Operations
- Algebraic Reasoning and Algebra
- Geometry and Measurement
- Data and Probability

3.2.3 Item Development

New items were developed for this administration. In preparation for the 2020–21 administration for mathematics OSTP 2020–21, a gap analysis of the existing Oklahoma item bank was conducted to identify any deficits for particular standards and objectives and to determine item counts to address those deficits during development.

3.2.4 Spring 2021 Test Design and Development

The OSTP mathematics tests were structured using both operational items (designated to contribute to a student’s score) and embedded field-test items (not designated to contribute to the student’s score).

Operational items were taken by all students in a given grade level. Across the operational and breach forms that were constructed, there were common linking items that both forms shared and unique items associated with each particular form. Student scores were based only on operational items. Operational items and field- test items were not distinguishable to students.

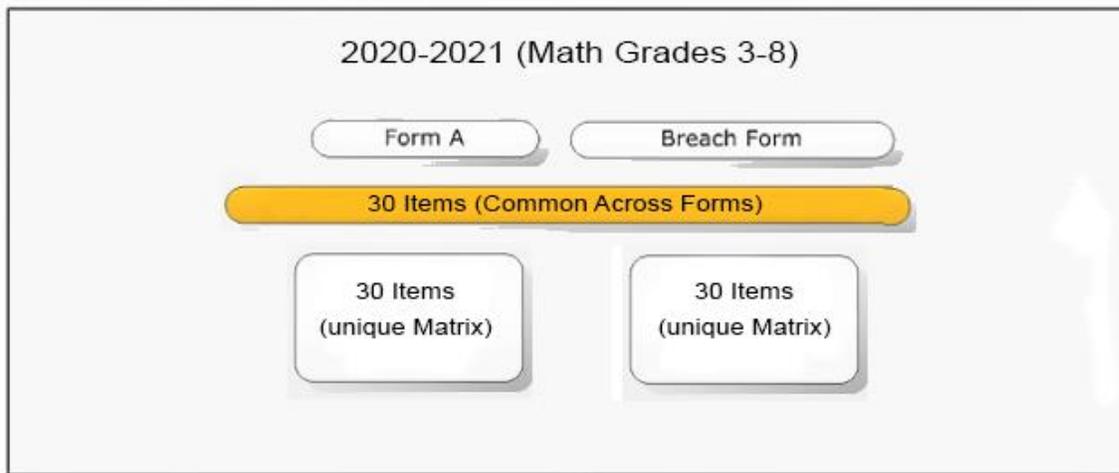
In the 2020–21 administration, each form included 60 items: 50 items contributed to the student’s score and 10 did not contribute to the student’s score, as they were field-test items. Breach forms were a reuse of spring 2020 forms. The 2020–21 test design for mathematics grades 3–8 is shown in Figure 3-2.

The percentages of common linking items for the 2020–21 OSTP mathematics tests for grades 3–8 are shown in Table 3-16.

Table 3-16. Percentage of Common Linking Items across Operational and Breach Forms

Content		
Mathematics	3	38%
	4	42%
	5	40%
	6	58%
	7	38%
	8	44%

Figure 3-2. Mathematics Grades 3–8 Test Design



The student experience for the 2020–21 OSTP mathematics tests for grades 3–8 is shown in Tables 3-17 through 3-19. In grade 3, all students experienced 60 multiple-choice items, with 30 multiple-choice items common to all forms and 30 unique items to each form. In grades 4-5, all students experience 59 multiple-choice items and 1 technology-enhanced items. In grades 6–8, all students experience 56 multiple-choice items and 4 technology-enhanced items. Thirty multiple-choice items were common to both forms, and 30 were unique to each form.

Table 3-17. Mathematics Grades 3-8 Student Test Experience - Operational

Grades						
3–5	50	50	0	0	50	50
6–8	47	47	3	3	50	50

MC = Multiple Choice, TEI = Technology-Enhanced Item, PE = Paper Equivalent

Table 3-18. Mathematics Grades 3-8 Student Test Experience – Field Test

Grades						
3	10	10	0	0	10	10
4-5	9	9	1	1	10	10
6-8	9	9	1	1	10	10

MC = Multiple Choice, TEI = Technology-Enhanced Item, PE = Paper Equivalent

Table 3-19. Mathematics Grades 3-8 Student Test Experience - Combined

Grades						
3	60	60	0	0	60	60
4-5	59	59	1	1	60	60
6-8	56	56	4	4	60	60

MC = Multiple Choice, TEI = Technology-Enhanced Item, PE = Paper Equivalent

3.2.5 Data Review

A conference call/WebEx between the SDE and Cognia was conducted to review the content of spring 2021 mathematics field-test items that were flagged due to psychometric criteria. Table 3-20 shows the criteria used for reviewing the flagged items.

Table 3-20. Mathematics Flagged Item Criteria

Statistic		
Item Difficulty (p-value)	Below 0.2 may be too difficult; Above 0.9 may be too easy	Below 0.2 may be too difficult; Above 0.9 may be too easy
Item Discrimination (corrwtot)	Generally, 0.20 or higher is desired; Must be >0.10 ; Negative or zero values should not be used. For values between 0.10 and 0.20, difference between corrwtot and any distractor option correlation value must be ≥ 0.09	Must be ≥ 0.40
Differential Item Functioning (DIF)	Values +/-C are serious DIF that must be looked at closely; +/-B values indicate moderate DIF that may warrant inspection	Values +/-C are serious DIF that must be looked at closely; +/-B values indicate moderate DIF that may warrant inspection

Statistics for flagged field-test items were reviewed by considering item difficulty (p -value), item discrimination (corrwtot), and DIF. Decisions were made whether flagged items should or should not be included in the Oklahoma item bank for future operational use. Results of the Data Review meeting are

presented in Table 3-21. A total of 43 mathematics items were flagged for review due to psychometric criteria, with 40% of the flagged items being accepted for operational use in spring 2022 and beyond.

Table 3-21. Mathematics Data Review Results

Grade				
3	2	1	2	5
4	0	2	1	3
5	4	3	5	12
6	6	3	3	12
7	3	1	3	7
8	2	3	1	6
Total	17	11	15	43

3.2.6 Use of Calculators and Reference Sheets

Approved calculators were allowed on the OSTP grades 6–8 mathematics assessments. Reference sheets were provided to students during the test. For approved calculators, see the calculator policy posted on the SDE website: https://sde.ok.gov/sites/default/files/documents/files/FINAL_Calculator%20Policy%202017-2018_Updated%202020.pdf

3.3 GRADES 5 AND 8—OSTP SCIENCE ASSESSMENTS

3.3.1 Develop/Review/Approve Test Blueprints with DOK Percentages

Items on the science OSTP grades 5 and 8 tests were developed specifically for Oklahoma and are directly linked to the Oklahoma Academic Standards for Science (OAS-Science). The standards are the basis for the reporting categories developed for each grade and are used to help guide the development of test items. Each item is designed to measure a specific Performance Expectation in the OAS-Science. The test blueprints were developed in collaboration with Cognia and the SDE. The test blueprints identify the amount of content covered on the tests and are based on the importance and coverage of the OAS-Science in Oklahoma schools. The ideal test blueprints are provided by the SDE on its website. For grades 5 and 8 science, see the following: <https://sde.ok.gov/assessment-material>; (these test blueprints can also be found in Appendix D).

The distribution of emphasis for the OSTP grades 5 and 8 assessable performance expectations is shown in Table 3-22. The actual and ideal distributions of performance expectations on each assessment match reasonably.

Table 3-22. Distribution of Emphasis in Terms of Target Percentage of Test by Grade Grades 5 and 8 OAS-Science Standards

Standard				
Physical Sciences	27-33%	33%	33-40%	33%
Life Sciences	27-33%	27%	21-27%	27%
Earth and Space Sciences	33-40%	40%	40-46%	40%
Total	100%	100%	100%	100%

3.3.2 Item Development

The OSTP science tests consist of clusters of items. A cluster is a set of items linked to a common stimulus. No new MC clusters were developed for grade 5. Eight new MC clusters were developed for grade 8, with two additional TEI clusters for grade 8 for field testing within the spring 2021 operational test forms. Three additional clusters were developed for the TIS. In preparation for the 2020–21 administration for OSTP science, a gap analysis of the existing Oklahoma item bank was conducted to identify deficits for particular standards, and item counts were determined to address those deficits during development.

3.3.3 Spring 2020 Test Design and Development

The OSTP science tests were structured using both operational and embedded field-test items. The items used on the OSTP grades 5 and 8 science tests were written as clusters of items aligned to the performance expectations of the 2014 OAS-S that were determined to be assessable on the state summative assessment.⁹ (For reference, the full OAS-S can also be found at [sde.ok.gov/sde/sites/ok.gov.sde/files/OAS Science Standards 3-2-15.pdf](https://sde.ok.gov/sde/sites/ok.gov.sde/files/OAS_Science_Standards_3-2-15.pdf)).

Operational items (or equivalent items in the paper form or in technology-enhanced items in the online form for grade 8 science) were taken by all students in a given grade level. One operational form and one breach form were constructed. Across the operational and breach forms, approximately 50% of the items were common linking items; the rest of each form contained unique items. There were a total of 15 operational clusters (45 operational items) on each form.

Field-test items for a range of performance expectations were tested to continue building an item bank that will support an appropriate sampling of the assessable performance expectations of the OAS-S each year. Field-test items were embedded in each form. One online form was administered for grades 5 and 8, with a paper/pencil form as an accommodation. Each form contained three field-test clusters (nine

⁹ For test blueprints for Science grades 5 and 8, see Appendix D. For both test blueprints and item specifications for grade 5, see https://sde.ok.gov/sites/default/files/documents/files/OSTP_2018-19_TIS_Sci_G5_web.pdf and grade 8 see https://sde.ok.gov/sites/default/files/documents/files/OSTP_2018-19_TIS_Sci_G8_web.pdf.

field-test items in total). Field-test items were not distinguishable to students. Student scores were based only on the operational items. Breach forms were a reuse of spring 2020 forms.

The student experience for the 2020–21 OSTP science tests for grades 5 and 8 is shown in Tables 3-23 through 3-25 below.

Table 3-23. Science Clusters in Core

Grade	MC		TEI		PMC		Total
	Count	Percentage	Count	Percentage	Count	Percentage	
5	15	45	45	0	0	45	45
8	15	42	42	3	6	45	48

MC = Multiple Choice, TEI = Technology-Enhanced Item, PMC = Paired Multiple Choice

Table 3-24. Science Clusters to Field Test

Grade	MC		TEI		PMC		Total
	Count	Percentage	Count	Percentage	Count	Percentage	
5	3	9	9	0	0	9	10
8	3	8	8	1	2	9	10

MC = Multiple Choice, TEI = Technology-Enhanced Item, PMC = Paired Multiple Choice

Table 3-25. Science Clusters in Combined Test

Grade	MC		TEI		PMC		Total
	Count	Percentage	Count	Percentage	Count	Percentage	
5	18	54	54	0	0	54	55
8	18	50	50	4	8	54	58

MC = Multiple Choice, TEI = Technology-Enhanced Item, PMC = Paired Multiple Choice

3.3.4 Data Review

A conference call/WebEx between the SDE and Cognia was conducted to review the content of spring 2021 grades 5 and 8 science field-test items that were flagged due to psychometric criteria. This included items that were flagged in the previous administration and were being tracked to see how they performed during the 2020–21 administration. Table 3-26 shows the criteria used for reviewing the flagged items.

Table 3-26. Science Flagged Item Criteria

Statistic		
Item Difficulty (p-value)	Below 0.2 may be too difficult; Above 0.9 may be too easy	Below 0.2 may be too difficult; Above 0.9 may be too easy
Item Discrimination (corrwtotl)	Generally, 0.20 or higher is desired; Must be >0.10; Negative or zero values should not be used. For values between 0.10 and 0.20, difference between corrwtotl and any distractor option correlation value must be ≥ 0.09	Must be ≥ 0.40
Differential Item Functioning (DIF)	Values +/-C are serious DIF that must be looked at closely; +/-B values indicate moderate DIF that may warrant inspection	Values +/-C are serious DIF that must be looked at closely; +/-B values indicate moderate DIF that may warrant inspection

Statistics for flagged field-test items were reviewed by considering item difficulty (p -value), item discrimination (corrwtotl), and DIF. Decisions were made whether flagged items should or should not be included in the Oklahoma item bank for future operational use. Results of the Data Review meeting are presented in Table 3-27. There was a total of 39 grade 5 and 8 science field test items flagged for review due to psychometric criteria. Twenty-three percent of the flagged field test items were accepted for future operational use.

Table 3-27. Science Data Review Results for 2020-21

Grade			
5	5	17	22
8	4	13	17
Total	9	30	39

3.3.5 OSTP Standards

The test frameworks for science at grades 5 and 8 are based on the OAS-S. Items are developed within clusters, and each cluster/item is designed to measure a specific performance expectation in the OAS-S. The grades 5 and 8 science performance expectations are organized across three content domains; physical sciences (PS), life sciences (LS), and Earth and space sciences (ESS).

3.3.6 Item Types

The grade 5 science test consists of clusters with multiple-choice items. The use of multiple-choice items affords efficient use of limited testing time. The grade 8 test also consists of clusters of items. A cluster, for the grade 8 test, is either a set of three multiple-choice items linked with a common stimulus or a set of two multiple-choice items and a technology-enhanced item linked with a common stimulus. On the accommodated paper form for grade 8, the technology-enhanced items are replaced by paired multiple-choice items.

All items are arranged in item clusters; no items are presented as stand-alone items. Presenting the items in item clusters allows for better alignment to the breadth and depth of the performance expectations in the OAS-S. Examples of test items for public use are provided by the SDE within the test and item specifications and can be found at sde.ok.gov/sde/assessment-material.

3.3.7 Test Design

The items used on the OSTP grades 5 and 8 science tests were written as clusters of items aligned to the performance expectations of the 2014 OAS-S that were determined to be assessable on the state summative assessment¹⁰ (for reference, the full OAS-S can also be found at https://sde.ok.gov/sites/ok.gov.sde/files/OAS_Science_Standards_3-2-15.pdf).

Field-test items for a range of performance expectations were tested to continue building an item bank that will support an appropriate sampling of the assessable performance expectations of the OAS-S each year. At both grade 5 and 8, three field-test clusters (nine items in total) appear per form.

3.3.8 Cognitive Complexity

The OSTP Science Assessment will have items within a cluster structured to assess a range of skills and knowledge applications within a standard. Clusters require sense-making and problem solving using the three dimensions. Sense-making happens when students must apply, via the science and engineering practices, their understanding of core ideas and crosscutting concepts to address the uncertainty associated with a scenario. The degree of sense-making required to complete an item is directly correlated to the level of cognitive complexity the student must engage with, as described in table 3-28.

Table 3-28. OSTP Levels of Cognitive Complexity

Category	
Scripted (S)	<input type="checkbox"/> Only one dimension. Or one dimension is foregrounded, one is backgrounded, and one is not present
	<input type="checkbox"/> Heavy scaffolding
	<input type="checkbox"/> Little to no sense-making
Low Guided (LG)	<input type="checkbox"/> Multidimensional but only one is heavily foregrounded
	<input type="checkbox"/> Moderate scaffolding
	<input type="checkbox"/> Low degree of sense-making
High Guided (HG)	<input type="checkbox"/> Multidimensional with at least two being used (foregrounded) equally
	<input type="checkbox"/> Minimal scaffolding
	<input type="checkbox"/> High degree of sense-making
Doing (D)	<input type="checkbox"/> The three dimensions are foregrounded
	<input type="checkbox"/> Student-designed exploration of science
	<input type="checkbox"/> Limited to no scaffolding
	<input type="checkbox"/> Student work like scientists to use various scientific practices to be able to develop or deepen an understanding of a scientific idea or problem as they explore a phenomenon. In most cases, if a student actually is engaged in three dimensions and has to develop the model or develop the explanation or develop the argument from raw data or information, they are being asked to do science.

¹⁰ For test blueprints for science grades 5 and 8, see Appendix D. For both test blueprints and item specifications for grade 5, see https://sde.ok.gov/sites/default/files/documents/files/OSTP_2018-19_TIS_Sci_G5_web.pdf and grade 8 see https://sde.ok.gov/sites/default/files/documents/files/OSTP_2018-19_TIS_Sci_G8_web.pdf.

3.3.9 Use of Calculators

Approved calculators were allowed on the OSTP grade 8 science test. No other resource materials or reference sheets could be used by students during the test. For reference, see <https://sde.ok.gov/sites/ok.gov.sde/files/CalculatorPolicy17-18%20ver%202.pdf>.

3.4 GRADE 11—CCRA SCIENCE

3.4.1 Develop/Review/Approve Test Blueprints with DOK Percentages

Items on the grade 11 CCR science tests were developed specifically for Oklahoma and are directly linked to the OAS-S. These standards are the basis for the reporting categories developed for each grade and are used to help guide the development of test items. Each item is designed to measure a specific Performance Expectation in the OAS-S. The test blueprints were developed in collaboration with Cognia and the SDE. The test blueprints identify the amount of content covered on the tests and are based on the importance and coverage of the OAS-S in Oklahoma schools. The ideal test blueprints are provided by the SDE on its website: <https://sde.ok.gov/assessment-material> (these can also be found in Appendix D).

The distribution of emphasis for the CCRA science assessable performance expectations is shown in Table 3-23. The actual and ideal distributions of performance expectations on each assessment match reasonably. The ideal number of items aligned to each standard can be found in the test blueprints in Appendix D.

3.4.2 Item Development

The grade 11 CCR science test also consists of clusters of items. A cluster, for the grade 11 test, is either a set of three multiple-choice items linked with a common stimulus or a set of two multiple-choice items and a technology-enhanced item linked with a common stimulus. On the accommodated paper form for grade 11, the technology-enhanced items are replaced by paired multiple-choice items.

All items are arranged in item clusters; no items are presented as stand-alone items. Presenting the items in item clusters allows for better alignment to the breadth and depth of the performance expectations in the OAS-S. Examples of test items for public use are provided by the SDE within the test, and item specifications and can be found on its website: <https://sde.ok.gov/assessment-material>.

3.4.3 Spring 2021 Test Design and Development

The CCRA science tests were structured using both operational and embedded field-test items. Operational items (or equivalent items in the paper form or in technology-enhanced items in the online form) were taken by all students in this grade level. One operational form and one breach form were constructed. Across the operational and breach forms, approximately 50% of the items were common

linking items; the rest of each form contained unique items. There were a total of 20 operational clusters (60 operational items) on each form.

Field-test items were embedded in each form. In grade 11, one online form was administered, with a paper/pencil form as an accommodation. Each form contained two field-test clusters (six field-test items in total). Field-test items were not distinguishable to students. Student scores were based only on the operational items. Breach forms were a reuse of spring 2020 forms.

The student experience for the 2020–21 CCRA science tests for grade 11 is shown in Tables 3-29 through 3-31 below.

Table 3-29. Science Clusters in Core

Grade							60	62
11	20	58	58	2	4			

MC = Multiple Choice, TEI = Technology-Enhanced Item, PMC = Paired Multiple Choice

Table 3-30. Science Clusters to Field Test

Grade							6	6
11 (varies per form)	2	6	6	0	0	6	6	
	2	5	5	1	2	6	7	

MC = Multiple Choice, TEI = Technology-Enhanced Item, PMC = Paired Multiple Choice

Table 3-31. Science Clusters in Combined Students experienced Test

Grade							66	66
11	22	58+6=64	64	2	4	66	66	
		58+5=63	63	3	6	66	69	

MC = Multiple Choice, TEI = Technology-Enhanced Item, PMC = Paired Multiple Choice

3.4.4 Data Review

A conference call/WebEx between the SDE and Cognia was conducted to review the content of spring 2021 grade 11 science field-test items that were flagged due to psychometric criteria. This included items that were flagged in the previous administration and were being tracked to see how they performed during the 2020–21 administration. Table 3-32 shows the criteria used for reviewing the flagged items.

Table 3-32. Science-Flagged Item Criteria

Statistic		
Item Difficulty (p-value)	Below 0.2 may be too difficult; Above 0.9 may be too easy	Below 0.2 may be too difficult; Above 0.9 may be too easy
Item Discrimination (corrwtot)	Generally, 0.20 or higher is desired; must be > 0.10; Negative or zero, values should not be used. For values between 0.10 and 0.20, difference between corrwtot and any distractor option correlation value must be ≥ 0.09	Must be ≥ 0.40
Differential Item Functioning (DIF)	Values +/- C are serious DIF that must be looked at closely; +/- B values indicate moderate DIF that may warrant inspection	Values +/- C are serious DIF that must be looked at closely; +/- B values indicate moderate DIF that may warrant inspection

Statistics for flagged field-test items were reviewed by considering item difficulty (p -value), item discrimination (corrwtot), and DIF. Decisions were made whether flagged items should or should not be included in the Oklahoma item bank for future operational use. Results of the Science Data Review meeting are presented in Table 3-33. There was a total of 36 grade 11 science field test items, two of which had been flagged for review due to psychometric criteria.

Table 3-33. Science Data Review Results for 2020–2021*

Grade			
11	1	35	36

**This table shows the total number of items field tested. Following acceptance at Data Review, these items became available for operational use in 2021–22 and beyond.*

3.4.5 CCRA Standards

The test frameworks for science at grade 11 are based on the OAS-Science. Items are developed within clusters, and each cluster/item is designed to measure a specific performance expectation in the OAS-Science. The grade 11 science performance expectations are organized across two content domains: physical sciences (PS) and life sciences (LS).

3.4.6 Item Types

The grade 11 science test consists of clusters of items. A cluster is either a set of three multiple-choice items linked with a common stimulus or a set of two multiple-choice items and a technology-enhanced item linked with a common stimulus. On the accommodated paper form for grade 11, the technology-enhanced items are replaced by paired multiple-choice items.

All items are arranged in item clusters; no items are presented as stand-alone items. Presenting the items in item clusters allows for better alignment to the breadth and depth of the performance expectations in the OAS-Science. Examples of test items for public use are provided by the SDE within the test, and item specifications and can be found at its website: <https://sde.ok.gov/assessment-material>.

3.4.7 Cognitive Complexity

The CCRA science tests will have items within a cluster structured to assess a range of skills and knowledge applications within a standard. Clusters require sense-making and problem solving using the three dimensions. Sense-making happens when students must apply, via the science and engineering practices, their understanding of core ideas and crosscutting concepts to address the uncertainty associated with a scenario. The degree of sense-making required to complete an item is directly correlated to the level of cognitive complexity the student must engage with, as described in table 3-34.

Table 3-34. CCRA Levels of Cognitive Complexity

Category	
Scripted (S)	<ul style="list-style-type: none"> <input type="checkbox"/> Only one dimension. Or one dimension is foregrounded, one is backgrounded, and one is not present <input type="checkbox"/> Heavy scaffolding <input type="checkbox"/> Little to no sense-making
Low Guided (LG)	<ul style="list-style-type: none"> <input type="checkbox"/> Multidimensional but only one is heavily foregrounded <input type="checkbox"/> Moderate scaffolding <input type="checkbox"/> Low degree of sense-making
High Guided (HG)	<ul style="list-style-type: none"> <input type="checkbox"/> Multidimensional with at least two being used (foregrounded) equally <input type="checkbox"/> Minimal scaffolding <input type="checkbox"/> High degree of sense-making
Doing (D)	<ul style="list-style-type: none"> <input type="checkbox"/> The three dimensions are foregrounded <input type="checkbox"/> Student-designed exploration of science <input type="checkbox"/> Limited to no scaffolding <input type="checkbox"/> Student work like scientists to use various scientific practices to be able to develop or deepen an understanding of a scientific idea or problem as they explore a phenomenon. In most cases, if a student actually is engaged in three dimensions and has to develop the model or develop the explanation or develop the argument from raw data or information, they are being asked to do science.

3.4.8 Use of Calculators and Reference Sheets

Approved calculators were allowed on the CCRA grade11 science test. For approved calculators, see the calculator policy posted on the SDE website: https://sde.ok.gov/sites/default/files/documents/files/FINAL_Calculator%20Policy%202017-2018_Updated%202020.pdf. Students were provided a periodic table of elements.

3.5 OVERALL TEST DEVELOPMENT PROCESS

3.5.1 Item Selection and Operational Test Assembly

In preparation for the item selection meeting, the test developers and psychometricians at Cognia considered the following when selecting sets of items to propose for the common (including items for release) and the embedded field-test items:

Content coverage/match to test design. The test design stipulates a specific number of multiple-choice items from each content area.

Item difficulty and complexity. Item statistics drawn from the data analysis of previously tested items were used to ensure similar levels of difficulty and complexity from year to year, as well as for quality psychometric characteristics.

“Cueing” items. Items were reviewed for any information that might “cue” or provide information that would help students to answer another item.

During assembly of the test forms, the following criteria were considered:

Option balance. Items were balanced among the forms so that each form contained a fairly equal distribution of keys (correct answers).

Key patterns. The sequence of keys was reviewed to ensure that key order appeared random.

Page fit. Item placement was modified to ensure the best fit and arrangement of items on any given page.

Facing-page issues. For multiple items associated with a single stimulus (inquiry task) and multiple-choice items with large graphics, consideration was given to whether items needed to begin on a left- or a right-hand page and to the nature and amount of material that needed to be placed on facing pages. These considerations serve to minimize the amount of page-flipping required of students.

Relationship between forms. Although equating and field-test items differ across forms, these items must take up the same number of pages in each form so that sessions begin on the same page in every form. Therefore, the number of pages needed for the longest form often determines the layout of each form.

Visual appeal. The visual accessibility of each page of the form was taken into consideration, including aspects such as the amount of white space, the density of the text, and the number of graphics.

3.5.2 Operational Test Draft Review

After the forms were laid out as they would appear in the final test booklets, the forms were again thoroughly reviewed by Cognia editors and test developers to ensure that the items appeared exactly as the state specialists had requested. Finally, all the forms were reviewed by the state specialists for their final approval.

3.5.3 Alternative Presentations

One form of each grade content area was translated into braille by a subcontractor who specializes in test materials for students who are blind or visually impaired. In addition, this braille form was also adapted into a large-print version. The braille vendor reviewed the form concurrently with the SDE review. This review included looking at items for any potential braille ability issues. If any concerns were noted, these items went back to the Cognia content team for review and feedback. Cognia then provided the necessary information to the SDE to determine the next steps to take or the decisions needed, including options to suppress the item.

Chapter 4 Test Administration

Although the administrations were standardized and the design not significantly changed from SY 2020–2021 to SY 2018–2019, some changes in administration were allowed to accommodate practical concerns due to COVID-19 disruptions. Specifically, test takers were offered the possibility of Saturday and evening testing as well as a longer testing administration window. There were no major irregularities reported. Though the overall participation rate was high, some important difference in participation rates and population demographics were observed in the SY 2020–2021 administration. These differences and other disruptions due to COVID-19 and the non-uniform instructional delivery may make drawing some inferences or comparisons inappropriate.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

4.1 GENERAL ADMINISTRATION INFORMATION

Table 4-1. Testing Windows

Grade			
Grade 3	4/6-5/7/2021	4/6-5/24/2021	ELA and Mathematics
Grade 4	4/6-5/7/2021	4/6-5/24/2021	ELA and Mathematics
Grade 5	4/6-5/7/2021	4/6-5/24/2021	ELA, Mathematics and Science
Grade 6	4/6-5/7/2021	4/6-5/24/2021	ELA and Mathematics
Grade 7	4/6-5/7/2021	4/6-5/24/2021	ELA and Mathematics
Grade 8	4/6-5/7/2021	4/6-5/24/2021	ELA, Mathematics and Science
CCRA (Grade 11)	3/18-4/23/2021	3/13-4/30/2021	Science and U.S. History

Total administration by test mode, of either paper-based tests (PBT) or online computer-based tests (CBT), for each grade and content area is shown in Table 4-2 below. Grades 3–8 and CCRA Science Grade 11 are offered as online assessments with paper assessments offered only as an accommodation. Evidence of the comparability between groups using different approved CBT device types and online accommodation tools is provided in Appendix F.



Table 4-2. Administration by Grade and Test Mode

Grade			
3	ELA Breach Form	Online	85
	ELA Operational Form	Online	45,568
	ELA Operational Form	Paper	507
	MAT Breach Form	Online	18
	MAT Operational Form	Online	45,504
	MAT Operational Form	Paper	519
	MAT Spanish Form	Online	66
4	ELA Breach Form	Online	50
	ELA Breach Form	Paper	1
	ELA Operational Form	Online	45,032
	ELA Operational Form	Paper	536
	MAT Breach Form	Online	26
	MAT Operational Form	Online	44,983
	MAT Operational Form	Paper	536
5	MAT Spanish Form	Online	54
	ELA Breach Form	Online	39
	ELA Breach Form	Paper	1
	ELA Operational Form	Online	45,970
	ELA Operational Form	Paper	462
	MAT Breach Form	Online	27
	MAT Operational Form	Online	45,831
	MAT Operational Form	Paper	510
	MAT Spanish Form	Online	41
	SCI Breach Form	Online	3
	SCI Operational Form	Online	45,785
6	SCI Operational Form	Paper	461
	SCI Spanish Form	Online	44
	ELA Breach Form	Online	89
	ELA Operational Form	Online	46,777
	ELA Operational Form	Paper	396
	MAT Breach Form	Online	16
	MAT Operational Form	Online	46,733
7	MAT Operational Form	Paper	398
	MAT Spanish Form	Online	67
	ELA Breach Form	Online	100
	ELA Operational Form	Online	46,711
	ELA Operational Form	Paper	415
	MAT Breach Form	Online	35
	MAT Operational Form	Online	46,646
8	MAT Operational Form	Paper	412
	MAT Spanish Form	Online	102
	ELA Breach Form	Online	34
	ELA Operational Form	Online	46,873
	ELA Operational Form	Paper	418
	MAT Breach Form	Online	39
	MAT Operational Form	Online	46,476
	MAT Operational Form	Paper	417
	MAT Spanish Form	Online	92
	SCI Breach Form	Online	32
	SCI Operational Form	Online	46,403
11	SCI Operational Form	Paper	378
	SCI Spanish Form	Online	78
	SCI Breach Form	Online	89
	SCI Operational Form	Online	42,361
	SCI Operational Form	Paper	201
	SCI Spanish Form	Online	45

4.2 ROLES AND RESPONSIBILITIES FOR ADMINISTRATION

The *2020-21 OSTP Test Administration Manual* indicated that school principals and/or their designated OSTP test coordinators were responsible for the proper administration of the OSTP tests. Uniformity of administration procedures from school to school was ensured by using manuals that contained explicit directions and scripts to be read aloud to students by test administrators and by providing training. The SDE also conducted site-monitoring visits during the test administration to ensure all guidelines were followed.

4.3 ADMINISTRATION PROCEDURES

Assessment training modules, test administration workshops, prerecorded webinars, and test administration manuals were provided to District Test Coordinators and to other assessment support staff, to give clear direction and support for the test administration for paper/pencil and computer-based assessments. Refer to section 4.5 for a brief description of the training. The districts' designated OSTP test coordinators were instructed by the SDE to read the *2020-21 OSTP Test Administration Manual*. The checklists included in the *2020-21 OSTP Test Administration Manual* outlined tasks to be performed by school staff before, during, and after test administration. In addition to these checklists, the *2020-21 OSTP Test Administration Manual* described the testing material sent to each school and how to inventory it, track it during administration, and return it after testing was complete. An additional focus was on maintaining security of the test materials. The *2020-21 OSTP Test Administration Manual* included checklists for the administrators to use to prepare themselves, their classrooms, and the students for the administration of the tests. The *2020-21 OSTP Test Administration Manual* contained sections that detailed the procedures to be followed for each testing session and instructions for preparing paper-based and computer-based materials before the test coordinator returned them to Cognia.

4.4 PARTICIPATION REQUIREMENTS AND DOCUMENTATION

The intent of the SDE in Oklahoma is for all public school students in grades 3–8 and grade 11 to participate in the OSTP tests through a standard administration, an administration with test accommodations (see Appendix G), or an alternate assessment. Furthermore, any student who is absent during any session of the OSTP tests is expected to take a make-up test within the testing window. The state of Oklahoma does not recognize OSTP opt-outs. Approximately 98% of students rostered for the 2020–21 OSTP participated.

Due to statutory and rule requirements resulting from the adoption of House Bill 3218, there is no opt-out option offered through the SDE. Schools were required to return a Student Answer Document for every enrolled student in the grade level, except for students who took an alternate assessment. Students who were alternately assessed in the 2019–20 school year were not required to participate in the 2020–21 OSTP. On those occasions when it was deemed impossible to test a particular student, school personnel

were required to inform the SDE. A summary of participation in the 2020–21 OSTP by demographic category and content area can be found in Appendix H.

4.4.1 Students with Disabilities

All students were expected to participate in the 2020–21 OSTP, unless they completed an alternate assessment during the 2020–21 school year.

4.4.2 English Learners

Students who had received less than 12 months of consecutive instruction in a U.S. public school and were designated as English Learners (ELs) were required to take the ELA, mathematics, and science OSTP tests. Spanish versions of mathematics and science tests were provided for both paper-based and online assessments.

4.5 ADMINISTRATOR TRAINING

In addition to distributing the 2020–21 OSTP Test Administration Manual, the SDE and Cognia conducted test administration webinars to inform school personnel about the OSTP tests and to provide training on the policies and procedures regarding administration of the tests. Six virtual trainings were conducted in February 2021. District Test Coordinators were required to attend the trainings, while other support personnel were optional attendees. Approximately twelve hundred people attended the trainings. In addition, an audio PowerPoint test administration workshop presentation was prerecorded and provided to the state for inclusion on the SDE website. These trainings were geared toward the District Test Coordinators.

Test Administrators and Test Proctors were also required to attend training in their schools or districts prior to administration. These trainings were in the form of online modules. A test was provided at the end of the module requiring a score of at least 80% to pass. Test Administrators and Test Proctors were required to pass this test and provide their Building Test Coordinator a copy of the certificate that prints upon completion.

4.6 DOCUMENTATION OF ACCOMMODATIONS

A test accommodation is a change in the way a test is administered or in the way a student responds to test questions. Similar to instructional accommodations, test accommodations are intended to offset the effects of a student's disability and to provide them with the opportunity to demonstrate knowledge and skills on statewide assessments. The right of a student with a disability to receive allowable accommodations on OSTP tests is protected by both federal and state laws.

The student's current individualized education program (IEP)/504 plan must specify precisely which test accommodation(s) they will receive. In cases where an IEP/504 plan is under development, the school

personnel responsible for writing the plan must have already met and agreed upon the necessary accommodation(s) before a student may be provided the accommodation(s).

A student who does not have a documented disability or is not served by a current IEP/504 plan is not eligible to receive accommodations on OSTP tests, except for Emergency Accommodation situations. Scribes may be provided for any student (with or without an IEP or Section 504 plan) who has a short-term medical condition that affects his or her physical dexterity and thus impedes his or her ability to respond to the assessment format. For more detailed information regarding assessment accommodations for students with an IEP/504 plan, see Appendix G or access the *OSTP Accommodations Manual* at <https://sde.ok.gov/assessment-administrator-resources-administrators>.

Large-print versions of the tests were created using Form 1 of the tests at all grade levels, for students with visual impairments. At all grades, only the operational items were translated into Braille by American Printing House for the Blind, a subcontractor that specializes in test materials for students who are blind or who need accommodations due to visual impairments.

For computer-based testing (CBT), the following accommodations were available:

- Color Contrast, where the student can select alternative font and background colors;
- Reverse Contrast, where all colors are inverted;
- Screen Zoom, where the entire screen is zoomed up to 300%;
- Text-to-Speech, where the computer reads the text aloud to the student.

The *OSTP Accommodations Manual* provides directions for coding information related to test accommodations and modifications in the Student Answer Document. All accommodations used during any test session were required to be coded by authorized school personnel—not by students—after testing was completed.

See Table 4-3 for the numbers of students tested with and without accommodations. The number of students who were tested with online testing accommodations are presented by accommodation type in Appendix I. That appendix also contains two tables of state-approved accommodations.

Table 4-3. Numbers of Students Tested With and Without Accommodations by Content Area and Grade

Tested Grade			
3	ELA	7,430	38,730
	Mathematics	8,620	37,487
4	ELA	7,911	37,708
	Mathematics	9,066	36,533
5	ELA	8,380	38,092
	Mathematics	8,857	37,552
	Science	8,238	38,055
6	ELA	6,829	40,433
	Mathematics	7,953	39,261
7	ELA	6,606	40,620
	Mathematics	7,792	39,403
8	ELA	7,085	40,240
	Mathematics	7,464	39,560
	Science	6,821	40,070
11	Science	3,728	38,968

4.7 TEST SECURITY

Maintaining test security is critical to the success of the OSTP. *The 2020-21 OSTP Test Administration Manual* explains in detail all test security measures and test administration procedures. The SDE takes the matter of test security very seriously and has implemented stringent procedures to protect the security of the OSTP.

Each District Test Coordinator, Building Test Coordinator, Test Administrator, and Test Proctor was responsible for receiving all secure test materials and for returning all secure test materials (see Section 210:10-13-4 of the Oklahoma Administrative Code). Violation of regulations could result in revocation of a person’s teaching, counseling, administrative, and/or other certificates. The tests, and all the materials associated with these tests, were to be considered secure materials. It was important to prevent any student from having access to the tests and thus have an advantage over other students before the administration of the tests. Prior exposure to the tests or to individual items would invalidate scores. It was expressly forbidden that the materials associated with these tests be photographed, photocopied, or reproduced in any other fashion, including paraphrasing—to do so would be in violation of copyright law. All test items had been copyrighted by the SDE. In addition, students were not permitted to have cell phones during testing, to avoid reproduction or communication of secure test materials.

The 2020-21 OSTP Test Administration Manual describes in detail the policy and procedures for nondisclosure of test content, securing test materials, use of proctors, use of security forms, test administrator responsibilities, and reporting test irregularities. The SDE also conducted site visits during test administration to assure compliance to policies. During this administration, 313 sites were selected for desk monitoring and 17 sites for on-site monitoring. During on-site monitoring included the following:



1. Assessment monitors checked into the site offices, presenting proper identification. They asked to see the Building Test Coordinator and signed in.
2. If time permitted, prior to the beginning of the testing session, monitors conducted a walkthrough of the testing rooms, observed the location where the secure materials were kept, and checked the copiers for the required signage.
3. When observing assessment activities, monitors practiced the principle of “observation from a distance,” with the understanding that the site staff needed to go about performing their job tasks while taking little or no notice of their observers. Monitors must be able to conduct their observation without participating in the administration in any way.
4. Most of the activities on assessment day were easily visible to observers. Before and after the administration, the observer may have walked among the district and site assessment personnel to view their work.
5. The State (SDE) observers may have requested access to view documentation for students who were receiving accommodations on the assessments.
6. During the assessment, the monitors attempted to seat themselves where they could observe all assessment activities and complete the observation checklist while maintaining a comfortable distance from students and the site assessment personnel.
7. The observation may have been extended after the conclusion of the assessment so that post assessment activities could be observed.
8. If district or site staff were not following assessment protocol, this would be noted on the observation checklist. The observer was not to correct site staff or make comments about task performance while in a testing room.
9. If an observation was made that needed immediate attention, monitors were to notify the Office of Assessments and Accountability for additional guidance and permission to invalidate assessments. District Test Coordinators would be notified of the violation and concern.
10. At the end of the visit, observation feedback was submitted to the State Office of Assessments and Accountability, using the checklist document (paper-based or electronic version).
11. The section for Other Comments was available for observers to include their thoughts about administration of the assessment, such as appropriate tone, management, and monitoring of the session; provision for security and confidentiality of test materials; school and student information; any information that might require action during this assessment cycle; and overall impressions of the assessment administration.
12. Completed checklists were to be submitted to the State (SDE) Office of Assessment in a timely manner, preferably within two days of completing the visit.

Materials were inventoried when returned to Cognia at the end of the test administration. A materials discrepancy report was provided after all secure materials were scanned. Cognia used this report to make all attempts to recover any missing materials. The process for researching any missing materials includes the following directions:

Contact the District Test Coordinators at schools on the list and have them conduct a search for any missing materials to ensure they were returned. If those materials are located, Cognia arranges for the return of those materials. (Cognia also conducts a physical box search on site at their facilities to search for materials.)

- Maintain a spreadsheet to document the missing materials if materials were not located by Cognia or the District Test Coordinator.

At the end of the secure material discrepancy clean-up period for 2021, there were 54 test books that were not recovered. These materials included a combination of test books, integrated test books and large-print kits. All of those materials are incorporated in Table 4-4 below. Additional information regarding Cognia’s test security policies and procedures is available in Appendix J—Statistical Detection Report for the Spring 2021 Administration.

Table 4-4. Secure Material Discrepancy

Grade			
3	□ 2 regular print	□ 1 regular print	
4	□ 14 regular print	□ 7 regular print	
5	□ 5 regular print ELA Books 1 and 2 (10 books total)	□ 3 regular print	
6	□ 6 regular print	□ 6 regular print	
7	□ 1 Large print	□ 1 Large print	
8		□ 1 Large print	
11			□ 2 regular print
Totals	33	19	2

4.8 TEST AND ADMINISTRATION IRREGULARITIES

There were no major testing irregularities to report this administration. The only situation to note was an issue with the writing portion of the ELA test when taken on a Chromebook. Due to an update in the Chrome operating system that was released during the administration window, there was a combination of buttons that could be pressed by students that would remove them from the testing session and return

them to the login screen. In all cases, the test sessions were able to be unlocked, students' work was saved, and students were able to continue working on the writing prompt. This irregularity happened only in the Chrome operating system.

4.9 SERVICE CENTER

To provide additional support to schools before, during, and after testing, Cognia operates the OSTP Service Center. The support of a service center is essential to the successful administration of any statewide test program. The service center provides a centralized location that individuals in the field can call, using a toll-free number, to ask specific questions or to report any problems he or she may be experiencing with paper/pencil testing or computer-based testing. Representatives are responsible for receiving, responding to, and tracking calls, and then routing issues to the appropriate person(s) for resolution. All calls are logged into a database that includes entry space for notes regarding the issue and resolution of each call.

The service center is staffed year-round and is available to receive calls from 7:30 a.m. to 4:30 p.m. CST, Monday through Friday. Extra representatives and extended hours were added during the test administration window to assist with the additional call volume. There are three levels of support provided:

Level 1 Support—Cognia Technical Product Support

Level 2 Support—Cognia OSTP Program Help Desk

Level 3 Support—eMetric Support for Computer-Based Testing Issues

Technical Support Figure 4-1 shows the “total contacts” (phone calls + email tickets) during the testing window.

Figure 4-1. Total Contacts (phone calls + email tickets) During Testing Window

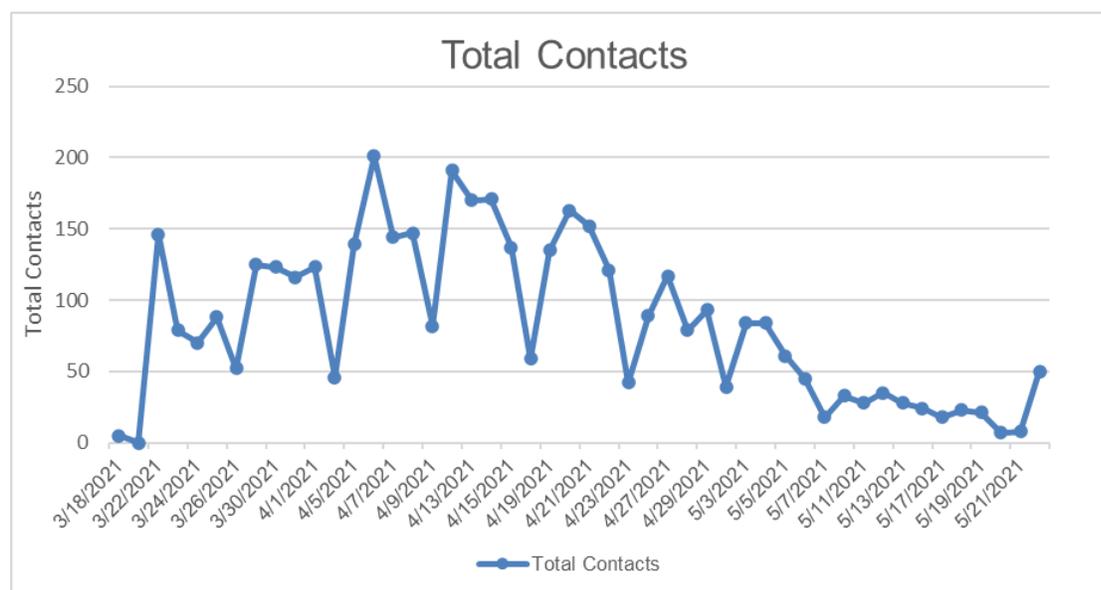
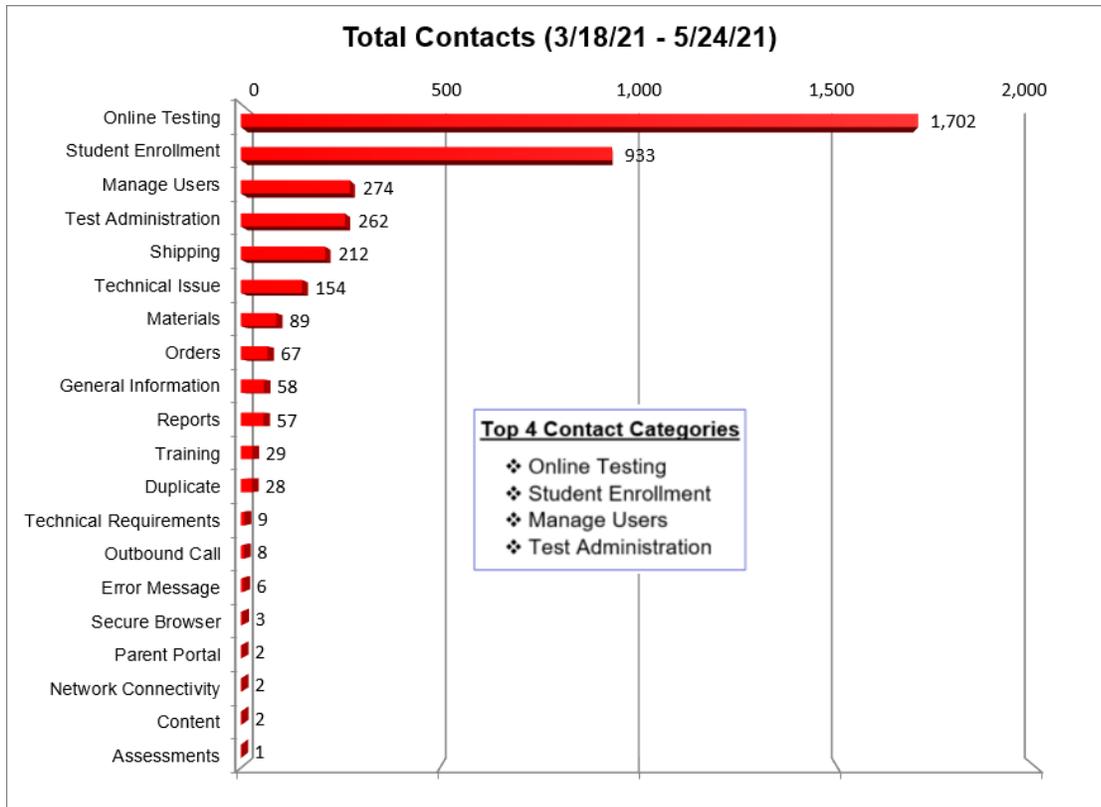


Figure 4-2 shows the summary of “total contacts” (phone calls + email tickets) by category during the testing window.

Figure 4-2. Summary of Total Contacts by Category



Chapter 5 Scoring

There were no significant changes to scoring procedures in SY 2020–2021 versus SY 2018–2019 . However, interpretations cannot be made in the same way as previous years. The disruptions due to COVID-19 and the non-uniform instructional delivery makes drawing inferences or comparisons inappropriate.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

Following a handoff from the test administration platform to the scoring system, all open-response items administered through computer-based testing were scored in iScore, a secure server-to-server electronic scoring software designed by Cognia for hand-scoring. The scoring of student work from both CBT and PBT follow the same scoring rules and specifications. All imaged data for multiple-choice responses were machine-scored.

5.1 MACHINE-SCORED ITEMS

Multiple-choice responses from students were compared to scoring keys using item analysis software. This robust software compared a student’s response to the item to the answer key and assigns a maximum score of one point for correct responses and zero points for incorrect responses. Student responses with blank item responses were also assigned zero points. At the end of an administration, a second independent validation of all the student responses was conducted to compare and validate results to ensure accurate machine scoring.

For the processing of paper-based multiple choice responses, the hardware elements of the scanners monitored themselves continuously for correct reads, and the software driving these scanners monitored the correct data reads. Standard checks included recognition of a sheet that did not belong or was positioned upside down or backward; identification of missing critical data, including a student ID number or test form that was out of range or missing; and identification of page and/or document sequence errors. When a problem was detected, the scanner stopped and displayed an error message directing the operator to investigate and correct the situation.

5.2 SCORING PLATFORM AND SCORING POSITIONS

iScore is the proprietary image-based scoring system used by Cognia to view and record scores submitted by scorers for each open-ended item. The iScore system ensures the security of student



responses and test items. During scoring, no student names or schools/districts associated with viewed student work are visible to scorers, and all Scoring Services temporary associates are subject to the same non-disclosure requirements as full-time Cognia staff. Cognia maintained security during scoring by using a highly secure, server-to-server interface, ensuring that access to all student response images was limited only to scorers and appropriate Cognia staff.

Scorers evaluated most student responses from images rendered by the online testing platform and a small number of responses from scanned images of paper-based tests. Whether administered in an online or a paper/pencil environment, all responses were scored applying the same scoring criteria.

Prior to the beginning of scoring, Cognia's iScore operational management created a contract database, and student responses were subsequently uploaded into the iScore system. To provide maximum security for all test and scoring materials in a distributed scoring environment, scorers were asked to download the iScore Kiosk onto their computers. The iScore Kiosk is a security feature that locks down the user's operating system so that no other application outside of iScore can run during scoring. Scorers and scoring leadership were given unique user authorization passwords as additional component of Cognia's stringent security procedures. Each scorer was required to log on to the image scoring system using a unique combination of an assigned username, a password, and a 6-digit code that was delivered via text or email.

The following staff members were involved with scoring the 2020–21 OSTP responses:

The Scoring Project Manager and the Director of Scoring Content and Quality oversaw communication and coordination of scoring, scheduling of activities, and general management of all Oklahoma scoring-related tasks.

The iScore Operations Manager guided the technical aspects of the iScore scoring platform.

The Scoring Content Specialists ensured consistency of scoring and managed the scoring leadership teams for all grades. The Content Specialist was responsible for monitoring scorer accuracy and accepting or rejecting the work product of scorers.

Multiple Scoring Supervisors trained staff and oversaw items at each grade level. They were selected from a pool of experienced Scoring Team Leaders for their proven ability to score accurately and to instruct and train other scorers. Scoring Supervisors trained Scoring Team Leaders and scorers on the item, answered questions during the scoring process, and worked closely with the Scoring Content Specialist.

Numerous Scoring Team Leaders (STLs), selected from a pool of skilled and experienced scorers, performed read-behind activities for the scorers to whom they were assigned. Scoring Team Leaders worked closely with the Scoring Supervisors to ensure accurate and consistent scoring for their assigned grade level.

Scorers were primarily recruited from the Menands, NY, area and evaluated student work based on the criteria of the scoring rubrics.

Per OSTP requirements as expressed in the scoring specifications document, Scoring Supervisors, STLs, and scorers were required to hold a bachelor's degree with coursework related to the content area being scored. All potential scorers and leadership staff submitted

documentation (e.g., résumés and/or transcripts) as evidence of meeting the education and experience requirements. As well, each scorer and leadership staff signed a binding non-disclosure/confidentiality agreement.

Table 5-1. Educational Background of Scorers and Scoring Leadership for OSTP

Education				
Bachelor's degree	25	61%	9	60%
Master's degree	14	34%	5	36%
Doctorate	2	5%		

* *Scoring Leadership: Scoring Supervisors and Scoring Team Leaders*

5.3 SCORING OF WRITING PROMPTS

5.3.1 Scope of Work

The writing component for grades 5 and 8 was administered as operational field test and consisted of eight items per grade. The items represented all three modes or purposes for writing, i.e., two narrative prompts, three informative prompts, and three opinion (Gr. 5) or argumentative (Gr. 8) prompts.

5.3.2 Benchmarking Meetings

To prepare for benchmarking meetings, Cognia scoring staff reviewed submitted student work for each prompt and pre-selected a variety of examples at all performance levels, if available. They assigned preliminary scores based upon their interpretation of the scoring rubric and expectations as expressed in the Oklahoma Academic Standards (OAS). They assembled a representative sample of 8–12 student responses that were solid, mid-range exemplars of each score point which constituted the Proposed Anchor Set. Cognia scoring staff assembled an additional 25–30 examples of student work across all performance levels, if available, for possible inclusion in any additional scorer training materials.

At the benchmarking meeting, the committee starts with a review of the prompt and passages, rubric, and any scoring notes that may convey trends observed during materials preparation. The committee then proceeds to review the Proposed Anchor Set. The goal is to arrive at an SDE-approved Anchor Set with agreed-upon scores for each response.

- After agreeing on the Anchor Set, the committee reviewed ~ 25 examples of student work that may include responses that are less clear and may border on adjacent score point levels. The goal was to further discriminate performance level cut points which will guided and informed the scoring of the entire body of student work.
- Practice and qualification papers were selected from those reviewed and scored responses.
- If necessary, additional student responses for practice or qualification purposes were pulled after the conclusion of the benchmarking meetings applying the decisions documented in the meetings.

Following the benchmarking meetings, the SDE-approved Anchor Set and all scoring decisions were used to train scorers and scoring leadership to accurately score student responses. Cognia regarded the results of the benchmarking meetings as the approved guidelines for training, qualifying, and monitoring scorers as well as for assigning valid scores to each student response. This ensured that each student response was assessed using consistent guidelines and that the approved standards and anchor papers directed all quality control measures.

5.3.3 Methodology for Scoring Writing Prompts

Responses to all writing prompts were scored on a holistic 1–4 scale. Scorers assigned one of the following codes to those responses that did not meet the criteria of the scoring rubric:

- Blank—No response or no intentional marks on the answer space.
- Unreadable—Response could not be read, either due to a scanning error, light or hard-to-read handwriting or for other reasons. Unreadable responses were sent to Edit scoring supervisors who reviewed the paper copy of the test book to assess the response. This designation typically applied to PBT responses only.
- Non-English—Response was written in a language other than English.
- Off Topic—Response included a direct copy of the prompt without any original text, an irrelevant response that did not respond to the prompt, or any unrelated artwork.
- Refusal—Response indicated a clear refusal to answer the prompt.
- Illegible—Response showed handwriting or spelling that was so poor that the response could not be evaluated.

5.3.4 Leadership Training

Scoring Supervisors reviewed training materials and consulted with the Scoring Content Specialist in advance of scorer training to ensure full understanding of the scoring parameters and decisions for the item. Scoring Supervisors then conducted training for Scoring Team Leaders in a separate training session prior to scorer training. In addition to a discussion of the items and their responses, leadership training included greater detail on the client’s scoring rationale of each score point, so that as leaders they would be better-equipped to handle questions from the scorers.

5.3.5 Scorer Training

Scorer training began with an introduction of all scoring staff and an overview of the purpose and goals of the project—including discussion about the security, confidentiality, and proprietary nature of testing materials, scoring materials, and procedures. Next, scorers thoroughly reviewed and discussed the rubric as well as the anchor and practice sets for each item before taking a qualification set.

Rubric Training:



The grade 5 and grade 8 OSTP Holistic Writing rubrics served as tools for providing a single score to student writing based on its overall qualities. Feedback was given on a scale of 1–4. The rubrics delineated clear-cut-points between score points through the use of distinctly scaffolded language. While rubric training focused on the holistic nature of the rubrics, the individual features that contributed to determining each specific holistic score point were thoroughly reviewed. Those features were:

Content: The degree of appropriateness related to the audience and task/purpose of the writing, the extent to which the focus was clearly maintained, and the depth of idea development.

Organization: The degree of unity and coherence, the presence and impact of introduction and conclusion, and the use of sequencing tools such as transitions.

Word Choice: The degree of variety of vocabulary used and the effectiveness of the language.

Sentence Structure: The degree of variety of structures and correctness of sentences.

Grammar, Usage, and Mechanics: The degree of control over grammar, usage, and mechanics.

These criteria served as excellent tools reflecting the key holistic features at each score point level. However, they were not intended to be used in isolation but in concert with anchor exemplars which defined those features and provided context.

Anchor Set

Responses in anchor sets were typical, midrange examples of each score point. They were read aloud in ascending order of score points. By announcing the true score of each anchor response, trainers facilitated group discussion of responses in relation to score point descriptions to help scorers internalize the characteristics associated with each score point. This anchor set continued to serve as a reference for scorers as they went on to qualification, scoring, and recalibration activities for that item.

Practice Set

To mimic live scoring, scorers practiced applying the scoring guide and anchors to responses in the practice set. As such, scorers assigned scores without any knowledge of the given score. After scorers independently read and scored each response in the practice set, trainers would poll scorers taking note of their initial assignments of scores. Trainers then led a group discussion of the responses, directing scorers' attention to difficult scoring issues (e.g., the borderline between two score points). Throughout the training, trainers modeled how to evaluate student responses by referring to the scoring standards as defined by the rubric and exemplified in the anchor set.

Qualifying Set

Scorers were required to score responses accurately and reliably in the qualifying set. The ten responses in the qualifying set were selected from an array of responses that clearly represented and illustrated the range of score points for that item as reviewed and approved by the state specialists. The qualification set was reviewed and approved by the SDE prior to administration.

To be eligible to score, scorers were required to achieve a scoring accuracy rate of at least 70% exact agreement and at least 90% exact or adjacent agreement.

5.3.6 Monitoring of Scoring Quality

Scorers were required to demonstrate and maintain their ability to score student responses accurately and consistently throughout the scoring process. The iScore image-scoring system enabled scoring leadership to measure and monitor individual and group performance on each scored item in terms of accuracy and consistency and in terms of read rate (scoring speed) and overall production rate on a constant, real-time basis. The iScore scoring tools that measured OSTP scoring quality were as follows:

- Read-behind scoring

- Double-blind scoring

- Recalibration Sets

Read-behind and double-blind statistics were reviewed daily. Recalibration sets were administered consistently during the project. The use of these multiple monitoring techniques is critical for monitoring scorer accuracy during the process of live scoring.

Each scorer's performance on the above quality measures was monitored and recorded by iScore and scoring leadership could review data related to the accuracy, consistency, and overall quality of scoring. Scoring leadership was always available to answer scorer questions. They also counseled and retrained scorers as needed to determine whether a scorer should continue scoring. Scorers who demonstrated inaccurate or inconsistent scoring through these quality control measures were stopped from scoring and retrained. Upon approval by the Scoring Supervisor or Scoring Content Specialist, the scorer could resume scoring. If a scorer's performance warranted removal from scoring, scoring leadership initiated a process through which that scorer's work was invalidated and returned to the scoring queue of unscored responses to be rescored by those scorers who demonstrated scoring accuracy at or above standard.

Read-Behind Scoring Procedures

Read-behind scoring allowed scoring leadership to monitor each scorer's scoring performance by way of an immediate real-time snapshot of the scorer's accuracy. The data that was generated by read-behind scoring presented leadership with opportunities to answer questions and to provide counsel to scorers who may have had trouble maintaining the scoring standards. iScore is designed such that the selection of any scored student responses for read-behind scoring was done without a scorer knowing which response was selected for a read-behind. The Scoring Team Leader (STL) would, at various points throughout the scoring session, instruct the system to assign the next one, two, or three responses per scorer to be placed into the read-behind queue at a time. Responses could be pulled for all scorers who were assigned to an STL or for certain scorers only. Each read-behind response was scored blindly by the STL; that is, each scorer's response score was revealed only to the STL after the STL had submitted his or her score to the system. The STL would then have an opportunity to compare his or her score

against the score assigned by the scorer. If the scores were discrepant (more than one score point apart) or if there were a significant number of adjacent scores (one score point apart) between the scorer and the STL, scoring leadership then counseled and retrained the scorer. The Scoring Team Leader entered his or her score into iScore before being allowed to see the scorer’s score. The Scoring Team Leader then compared the two scores, and the score-of-record (i.e., the reported score) was determined as follows:

- If there was exact agreement between the scorer and the STL scores, no action was taken—the scorer’s original score remained.

- If scores were adjacent (a difference of one score point), the STL’s score became the score of record. (a significant number of adjacent scores for a scorer triggered an individual scoring consultation with the scoring team leader, after which the scoring supervisor determined whether or when the scorer could resume scoring.)

- If the scores were discrepant (i.e., differed by more than one point), the STL’s score became the score-of-record. (This result triggered an individual consultation for the scorer with the Scoring Team Leader, after which the Scoring Supervisor determined whether or when the scorer could resume scoring on that item.)

Table 5-2 illustrates how scores were resolved by the read-behind process.

Table 5-2. Examples of Read-Behind Scoring Resolutions¹

Scorer Score		
4	4	4
4	3	3
1	3	3

¹In all cases, the leadership score is the final score of record.

Scoring Team Leaders were tasked with conducting read behinds on 10% of the total student responses, with targets to distribute the read-behinds across all the scorers to which they were assigned. Scorers who hovered at the threshold of acceptable accuracy would have been targeted with more read-behinds than scorers who were consistently demonstrating high levels of accuracy.

Double-Blind Scoring

All student responses were 30% double-blind scored. Since this was an operational field test, AI scoring for the writing prompts was not an option, so all scoring was conducted by humans.

In double-blind scoring, the situation might arise that the scores assigned by two scorers did not match. If there was a discrepancy (a difference greater than one score point) between two scores assigned to the same student response, it was placed into an arbitration queue. Arbitration responses were reviewed by scoring leadership (Scoring Team Leader or Scoring Supervisor) without knowledge of the two scorers’ scores. Scoring leadership assigned the final score. Scoring leadership consulted individually with any scorer whose scoring rate fell below the required accuracy rate, and the Scoring Supervisor determined whether or when the scorer could resume scoring on that item. Once the scorer could resume scoring,

scoring leadership carefully monitored the scorer's accuracy by increasing the number of read-behinds. If the two scores were adjacent (a difference of one score point) then the first score became the score of record.

Recalibration Sets

To determine whether scorers were still calibrated to the scoring standard, they were required to take an online recalibration set at the start of the second day of scoring that item throughout the scoring project. Each recalibration set consisted of five responses representing a range of possible scores. Any scorer who demonstrated difficulty was retrained before being allowed by the Scoring Supervisor to continue scoring. Once the scorer was allowed to resume scoring, scoring leadership carefully monitored these scorers by increasing the number of read-behinds.

Scoring Reports

iScore generated multiple reports that were used by scoring leadership to measure and monitor scorers for scoring accuracy, consistency, and productivity. Samples of these reports are provided in Appendix K.

5.3.7 Interrater Consistency

Interrater consistency information is presented as evidence for the reliability of the human-scored results for ELA Grades 5 and 8. Specifically, these results demonstrate the agreement between scores assigned by first and second rater.

Various statistics are employed to evaluate interrater consistency or reliability, such as the number of included scores, percent of exact agreement, percent of adjacent agreement, and Cohen's weighted kappa (κ). The percent of responses that required a third score is also included to quantify the resolution between discrepant first and second raters; the third score is required when the scores of the raters are not adjacent. The correlation describes the degree of consistency between the two raters with a correlation of 1.0 being perfect agreement. Cohen's weighted kappa is a commonly used descriptor of interrater agreement, especially in cases where ratings are ordinal in nature, which describes interrater reliability while also accounting for agreement by chance. As with the correlation statistic presented, kappa achieves its maximum value of 1.0 only when all pairs of ratings are in exact agreement. Table 5-3 presents a summary of interrater consistency statistics collapsed across items by content area

On average, paired raters for the Grade 5 ELA item agreed exactly (i.e., independently rated the item with the same score) 78.3% of the time. When they disagreed, it was nearly always by only a single score point. Raters in Grade 5 only disagreed by more than one score point in 0.8% of cases, and Grade 8 raters disagreed by more than one score point in 2% of cases, on average. On average, greater agreement was shown in Grade 5 than in Grade 8: average $\kappa = 0.55$ and $\kappa = 0.43$, respectively. While there was predictable and anticipated disagreement indicated by these statistical analyses, it should be

noted that in cases in which disagreement was more than one score point, a third rater was used, mitigating the impact of any such disparity.

Table 5-3. Summary of Interrater Consistency Statistics Collapsed Across Items by Content Area

Content Area								
ELA	5	760803	4	4-1	86.3	13.0	2.0	0.68
		760986	4	4-1	79.4	19.3	2.6	0.61
		761338	4	4-1	72.4	26.5	2.0	0.53
		761740	4	4-1	74.1	25.5	0.7	0.55
		761786	4	4-1	78.1	21.2	1.1	0.55
		761899	4	4-1	68.4	30.7	2.2	0.46
		762003	4	4-1	81.9	17.2	2.7	0.45
		763352	4	4-1	85.8	13.8	1.9	0.57
	8	761992	4	4-1	66.2	31.4	2.9	0.49
		762043	4	4-1	63.9	33.3	3.6	0.43
		762085	4	4-1	59.7	37.9	3.1	0.39
		762218	4	4-1	68.9	30.1	1.6	0.53
		762233	4	4-1	62.3	36.1	2.2	0.41
		762511	4	4-1	65.0	34.1	1.6	0.41
		762991	4	4-1	63.4	33.8	3.0	0.43
		762993	4	4-1	62.0	36.0	2.4	0.36

5.4 SCORING OF CONSTRUCTED RESPONSE ITEMS

5.4.1 Scope of Work

The OSTP test administration for ELA also consisted of two constructed response items each in grades 3, 4, 6, and 7.

Much like the grades 5 and 8 writing prompts, the images of student responses to the constructed-response items of grades 3, 4, 6, and 7 were hand-scored through the iScore system. The scoring of the CR questions mostly followed the same scoring specifications and parameters as the grade 5 and 8 writing prompts. Differences were the scorer qualification threshold which was 80% exact and 90% adjacent agreement. Also, the double-blind rate was 100% with the second score provided by the AI engine.

5.5 METHODOLOGY FOR SCORING CONSTRUCTED RESPONSE ITEMS

All student work for the grades 3, 4, 6, and 7 constructed response items was scored on a holistic 0-2 scale. For any responses that did not meet the criteria of the scoring rubric, scorers could use the same designations that were available to the scorers of the grade 5 and 8 writing prompts. All responses were evaluated by two scorers with 10% also being rated by a Scoring Team Leader. Prior to scorer training, Scoring Supervisors reviewed training materials and consulted with the Scoring Content Specialist in advance of training to ensure full understanding of the scoring decisions for the item. Leadership training also included a deeper discussion related to the scoring rationale of each score point and its representations in student work. Scorer training replicated the established process for grades 5 and 8 writing prompts. Training materials consisted of anchor sets and practice sets. Qualification sets were used to determine a scorer's ability to successfully apply the scoring standards that were relayed during training. All scores assigned to the anchor set responses were approved during a previously held benchmarking meeting.

During scorer training, the responses in the anchor set were read aloud in descending score point order. Scorers practiced applying the scoring standards as exemplified in the scoring rubric and the anchor set responses by scoring the responses of the practice set. The practice set is intended to mimic live scoring. As such, scorers assigned scores without any knowledge of the given score. After scorers independently read and scored each practice set response, trainers polled scorers and then lead a group discussion directing scorers' attention to more difficult scoring issues (e.g., the borderline between two score points). Throughout the training, trainers modeled how to evaluate student work by referring to the anchor set and to the rubric. Using qualifying sets, scorers were required to score responses accurately and reliably. The ten responses in each qualifying set were selected from an array of responses that clearly illustrated the range of score points for that item as reviewed and approved by the state specialists. To be eligible to score any of the constructed response items, scorers were required to demonstrate scoring accuracy rates of at least 80% exact agreement and at least 90% exact or adjacent agreement.

The approach to quality control applied to the scoring of Constructed Response items replicated the process described for the scoring of the grades 5 and 8 Writing Prompts. Scorers were constantly monitored for their accuracy by performing read-behinds and through double-blind scoring and their statistics were reviewed daily. Scorers who demonstrated inaccurate or inconsistent scoring through these quality control measures were stopped from scoring. Their work for the day was invalidated and rescored by other qualified scorers. Anyone who repeatedly demonstrated below-standard accuracy and consistency in scoring would have been removed from the project. Scorers who met or exceeded the expected accuracy rates continued scoring. The use of these quality control tools is critical for monitoring scorer accuracy during live scoring.

Read-Behind Scoring Procedures



Team leaders were tasked with conducting read-behinds on 10% of the total student responses, with targets to distribute the read-behinds across all the scorers assigned to them. Scorers who hovered at the threshold of acceptable accuracy would have been targeted with more read-behinds than scorers who were consistently demonstrating high levels of accuracy.

Table 5-4 illustrates how scores were resolved by the read-behind process for the constructed response items:

Table 5-4. Examples of Read-Behind Scoring Resolutions*

Scorer Score		
2	2	2
2	1	1
1	2	2

**In all cases, the leadership score is the final score of record.*

Double-Blind Scoring

All student responses were 100% double-blind scored with the second score provided by an AI engine. If there was a discrepancy (a difference greater than one score point) between the scores that were independently assigned by two scorers, the response was placed into an arbitration queue. Arbitration responses were reviewed by scoring leadership (Scoring Team Leader or Scoring Supervisor). Scoring leadership assigned the final score. Scoring leadership consulted individually with any scorer whose scoring rate fell below the required accuracy rate, and the Scoring Supervisor determined when or whether a scorer could resume scoring that item. Once the scorer could resume scoring, scoring leadership carefully monitored the scorer’s accuracy by increasing the number of read-behinds. A summary of the interrater consistency results is presented in Appendix K.

Recalibration Sets

At the start of the second day of scoring an item throughout the scoring project, scorers were required to take an online recalibration set to determine whether scorers were still calibrated to the scoring standard. Each recalibration set consisted of five responses representing a range of possible scores. Any scorer who demonstrated difficulty was retrained before being allowed by the Scoring Supervisor to continue scoring. Once the scorer was allowed to resume scoring, scoring leadership carefully monitored these scorers by increasing the number of read-behinds.

Interrater Consistency

Unlike for the Writing Prompts which are scored on a 4-point scale, the weighted kappa statistic is not generated for the 2-point Constructed Response items. The design of all other quality control reports is identical.

Chapter 6 Classical Item Analysis

There were no substantial changes to classical item analysis procedures in SY 2020–2021 versus SY 2018–2019. One small change is that the SY 2018–2019 administration included a stand-alone analysis of test accommodation tool and test devices intended to support the comparability of scores using multiple device types and online accommodation tool types. Such comparisons were likely to be confounded by COVID-19 disruptions for this administration and the SY 2018–2019 evidence should be considered evidence of comparability in this regard for that and future administrations, including SY 2020–2021. Interpretations of differences using classical item analyses are always difficult, as such statistics are population dependent. Even so, interpretations cannot be made in the same way as previous years. The disruptions due to COVID-19 and the non-uniform instructional delivery makes drawing inferences or comparisons inappropriate.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

As noted in the *Principles of Educational and Psychological Testing* (Brown, 1983), “A test is only as good as the items it contains.” A complete evaluation of a test’s quality must include an evaluation of each item. Both *Standards for Educational and Psychological Testing* (AERA et al., 2014) and *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices, 2004) include standards for identifying quality items. Items should assess only knowledge or skills that are identified as part of the domain being tested and should avoid assessing irrelevant factors. Items should also be unambiguous and free of grammatical errors, potentially insensitive content or language, and other confounding characteristics. In addition, items must not unfairly disadvantage students in particular racial, ethnic, or gender groups.

Both qualitative and quantitative analyses have been conducted to ensure that OSTP items meet these standards. Qualitative analyses are described in earlier chapters of this report; this chapter focuses on quantitative evaluations. Statistical evaluations are presented in four parts: (1) difficulty indices, (2) item-test correlations, (3) differential item functioning (DIF) statistics, and (4) dimensionality analyses. The item analyses presented here are based on the statewide administration of the OSTP in spring 2021. Note that the information presented in this chapter is based on operational items (the items on which student scores are calculated). Item analyses were also performed for field-test items; the statistics were used during the item review process and form assembly for future administrations.

6.1 CLASSICAL DIFFICULTY AND DISCRIMINATION INDICES

All multiple-choice items were evaluated in terms of item difficulty according to standard classical test theory practices. Difficulty is defined as the average proportion of points achieved on an item and is measured by obtaining the average score on an item and dividing it by the maximum possible score for the item. Multiple-choice items are scored dichotomously (correct vs. incorrect); for these items, the difficulty index is simply the proportion of students who correctly answered the item. Although this index is traditionally described as a measure of difficulty, it is properly interpreted as an *easiness* index, because larger values indicate easier items. An index of 0.0 indicates that all students received no credit for the item, and an index of 1.0 indicates that all students received full credit for the item.

Items that are answered correctly by almost all students provide little information about differences in student abilities, but they do indicate knowledge or skills that have been mastered by most students. Similarly, items that are correctly answered by very few students provide little information about differences in student abilities, but they may indicate knowledge or skills that have not yet been mastered by most students. In general, to provide the best measurement, difficulty indices should range from near-chance performance (0.25 for four-option multiple-choice items) to 0.90, with the majority of items generally falling between around 0.4 to 0.7. However, on a standards-referenced assessment such as the OSTP, it may be appropriate to include some items with very low or very high item difficulty values to ensure sufficient content coverage.

A desirable characteristic of an item is for higher-ability students to perform better on the item than lower-ability students do. The correlation between student performance on a single item and total test score is a commonly used measure of this characteristic of the item. Within classical test theory, the item-test correlation is referred to as the item's discrimination because it indicates the extent to which successful performance on an item discriminates between high and low scores on the test. The theoretical range of these statistics is -1.0 to $+1.0$, with a typical observed range from 0.2 to 0.6.

Discrimination indices can be thought of as measures of how closely an item assesses the same knowledge and skills assessed by other items contributing to the criterion total score. That is, the discrimination index can be thought of as a measure of construct consistency.

A summary of the item difficulty and item discrimination statistics for each content area and grade combination is presented in Table 6-1. Note that the statistics are presented for all multiple-choice items. The mean difficulty and discrimination values shown in the table are within generally acceptable and expected ranges, with mean difficulties (p -values) between 0.39 and 0.62 and mean discriminations between 0.36 and 0.46.

Table 6-1. Summary of Item Difficulty and Discrimination Statistics of Multiple-Choice Items by Content Area and Grade

Content Area											
ELA	3	48	0.53	0.13	0.24	0.75	0.40	0.08	0.22	0.56	
	4	48	0.56	0.16	0.19	0.83	0.39	0.12	0.00	0.58	
	5	50	0.61	0.13	0.32	0.84	0.44	0.08	0.18	0.62	
	6	48	0.61	0.15	0.17	0.83	0.42	0.10	0.14	0.60	
	7	48	0.55	0.14	0.17	0.83	0.37	0.11	0.00	0.54	
	8	50	0.59	0.16	0.19	0.91	0.37	0.10	0.20	0.56	
Mathematics	3	50	0.62	0.15	0.26	0.93	0.46	0.10	0.17	0.66	
	4	50	0.56	0.18	0.23	0.90	0.42	0.09	0.22	0.56	
	5	50	0.53	0.16	0.17	0.85	0.43	0.09	0.18	0.57	
	6	47	0.54	0.15	0.23	0.84	0.40	0.10	0.17	0.60	
	7	47	0.39	0.14	0.14	0.71	0.36	0.12	0.00	0.54	
	8	47	0.42	0.15	0.11	0.72	0.38	0.11	0.10	0.56	
Science	5	45	0.52	0.15	0.29	0.86	0.39	0.09	0.19	0.57	
	8	42	0.49	0.12	0.23	0.74	0.37	0.09	0.20	0.57	
	11	58	0.42	0.12	0.21	0.74	0.36	0.09	0.10	0.57	

A comparison of indices across grade levels is complicated because these indices are population-dependent. Direct comparisons would require that either the items or the students were common across groups. Since that is not the case, it cannot be determined whether differences in performance across grade levels are due to differences in student abilities, differences in item difficulties, or both. With this caveat in mind, it appears generally that for mathematics and science, students in higher grades found their items more difficult than did students in lower grades, while in ELA difficulty values are relatively consistent across grades.

In addition to the item difficulty and discrimination summaries presented above, item level classical statistics and item level score distributions were also calculated. Item level classical statistics are provided in Appendix L; item difficulty and discrimination values are presented for each item. The item difficulty and discrimination indices are within generally desirable ranges. Very few items were answered correctly at near-chance or near-perfect rates. Similarly, the positive discrimination indices indicate that students who performed well on individual items tended to perform well overall. There were a small number of items that had near-zero discrimination indices.

6.2 DIFFERENTIAL ITEM FUNCTIONING (DIF) ANALYSIS

Code of Fair Testing Practices in Education (2004) explicitly states that subgroup differences in performance should be examined when sample sizes permit, and that actions should be taken to ensure that differences in performance are due to construct-relevant, rather than irrelevant, factors. *Standards for Educational and Psychological Testing* (AERA et al., 2014) includes similar guidelines. As part of the

effort to identify such problems, all 2020–21 OSTP and CCRA assessment items (operational and field test) were evaluated in terms of differential item functioning (DIF) statistics.

For the OSTP and CCRA, the standardization DIF procedure (Dorans & Kulick, 1986) was employed to evaluate subgroup differences. The standardization DIF procedure is designed to identify items for which subgroups of interest perform differently, beyond the impact of differences in overall achievement. The DIF procedure calculates the difference in item performance for two groups of students (at a time) matched for achievement on the total test. Specifically, average item performance is calculated for students at every total score. Then an overall average is calculated, weighting the total score distribution so that it is the same for the two groups.

When differential performance between two groups occurs on an item (i.e., a DIF index in the “low” or “high” categories, explained below), it may or may not be indicative of item bias. Course-taking patterns or differences in school curricula can lead to DIF, but for construct-relevant reasons. On the other hand, if subgroup differences in performance could be traced to differential experience (such as geographical living conditions or access to technology), the inclusion of such items should be reconsidered.

Computed DIF indices have a theoretical range from -1.0 to 1.0 for multiple-choice items. Dorans and Holland (1993) suggested that index values between -0.05 and 0.05 should be considered negligible. Dorans and Holland further stated that items with values between -0.10 and -0.05 or between 0.05 and 0.10 (i.e., “low” DIF) should be inspected to ensure that no possible effect is overlooked and that items with values outside the $[-0.10, 0.10]$ range (i.e., “high” DIF) are more unusual and should be examined very carefully.¹¹

For the 2020–21 OSTP and CCRA, 10 demographic subgroup comparisons were evaluated for DIF:

- Male versus female
- White versus Hispanic or Latino
- White versus Black/African American
- White versus American Indian/Alaskan Native
- White versus Pacific Islander
- White versus two or more races
- Non-EL versus EL (English Learner)
- Non-IEP versus IEP
- Non-Economically Disadvantaged versus Economically Disadvantaged

¹¹ It should be pointed out here that DIF for items is evaluated initially at the time of field-testing. If an item displays high DIF, it is flagged for review by a Cognia content specialist. The content specialist consults with the SDE to determine whether to include the flagged item in a future operational test administration.

DIF procedures were limited to the subgroups listed above, which have sufficiently large sample sizes, in order to avoid inflation of type I error rates.

Generally speaking, the number of high DIF items was low for most tests. Most tests had zero items flagged for any of the subgroup comparisons, with all but two of the remaining tests having three or fewer items flagged. These differences typically result from subgroup comparisons with small focal groups (e.g., White versus Pacific Islander). Two tests had five items flagged and two tests had four items flagged, again likely due to the small sample size of the focal group (Grades 5, 7, and 8 ELA and Grade 8 mathematics, White vs. Pacific Islander). Notably, no items were flagged for high DIF based on Economic Disadvantage and only one grade had multiple items flagged for IEP, with these three multiple-choice mathematics items favoring the focal group, rather than the reference group. With so few items flagged, no other patterns are evident. The tables in Appendix M present the number of items classified as either “low” or “high” DIF, overall and by group favored.

6.3 DIMENSIONALITY ANALYSIS

Because tests are constructed with multiple content area subcategories and their associated knowledge and skills, the potential exists for a large number of dimensions being invoked beyond the common primary dimension. Generally, the subcategories are highly correlated with each other; therefore, the primary dimension they share typically explains an overwhelming majority of variance in test scores (Roussos & Ozbek, 2006). In fact, the presence of just such a dominant primary dimension is the psychometric assumption that provides the foundation for the unidimensional item response theory (IRT) models that are used for calibrating, linking, scaling, and equating the 2020–21 OSTP and CCRA test forms.

The purpose of dimensionality analyses is to investigate whether violation of the assumption of test unidimensionality is statistically detectable and, if so, (1) the degree to which unidimensionality is violated and (2) the nature of the multidimensionality. Findings from dimensionality analyses performed on the 2020–21 OSTP and CCRA common items for mathematics, ELA, and science are reported in Table 6-2. (note: only common and operational items were analyzed because they are used for score reporting.)

The dimensionality analyses were conducted using the nonparametric IRT-based methods DIMTEST (Stout, 1987; Stout, Froelich, & Gao, 2001) and DETECT (Zhang & Stout, 1999). Both methods use as their basic statistical building block the estimated average conditional covariances for item pairs. A conditional covariance is the covariance between two items conditioned on total score for the rest of the test, and the average conditional covariance is obtained by averaging overall possible conditioning scores. When a test is strictly unidimensional, all conditional covariances are expected to take on values within random noise of zero, indicating statistically independent item responses for examinees with equal expected scores. Nonzero conditional covariances are essentially violations of the principle of local

independence, and local dependence implies multidimensionality. Thus, nonrandom patterns of positive and negative conditional covariances are indicative of multidimensionality.

DIMTEST is a hypothesis-testing procedure for detecting violations of local independence. The data are first randomly divided into a training sample and a cross-validation sample. Then an exploratory analysis of the conditional covariances is conducted on the training sample data to find the cluster of items that displays the greatest evidence of local dependence. The cross-validation sample is then used to test whether the conditional covariances of the selected cluster of items displays local dependence, conditioning on total score on the nonclustered items. The DIMTEST statistic follows a standard normal distribution under the null hypothesis of unidimensionality.

DETECT is an effect-size measure of multidimensionality. As with DIMTEST, the data are first randomly divided into a training sample and a cross-validation sample (these samples are drawn independently of those used with DIMTEST). The training sample is used to find a set of mutually exclusive and collectively exhaustive clusters of items that best fit a systematic pattern of positive conditional covariances for pairs of items from the same cluster and negative conditional covariances from different clusters. Next, the clusters from the training sample are used with the cross-validation sample data to average the conditional covariances: within-cluster conditional covariances are summed; from this sum the between-cluster conditional covariances are subtracted; this difference is divided by the total number of item pairs, and this average is multiplied by 100 to yield an index of the average violation of local independence for an item pair. DETECT values less than 0.2 indicate very weak multidimensionality (or near unidimensionality), values of 0.2 to 0.4 weak to moderate multidimensionality, values of 0.4 to 1.0 moderate to strong multidimensionality, and values greater than 1.0 very strong multidimensionality (Roussos & Ozbek, 2006).

DIMTEST and DETECT were applied to the 2020–21 OSTP and CCRA, which consisted of 15 different combinations of grade levels and content areas (six in mathematics and ELA, and three in science). With the exception of ELA grades 6–8, each combination of grade level and content area contained a single operational form, which was analyzed; in ELA grades 6–8, a partial in common form of 43 (out of 50) operational items were analyzed.

Because DIMTEST software has an upper limit of 24,000 students, the training and cross-validation samples for all test forms were limited to 12,000 each and were randomly sampled from the total sample. DETECT, on the other hand, has an upper limit of 500,000 students, so every training sample and cross-validation sample used all the available data. After randomly splitting the data into training and cross-validation samples, DIMTEST was applied to each dataset to see if the null hypothesis of unidimensionality would be rejected. Next, DETECT was applied to each dataset for which the DIMTEST null hypothesis was rejected, in order to estimate the effect size of the multidimensionality.

Due to the large sample sizes, DIMTEST would be sensitive even to quite small violations of unidimensionality, and the null hypothesis was strongly rejected for nearly every dataset with most p -

values being less than 0.01 (see Table 6-2). Strong rejection of the null hypothesis of unidimensionality is not surprising because strict unidimensionality is an idealization that almost never holds exactly for a given dataset. Thus, it was important to use DETECT to estimate the effect size of the violations of local independence found by DIMTEST. Table 6-2 displays the multidimensional effect-size estimates from DETECT.

Table 6-2. Multidimensionality Effect Sizes by Content Area and Grade

Content Area			
ELA	3	.034	.180
	4	<.001	.120
	5	<.001	.136
	6	<.001	.119
	7	.028	.123
	8	<.001	.113
Mathematics	3	<.001	.144
	4	<.001	.181
	5	<.001	.221
	6	<.001	.175
	7	<.001	.233
	8	<.001	.178
Science	5	<.001	.172
	8	<.001	.163
	11	<.001	.219

All the DETECT values for 2020–21 indicated very weak to weak multidimensionality. The average DETECT values for the three content areas were 0.132 for ELA, 0.189 for mathematics, and 0.185 for science. The violations of local independence, as evidenced by the DETECT effect sizes, were very weak (DETECT Effect Size < 0.20), with three exceptions (Grade 5 and 7 mathematics and Grade 11 science), which were still weak (DETECT Effect Size = 0.221, .233 and .219 respectively), and do not suggest deviations from unidimensionality, which would warrant changes in test design or scoring.

Chapter 7 Item Response Theory Scaling and Equating

The IRT analyses featured one important difference between the SY 2020–2021 administration and previous years. Instead of post-equated design that identifies and recalibrates items exhibiting parameter drift, a preequated design in which previous years' item parameters were held constant was employed wherever possible. This is different than how equating is traditionally conducted for OSTP and CCRA: a post-equating design relying on a set of items held to previous years' parameters and the rest being brought on scale through the Stocking-Lord procedure. Drift analyses were conducted to inform thinking about model fit, but the parameters were held constant in order to stabilize the scale and ensure comparability over time.

Though equating procedures were adjusted for the SY 2020–2021 administration to best ensure comparability in the face of disruptions due to COVID-19 and the non-uniform instructional delivery, caution is urged against drawing specific inferences or comparisons.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

In addition to the classical test theory item analyses previously described, the SY 2020–2021 OSTP and CCRA were analyzed according to item response theory (IRT) models. IRT analyses were used to place all 2020–21 forms on the same scale; details on the IRT calibration and equating procedures for the assessment are described in this chapter. IRT calibration and equating results are provided in the *Oklahoma School Testing Program 2020–2021 Equating Report* (provided in Appendix N), which was shared with members of the SDE and reviewed with Cognia psychometricians in May of 2021. The *Equating Report* presents information about the psychometric activities and results in support of calibration and equating for all SY 2020–2021 OSTP assessments. As such, readers are referred to this document frequently throughout this chapter.

7.1 ITEM RESPONSE THEORY CALIBRATION

All 2020–21 OSTP and CCRA items were calibrated using IRT, which uses mathematical models to define a relationship between an unobserved measure of student performance, usually referred to as theta (θ), and the probability (p) of getting a dichotomous item correct or of getting a particular score on a polytomous item. In IRT, it is assumed that all items are independent measures of the same construct



(i.e., of the same θ). Another way to think of θ is as a mathematical representation of the latent trait of interest. Several common IRT models are used to specify the relationship between θ and p (Hambleton & van der Linden, 1997; Hambleton & Swaminathan, 1985). The process of determining the specific mathematical relationship between θ and p is called item calibration. After items are calibrated, they are defined by a set of parameters that specify a nonlinear, monotonically increasing relationship between θ and p . Once the item parameters are known, an estimate of θ for each student can be calculated. This estimate, $\hat{\theta}$, is an estimate of the student's true score or a general representation of student performance. It has characteristics that are preferable to those of raw scores for equating purposes.

For the 2020–21 OSTP and CCRA tests, the three-parameter logistic (3PL) model was used for dichotomous items. The graded-response model (GRM) was used for polytomous items (Nering & Ostini, 2010), including polytomously scored multipart items and open-response items.

The 3PL model for dichotomous items can be defined as follows:

$$P_i(\theta_j) = c_i + (1 - c_i) \frac{\exp[Da_i(\theta_j - b_i)]}{1 + \exp[Da_i(\theta_j - b_i)]} \quad (\text{Equation 1})$$

where
 i indexes the items,
 j indexes students,
 a represents item discrimination,
 b represents item difficulty,
 c is the pseudo-guessing parameter, and
 D is a normalizing constant equal to 1.701.

In the GRM for polytomous items, an item is scored in $k + 1$ graded categories that can be viewed as a set of k dichotomies. At each point of dichotomization (i.e., at each threshold), a two-parameter model can be used to model the probability that a student's response falls at or above a particular ordered category, given θ . This implies that a polytomous item with $k + 1$ categories can be characterized by k item category threshold curves (ICTCs) of the two-parameter logistic form:

$$P_{ik}^*(\theta_j) = P(U_i \geq k | \theta_j) = \frac{\exp[Da_i(\theta_j - b_i + d_{ik})]}{1 + \exp[Da_i(\theta_j - b_i + d_{ik})]} \quad (\text{Equation 2})$$

where
 U indexes the scored response on an item,
 i indexes the items,
 j indexes students,
 k indexes threshold,
 θ is the student ability,
 a represents item discrimination,
 b represents item difficulty,
 d represents threshold, and
 D is a normalizing constant equal to 1.701.

After computing k ICTCs in the GRM, $k + 1$ item category characteristic curves (ICCCs), which indicate the probability of responding to a particular category given θ_j , are derived by subtracting adjacent ICTCs:

$$P_{ik}(\theta_j) = P(U_i = k|\theta_j) = P_{ik}^*(\theta_j) - P_{i(k+1)}^*(\theta_j), \quad (\text{Equation 3})$$

where

i indexes the items,

j indexes students,

k indexes threshold,

θ_j is the student ability,

P_{ik} represents the probability that the score on item i falls in category k , and

P_{ik}^* represents the probability that the score on item i falls at or above the threshold k

($P_{i0}^* = 1$ and $P_{i(m+1)}^* = 0$).

The GRM is also commonly expressed as follows:

$$P_{ik}(\theta_j) = \frac{\exp[D a_i(\theta_j - b_i + d_k)]}{1 + \exp[D a_i(\theta_j - b_i + d_k)]} - \frac{\exp[D a_i(\theta_j - b_i + d_{k+1})]}{1 + \exp[D a_i(\theta_j - b_i + d_{k+1})]}. \quad (\text{Equation 4})$$

Test Characteristic Curves (TCCs) display the expected (average) raw score associated with each θ_j value between -3.0 and 3.0. Mathematically, the TCC is computed by summing the item characteristic curves (ICCs) of all items that contribute to the raw score. The expected raw score at a given value of θ_j is as follows:

$$E(X|\theta_j) = \sum_{i=1}^n P_i(1|\theta_j), \quad (\text{Equation 5})$$

where

i indexes the items (and n is the number of items contributing to the raw score),

j indexes students (here, θ_j runs from -4 to 4), and

$E(X|\theta_j)$ is the expected raw score for a student of ability θ_j .

The expected raw score monotonically increases with θ_j , consistent with the notion that students of high ability tend to earn higher raw scores than do students of low ability. Most TCCs are “S-shaped,” as they are flatter at the ends of the distribution and steeper in the middle.

The Test Information Function (TIF) displays the amount of statistical information that the test provides at each value of θ_j . Information functions depict test precision across the entire latent trait continuum. There is an inverse relationship between the information of a test and its standard error of measurement (SEM). For long tests, the SEM at a given θ_j is approximately equal to the inverse of the square root of the statistical information at θ_j (Hambleton, Swaminathan, & Rogers, 1991), as follows:

$$SEM(\theta_j) = \frac{1}{\sqrt{I(\theta_j)}}. \quad (\text{Equation 6})$$

Compared to the tails, TIFs are often higher near the middle of the distribution, where most students are located and where most items are sensitive by design.

For more information about item calibration and determination, the reader is referred to Lord and Novick (1968), Hambleton and Swaminathan (1985), or Baker and Kim (2004).

7.1.1 IRT Results

PARSCALE v4.1 (Muraki & Bock, 2003) software was used to perform all IRT analyses for the OSTP and CCRA. Each item occupied only one block in the calibration run, and the 1.701 normalizing constant was used for three-parameter logistic (3PL) items. A default convergence criterion of 0.001 was used. Further details about calibration settings are provided in Equating Report Section 1.2. The number of Newton cycles required for convergence for each grade and content area during the IRT analysis can be found in Equating Report Table 1.2.1. The number of cycles required fell within acceptable ranges (less than 150) for all tests.

Equating Report Table 1.2.2 lists items that were flagged based on the quality control checks implemented during the calibration process. The majority of items flagged during this step were identified because of the guessing parameter (c -parameter) being poorly estimated. Difficulty in estimating the c -parameter is not at all unusual and is well-documented in psychometric literature (for example, see Nering & Ostini, 2010), especially when the item's discrimination is below 0.50. In all cases, fixing the c -parameter resulted in reasonable and stable item parameter estimates and improved model fit. Other items were flagged as a result of the equating procedures; those results are described in the Equating section.

The tables in Appendix N (Equating Report Section 2.6) give the IRT item parameters of all dichotomous and polytomous items on the 2020–21 OSTP tests by content area and grade. Appendix N (Equating Report Section 2.1) provides the test characteristic curves (TCCs) and test information functions (TIFs) for the 2017–18 OSTP test by content area and grade.

7.2 EQUATING

The purpose of equating is to ensure that scores obtained from different forms of a test are equivalent to each other. Equating may be used if multiple test forms are administered in the same year, as well as to equate one year's forms to those given in the previous year. Equating ensures that students are not given an unfair advantage or disadvantage because the test form they took is easier or harder than those taken by other students.

The 2020–21 administration of the OSTP and CCRA tests used a raw score-to-theta equating procedure in which test forms were equated to the theta scale established on the reference form (i.e., the form used in the most recent standard setting). This is accomplished through the chained linking design, in which every new form is equated back to the theta scale of the previous year's test form. It can therefore be

assumed that the theta scale of every new test form is the same as the theta scale of the reference form since this is where the chain originated.

The groups of students who took the equating items on the 2020–21 OSTP tests are not equivalent to the groups who took them in the reference year. IRT is particularly useful for equating scenarios that involve nonequivalent groups (Allen & Yen, 1979). Equating for OSTP and CCRA uses the anchor-test-nonequivalent-groups design described by Petersen, Kolen, and Hoover (1989). In this equating design, no assumption is made about the equivalence of the examinee groups taking different test forms (that is, naturally occurring groups are assumed). Comparability is instead evaluated by utilizing a set of anchor items (also called equating items). However, the equating items are designed to mirror the operational test in terms of item types and distribution of emphasis. In the OSTP and CCRA test, every operational item is treated as an equating item wherever possible.

Previously uncalibrated item parameter estimates for the 2020–21 OSTP tests were placed on the 2020–21 scale by using the fixed common item parameter-equating method (FCIP). The fundamental approach taken in FCIP equating involves fixing the item parameters for equating items—those items that are the same in two test administrations—to their values from the previous year. When the current year’s non-equating items are calibrated simultaneously with equating items, the item parameters of the non-equating items are placed onto the previous year’s scale.

7.3 EQUATING RESULTS

Wherever possible, the 2020-21 OSTP and CCRA tests followed a preequated design, however a variety of evaluations of the equating items were conducted for the purposes of examining model fit and investigating differences between pre-COVID-19 and post-COVID-19 administrations. Equating items that were flagged for evaluation as a result of these procedures are listed in Appendix N (Equating Report Table 1.2.2). These items were scrutinized; however, the parameters were held constant in order to stabilize the scale and ensure comparability over time. Again, although the procedures used to evaluate the equating items are described below, no items were excluded from the equating sets. Delta analysis results are provided graphically in Equating Report Section 2.1 and tabled in Equating Report Section 2.4. The delta procedure was used to evaluate adequacy of equating items; the discard status presented in the appendix indicates whether the item was flagged as potentially inappropriate for use in equating. Finally, *a-a* plots and *b-b* plots, which show the IRT parameters for 2020–21 equating items plotted against their previous values, are presented in Appendix N (Equating Report Section 2.1). Any items that appeared as outliers in the plots were evaluated only for the purposes of evaluating item/model fit. Once all evaluations of the equating items were complete, the FCIP method was used to place previously uncalibrated item parameters onto the 2018–19 scale, as described above.

7.4 PERFORMANCE STANDARDS

The OSTP standards to establish performance level cut scores in ELA, mathematics, and science for grades 3–8 were established in the summer of 2017. Details of the standard-setting procedures can be found in the *Oklahoma School Testing Program: Standard Setting Report* (Measured Progress, 2017) provided as Appendix O. The CCRA standards were set in the summer of 2019 and can be found in Appendix P.

The cuts on the theta scale that were established via standard setting are presented in Table 7-1. Also shown in the table are the cut points on the reporting score scale (described below). These cut points will remain fixed throughout the assessment program unless standards are reset for any reason.

The tables in Appendix Q show performance level distributions for 2020–21 by content area and grade.

Table 7-1. Cut Scores on the Theta Metric and Reporting Scale by Content Area and Grade

Content Area									
	RSA	-0.92240	*	*	*	*	*	*	*
ELA	3	-0.53135	0.34092	1.39558	200	277	300	329	399
	4	-0.52719	0.38608	1.49870	200	275	300	331	399
	5	-0.78321	0.32533	1.17231	200	271	300	323	399
	6	-0.90856	0.28516	1.39169	200	269	300	330	399
	7	-0.49771	0.46660	1.25890	200	273	300	323	399
	8	-0.69508	0.45070	1.20801	200	269	300	322	399
Mathematics	3	-0.84047	0.18660	0.98750	200	274	300	321	399
	4	-0.77087	0.26986	1.06199	200	273	300	322	399
	5	-0.82901	0.42687	1.16994	200	266	300	321	399
	6	-0.75897	0.44047	1.51120	200	267	300	330	399
	7	-0.33556	0.44732	1.47147	200	279	300	329	399
	8	-0.02698	0.75594	1.26746	200	277	300	316	399
Science	5	-0.91364	0.17570	1.32213	200	272	300	330	399
	8	-0.34011	0.27999	1.32579	200	284	300	328	399
	11	0.16841	0.80213	1.52891	200	278	300	327	399

* Note that only a single cut point was set for grade 3 RSA and no scaled scores were reported.

7.5 OKLAHOMA PERFORMANCE INDEX SCORES

Because the θ scale used in IRT calibrations is not readily understood by most stakeholders, reporting scales were developed for OSTP and CCRA, and are known as Oklahoma Performance Index scores.

The reporting scales are simple linear transformations of the underlying θ scale, which were developed to range from 200 through 399. The lowest scaled score required to achieve Proficient is fixed at 300 for each subject and grade level.

By providing information that is more specific about the position of a student's results, scaled scores supplement performance-level scores. Students' raw scores (i.e., total number of points) on the 2020–21 OSTP and CCRA were translated to scaled scores using a data analysis process called scaling. Scaling simply converts data from one scale to another. In the same way that a given temperature can be expressed in either Fahrenheit or Celsius scales (or the same distance can be expressed in either miles or kilometers), student scores on the 2020–21 OSTP and CCRA tests can be expressed in either raw or scaled scores.

It is important to note that converting from raw scores to scaled scores does not change students' performance-level classifications. Given the relative simplicity of raw scores, it is fair to ask why scaled scores instead of raw scores are used in OSTP and CCRA reports. Foremost, scaled scores offer the advantage of simplifying result reporting across content areas and subsequent years. Because the standard-setting process typically results in different cut scores across content areas on a raw score basis, it is useful to transform these raw cut scores to a scale that is more easily interpretable and consistent. For the OSTP and CCRA, a score of 300 is the cut score determining proficiency in ELA, mathematics, and science. Using scaled scores greatly simplifies the task of understanding how a student performed. The psychometric advantage of scaled scores over raw scores is that they are linear transformations of θ . Since the θ scale is used for equating, scaled scores are comparable from one year to the next. Raw scores are not.

The scaled scores are obtained by a simple translation of ability estimates ($\hat{\theta}$) using the linear relationship between threshold values on the θ metric and their equivalent values on the scaled score metric.

Students' ability estimates are based on their raw scores and are found by mapping through the TCC.

Scaled scores are calculated using the linear equation as follows:

$$SS = m\hat{\theta} + b, \quad \text{(Equation 7)}$$

where
 m is the slope and
 b is the intercept.

A separate linear transformation is used for each grade and content area combination. Table 7-2 shows the slope and intercept terms used to calculate the scaled scores for each grade, content area, and performance level. Note that the values in Table 7-2 will not change unless the standards are reset.

Table 7-2. Scaled Score Slope and Intercept by Content Area and Grade

Content Area			
ELA	3	27.055981	290.776075
	4	27.394076	289.423695
	5	26.941195	291.235221
	6	26.649869	292.400523
	7	28.018339	286.926643
	8	27.892824	287.428704
Mathematics	3	25.961085	295.155662
	4	26.540559	292.837765
	5	27.706800	288.172798
	6	27.812661	287.749357
	7	27.866287	287.534853
	8	30.517315	276.930741
Science	5	25.887090	295.451638
	8	26.612832	292.548673
	11	35.877646	271.221287

The raw score to scaled score lookup tables for each content area are presented in Appendix N (Equating Report Section 2.2). Graphs of the scaled score cumulative frequency distributions for 2020–21 are also presented in Appendix N (Equating Report Section 2.1).

Chapter 8 Reliability

There are no significant changes to reliability analysis procedures in the SY 2020–2021 administration compared to previous years. However, interpretations cannot be made in the same way as previous years. The disruptions due to COVID-19 and the non-uniform instructional delivery makes drawing inferences or comparisons inappropriate.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

Although an individual item's performance is an important focus for evaluation, a complete evaluation of an assessment must also address the way items function together and complement one another. Tests that function well provide a dependable assessment of the student's level of ability. Unfortunately, no test can do this perfectly. A variety of factors can contribute to a given student's score being either higher or lower than his or her true ability. For example, a student may misread an item or mistakenly fill in the wrong bubble when he or she knew the answer. Collectively, extraneous factors that impact a student's score are referred to as measurement error. Any assessment includes some amount of measurement error; that is, no measurement is perfect. This is true of all academic assessments—some students will receive scores that underestimate their true ability, and other students will receive scores that overestimate their true ability.

When tests have a high amount of measurement error, student scores are very unstable. Students with high ability may get low scores or vice versa. Consequently, one cannot reliably measure a student's true level of ability with such a test. Assessments that have less measurement error (i.e., errors made are small on average and student scores on such a test will consistently represent his or her ability) are described as more reliable.

There are a number of ways to estimate an assessment's reliability. One possible approach is to give the same test to the same students at two time points that are close to each other. If students receive the same scores on each test, then the extraneous factors affecting performance are small and the test is reliable. (This is referred to as "test-retest reliability.") A potential problem with this approach is that students may remember items from the first administration or may have gained (or lost) knowledge or skills in the interim between the two administrations. A solution to the "remembering items" problem is to give a different but parallel test at the second administration. If student scores on each test correlate highly, the test is considered reliable. (This is known as "alternate forms reliability," because an alternate form of the test is used in each administration.) This approach, however, does not address the problem

that students may have gained (or lost) knowledge or skills in the interim between the two administrations. In addition, the practical challenges of developing and administering parallel forms generally preclude the use of parallel forms reliability indices.

One way to address the latter problems is to split the test in half and then correlate students' scores on the two half-tests; this in effect treats each half-test as a complete test. By doing this, the problems associated with an intervening time interval and of creating and administering two parallel forms of the test are alleviated. This is known as a "split-half estimate of reliability." If the two half-test scores correlate highly, items on the two half-tests must be measuring very similar knowledge or skills. This is evidence that the items complement one another and function well as a group. This also suggests that measurement error will be minimal.

The split-half method requires psychometricians to select items that contribute to each half-test score. This decision may have an impact on the resulting correlation since each different possible split of the test halves will result in a different correlation. Another problem with the split-half method of calculating reliability is that it underestimates reliability, because test length is cut in half. All else being equal, a shorter test is less reliable than a longer test. Cronbach (1951) provided a statistic, α (alpha), that eliminates the problem of the split-half method by comparing individual item variances to total test variance. Cronbach's α was used to assess the reliability of the 2020–21 OSTP as follows:

$$\alpha \equiv \frac{n}{n-1} \left[1 - \frac{\sum_{i=1}^n \sigma_{(Y_i)}^2}{\sigma_x^2} \right], \quad \text{(Equation 8)}$$

where
 i indexes the item,
 n is the total number of items,
 $\sigma_{(Y_i)}^2$ represents individual item variance, and
 σ_x^2 represents the total test variance.

8.1 RELIABILITY AND STANDARD ERRORS OF MEASUREMENT (SEM)

All reliability calculations (i.e., Cronbach's alpha and SEM) were based on the final sets of common and unique items that passed data review and were retained for operational scoring on operational forms. Average values and ranges of raw scores, Cronbach's α coefficient, and raw score standard errors of measurement (SEMs) for each content area and grade based on the overall population of students who took the 2020–21 OSTP are presented in Table 8-1. In this context, SEMs can be formally defined as the standard deviation of errors of measurement associated with test scores for a specific population of respondents. Additionally, Appendix R presents descriptive statistics for raw scores and reliability results.

Table 8-1. Summary of Reliability and SEM Results by Content Area and Grade

Subject							
ELA	3	45,568	51	26.71	9.91	0.90	3.16
	4	45,032	51	28.30	9.41	0.89	3.11
	5	45,970	55	31.98	10.76	0.92	3.12
	6	46,777	51	29.83	9.79	0.90	3.02
	7	46,711	51	27.83	9.04	0.88	3.19
	8	46,873	57	33.14	9.22	0.88	3.15
Mathematics	3	45,504	50	30.83	10.64	0.92	2.93
	4	44,983	50	27.85	9.84	0.91	3.00
	5	45,831	50	26.58	10.16	0.91	3.05
	6	46,733	50	25.93	9.50	0.89	3.08
	7	46,646	50	18.98	8.50	0.87	3.03
	8	46,476	50	20.86	8.85	0.88	3.11
Science	5	45,785	45	23.41	8.28	0.87	2.99
	8	46,403	48	24.33	8.74	0.86	3.22
	11	42,361	62	26.30	10.56	0.89	3.55

Appendix R also presents reliabilities for various subgroups of interest. Subgroup Cronbach's α 's were calculated using the formula defined above, based only on the members of the subgroup in question in the computations; values are calculated only for subgroups with ten or more students. For several reasons, these results should be interpreted with caution. First, inherent differences between grades and content areas preclude making valid inferences about the quality of a test based on statistical comparisons with other tests. Second, reliabilities are dependent not only on the measurement properties of a test but also on the statistical distribution of the studied subgroup. For example, it can be readily seen that the subgroup sample sizes vary considerably, which results in natural variation in reliability coefficients. Additionally, Cronbach's α , a type of correlation coefficient, may be artificially depressed for subgroups with little variability (Draper & Smith, 1998). Third, there is no industry standard to interpret the strength of a reliability coefficient, and this is particularly true when the population of interest is a single subgroup.

Of more interest are reliabilities for the reporting categories within OSTP content areas, as described in Chapter 3. Cronbach's α coefficients for reporting categories were calculated with the same formula defined previously using just the items of a given subcategory in the computations. Again, these results are presented in Appendix R. As results are based on a subset of items rather than the full test, once again, as expected, computed reporting category reliabilities were lower (sometimes substantially so) than overall test reliabilities approximately to the degree one would expect based on classical test theory; interpretations should take this into account. Qualitative differences between grades and content areas

once again preclude valid inferences about the quality of the full test based on statistical comparisons among reporting categories.

8.2 RELIABILITY OF PERFORMANCE LEVEL CATEGORIZATION

While related to reliability, the accuracy and consistency of classifying students into performance categories are even more important statistics in a standards-based reporting framework (Livingston and Lewis, 1995). After the performance levels were specified and students were classified into those levels, empirical analyses were conducted to determine the statistical accuracy and consistency of the classifications. For the OSTP and CCRA, students are classified into one of four performance levels: Below Basic, Basic, Proficient, or Advanced. This section of the report explains the methodologies used to assess the reliability of classification decisions.

Accuracy refers to the extent to which decisions based on test scores match decisions that would have been made if the scores did not contain any measurement error. Accuracy must be estimated because errorless test scores do not exist. Consistency measures the extent to which classification decisions based on test scores match the decisions based on scores from a second, parallel form of the same test. Consistency can be evaluated directly from actual responses to test items if two complete and parallel forms of the test are given to the same group of students. In operational test programs, however, such a design is usually impractical. Instead, techniques have been developed to estimate both the accuracy and consistency of classification decisions based on a single administration of a test. The Livingston and Lewis (1995) technique was used for the 2020–21 OSTP and CCRA because their technique is easily adaptable to all types of testing formats, including mixed-format tests.

The accuracy and consistency estimates reported in Appendix S make use of “true scores” in the classical test theory sense. A true score is the score that would be obtained if a test had no measurement error. Of course, true scores cannot be observed and so must be estimated. In the Livingston and Lewis (1995) method, estimated true scores are used to categorize students into their “true” classifications.

For the 2020–21 OSTP and CCRA, after various technical adjustments (described in Livingston & Lewis, 1995), a four-by-four contingency table of accuracy was created for each content area and grade, where cell $[i, j]$ represented the estimated proportion of students whose true score fell into classification i (where $i = 1$ to 4) and observed score fell into classification j (where $j = 1$ to 4). The sum of the diagonal entries (i.e., the proportion of students whose true and observed classifications matched) signified overall accuracy.

To calculate consistency, true scores were used to estimate the joint distribution of classifications on two independent, parallel test forms. Following statistical adjustments per Livingston and Lewis (1995), a new four-by-four contingency table was created for each content area and grade and populated by the proportion of students who would be categorized into each combination of classifications according to the two (hypothetical) parallel test forms. Cell $[i, j]$ of this table represented the estimated proportion of

students whose observed score on the first form would fall into classification i (where $i = 1$ to 4) and whose observed score on the second form would fall into classification j (where $j = 1$ to 4). The sum of the diagonal entries (i.e., the proportion of students categorized by the two forms into exactly the same classification) signified overall consistency.

The above indices are derived from Livingston and Lewis's (1995) method of estimating the accuracy and consistency of classifications. It should be noted that Livingston and Lewis discuss two versions of the accuracy and consistency tables. A standard version performs calculations for forms parallel to the form taken. An "adjusted" version adjusts the results of one form to match the observed score distribution obtained in the data. The tables use the standard version for two reasons: (1) this "unadjusted" version can be considered a smoothing of the data, thereby decreasing the variability of the results; and (2) for results dealing with the consistency of two parallel forms, the unadjusted tables are symmetrical, indicating that the two parallel forms have the same statistical properties. This second reason is consistent with the notion of forms that are parallel; that is, it is more intuitive and interpretable for two parallel forms to have the same statistical distribution.

Another way to measure consistency is to use Cohen's (1960) coefficient κ (kappa), which assesses the proportion of consistent classifications after removing the proportion of consistent classifications that would be expected by chance. It is calculated using the following formula:

$$\kappa = \frac{(\text{Observed agreement}) - (\text{Chance agreement})}{1 - (\text{Chance agreement})} = \frac{\sum_i C_{ii} - \sum_i C_i C_i}{1 - \sum_i C_i C_i}, \quad (\text{Equation 9})$$

where

C_i is the proportion of students whose observed performance level would be Level i (where $i = 1-4$) on the first hypothetical parallel form of the test;

C_i is the proportion of students whose observed performance level would be Level i (where $i = 1-4$) on the second hypothetical parallel form of the test; and

C_{ii} is the proportion of students whose observed performance level would be Level i (where $i = 1-4$) on both hypothetical parallel forms of the test.

Because κ is corrected for chance, its values are lower than are those of other consistency estimates.

8.3 ACCURACY AND CONSISTENCY RESULTS

The accuracy and consistency analyses described above are provided in Table 8-2. The table includes overall accuracy and consistency indices, including kappa. Accuracy and consistency values conditional on performance level are also given. For these calculations, the denominator is the proportion of students associated with a given performance level. For example, the conditional accuracy value is 0.78 for Basic for mathematics grade 3. This figure indicates that among the students whose true scores placed them in this classification, 78% would be expected to be in this classification when categorized according to their observed scores. Similarly, again for mathematics grade 3, a consistency value of 0.59 indicates that 59% of students with observed scores in the Proficient level would be expected to score in this classification again if a second, parallel test form were used.

Table 8-2. Summary of Decision Accuracy (and Consistency) Results by Content Area and Grade Overall and Conditional on Achievement Level

Content Area							
ELA	3	0.80 (0.72)	0.58	0.88 (0.85)	0.75 (0.66)	0.69 (0.59)	0.69 (0.44)
	4	0.81 (0.73)	0.59	0.90 (0.85)	0.75 (0.65)	0.70 (0.62)	1.00 (0.31)
	5	0.79 (0.71)	0.59	0.89 (0.84)	0.81 (0.74)	0.66 (0.58)	0.65 (0.43)
	6	0.80 (0.73)	0.60	0.88 (0.82)	0.84 (0.77)	0.65 (0.59)	1.00 (0.42)
	7	0.73 (0.71)	0.54	0.95 (0.86)	0.69 (0.64)	0.48 (0.49)	0.43 (0.33)
	8	0.77 (0.69)	0.54	0.88 (0.82)	0.81 (0.74)	0.53 (0.45)	0.67 (0.44)
Mathematics	3	0.80 (0.72)	0.61	0.89 (0.83)	0.78 (0.70)	0.70 (0.59)	0.79 (0.67)
	4	0.79 (0.71)	0.59	0.88 (0.85)	0.80 (0.72)	0.61 (0.50)	0.76 (0.61)
	5	0.81 (0.74)	0.62	0.89 (0.85)	0.83 (0.77)	0.61 (0.49)	0.78 (0.63)
	6	0.82 (0.75)	0.62	0.87 (0.83)	0.84 (0.77)	0.67 (0.56)	0.78 (0.60)
	7	0.81 (0.75)	0.58	0.89 (0.88)	0.68 (0.57)	0.73 (0.60)	0.76 (0.52)
	8	0.81 (0.76)	0.55	0.95 (0.92)	0.67 (0.55)	0.42 (0.35)	1.00 (0.38)
Science	5	0.78 (0.70)	0.56	0.83 (0.78)	0.79 (0.71)	0.73 (0.64)	0.67 (0.45)
	8	0.77 (0.70)	0.55	0.89 (0.85)	0.60 (0.49)	0.72 (0.63)	0.67 (0.47)
	11	0.79 (0.73)	0.57	0.93 (0.89)	0.72 (0.61)	0.56 (0.51)	0.23 (0.41)

For some testing situations, the greatest concern may be making decisions around level thresholds. For example, if a college gave credit to students who achieved an Advanced Placement test score of 4 or 5 but not to students with scores of 1, 2, or 3, one might be interested in the accuracy of the dichotomous decision below 4 versus 4 or above. For the 2020–21 OSTP and CCRA, Appendix S provides accuracy and consistency estimates at each cutpoint, as well as false positive and false negative decision rates. (A false positive is the proportion of students whose observed scores were above the cut and whose true scores were below the cut. A false negative is the proportion of students whose observed scores were below the cut and whose true scores were above the cut). Accuracy and consistency estimates at each cutpoint were 0.86 or higher across all content areas and grades for OSTP and CCRA 2020–21. Further, false positive and false negative rates were at the nominal level (0.11) or lower, indicating that student classification according to true scores agrees with observed score classification.

Chapter 9 Score Reporting

One key change to score reporting in the 2020–2021 administration is that, in the absence of SY 2019–2020 assessment results, no growth metrics are being reported this year. Therefore, it is particularly important this year, that other information (e.g., opportunity to learn, mode of learning, access to grade level content, attendance, course grades, etc.) be considered when interpreting your data to plan next steps. Additionally, because of unique COVID-related disruptions, we ask that you please consider your local context before comparing 2021 data to previous years or other school sites. Another key change to this chapter for SY 2020–2021 is the omission of analyses of the reporting structures using confirmatory factor analysis. Given differences in learning and instruction in SY 2020–2021, it would be unclear if reporting structure dimensionality as identified by confirmatory factor analysis would be influenced by COVID related disruptions and such analyses would be difficult to interpret. To that end, analyses from the SY 2018–2019 technical report would provide reasonable evidence as to support the usefulness and interpretability of OSTP and CCRA reporting structures in this and future administrations. Additional evidence supporting the reporting structure of OSTP and CCRA Assessments is presented in Appendix T.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

The OSTP and CCRA are designed to measure student performance against Oklahoma’s content standards. Consistent with this purpose, results for the 2020–21 OSTP and CCRA were reported in terms of four performance levels that describe student performance in relation to these established state standards: Below Basic, Basic, Proficient, and Advanced. Students received a separate performance-level classification (based on overall scaled score) in each content area.

The OSTP and CCRA are administered in both online and paper formats; all tests were primarily online, with paper forms provided as an accommodation.

Reports were generated at the student, school, and district levels. For grades 3–8, student results labels and student reports were printed and mailed to the districts for distribution to the schools. In addition to the paper reports, an online reporting tool was provided for school, district, and state users to dynamically generate their own reports and review the student and summary results of each test. The details of each report are presented in the sections that follow. Samples of the reports are included in Appendix U. As a part of the reporting tools this year, a parent portal was added to provide families with an online portal to access student reports.



For CCRA science, all reporting was done through the online reporting tool and the parent portal for families. Science student results labels were shipped to the districts for students' information files. U.S. History was a field test in 2020-21 and only reported to the SDE in a participation file and a rankings file.

9.1 PROCESSING AND REPORTING BUSINESS REQUIREMENTS

To ensure that reported results for the OSTP are accurate relative to collected data and other pertinent information, a document delineating the processing and reporting business requirements is prepared prior to each reporting cycle. The requirements are observed in the analyses of OSTP test data and in reporting content area results. These requirements also guide data analysts in identifying students to be excluded from school-, district-, and state-level summary computations. A copy of the *Processing and Reporting Business Requirements* document is included in Appendix V.

9.2 STATIC REPORTS

The following reporting deliverables were produced for the Oklahoma tests:

- Student Report
- Student Results Label
- eMetric Data Interaction Online Reporting Tool
- eMetric Parent Portal

The student report (for grades 3–8) and student results labels (for all tested grades) were printed and shipped to the school districts for distribution to the schools. In addition, the school, district, and state users also had access to the eMetric Data Interaction reporting tool. Each of these reporting deliverables is described in the following sections.

9.2.1 Student Report

The student report created for each student is a double-sided color folio report that provides scaled score, performance-level, and reporting category results for each tested content area, as well as a state level breakdown of student performance by performance level for each content area. (See Appendix U for an example.) Students receive one report with information on each tested content area. One copy of the report is produced for schools to send home to parents and/or guardians. Schools were provided with instruction on how to pull information from the eMetric portal if paper copies were needed for the student file.

The front page of the report begins by providing the following identifying demographics about the student:

- Student name
- Local ID
- State ID



- Date of birth
- Grade
- Class name
- School name
- District name

The top section of the front page includes a description of the purpose of the OSTP. Following the description is a graphical display of the student's scaled score and the earned performance level for each content area tested. Below that information there is a graphical display of the student's test results in that content area over the last three years (if that information is available). For grade 3 ELA tests, there is also a statement about whether a student did or did not meet the RSA Criteria based upon Standard 2.0 (Reading and Writing Process) and Standard 4.0 (Vocabulary). Similarly, in grade 8 ELA there is an indication as to whether or not student has met the Driven to Read requirements.

The middle section of the folio provides detailed information on how families can support students in each content area. The top sections provide the performance level descriptor information behind the performance level achieved by the student in each performance level. Next, each content area is broken down into reporting categories and shows an indication of how many points the student earned in each category out of the total points possible. Alongside each reporting category are the normative performance comparisons for that category and ways in which families can support their student's continued growth. Beneath that section, the student results in each content area tested are compared to the school, district, and state performance in a bar graph. Finally, beneath ELA and mathematics score information Lexile measures (for reading) and Quantile measures (for mathematics) are displayed.

Student Lexile measures (for reading) and Quantile measures (for mathematics) appear below the scaled score and performance level display for students who tested in ELA or mathematics.

The back page of the report provides additional information for families looking to gather more information about the report or their student's performance in school. There is a section to assist families with using the report when meeting with the student's teacher or school. There is also a list of resources and links to family guides to further support student growth and achievement.

9.2.2 Student Results Labels

A student results label was generated for each student. Each student label is two-by-four inches and provides the following student information:

- Student name
- Student ID
- Date of birth
- Gender



- Grade
- School name
- District name

The label provides the student's consolidated scaled score and performance level information for all tested content areas for the grade level. If a student did not earn a scaled score, the report states the reason the student was not tested.

9.2.3 Interactive Reports

Data Interaction, eMetric's web-based reporting solution, features a range of report types that allow analysis across years from the group level down to the individual student level. Each report type may be customized to include or exclude fields and attributes to meet the SDE's specific needs. Report types include the following:

- Roster Report
- Group Summary Report
- Graphical Summary Report
- Longitudinal Roster Report
- Quick Reports
- Individual Student Report

9.2.4 Roster Report

The Roster Report includes individual student scores and demographics for each content area and single administration. Users can select to view, search, and filter by organization (school, district, or entire state, depending on the user's access level) and a variety of demographic data and score data. Drill-down features allow users to directly access individual student results.

9.2.5 Group Summary Report (Performance Levels)

The Group Summary Report provides a comparison of school, district, and state group performance over various summary statistics. Statistics include number of students tested, mean scaled score, and number and percent of students at each performance level. Users can customize the display by selecting different content areas, statistics, multiple administrations, demographic variables, and report views, resulting in powerful and flexible ways to create dynamic reports. Drill-down features allow users to disaggregate by subgroup or directly access individual student results for a selected subgroup.

9.2.6 Group Summary Report (Standards and Objectives)

The Group Summary Report for Standards and Objectives creates reports by school or district with results of standards and objectives by content area for one administration. The data can be filtered and

disaggregated by score and demographic data. Drill-down features allow users to disaggregate by subgroup or to directly access individual student results. This is a legacy report that is only available when viewing data from the former OCCT assessment.

9.2.7 Graphical Summary Report (Performance Levels)

The Graphical Summary Report provides a visual alternative to analyze group data through the use of graphs and other visualization tools. Summary statistics include percentage of students in each performance level, percentage of students at or above Proficient, percentage of students below Proficient, and RSA status level. Graphs include bar charts, pie charts, and histograms. Users can customize their graphs by selecting different content areas, statistics, multiple administrations, demographic variables, and views. Drill-down features allow users to disaggregate by subgroup or to directly access individual student results.

9.2.8 Longitudinal Roster Report

The Longitudinal Roster Report displays results of individual student scores and demographics by content area in multiple administrations. Users can select to view, search, and filter by organization (school, district, or entire state, depending on the user's access level) and a variety of demographic data and score data. Drill-down features allow users to directly access individual student results.

9.2.9 Quick Reports

Six quick reports are provided. These are the same summary or roster reports outlined above with specific preselected filters requested by the client that provide the most commonly used report data. Quick Reports provided are as follows:

- Summary Report of Total Tested (by organization, administration, and subject)
- Roster: All Selections (with all scores preselected)
- Group Summary PL: All Selections (with all scores and disaggregate variables preselected)
- Group Summary S & O: All Selections (with all scores and disaggregate variables preselected)
- Graphical Summary PL: All Selections (with all disaggregate variables preselected)
- Longitudinal Roster: All Selections (with all scores preselected)

It is important to note that some of these are legacy reports that are only available when viewing data from the former OCCT assessment.

9.2.10 Parent Portal

This year families have been provided with an online portal to access student reports. The Oklahoma Parent Portal is designed to provide students and parents/guardians with online access to a student's

state assessment scores. This portal will assist a student and his or her parents/guardians with tracking assessment information throughout the student's academic career.

The portal provides scores from the OSTP and CCRA 2020-21 assessments. The OCCT for grades 3–8, End-of-Instruction (EOI) and the OMAAP scores are not available in the Parent Portal.

9.3 QUALITY ASSURANCE

The Software Quality Assurance (SQA) team worked together with the data processing and data analysis teams to ensure quality data was captured and delivered accurately. Using multiple software tools, quality control checks were performed by the data processors and data analysts as the data was handed off.

These quality checks initialized the accuracy of the data being ingested into the database and subsequent tables and columns.

Software Quality Assurance developed a test plan that included previously agreed upon report designs and the *Processing and Reporting Business Requirements* document. Test cases housed in an internal test cases repository software were then executed, including, but not limited to, the following:

- testing data counts of data imported;
- testing data quality of individual fields for valid values, such as gender, ethnicity, etc.;
- validating scripts developed by the software developers to ensure they match business requirements and technical specifications.

Included in this testing effort to ensure the quality of the data, the SQA team used a sample of schools and districts which were selected based on multiple criteria. A few criteria are identified below:

- students' unique testing records
- students' complete testing
- students' partial complete testing
- invalidated students

Working closely with the data processing and data analysis teams allowed a timely and precise turnaround if any data anomalies were found. Test cases were tied to tickets outlining required work to allow for full transparency and cohesive teamwork in validation of the data.

Later, the SQA team executed test cases validating student printed reports and student labels to ensure that they met the specifications.

When all the test cases were passed, the SQA team notified the Cognia State Services department for final sign off.

Chapter 10 Validity

The nature of support for the validity of interpretations and uses of the SY 2020–2021 administration of the OSTP and CCRA contained within this chapter is such that no modification was necessary. The evidence within each section is built upon the appropriateness of all of the other technical aspects of the assessment as documented in this report. Where changes between the SY 2020–2021 administration and previous years were reported, those changes were made primarily to ensure that evidence remained sufficient to preserve validity of interpretation and use and that the descriptions of evidence sources within this chapter continued to support these interpretations and uses.

The Oklahoma State Department of Education provides a resource document to aid in the interpretation of assessment scores, including important considerations for reviewing and interpreting SY 2020–2021 state performance data. This document is available at https://sde.ok.gov/sites/default/files/documents/files/F_09_22_Y%202021_Overview%20and%20Framing%20Questions_0.pdf.

Five sources of validity evidence that can be used in evaluating claims are outlined by Standards for Educational and Psychological Testing (AERA et al., 2014): test content, internal structure, response processes, relationships to other variables, and consequences of testing. Each of these sources speaks to different aspects of validity but are not distinct types of validity. Instead, each contributes to a body of evidence about the comprehensive validity of score interpretations. When validating test scores, these sources of evidence should be carefully considered.

10.1 EVIDENCE BASED ON TEST CONTENT

Evidence based on test content validity is meant to determine how well the assessment tasks represent the curriculum and standards for each content area and to support Claim 1: “the assessments are reliable, valid, and aligned to the Oklahoma Academic Standards.”

Content validation is informed by the item development process, including how the test blueprints and test items align to the curriculum and standards. Viewed through this lens provided by the standards, evidence based on test content is described in Chapters 3 and 4. A description of the item development process, along with a description of the alignment process and test development, is presented in complete detail in Chapter 3—Test Design and Development. A detailed description of the test administration processes is found in Chapter 4—Test Administration. All operational and field-test items for OSTP and CCRA (grades 3–8 and grade 11) administered in spring 2021 were subjected to cycles of reviews by the SDE. All OSTP test items were aligned by Oklahoma educators to specific OAS and underwent several rounds of review for content fidelity and appropriateness.

Items were presented to students in two formats (constructed-response or multiple-choice) and ultimately administered according to state-mandated standardized procedures, with allowable accommodations. All test proctors were required to attend training sessions. Finally, machine- and human-scoring of student responses were subject to standardized and rigorous procedures to ensure the accuracy and validity of the results in capturing student performance. Chapter 5 describes the steps taken to train scorers and monitor the quality of scoring student responses for constructed-response items. Quality control procedures related to scanning and machine scoring are also described.

Through the content standards, evidence based on test content addresses Claim 4: “the OSTP assessments provide a measure of future academic performance to assessments administered in high school.” The OAS in mathematics, English language arts, and science all present the progression of expectations regarding knowledge and skills across Pre-Kindergarten through grade 12 in serving to meet the demands of college and employers. Through this articulation of content standards, the spring 2021 administration of the OSTP and CCRA tests supports high school academic performance.

10.2 EVIDENCE BASED ON INTERNAL STRUCTURE

Evidence based on internal structure is presented in the discussions of item analyses, reliability, and scaling and equating in Chapters 6–8. Technical characteristics of the internal structure of the assessments are presented in terms of classical item statistics (item difficulty, item-test correlation), differential item functioning (DIF) analyses, dimensionality analyses, reliability, standard errors of measurement (SEM), and item response theory (IRT) parameters and procedures. These various sources provide support for Claim 1: “the assessments are reliable, valid, and aligned to the Oklahoma Academic Standards.”

The spring 2021 OSTP grades 3–8 scores for mathematics and ELA and grades 5 and 8 for science were equated to the reference scale established by standard setting in 2017. The spring 2021 CCRA scores for science grade 11 were placed on the reference scale established by standard setting in the summer of 2019. Complete descriptions of the operational and field-test item analyses and the calibration, scaling, and equating analysis are found in Chapter 6—Classical Item Analysis and Chapter 7—Item Response Theory Scaling and Equating. Summaries of reliability and validity for different levels of analyses are found in Chapter 8—Reliability.

In general, item difficulty and discrimination indices were in acceptable and expected ranges. Very few items were answered correctly at near-chance or near-perfect rates. Similarly, the positive discrimination indices indicate that most items were assessing consistent constructs, and students who performed well on individual items tended to perform well overall.

Reliability coefficients for operational forms were high and similar across grades, ranging from 0.89 to 0.92 for mathematics, from 0.87 to 0.91 for ELA, and from 0.87 to 0.89 for science. Standard errors of measurement demonstrated similar consistency, ranging from 2.76 to 3.11 for mathematics, from 2.92 to

3.19 for ELA, and from 2.93 to 3.56 for science. (See Table 8-1.) As discussed in section 8.1, the reliability of student subgroups should be interpreted with caution, as reliabilities are dependent not only on the measurement properties of a test but also on the statistical distribution of the studied subgroup. For example, it can be readily seen in Appendix R that subgroup sample sizes varied considerably, which results in natural variation in reliability coefficients. As expected, subcategory reliabilities are lower than overall test reliabilities. These results are attributed to the fact that only a subset of items makes up each reporting subcategory; reliability results are therefore seen to decrease to an expected degree associated with test items.

Evidence supporting placement of students in the correct performance level, considering true score and classification according to chance, is demonstrated as all kappa values are above 0.50, indicating that the majority of students were placed in the correct performance level (Table 8-2). Further, accuracy and consistency values at each of the cutpoints are typically above 0.90 and 0.85, respectively, indicating that the majority of students would be classified in the same performance level if administered a parallel test form.

10.3 EVIDENCE BASED ON RESPONSE PROCESSES

Evidence for validity of the OSTP and CCRA is also based on “the fit between the construct and the detailed nature of performance or response actually engaged in by examinees” (AERA et al., 2014). This evidence is collected by surveying examinees about their performance strategies or responses to particular items. Because items are developed to measure particular constructs and intellectual processes, evidence that examinees have engaged in relevant performance strategies to correctly answer the items supports the validity of the test scores. This is the third piece of evidence supporting Claim 1: “the assessments are reliable, valid, and aligned to the Oklahoma Academic Standards.”

Cognitive labs were conducted with Oklahoma students in September 2015 in support of the OSTP 2016-17 science administration and future administrations. Further cognitive labs in support of ELA and mathematics were conducted in September 2019 in support of the OSTP 2019-20 test administration and future administrations. These cognitive labs reports are combined and included in this report as Appendix W.

10.4 EVIDENCE BASED ON RELATIONSHIPS TO OTHER VARIABLES

Evidence based on the relationship to external measures of mathematics, ELA, and science is addressed in the *Oklahoma School Testing Program: Standard Setting Report* (Measured Progress, 2017)—provided as Appendix O. This source of evidence provides support for Claim 2: “student performance resulting from the assessments is comparable to results of other high-quality large-scale assessments.”

Standard setting procedures were designed to facilitate alignment between student performance on the OSTP assessments and as demonstrated on the NAEP and ACT assessments. A benchmarking procedure was implemented during standard setting that enabled panelists and stakeholders to evaluate student performance in the context of proficiency on these comparable, external assessments. This resulted in cutpoints that are both appropriate and aspirational for student performance in Oklahoma.

10.5 EVIDENCE BASED ON CONSEQUENCES OF TESTING

Evidence based on the consequences of testing is addressed in the reporting information in Chapter 9, as well as in the interpretive materials (see Section 1.1—Purpose of the Oklahoma School Testing Program). These sources of evidence are provided in support of Claim 3: “the assessment results facilitate norm-referenced and criterion-referenced score interpretations.”

These documents speak to the efforts undertaken to promote accurate and clear information provided to the public regarding test scores. Several different standard score reports were provided to stakeholders. In addition, a data analysis tool has been provided to each school system to allow educators the flexibility to customize reports for local needs. These documents all serve to provide useful and simple access to student performance information (i.e., scale scores and performance levels) at the individual and aggregate level.

10.6 SUMMARY OF EVIDENCE

Evidence for the validity of test score interpretations resulting from the spring 2021 administration of the OSTP and CCRA assessments is strengthened as the evidence supporting test score interpretations accrues. In this sense, the process of seeking and evaluating evidence for the validity of test score interpretation is ongoing. Nevertheless, there currently exists sufficient evidence to support the claims for the OSTP and CCRA assessments stated in Chapter 1 with respect to test content, internal structure, response processes, relationships to other variables, and consequences of testing.

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Appendices



APPENDIX A
CONTENT STANDARDS

OKLAHOMA ACADEMIC STANDARDS

ENGLISH LANGUAGE ARTS



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —

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OKLAHOMA ENGLISH LANGUAGE ARTS STANDARDS GUIDING PRINCIPLES

Teachers use standards as guides for developing curriculum and instruction that is appropriately engaging, challenging, and sequenced for the students in their care. By nature, acquiring language arts knowledge and skills is a recursive learning endeavor: students revisit concepts again and again as they use language at increasingly sophisticated levels. Because of this recursive learning process, language arts learning will not progress for students in the strictly linear way it may in other content areas. Nonetheless, it is important for any set of standards to provide “concise, written descriptions of what students are expected to know and be able to do at a specific stage of their education” (Great Schools Partnership, 2014). In order to make this document a clear, coherent description of what students are expected to know and be able to do at specific stages, the writers have adopted some guidelines for design and organization.

Clarity

- ★ Standard statements are written with verbs that indicate specifically what learning students must demonstrate and at what depth. When students *defend, compare, estimate, paraphrase, predict, or summarize*, they are able to show a broader range of mastery of a concept than when they are expected to *identify, recognize, or recall*. However, the writers also have given full consideration to the complexity of the content itself. For example, it is more challenging to identify the implied theme of an extended essay than to identify the subject of a sentence. The progression of language arts learning from pre-kindergarten through high school should reflect a grade-level appropriate relationship between the level of critical thinking students use and the actual listening, speaking, reading, and writing experiences students have.
- ★ Content to be emphasized and assessed at specific grade levels (e.g., modes of writing or particular elements of grammar) is clearly identified.
- ★ Definitions for terms used in the standards document are compiled in an updated, expanded glossary.

Coherence

- ★ Eight overarching standards, the College- and Career- Ready English Language Arts standards, identify the knowledge and skills of the discipline that PK-12 students are to learn; each standard for every grade is delineated at the appropriate level.
- ★ A PK-12 vertical progression of standards, organized by the eight overarching standards, allows for educators to recognize how all the standards are intertwined to develop the total literacy of a student. When a skill is no longer present, mastery is implied; however, teachers must support previous grade level skills according to the mastery level of their students. This grade-to-grade, standard-by-standard progression can be viewed in a horizontal format, organized into overlapping grade bands.
- ★ Users must examine all of the standards for each grade level as a whole to have a coherent understanding of what is required of learners.
- ★ Because of the interconnectedness of language arts concepts and skills, various aspects of what students know and can do may be described in more than one standard. For example, learners conducting research (Standard 6) should use speaking and listening (Standard 1), the reading and writing processes (Standard 2), academic vocabulary (Standard 4), critical reading and writing (Standard 3), formal grammar and usage (Standard

5), and more than likely, they will access research and complete their research products because they are competent in multimodal literacies (Standard 7).

- ★ As students progress through grade levels, expectations encompass the content of the previous grades. Specifically in connection to reading assignments, the complexity of texts increases as students advance to later grades; however, simpler texts can be used effectively in order for learners to develop a deeper understanding of content (as examples – theme, figurative language, genre, structure).

Purpose

In addition to a commitment to clear and coherent standards, the writers were guided by four fundamental purposes of English language arts education.

- ★ All learners must hear the voices of their own heritage in the literature they encounter. They must be given the opportunity to speak with the voices they choose for themselves in the writing they create. The language arts classroom is a place that is inclusive of race, ethnicity, culture, and all perspectives that reflect the richness of human experience.
- ★ All learners are supported to become independent readers in a range of disciplines. The ability to interpret literature as well as informative, highly technical, and often lengthy reading passages on one's own is paramount in achieving academic and career success. Furthermore, learners who possess the skills required to read independently have the power to choose both what they *need* and what they *want* to read.
- ★ All learners are supported to become independent writers for a variety of audiences and a range of purposes. Four- and five-year-olds begin writing by verbally telling their ideas and stories to others, but their status as independent writers is not earned with mastery of the five-paragraph essay form in high school. Independent writers are able to access multiple strategies and formats to communicate and craft the message so that it resonates with any readers they want to reach.
- ★ A literate citizenry possesses the skills required to analyze, evaluate, act upon, and compose a wide range of communications. An ultimate goal of language arts education is the development of informed citizens who can contribute to the common good.

OKLAHOMA COLLEGE- AND CAREER-READY ENGLISH LANGUAGE ARTS STUDENTS

The following eight standards encompass the content and competencies of English language arts. Each standard reflects both reading and writing applications, as these processes are bound together in the literate world.

The order of the standards is meant to suggest that students learn to read and write by speaking and listening on their way to the ultimate goal of becoming independent, critical readers and writers. At the same time, speaking and listening skills will continue to be developed as students progress through the grade levels, and concepts of independent reading and writing will be introduced even in the earliest grades.

Independent reading and writing is a natural outgrowth of strong standards implementation through rigorous curriculum. Standard 8 addresses the integrated nature of English language arts and acknowledges students' need to grow increasingly independent for college and career readiness. Being able to work independently and seek out opportunities to read and write is a significant part of life-long learning. These skills easily transfer to test taking, civic engagement, and citizen participation.

Standard 1: Speaking and Listening

Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

Standard 2: Reading Foundations/Reading Process and Writing Process

Students will develop foundational skills for future reading success by working with sounds, letters, and text. Students will use recursive processes when reading and writing.

Standard 3: Critical Reading and Writing

Students will apply critical thinking skills to reading and writing.

Standard 4: Vocabulary

Students will expand their working vocabularies to effectively communicate and understand texts.

Standard 5: Language

Students will apply knowledge of grammar and rhetorical style to reading and writing.

Standard 6: Research

Students will engage in inquiry to acquire, refine, and share knowledge.

Standard 7: Multimodal Literacies

Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non-verbal, and interactive texts.

Standard 8: Independent Reading and Writing

Students will read and write for a variety of purposes including, but not limited to, academic and personal, for extended periods of time.

OKLAHOMA ENGLISH LANGUAGE ARTS STANDARDS GUIDING RESEARCH

Well-recognized guiding research in language arts upholds Oklahoma’s Eight CCR Standards as a whole, especially the standards’ emphasis on the reciprocal relationship between reading and writing: we read what others have written and write to create reading for audiences beyond ourselves. This guiding research deserves expanded commentary.

READING FOUNDATIONS

The International Literacy Association (ILA) and the Report of the Subgroups of the National Reading Panel have identified important components of reading. Foundational reading skills are included within Standard 2: Reading Process.

PRINT CONCEPTS - the ability to understand distinguishing features of print, including knowing that the print on the page contains a message, that print contains words that can be read aloud, that print has a distinct “right side up,” and that words are read from left to right.

PHONOLOGICAL/PHONEMIC AWARENESS - the understanding that words and syllables can be broken down into smaller units or phonemes is a strong predictor of later reading success.

PHONICS/DECODING - instruction that provides students with a consistent strategy to apply knowledge of sound-symbol relationships to assist them in identifying unfamiliar words.

VOCABULARY – a comprehension that a reader's understanding of text is inextricably linked to his or her vocabulary base that can be developed through reading, direct instruction, and student-centered activities.

READING FLUENCY – a recognition that fluent reading is characterized by reading words with automaticity and expression and recognizing words with speed, accuracy, and prosody; such automatic word recognition frees a student’s attention to comprehend the text.

COMPREHENSION/CRITICAL LITERACY – a recognition that the goal of reading is understanding text by establishing a purpose for reading and determining what is literal and what is implied in the text. Critical literacy involves the reader being able to make connections between parts of a text and between texts. In addition to these foundational components, skilled reading is influenced by the development of motivation and engagement, attitude, and stance toward reading and writing and the process of interacting with text before, during and after reading.

MOTIVATION and ENGAGEMENT - readers’ desire to interact with a text, influenced by their own self-efficacy as well as the genre, text level, author, illustrator, or topic of a text. The reader’s engagement with text may be influenced by motivation to interact with a specific text.

ATTITUDE - a reader’s attitude toward reading for academic or leisure purposes influences the probability that he/she will choose to become engaged in the reading process.

STANCE - whether a reader is approaching a text for pleasure or for information.

READING PROCESS - the importance of a reader being involved with the text before (setting a purpose for reading), during (reading, monitoring comprehension, investigating terms he/she does not understand), and after (referring back to the text to strengthen one's understanding, answer questions, engage in discussions and complete projects) reading.

WRITING PROCESS

The National Council of Teachers of English (NCTE) has identified a process, confirmed by research, that skilled writers use to create text. Because writing is recursive, the stages of the process may not occur in a linear sequence, but the writer may revert to an activity characteristic of an earlier stage. The stages of the writing process include –

PREWRITING - preparing to write by gathering and organizing ideas, generating a topic, and clarifying purpose, audience, and form.

DRAFTING - putting ideas down on paper with a focus on content while using notes or ideas generated during prewriting, without over-concern about adherence to grammatical rules, spelling, or mechanics.

REVISING - refining of content, not mechanics. Revision begins during the prewriting activity and continues through the final draft, as writers think again about the choices made for content and add, delete, or rearrange the material. Skilled writers may revise a draft several times, accepting suggestions for improvement from peers and teachers in addition to self-critique.

EDITING – making writing suitable for publication, including the correction of errors in punctuation, capitalization, spelling, usage, sentence structure, and legibility so that errors in conventions do not interfere with an audience's ability to understand the message.

PUBLISHING - sharing the writer's product with and/or being evaluated by the intended audience, or readers in general. An authentic audience, one with whom the students want to communicate, is necessary for effective writing. It is important to note that not every piece that a writer begins will be carried through the entire writing process and polished for publication. However, each student should be expected to develop some pieces of writing thoroughly enough to be published. Publishing reinforces the knowledge that writing is an act of communication.

MULTIMODAL LITERACIES

The Multimodal Literacies advanced from the Oklahoma *Priority Academic Student Skills*’ Visual Literacy standard.

Text in the twenty-first century is not limited to print. Increasingly, texts are composites of print, images, sound, video, charts, and interactive links. Students need to know how to interpret and produce these kinds of texts for college, career, and informed citizenship. A statement by the NCTE Executive Committee (February 2013) confirms,

... the 21st century demands that a literate person possess a wide range of abilities and competencies, many literacies. These literacies are multiple, dynamic, and malleable. As in the past, they are inextricably linked with particular histories, life possibilities, and social trajectories of individuals and groups. Active, successful participants in this 21st century global society must be able to

- develop proficiency and fluency with the tools of technology;
- build intentional cross-cultural connections and relationships with others so as to pose and solve problems collaboratively and strengthen independent thought;
- design and share information for global communities to meet a variety of purposes;
- manage, analyze, and synthesize multiple streams of simultaneous information; create, critique, analyze, and evaluate multimedia texts; and
- attend to the ethical responsibilities required by these complex environments.

The committee asserts,

The use of multimodal literacies has expanded the ways we acquire information and understand concepts. Ever since the days of illustrated books and maps texts have included visual elements for the purpose of imparting information. The contemporary difference is the ease with which we can combine words, images, sound, color, animation, video, and styles of print in projects so that they are part of our everyday lives and, at least by our youngest generation, often taken for granted.

What this means for teaching

The techniques of acquiring, organizing, evaluating, and creatively using multimodal information should become an increasingly important component of the English language arts classroom (November 2005).

Further Support

A large body of research has been consulted for each of Oklahoma’s Eight College- and Career- Ready Standards; these sources are provided in a complete bibliography which can be accessed on the Oklahoma Department of Education’s English Language Arts Standards webpage.

OKLAHOMA ENGLISH LANGUAGE ARTS EIGHT OVERARCHING STANDARDS IN READING AND WRITING

Academic standards establish objective performance criteria. They are used as guides for developing curriculum and instruction that is appropriately engaging, challenging, and sequenced for students. Acquiring language arts knowledge and skills is a recursive learning endeavor. Students need to revisit concepts as they develop language arts acumen at increasingly higher levels of complexity.

The eight overarching standards reinforce the recursive nature of the language arts, a non-linear process that involves the continuous and thoughtful refinement of concepts and skills. In each of the eight overarching English language arts standards, concepts and skills are expressed in terms of both reading and writing, intended to support integrated, rather than isolated, reading/writing instruction. Research supports this integrated model of English language arts, where students read to understand the meaning and composition of a text and write with readers' expectations and assumptions in mind.

ENGLISH LANGUAGE ARTS COLLEGE- AND CAREER- STANDARDS

Standard 1: Speaking and Listening Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

Reading

Students will develop and apply effective communication skills through speaking and active listening.

Writing

Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.

Standard 2: Reading Foundations/Reading and Writing Process Students will develop foundational skills for future reading success by working with sounds, letters, and text. Students will use a variety of recursive reading and writing processes.

Reading

Students will read and comprehend increasingly complex literary and informational texts.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

Standard 3: Critical Reading and Critical Writing Students will apply critical thinking skills to reading and writing.

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

Standard 4: Vocabulary Students will expand their working vocabularies to effectively communicate and understand texts.

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

Standard 5: Language Students will apply knowledge of grammar and rhetorical style to reading and writing.

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

Standard 6: Research Students will engage in inquiry to acquire, refine, and share knowledge.

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

Standard 7: Multimodal Literacies Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non verbal, and interactive texts.

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

Standard 8: Independent Reading and Writing Students will read and write for a variety of purposes including, but not limited to, academic and personal, for extended periods of time.

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

Navigating the Vertical Alignment

Overarching Oklahoma College- and Career- Ready Standard for English Language Arts

1: Speaking and Listening - Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

	5th Grade	6th Grade	7th Grade
<p>Reading Students will develop and apply effective communication skills through speaking and active listening.</p>	<p>5.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with awareness of verbal and nonverbal cues.</p> <p>5.1.R.2 Students will ask and answer questions to seek help, get information, or clarify about information presented orally through text or other media to confirm understanding.</p> <p>5.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>	<p>6.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with awareness of verbal and nonverbal cues.</p> <p>6.1.R.2 Students will actively listen and interpret a speaker's messages (both verbal and nonverbal) and ask questions to clarify the speaker's purpose and perspective.</p> <p>6.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>	<p>7.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with awareness and control of verbal and nonverbal cues.</p> <p>7.1.R.2 Students will actively listen and interpret a speaker's messages (both verbal and nonverbal) and ask questions to clarify the speaker's purpose and perspective.</p> <p>7.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>
<p>Writing Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.</p>	<p>5.1.W.1 Students will give formal and informal presentations in a group or individually, organizing information and determining appropriate content for audience.</p> <p>5.1.W.2 Students will work effectively and respectfully within diverse groups, share responsibility for collaborative work, and value individual contributions made by each group member.</p>	<p>6.1.W.1 Students will give formal and informal presentations in a group or individually, organizing information and determining appropriate content and purpose for audience.</p> <p>6.1.W.2 Students will work effectively and respectfully within diverse groups, share responsibility for collaborative work, and value individual contributions made by each group member.</p>	<p>7.1.W.1 Students will give formal and informal presentations in a group or individually, providing evidence to support a main idea.</p> <p>7.1.W.2 Students will work effectively and respectfully within diverse groups, show willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.</p>

Vertical Grade-level Progressions

Standard Objectives
delineated for each grade and vertically aligned

Recursive Reading and Writing Strands

with Guiding Principles

Standard Code

Grade . Standard Number . Strand . Objective

Instructional Design Considerations

EIGHT CONSISTENT STANDARDS

The standards were developed with consideration to teachers and curriculum designers. **Rich units of study can be designed by incorporating each of the eight overarching standards.** Further grade-specific guidance is provided in the Reading and Writing strands.

READING and WRITING STRANDS

The standards were designed to develop the total literacy of students by intentionally taking into consideration what they do when reading and writing. **Every standard includes a reading and writing strand with standard objectives delineated by grade-level.**

Reading instruction supports the development and refinement of writing skills. Writing instruction supports the development and refinement of reading skills.



RECURSIVE TEACHING and LEARNING

Teaching and learning language arts is a recursive endeavor: students will revisit concepts again and again as they use language at increasingly sophisticated levels. **Skills are repeated with an implied expectation that they are attributed to increasingly more complex texts.**

Because of this recursive learning process, language arts learning does not progress for students in a strictly linear way.

Oklahoma ELA standards are not taught in isolation. Standards can be bundled for educators to develop grade-appropriate lessons, tasks, and assessments.

Speaking and Listening

Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

Reading

Students will develop and apply effective communication skills through speaking and active listening.

Writing

Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.

1: Speaking and Listening Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will develop and apply effective communication skills through speaking and active listening.

PK.1.R.1 Students will actively listen and speak using agreed-upon rules with guidance and support.

PK.1.R.2. Students will begin to ask and answer questions about information presented orally or through text or other media with guidance and support.

PK.1.R.3 Students will begin to engage in collaborative discussions about appropriate topics and texts with peers and adults in small and large groups with guidance and support.

PK.1.R.4 Students will follow simple oral directions.

K.1.R.1 Students will actively listen and speak using agreed-upon rules for discussion with guidance and support.

K.1.R.2 Students will ask and answer questions to seek help, get information, or clarify about information presented orally or through text or other media with guidance and support.

K.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts with peers and adults in small and large groups with guidance and support.

K.1.R.4 Students will follow one and two step directions.

1.1.R.1 Students will actively listen and speak using agreed-upon rules for discussion.

1.1.R.2 Students will ask and answer questions to seek help, get information, or clarify about information presented orally through text or other media, to confirm understanding.

1.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts with peers and adults in small and large groups.

1.1.R.4 Students will restate and follow simple two-step directions.

Writing

Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.

PK.1.W.1 Students will begin to orally describe personal interests or tell stories to classmates with guidance and support.

PK.1.W.2 Students will work respectfully with others with guidance and support.

K.1.W.1 Students will orally describe personal interests or tell stories, facing the audience and speaking clearly in complete sentences and following implicit rules for conversation, including taking turns and staying on topic.

K.1.W.2 Students will work respectfully with others with guidance and support.

1.1.W.1 Students will orally describe people, places, things, and events with relevant details expressing their ideas.

1.1.W.2 Students will work respectfully in groups.

1: Speaking and Listening Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

2nd Grade

3rd Grade

4th Grade

Reading

Students will develop and apply effective communication skills through speaking and active listening.

2.1.R.1 Students will actively listen and speak using appropriate discussion rules.

2.1.R.2 Students will ask and answer questions to seek help, get information, or clarify about information presented orally, through text or other media to confirm understanding.

2.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts with peers and adults in small and large groups.

2.1.R.4 Students will restate and follow multi-step directions.

3.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules.

3.1.R.2 Students will ask and answer questions to seek help, get information, or clarify about information presented orally through text or other media to confirm understanding.

3.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly in pairs, diverse groups, and whole class settings.

4.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules.

4.1.R.2 Students will ask and answer questions to seek help, get information, or clarify information presented orally through text or other media to confirm understanding.

4.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.

Writing

Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.

2.1.W.1 Students will report on a topic or text, tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.

2.1.W.2 Students will work respectfully within groups, share responsibility for collaborative work, and value individual contributions made by each group member.

3.1.W.1 Students will report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences at an appropriate pace.

3.1.W.2 Students will work respectfully within diverse groups, share responsibility for collaborative work, and value individual contributions made by each group member.

4.1.W.1 Students will report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences at an appropriate pace.

4.1.W.2 Students will work effectively and respectfully within diverse groups, share responsibility for collaborative work, and value individual contributions made by each group member.

1: Speaking and Listening Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

	5th Grade	6th Grade	7th Grade
<p>Reading Students will develop and apply effective communication skills through speaking and active listening.</p>	<p>5.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with awareness of verbal and nonverbal cues.</p> <p>5.1.R.2 Students will ask and answer questions to seek help, get information, or clarify about information presented orally through text or other media to confirm understanding.</p> <p>5.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>	<p>6.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with awareness of verbal and nonverbal cues.</p> <p>6.1.R.2 Students will actively listen and interpret a speaker’s messages (both verbal and nonverbal) and ask questions to clarify the speaker’s purpose and perspective.</p> <p>6.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>	<p>7.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with awareness and control of verbal and nonverbal cues.</p> <p>7.1.R.2 Students will actively listen and interpret a speaker’s messages (both verbal and nonverbal) and ask questions to clarify the speaker’s purpose and perspective.</p> <p>7.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>
<p>Writing Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.</p>	<p>5.1.W.1 Students will give formal and informal presentations in a group or individually, organizing information and determining appropriate content for audience.</p> <p>5.1.W.2 Students will work effectively and respectfully within diverse groups, share responsibility for collaborative work, and value individual contributions made by each group member.</p>	<p>6.1.W.1 Students will give formal and informal presentations in a group or individually, organizing information and determining appropriate content and purpose for audience.</p> <p>6.1.W.2 Students will work effectively and respectfully within diverse groups, share responsibility for collaborative work, and value individual contributions made by each group member.</p>	<p>7.1.W.1 Students will give formal and informal presentations in a group or individually, providing evidence to support a main idea.</p> <p>7.1.W.2 Students will work effectively and respectfully within diverse groups, show willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.</p>

1: Speaking and Listening Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

	8th Grade	9th Grade - English I	10th Grade - English II
<p>Reading Students will develop and apply effective communication skills through speaking and active listening.</p>	<p>8.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with control of verbal and nonverbal cues.</p> <p>8.1.R.2 Students will actively listen and interpret a speaker’s messages (both verbal and nonverbal) and ask questions to clarify the speaker’s purpose and perspective.</p> <p>8.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>	<p>9.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with control of verbal and nonverbal cues.</p> <p>9.1.R.2 Students will actively listen and interpret a speaker’s messages (both verbal and nonverbal) and ask questions to clarify the speaker’s purpose and perspective.</p> <p>9.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>	<p>10.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with control of verbal and nonverbal cues.</p> <p>10.1.R.2 Students will actively listen and evaluate, analyze, and synthesize a speaker’s messages (both verbal and nonverbal) and ask questions to clarify the speaker’s purpose and perspective.</p> <p>10.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas clearly while building on the ideas of others in pairs, diverse groups, and whole class settings.</p>
<p>Writing Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.</p>	<p>8.1.W.1 Students will give formal and informal presentations in a group or individually, providing textual and visual evidence to support a main idea.</p> <p>8.1.W.2 Students will work effectively and respectfully within diverse groups, show willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.</p>	<p>9.1.W.1 Students will give formal and informal presentations in a group or individually, providing textual and visual evidence to support a main idea.</p> <p>9.1.W.2 Students will work effectively and respectfully within diverse groups, show willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.</p>	<p>10.1.W.1 Students will give formal and informal presentations in a group or individually, providing textual and visual evidence to support a main idea.</p> <p>10.1.W.2 Students will work effectively and respectfully within diverse groups, show willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.</p>

1: Speaking and Listening Students will speak and listen effectively in a variety of situations including, but not limited to, responses to reading and writing.

11th Grade - English III

12th Grade - English IV

Reading

Students will develop and apply effective communication skills through speaking and active listening.

11.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with control of verbal and nonverbal cues.

11.1.R.2 Students will actively listen and evaluate, analyze, and synthesize a speaker's messages (both verbal and nonverbal) and ask questions to clarify the speaker's purpose and perspective.

11.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas by contributing to, building on, and questioning the ideas of others in pairs, diverse groups, and whole class settings.

12.1.R.1 Students will actively listen and speak clearly using appropriate discussion rules with control of verbal and nonverbal cues.

12.1.R.2 Students will actively listen and evaluate, analyze, and synthesize a speaker's messages (both verbal and nonverbal) and ask questions to clarify the speaker's purpose and perspective.

12.1.R.3 Students will engage in collaborative discussions about appropriate topics and texts, expressing their own ideas by contributing to, building on, and questioning the ideas of others in pairs, diverse groups, and whole class settings.

Writing

Students will develop and apply effective communication skills through speaking and active listening to create individual and group projects and presentations.

11.1.W.1 Students will give formal and informal presentations in a group or individually, providing textual and visual evidence to support a main idea.

11.1.W.2 Students will work effectively and respectfully within diverse groups, demonstrate willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.

12.1.W.1 Students will give formal and informal presentations in a group or individually, providing textual and visual evidence to support a main idea.

12.1.W.2 Students will work effectively and respectfully within diverse groups, demonstrate willingness to make necessary compromises to accomplish a goal, share responsibility for collaborative work, and value individual contributions made by each group member.

Standard 2:

Reading Foundations

Students will develop foundational skills for future reading success by working with sounds, letters, and text.

Phonological Awareness

Phonological awareness is the ability to recognize, think about, and manipulate sounds in spoken language without using text.

pg. 20

Print Concepts

Students will demonstrate their understanding of the organization and basic features of print, including book handling skills and the understanding that printed materials provide information and tell stories.

pg. 22

Phonics and Word Study

Students will decode and read words in context and isolation by applying phonics and word analysis skills.

pg. 24

Fluency

Students will recognize high-frequency words and read grade-level text smoothly and accurately, with expression that connotes comprehension.

pg. 26

Pre-Kindergarten

Kindergarten

1st Grade

Phonological Awareness

Phonological awareness is the ability to recognize, think about, and manipulate sounds in spoken language without using text.

<p>PK.2.PA.1 Students will distinguish spoken words in a sentence with guidance and support.</p> <p>PK.2.PA.2 Students will recognize spoken words that rhyme.</p> <p>PK.2.PA.3 Students will begin to recognize syllables in spoken words (e.g., <i>sunshine</i>= <i>sun</i> + <i>shine</i>).</p> <p>PK.2.PA.4 Students will begin to isolate initial and final sounds in spoken words.</p> <p>PK.2.PA.5 Students will begin to recognize initial sounds in a set of spoken words (i.e., <i>alliteration</i>).</p> <p>PK.2.PA.6 Students will combine onsets and rimes to form familiar one syllable spoken words with pictorial support (e.g., /c/ + at = cat).</p>	<p>K.2.PA.1 Students will distinguish spoken words in a sentence.</p> <p>K.2.PA.2 Students will recognize and produce pairs of rhyming words, and distinguish them from non-rhyming pairs.</p> <p>K.2.PA.3 Students will isolate and pronounce the same initial sounds in a set of spoken words (i.e., <i>alliteration</i>) (e.g., “the puppy pounces”).</p> <p>K.2.PA.4 Students will recognize the short or long vowel sound in one syllable words.</p> <p>K.2.PA.5 Students will count, pronounce, blend, segment, and delete syllables in spoken words.</p> <p>K.2.PA.6 Students will blend and segment onset and rime in one syllable spoken words (e.g., <i>Blending</i>: /ch/ + at = chat; <i>segmenting</i>: cat = /c/+ at).</p> <p>K.2.PA.7 Students will blend phonemes to form one syllable spoken words with 3 to 5 phonemes (e.g., /f/ /a/ /s/ /t/= fast)</p> <p>K.2.PA.8 Students will segment phonemes in one syllable spoken words with 3 to 5 phonemes (e.g., “fast” = /f/ /a/ /s/ /t/).</p> <p>K.2.PA.9 Students will add, delete, and substitute phonemes in one syllable spoken words (e.g., “add /c/ to the beginning of “at” to say “cat;” “remove the /p/ from “pin,” to say “in;” “change the /d/ in “dog” to /f/ /r/ to say “frog”).</p>	<p>1.2.PA.1 Students will blend and segment onset and rime in spoken words (e.g., /ch/+ /at/ = chat).</p> <p>1.2.PA.2 Students will differentiate short from long vowel sounds in one syllable words.</p> <p>1.2.PA.3 Students will isolate and pronounce initial, medial, and final sounds in spoken words.</p> <p>1.2.PA.4 Students will blend phonemes to form spoken words with 4 to 6 phonemes) including consonant blends (e.g., /s/ /t/ /r/ /i/ /ng/=string).</p> <p>1.2.PA.5 Students will segment phonemes in spoken words with 4 to 6 phonemes into individual phonemes (e.g. string= /s/ /t/ /r/ /i/ /ng/).</p> <p>1.2.PA.6 Students will add, delete, and substitute phonemes in spoken words (e.g., “add /g/ to the beginning of low to say ‘glow;’ “remove the /idge/ from ‘bridge,’ to say ‘br;’ “change the /ar/ in ‘charm’ to /u/ to say ‘chum”).</p>
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2nd Grade

3rd Grade

4th Grade

Phonological Awareness

Phonological awareness is the ability to recognize, think about, and manipulate sounds in spoken language without using text.

***Students will continue to review and apply earlier grade level expectations for this standard.
If phonological awareness skills are not mastered, students will address skills from previous grades.***

Pre-Kindergarten

Kindergarten

1st Grade

Print Concepts

Students will demonstrate their understanding of the organization and basic features of print, including book handling skills and the understanding that printed materials provide information and tell stories.

PK.2.PC.1 Students will write the majority of the letters in their first name and some uppercase and lowercase letters with guidance and support.

PK.2.PC.2 Students will understand that print carries a message by recognizing labels, signs, and other print in the environment with guidance and support.

PK.2.PC.3 Students will begin to demonstrate correct book orientation and identify the front and back covers of a book.

PK.2.PC.4 Students will recognize that written words are made up of letters and are separated by spaces with guidance and support.

PK.2.PC.5 Students will begin to understand that print moves from top to bottom, left to right, and front to back.

PK.2.PC.6 Students will recognize ending punctuation marks in print during shared reading or other text experiences with guidance and support.

K.2.PC.1 Students will correctly form letters to write their first and last name and most uppercase and lowercase letters correctly.

K.2.PC.2 Students will demonstrate their understanding that print carries a message by recognizing labels, signs, and other print in the environment.

K.2.PC.3 Students will demonstrate correct book orientation and identify the title, title page, and the front and back covers of a book.

K.2.PC.4 Students will recognize that written words are made up of letters and are separated by spaces.

K.2.PC.5 Students will recognize that print moves from top to bottom, left to right, and front to back (does not have to be matched to voice).

K.2.PC.6 Students will recognize the distinguishing features of a sentence. (e.g., capitalization of the first word, ending punctuation: period, exclamation mark, question mark) with guidance and support.

1.2.PC.1 Students will correctly form letters and use appropriate spacing for letters, words, and sentences using left-to-right and top-to-bottom progression.

1.2.PC.2 Students will recognize the distinguishing features of a sentence (e.g., capitalization of the first word, ending punctuation, comma, quotation marks).

Students will continue to review and apply earlier grade level expectations for this standard.

If print concepts skills are not mastered, students will address skills from previous grades.

2: Reading Foundations Students will develop foundational skills for future reading success by working with sounds, letters, and text.

2nd Grade

3rd Grade

4th Grade

Print Concepts

Students will demonstrate their understanding of the organization and basic features of print, including book handling skills and the understanding that printed materials provide information and tell stories.

2.2.PC Students will correctly form letters in print and use appropriate spacing for letters, words, and sentences.

3.2.PC Students will correctly form letters in print and cursive and use appropriate spacing for letters, words, and sentences.

4.2.PC Students will correctly form letters in print and cursive and use appropriate spacing for letters, words, and sentences.

***Students will continue to review and apply earlier grade level expectations for this standard.
If print concepts skills are not mastered, students will address skills from previous grades.***

Pre-Kindergarten

Kindergarten

1st Grade

Phonics and Word Study

Students will decode and read words in context and isolation by applying phonics and word analysis skills.

<p>PK.2.PWS.1 Students will name the majority of the letters in their first name and many uppercase and lowercase letters with guidance and support.</p> <p>PK.2.PWS.2 Students will produce some sounds represented by letters with guidance and support.</p>	<p>K.2.PWS.1 Students will name all uppercase and lowercase letters.</p> <p>K.2.PWS.2 Students will sequence the letters of the alphabet.</p> <p>K.2.PWS.3 Students will produce the primary or most common sound for each consonant, short and long vowel sounds (e.g., c = /k/, c = /s/, s = /s/, s = /z/, x = /ks/, x = /z/).</p> <p>K.2.PWS.4 Students will blend letter sounds to decode simple <i>Vowel / Consonant (VC)</i> and <i>Consonant / Vowel / Consonant (CVC)</i> words (e.g., VC words= at, in, up; CVC words = pat, hen, lot).</p>	<p>1.2.PWS.1 Students will decode phonetically regular words by using their knowledge of:</p> <ul style="list-style-type: none"> ● single consonants (e.g., c = /k/, c = /s/, s = /s/, s = /z/, x = /ks/, x = /z/) ● consonant blends (e.g., bl, br, cr) ● consonant digraphs and trigraphs (e.g., sh-, -tch) ● vowel sounds: <ul style="list-style-type: none"> ○ long ○ short ● r-controlled vowels (e.g., ar, er, ir or, ur) ● vowel spelling patterns: <ul style="list-style-type: none"> ○ vowel digraphs (e.g., ea, oa, ee) ○ vowel-consonant-silent-e (e.g., lake) <p>1.2.PWS.2 Students will decode words by applying knowledge of structural analysis:</p> <ul style="list-style-type: none"> ● most major syllable patterns (e.g., closed, open, vowel team, vowel silent e, r-controlled) ● inflectional endings (e.g., -s, -ed, -ing) ● compound words ● contractions <p>1.2.PWS.3 Students will read words in common word families (e.g., -at, -ab, -am, -in).</p>
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2nd Grade

3rd Grade

4th Grade

Phonics and Word Study

Students will decode and read words in context and isolation by applying phonics and word analysis skills.

2.2.PWS.1 Students will decode one- and two- syllable words by using their knowledge of:

- single consonants, including those with two different sounds (e.g., *soft and hard c [cent, cat] and g [gem,goat]*)
- consonant blends (e.g., *bl, br, cr*)
- consonant digraphs and trigraphs (e.g., *sh-, -tch*)
- vowel sounds:
 - long
 - short
 - “r” controlled vowels (e.g., *ar, er, ir or, ur*)
- vowel spelling patterns:
 - vowel digraphs (e.g., *ea, oa, ee*)
 - vowel-consonant-silent-e (e.g., *lake*)
 - vowel diphthongs (*vowel combinations having two vowel sounds e.g., oi as in boil, oy as in boy*)

2.2.PWS.2 Students will decode words by applying knowledge of structural analysis:

- all major syllable patterns (e.g., *closed, consonant +le, open, vowel team, vowel silent e, r-controlled*)
- inflectional endings (e.g., *-s, -ed, -ing*)
- compound words
- contractions
- abbreviations
- common roots and related prefixes and suffixes

2.2.PWS.3 Students will read words in common word families (e.g., *-ight, -ink, -ine, ow*).

3.2.PWS.1 Students will decode multisyllabic words using their knowledge of:

- “r” controlled vowels (e.g., *ar, er, ir or, ur*)
- vowel diphthongs (*vowel combinations having two vowel sounds e.g., oi as in boil, oy as in boy*)

3.2.PWS.2 Students will decode multisyllabic words by applying knowledge of structural analysis:

- all major syllable patterns
- contractions
- abbreviations
- common roots and related prefixes and suffixes

3.2.PWS.3 Students will use decoding skills and semantics in context when reading new words in a text, including multisyllabic words.

4.2.PWS.1 Students will use their combined knowledge of letter-sound correspondences, syllable patterns, morphology and semantics to accurately read unfamiliar words, including multisyllabic words.

Students will continue to review and apply earlier grade level expectations for this standard. If these decoding skills are not mastered, students will address skills from previous grades.

2: Reading Foundations Students will develop foundational skills for future reading success by working with sounds, letters, and text.

Fluency

Students will recognize high-frequency words and read grade-level text smoothly and accurately, with expression that connotes comprehension.

Pre-Kindergarten

PK.2.F.1 Students will read first name in print.

Kindergarten

K.2.F.1 Students will read first and last name in print.

K.2.F.2 Students will read common high frequency grade-level words by sight (e.g., *not, was, to, have, you, he, is, with, are*).

1st Grade

1.2.F.1 Students will read high frequency and/or common irregularly spelled grade-level words with automaticity in text.

1.2.F.2 Students will orally read grade-level text at an appropriate rate, smoothly and accurately, with expression that connotes comprehension.

2: Reading Foundations Students will develop foundational skills for future reading success by working with sounds, letters, and text.

Fluency

Students will recognize high-frequency words and read grade-level text smoothly and accurately, with expression that connotes comprehension.

2nd Grade

2.2.F.1 Students will read high frequency and/or common irregularly spelled grade-level words with automaticity in text.

2.2.F.2 Students will orally read grade-level text at an appropriate rate, smoothly and accurately, with expression that connotes comprehension.

3rd Grade

3.2.F.1 Students will read high frequency and/or irregularly spelled grade-level words with automaticity in text.

3.2.F.2 Students will orally read grade-level text at an appropriate rate, smoothly and accurately, with expression that connotes comprehension.

4th Grade

4.2.F.1 Students will read high frequency and irregularly spelled grade-level words with automaticity in text.

4.2.F.2 Students will orally read grade-level text at an appropriate rate, smoothly and accurately, with expression that connotes comprehension.

***Students will continue to review and apply earlier grade level expectations for this standard.
If these fluency skills are not mastered, students will address skills from previous grades.***

2: Reading Foundations Students will develop foundational skills for future reading success by working with sounds, letters, and text.

Fluency

Students will recognize high-frequency words and read grade-level text smoothly and accurately, with expression that connotes comprehension.

5th Grade

6th Grade

7th Grade

8th Grade

***Students will continue to review and apply earlier grade level expectations for this standard.
If these fluency skills are not mastered, students will address skills from previous grades.***

Reading and Writing Process

Students will use a variety of recursive reading and writing processes.

Reading

Students will read and comprehend increasingly complex literary and informational texts.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will read and comprehend increasingly complex literary and informational texts.

PK.2.R Students will begin to retell or reenact major events from a read-aloud with guidance and support to recognize the main idea.

K.2.R.1 Students will retell or reenact major events from a read-aloud with guidance and support to recognize the main idea.

1.2.R.1 Students will retell or reenact major events in a text, focusing on important details to recognize the main idea.

K.2.R.2 Students will discriminate between fiction and nonfiction/informational text with guidance and support.

1.2.R.2 Students will discriminate between fiction and nonfiction/informational text.

K.2.R.3 Students will sequence the events/plot (*i.e., beginning, middle, and end*) of a story or text with guidance and support.

1.2.R.3 Students will sequence the events/plot (*i.e., beginning, middle, and end*) of a story or text.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

PK.2.W Students will begin to express themselves through drawing, dictating, and emergent writing.

K.2.W.1 Students will begin to develop first drafts by expressing themselves through drawing and emergent writing.

1.2.W.1 Students will develop and edit first drafts using appropriate spacing between letters, words, and sentences using left-to-right and top-to-bottom progression.

K.2.W.2 Students will begin to develop first drafts by sequencing the action or details of stories/texts.

1.2.W.2 Students will develop drafts by sequencing the action or details in a story or about a topic through writing sentences with guidance and support.

K.2.W.3 Students will begin to edit first drafts using appropriate spacing between letters and words.

1.2.W.3 Students will correctly spell grade-appropriate, highly decodable words (*e.g., cup, like, cart*) and common, irregularly spelled sight words (*e.g., the*) while editing.

1.2.W.4 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook*).

2: Reading and Writing Process Students will use a variety of recursive reading and writing processes.

Reading

Students will read and comprehend increasingly complex literary and informational texts.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

	2nd Grade	3rd Grade	4th Grade
	<p>2.2.R.1 Students will locate the main idea and supporting details of a text.</p> <p>2.2.R.2 Students will begin to compare and contrast details (<i>e.g., plots or events, settings, and characters</i>) to discriminate genres.</p> <p>2.2.R.3 Students will begin to summarize events or plots (<i>i.e., beginning, middle, end, and conflict</i>) of a story or text.</p>	<p>3.2.R.1 Students will locate the main idea and key supporting details of a text or section of text.</p> <p>3.2.R.2 Students will compare and contrast details (<i>e.g., plots or events, settings, and characters</i>) to discriminate genres.</p> <p>3.2.R.3 Students will summarize events or plots (<i>i.e., beginning, middle, end, and conflict</i>) of a story or text.</p>	<p>4.2.R.1 Students will distinguish how key details support the main idea of a passage.</p> <p>4.2.R.2 Students will compare and contrast details in literary and nonfiction/informational texts to discriminate various genres.</p> <p>4.2.R.3 Students will summarize events or plots (<i>i.e., beginning, middle, end, conflict, and climax</i>) of a story or text.</p> <p>4.2.R.4 Students will begin to paraphrase main ideas with supporting details in a text.</p>
	<p>2.2.W.1 Students will develop drafts by sequencing the action or details in a story or about a topic through writing sentences.</p> <p>2.2.W.2 Students will develop and edit first drafts using appropriate spacing between letters, words, and sentences.</p> <p>2.2.W.3 Students will correctly spell grade-appropriate words while editing.</p> <p>2.2.W.4 Students will use resources to find correct spellings of words (<i>e.g., word wall, vocabulary notebook, dictionaries</i>).</p>	<p>3.2.W.1 Students will develop drafts by categorizing ideas and organizing them into paragraphs using correct paragraph indentations.</p> <p>3.2.W.2 Students will edit drafts and revise for clarity and organization.</p> <p>3.2.W.3 Students will correctly spell grade-appropriate words while editing.</p> <p>3.2.W.4 Students will use resources to find correct spellings of words (<i>e.g., word wall, vocabulary notebook, print and electronic dictionaries</i>).</p>	<p>4.2.W.1 Students will develop drafts by categorizing ideas and organizing them into paragraphs.</p> <p>4.2.W.2 Students will edit drafts and revise for clarity and organization.</p> <p>4.2.W.3 Students will correctly spell grade-appropriate words while editing.</p> <p>4.2.W.4 Students will use resources to find correct spellings of words (<i>e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check</i>).</p>

2: Reading and Writing Process Students will use a variety of recursive reading and writing processes.

5th Grade

6th Grade

7th Grade

Reading

Students will read and comprehend increasingly complex literary and informational texts.

5.2.R.1 Students will create an objective summary, including main idea and supporting details, while maintaining meaning and a logical sequence of events.

5.2.R.2 Students will compare and contrast details in literary and nonfiction/informational texts to distinguish genres.

5.2.R.3 Students will begin to paraphrase main ideas with supporting details in a text.

6.2.R.1 Students will create an objective summary, including main idea and supporting details, while maintaining meaning and a logical sequence of events.

6.2.R.2 Students will analyze details in literary and nonfiction/informational texts to distinguish genres.

6.2.R.3 Students will paraphrase main ideas with supporting details in a text.

7.2.R.1 Students will create an objective summary, including main idea and supporting details, while maintaining meaning and a logical sequence of events.

7.2.R.2 Students will analyze details in literary and nonfiction/informational texts to distinguish genres.

7.2.R.3 Students will paraphrase main ideas with supporting details in a text.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

5.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

5.2.W.2 Students will plan (*e.g., outline*) and prewrite a first draft as necessary.

5.2.W.3 Students will develop drafts by choosing an organizational structure (*e.g., description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

5.2.W.4 Students will edit and revise multiple drafts for intended purpose (*e.g., staying on topic*), organization, and coherence.

5.2.W.5 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

6.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

6.2.W.2 Students will plan (*e.g., outline*) and prewrite a first draft as necessary.

6.2.W.3 Students will develop drafts by choosing an organizational structure (*e.g., description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

6.2.W.4 Students will edit and revise multiple drafts for intended purpose (*e.g., staying on topic*), organization, coherence, using a consistent point of view.

6.2.W.5 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

7.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

7.2.W.2 Students will plan (*e.g., outline*) and prewrite a first draft as necessary.

7.2.W.3 Students will develop drafts by choosing an organizational structure (*e.g., description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

7.2.W.4 Students will edit and revise multiple drafts for organization, transitions to improve coherence and meaning, using a consistent point of view.

7.2.W.5 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will read and comprehend increasingly complex literary and informational texts.

8.2.R.1 Students will summarize and paraphrase ideas, while maintaining meaning and a logical sequence of events, within and between texts.

8.2.R.2 Students will analyze details in literary and nonfiction/informational texts to evaluate patterns of genres.

8.2.R.3 Students will generalize main ideas with supporting details in a text.

9.2.R.1 Students will summarize, paraphrase, and generalize ideas, while maintaining meaning and a logical sequence of events, within and between texts.

9.2.R.2 Students will analyze details in literary and nonfiction/informational texts to evaluate patterns of genres.

9.2.R.3 Students will synthesize main ideas with supporting details in texts.

10.2.R.1 Students will summarize, paraphrase, and synthesize ideas, while maintaining meaning and a logical sequence of events, within and between texts.

10.2.R.2 Students will analyze details in literary and nonfiction/informational texts to connect how genre supports the author’s purpose.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

8.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

8.2.W.2 Students will plan (*e.g., outline*) and prewrite a first draft as necessary.

8.2.W.3 Students will develop drafts by choosing an organizational structure (*e.g., description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

8.2.W.4 Students will edit and revise multiple drafts for organization, transitions to improve coherence and meaning, sentence variety, and use of consistent point of view.

8.2.W.5 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

9.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

9.2.W.2 Students will plan (*e.g., outline*) and prewrite a first draft as necessary.

9.2.W.3 Students will develop drafts by choosing an organizational structure (*e.g., description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

9.2.W.4 Students will edit and revise multiple drafts for organization, transitions to improve coherence and meaning, sentence variety, and use of consistent tone and point of view.

9.2.W.5 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

10.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

10.2.W.2 Students will plan (*e.g., outline*) and prewrite a first draft as necessary.

10.2.W.3 Students will develop drafts by choosing an organizational structure (*e.g., description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

10.2.W.4 Students will edit and revise multiple drafts for organization, enhanced transitions and coherence, sentence variety, and consistency in tone and point of view to establish meaningful texts.

10.2.W.5 Students will use resources to find correct spellings of words (*e.g., word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

11th Grade - English III

12th Grade - English IV

Reading

Students will read and comprehend increasingly complex literary and informational texts.

11.2.R.1 Students will summarize, paraphrase, and synthesize ideas, while maintaining meaning and a logical sequence of events, within and between texts.

11.2.R.2 Students will evaluate details in literary and non-fiction/informational texts to connect how genre supports the author’s purpose.

12.2.R.1 Students will summarize, paraphrase, and synthesize ideas, while maintaining meaning and a logical sequence of events, within and between texts.

12.2.R.2 Students will evaluate details in literary and non-fiction/informational texts to connect how genre supports the author’s purpose.

Writing

Students will develop and strengthen writing by engaging in a recursive process that includes prewriting, drafting, revising, editing, and publishing.

11.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

11.2.W.2 Students will plan (e.g., *outline*) and prewrite a first draft as necessary.

11.2.W.3 Students will develop drafts by choosing an organizational structure (e.g., *description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

11.2.W.4 Students will edit and revise multiple drafts for logical organization, enhanced transitions and coherence, sentence variety, and use of tone and point of view through specific rhetorical devices to establish meaningful texts.

11.2.W.5 Students will use resources to find correct spellings of words (e.g., *word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

12.2.W.1 Students will apply components of a recursive writing process for multiple purposes to create a focused, organized, and coherent piece of writing.

12.2.W.2 Students will plan (e.g., *outline*) and prewrite a first draft as necessary.

12.2.W.3 Students will develop drafts by choosing an organizational structure (e.g., *description, compare/contrast, sequential, problem/solution, cause/effect, etc.*) and building on ideas in multi-paragraph essays.

12.2.W.4 Students will edit and revise multiple drafts for logical organization, enhanced transitions and coherence, sentence variety, and use of tone and point of view through specific rhetorical devices to establish meaningful texts.

12.2.W.5 Students will use resources to find correct spellings of words (e.g., *word wall, vocabulary notebook, print and electronic dictionaries, and spell-check*).

Critical Reading and Writing

Students will apply critical thinking skills to reading and writing.

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

3: Critical Reading and Writing Students will apply critical thinking skills to reading and writing.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

PK.3.R.1 Students will describe the role of an author and illustrator, telling how they contribute to a story, with guidance and support.

PK.3.R.2 Students will describe characters in a story with guidance and support.

PK.3.R.3 Students will tell what is happening in a picture or illustration with guidance and support.

PK.3.R.4 Students will ask and answer basic questions (*e.g., who, what, where, and when*) about texts during shared reading or other text experiences with guidance and support.

K.3.R.1 Students will name the author and illustrator, and explain the roles of each in a particular story.

K.3.R.2 Students will describe characters and setting in a story with guidance and support.

K.3.R.3 Students will tell what is happening in a picture or illustration.

K.3.R.4 Students will ask and answer basic questions (*e.g., who, what, where, and when*) about texts during shared reading or other text experiences with guidance and support

1.3.R.1 Students will identify the author's purpose (*i.e., tell a story, provide information*) with guidance and support.

1.3.R.2 Students will describe who is telling the story (*i.e., point of view*).

1.3.R.3 Students will find textual evidence when provided with examples of literary elements and organization:

- setting (*i.e., time, place*)
- plot
- main characters and their traits in a story

1.3.R.4 Students will ask and answer basic questions (*e.g., who, what, where, why, and when*) about texts.

1.3.R.5 Students will begin to locate facts that are clearly stated in a text.

Pre-Kindergarten

Kindergarten

1st Grade

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

PK.3.W Students will use drawing, labeling, and dictating to express thoughts and ideas with guidance and support.

K.3.W Students will use drawing, labeling, dictating, and writing to tell a story, share information, or express an opinion with guidance and support.

NARRATIVE

1.3.W.1 Students will begin to write narratives incorporating characters, plot (*i.e., beginning, middle, end*), and a basic setting (*i.e., time, place*) with guidance and support.

INFORMATIVE

1.3.W.2 Students will begin to write facts about a subject in response to a text read aloud to demonstrate understanding with guidance and support.

OPINION

1.3.W.3 Students will express an opinion in writing about a topic and provide a reason to support the opinion.

2nd Grade

3rd Grade

4th Grade

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

2.3.R.1 Students will determine the author’s purpose (*i.e., tell a story, provide information*).

2.3.R.2 Students will infer whether a story is narrated in first or third person point of view in grade-level literary and/or informational text.

2.3.R.3 Students will find textual evidence when provided with examples of literary elements and organization:

- setting (*i.e., time, place*)
- plot
- characters
- characterization

2.3.R.4 Students will find examples of literary devices:

- simile
- metaphor

2.3.R.5 Students will locate facts that are clearly stated in a text.

3.3.R.1 Students determine the author’s stated and implied purpose (*i.e., entertain, inform, persuade*).

3.3.R.2 Students will infer whether a story is narrated in first or third person point of view in grade-level literary and/or informational text.

3.3.R.3 Students will find textual evidence when provided with examples of literary elements and organization:

- setting (*i.e., time, place*)
- plot
- characters
- characterization
- theme

3.3.R.4 Students will find examples of literary devices:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole

3.3.R.5 Students will distinguish fact from opinion in a text.

4.3.R.1 Students will determine the author’s purpose (*i.e., entertain, inform, persuade*) and infer the difference between the stated and implied purpose.

4.3.R.2 Students will infer whether a story is narrated in first or third person point of view in grade-level literary and/or informational text.

4.3.R.3 Students will describe key literary elements:

- setting
- plot
- characters (*i.e., protagonist, antagonist*)
- characterization
- theme

4.3.R.4 Students will find examples of literary devices:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole
- imagery
- symbolism*
- tone*

**Students will find textual evidence when provided with examples.*

4.3.R.5 Students will distinguish fact from opinion in a text and investigate facts for accuracy.

2nd Grade

3rd Grade

4th Grade

Reading (Continued)

2.3.R.6 Students will describe the structure of a text (e.g., description, compare/contrast, sequential, problem/solution, cause/effect) with guidance and support.

2.3.R.7 Students will answer inferential questions (e.g., how and why) with guidance and support.

3.3 R.6 Students will describe the structure of a text (e.g., description, compare/contrast, sequential, problem/solution, cause/effect) with guidance and support.

3.3.R.7 Students will ask and answer inferential questions using the text to support answers with guidance and support.

4.3.R.6 Students will describe the structure of a text (e.g., description, compare/contrast, sequential, problem/solution, cause/effect).

4.3.R.7 Students will ask and answer inferential questions using the text to support answers.

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

NARRATIVE

2.3.W.1 Students will write narratives incorporating characters, plot (i.e., beginning, middle, end), and a basic setting (i.e., time, place) with guidance and support.

INFORMATIVE

2.3.W.2 Students will write facts about a subject and include a main idea with supporting details.

OPINION

2.3.W.3 Students will express an opinion about a topic and provide reasons as support.

NARRATIVE - Grade Level Focus

3.3.W.1 Students will write narratives incorporating characters, plot, setting, point of view, and conflict (i.e., solution and resolution).

INFORMATIVE

3.3.W.2 Students will write facts about a subject, including a main idea with supporting details, and use transitional and signal words.

OPINION

3.3.W.3 Students will express an opinion about a topic and provide reasons as support.

NARRATIVE

4.3.W.1 Students will write narratives incorporating characters, plot, setting, point of view, conflict (i.e., solution and resolution), and dialogue.

INFORMATIVE - Grade Level Focus

4.3.W.2 Students will write facts about a subject, including a clear main idea with supporting details, and use transitional and signal words.

OPINION

4.3.W.3 Students will express an opinion about a topic and provide fact-based reasons as support.

3: Critical Reading and Writing Students will apply critical thinking skills to reading and writing.

5th Grade

6th Grade

7th Grade

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

5.3.R.1 Students will determine an author’s stated or implied purpose and draw conclusions to evaluate how well the author’s purpose was achieved.

5.3.R.2 Students will determine the point of view and describe how it affects grade-level literary and/or informational text.

5.3.R.3 Students will describe and find textual evidence of key literary elements:

- setting
- plot
- characters (*i.e., protagonist, antagonist*)
- characterization
- theme

5.3.R.4 Students will evaluate literary devices to support interpretations of literary texts:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole
- imagery
- symbolism*
- tone*

**Students will find textual evidence when provided with examples.*

6.3.R.1 Students will compare and contrast stated or implied purposes of authors writing on the same topic in grade-level literary and/or informational texts.

6.3.R.2 Students will evaluate how the point of view and perspective affect grade-level literary and/or informational text.

6.3.R.3 Students will analyze how key literary elements contribute to the meaning of the literary work:

- setting
- plot
- characters (*i.e., protagonist, antagonist*)
- characterization
- theme
- conflict (*i.e., internal and external*)

6.3.R.4 Students will evaluate literary devices to support interpretations of literary texts:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole
- imagery
- symbolism*
- tone*

**Students will find textual evidence when provided with examples.*

7.3.R.1 Students will compare and contrast stated or implied purposes of authors writing on the same topic in grade-level literary and/or informational texts.

7.3.R.2 Students will evaluate how the point of view and perspective affect grade-level literary and/or informational text.

7.3.R.3 Students will analyze how key literary elements contribute to the meaning of the literary work:

- setting
- plot
- characters (*i.e., protagonist, antagonist*)
- characterization
- theme
- conflict (*i.e., internal and external*)

7.3.R.4 Students will evaluate literary devices to support interpretations of literary texts:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole
- imagery
- symbolism
- tone
- irony*

**Students will find textual evidence when provided with examples.*

5th Grade

6th Grade

7th Grade

Reading (Continued)

5.3.R.5 Students will distinguish fact from opinion in non-fiction text and investigate facts for accuracy.

5.3.R.6 Students will distinguish the structures of texts (e.g., description, compare/contrast, sequential, problem/solution, cause/effect) and content by making inferences about texts and use textual evidence to support understanding.

5.3.R.7 Students will compare and contrast texts and ideas within and between texts.

6.3.R.5 Students will categorize facts included in an argument as for or against an issue.

6.3.R.6 Students will analyze the structures of texts (e.g., description, compare/contrast, sequential, problem/solution, cause/effect) and content by making inferences about texts and use textual evidence to support understanding.

6.3.R.7 Students will analyze texts and ideas within and between texts and provide textual evidence to support their inferences.

7.3.R.5 Students will distinguish factual claims from opinions.

7.3.R.6 Students will analyze the structures of texts (e.g., compare/contrast, problem/solution, cause/effect, claims/evidence) and content by making inferences about texts and use textual evidence to draw simple logical conclusions.

7.3.R.7 Students will make connections (e.g., thematic links) between and across multiple texts and provide textual evidence to support their inferences.

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

NARRATIVE

5.3.W.1 Students will write narratives incorporating characters, plot, setting, point of view, conflict (i.e., internal, external), and dialogue.

INFORMATIVE - Grade Level Focus

5.3.W.2 Students will introduce and develop a topic, incorporating evidence (e.g., specific facts, examples, details) and maintaining an organized structure.

OPINION

5.3.W.3 Students will clearly state an opinion supported with facts and details.

5.3.W.4 Students will show relationships among facts, opinions, and supporting details.

NARRATIVE

6.3.W.1 Students will write narratives incorporating characters, plot, setting, point of view, conflict (i.e., internal, external), and dialogue.

INFORMATIVE

6.3.W.2 Students will compose essays and reports about topics, incorporating evidence (e.g., specific facts, examples, details) and maintaining an organized structure.

OPINION - Grade Level Focus

6.3.W.3 Students will clearly state an opinion supported with facts and details.

6.3.W.4 Students will show relationships among facts, opinions, and supporting details.

NARRATIVE

7.3.W.1 Students will write narratives incorporating characters, plot, setting, point of view, conflict, dialogue, and sensory details to convey experiences and events.

INFORMATIVE

7.3.W.2 Students will compose essays and reports about topics, incorporating evidence (e.g., specific facts, examples, details) and maintaining an organized structure and a formal style.

ARGUMENT - Grade Level Focus

7.3.W.3 Students will introduce a claim and organize reasons and evidence, using credible sources.

7.3.W.4 Students will show relationships among the claim, reasons, and evidence.

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

8.3.R.1 Students will analyze works written on the same topic and compare the methods the authors use to achieve similar or different purposes and include support using textual evidence.

8.3.R.2 Students will evaluate points of view and perspectives and describe how this affects grade-level literary and/or informational text.

8.3.R.3 Students will analyze how authors use key literary elements to contribute to the meaning of a text:

- setting
- plot
- characters (*i.e., protagonist, antagonist*)
- characterization
- theme
- conflict (*i.e., internal and external*)

9.3.R.1 Students will analyze works written on the same topic and compare the methods the authors use to achieve similar or different purposes and include support using textual evidence.

9.3.R.2 Students will evaluate points of view and perspectives in more than one grade-level literary and/or informational text and explain how multiple points of view contribute to the meaning of a work.

9.3.R.3 Students will analyze how authors use key literary elements to contribute to meaning and interpret how themes are connected across texts:

- setting
- plot
- characters (*i.e., protagonist, antagonist*)
- character development
- theme
- conflict (*i.e., internal and external*)
- archetypes

10.3.R.1 Students will evaluate the extent to which historical, cultural, and/or global perspectives affect authors' stylistic and organizational choices in grade-level literary and informational genres.

10.3.R.2 Students will evaluate points of view and perspectives in more than one grade-level literary and/or informational text and explain how multiple points of view contribute to the meaning of a work.

10.3.R.3 Students will analyze how authors use key literary elements to contribute to meaning and interpret how themes are connected across texts:

- character development
- theme
- conflict (*i.e., internal and external*)
- archetypes

8th Grade

Reading (Continued)

8.3.R.4 Students will evaluate literary devices to support interpretations of literary texts:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole
- imagery
- tone
- symbolism
- irony

8.3.R.5 Students will evaluate textual evidence to determine whether a claim is substantiated or unsubstantiated.

8.3.R.6 Students will analyze the structures of texts (*e.g., compare/contrast, problem/solution, cause/effect, claims/evidence*) and content by making complex inferences about texts to draw logical conclusions from textual evidence.

8.3.R.7 Students will make connections (*e.g., thematic links, literary analysis*) between and across multiple texts and provide textual evidence to support their inferences.

9th Grade - English I

9.3.R.4 Students will evaluate literary devices to support interpretations of texts, including comparisons across texts:

- simile
- metaphor
- personification
- onomatopoeia
- hyperbole
- imagery
- tone
- symbolism
- irony

9.3.R.5 Students will evaluate textual evidence to determine whether a claim is substantiated or unsubstantiated.

9.3.R.6 Students will comparatively analyze the structures of texts (*e.g., compare/contrast, problem/solution, cause/effect, claims/counterclaims/evidence*) and content by inferring connections among multiple texts and providing textual evidence to support their inferences.

9.3.R.7 Students will make connections (*e.g., thematic links, literary analysis*) between and across multiple texts and provide textual evidence to support their inferences.

10th Grade - English II

10.3.R.4 Students will evaluate literary devices to support interpretations of texts, including comparisons across texts:

- figurative language
- imagery
- tone
- symbolism
- irony

10.3.R.5 Students will distinguish among different kinds of evidence (*e.g., logical, empirical, anecdotal*) used to support conclusions and arguments in texts.

10.3.R.6 Students will comparatively analyze the structures of texts (*e.g., compare/contrast, problem/solution, cause/effect, claims/counterclaims/evidence*) and content by inferring connections among multiple texts and providing textual evidence to support their inferences.

10.3.R.7 Students will make connections (*e.g., thematic links, literary analysis*) between and across multiple texts and provide textual evidence to support their inferences.

8th Grade

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

NARRATIVE

8.3.W.1 Students will write narratives incorporating characters, plot (*i.e.*, *flashback and foreshadowing*), setting, point of view, conflict, dialogue, and sensory details.

INFORMATIVE

8.3.W.2 Students will compose essays and reports about topics, incorporating evidence (*e.g.*, *specific facts, examples, details*) and maintaining an organized structure and a formal style.

ARGUMENT - Grade Level Focus

8.3.W.3 Students will introduce a claim, recognize at least one claim from an opposing viewpoint, and organize reasons and evidences, using credible sources.

8.3.W.4 Students will show relationships among the claim, reasons, and evidence and include a conclusion that follows logically from the information presented.

9th Grade - English I

NARRATIVE - Grade Level Focus

9.3.W.1 Students will write nonfiction narratives (*e.g.*, *memoirs, personal essays*).

INFORMATIVE - Grade Level Focus

9.3.W.2 Students will compose essays and reports to objectively introduce and develop topics, incorporating evidence (*e.g.*, *specific facts, examples, details, data*) and maintaining an organized structure and a formal style.

9.3.W.3 Students will elaborate on ideas by using logical reasoning and illustrative examples to connect evidences to claim(s).

ARGUMENT

9.3.W.4 Students will introduce claims, recognize and distinguish from alternate or opposing claims, and organize reasons and evidences, using credible sources.

9.3.W.5 Students will show relationships among the claim, reasons, and evidence and include a conclusion that follows logically from the information presented and supports the argument.

9.3.W.6 Students will blend multiple modes of writing to produce effective argumentative essays.

10th Grade - English II

NARRATIVE

10.3.W.1 Students will write narratives embedded in other modes as appropriate.

INFORMATIVE - Grade Level Focus

10.3.W.2 Students will compose essays and reports to objectively introduce and develop topics, incorporating evidence (*e.g.*, *specific facts, examples, details, data*) and maintaining an organized structure and a formal style.

10.3.W.3 Students will elaborate on ideas by using logical reasoning and illustrative examples to connect evidences to claim(s).

ARGUMENT - Grade Level Focus

10.3.W.4 Students will introduce precise claims and distinguish them from counterclaims and provide sufficient evidences to develop balanced arguments, using credible sources.

10.3.W.5 Students will use words, phrases, and clauses to connect claims, counterclaims, evidence, and commentary to create a cohesive argument and include a conclusion that follows logically from the information presented and supports the argument.

10.3.W.6 Students will blend multiple modes of writing to produce effective argumentative essays.

11th Grade - English III

12th Grade - English IV

Reading

Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.

11.3.R.1 Students will analyze the extent to which historical, cultural, and/or global perspectives affect authors' stylistic and organizational choices in grade-level literary and informational genres.

11.3.R.2 Students will evaluate points of view and perspectives in more than one grade-level literary and/or informational text and explain how multiple points of view contribute to the meaning of a work.

11.3.R.3 Students will analyze how authors use key literary elements to contribute to meaning and interpret how themes are connected across texts:

- theme
- archetypes

11.3.R.4 Students will evaluate literary devices to support interpretations of texts, including comparisons across texts:

- imagery
- tone
- symbolism
- irony

11.3.R.5 Students will evaluate how authors writing on the same issue reached different conclusions because of differences in assumptions, evidence, reasoning, and viewpoints.

11.3.R.6 Students will comparatively analyze the structures of texts (*e.g., compare/contrast, problem/solution, cause/effect, claims/counterclaims/evidence*) and content by inferring connections among multiple texts and providing textual evidence to support their conclusions.

11.3.R.7 Students will make connections (*e.g., thematic links, literary analysis, authors' style*) between and across multiple texts and provide textual evidence to support their inferences.

12.3.R.1 Students will analyze the extent to which historical, cultural, and/or global perspectives affect authors' stylistic and organizational choices in grade-level literary and informational genres.

12.3.R.2 Students will evaluate points of view and perspectives in more than one grade-level literary and/or informational text and explain how multiple points of view contribute to the meaning of a work.

12.3.R.3 Students will analyze how authors use key literary elements to contribute to meaning and interpret how themes are connected across texts.

12.3.R.4 Students will evaluate literary devices to support interpretations of texts, including comparisons across texts.

12.3.R.5 Students will evaluate how authors writing on the same issue reached different conclusions because of differences in assumptions, evidence, reasoning, and viewpoints.

12.3.R.6 Students will comparatively analyze the structures of texts (*e.g., compare/contrast, problem/solution, cause/effect, claims/counterclaims/evidence*) and content by inferring connections among multiple texts and providing textual evidence to support their conclusions.

12.3.R.7 Students will make connections (*e.g., thematic links, literary analysis, authors' style*) between and across multiple texts and provide textual evidence to support their inferences.

11th Grade - English III

Writing

Students will write for varied purposes and audiences in all modes, using fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

NARRATIVE

11.3.W.1 Students will write narratives embedded in other modes as appropriate.

INFORMATIVE

11.3.W.2 Students will compose essays and reports to objectively introduce and develop topics, incorporating evidence (*e.g., specific facts, examples, details, data*) and maintaining an organized structure and a formal style.

11.3.W.3 Students will elaborate on ideas by using logical reasoning and illustrative examples to connect evidences to claim(s).

ARGUMENT

11.3.W.4 Students will (1) introduce precise, informed claims, (2) distinguish them from alternate or opposing claims, (3) organize claims, counterclaims, and evidence in a way that provides a logical sequence for the entire argument, and (4) provide the most relevant evidences to develop balanced arguments, using credible sources.

11.3.W.5 Students will use words, phrases, clauses, and varied syntax to connect all parts of the argument and create cohesion and include a conclusion that follows logically from the information presented and supports the argument.

11.3.W.6 Students will blend multiple modes of writing to produce effective argumentative essays.

12th Grade - English IV

NARRATIVE

12.3.W.1 Students will write narratives embedded in other modes as appropriate.

INFORMATIVE

12.3.W.2 Students will compose essays and reports to objectively introduce and develop topics, incorporating evidence (*e.g., specific facts, examples, details, data*) and maintaining an organized structure and a formal style.

12.3.W.3 Students will elaborate on ideas by using logical reasoning and illustrative examples to connect evidences to claim(s).

ARGUMENT

12.3.W.4 Students will (1) introduce precise, informed claims, (2) distinguish them from alternate or opposing claims, (3) organize claims, counterclaims, and evidence in a way that provides a logical sequence for the entire argument, and (4) provide the most relevant evidences to develop balanced arguments, using credible sources.

12.3.W.5 Students will use words, phrases, clauses, and varied syntax to connect all parts of the argument and create cohesion and include a conclusion that follows logically from the information presented and supports the argument.

12.3.W.6 Students will blend multiple modes of writing to produce effective argumentative essays.

Vocabulary

Students will expand their working vocabularies to effectively communicate and understand texts.

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

4: Vocabulary Students will expand their working vocabularies to effectively communicate and understand texts.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

PK.4.R.1 Students will acquire new academic, content-specific, grade-level vocabulary and relate new words to prior knowledge with guidance and support.

PK.4.R.2 Students will begin to develop an awareness of context clues through read-alouds and other text experiences.

PK.4.R.3 Students will name and sort familiar objects into categories based on common attributes with guidance and support.

K.4.R.1 Students will acquire new academic, content-specific, grade-level vocabulary and relate new words to prior knowledge with guidance and support.

K.4.R.2 Students will begin to develop an awareness of context clues through read-alouds and other text experiences.

K.4.R.3 Students will name and sort pictures of objects into categories based on common attributes with guidance and support.

1.4.R.1 Students will acquire new academic, content-specific, grade-level vocabulary, relate new words to prior knowledge, and apply vocabulary in new situations.

1.4.R.2 Students will use word parts (*e.g., affixes, roots, stems*) to define unfamiliar words with guidance and support.

1.4.R.3 Students will use context clues to determine the meaning of words with guidance and support.

1.4.R.4 Students will name and sort words into categories based on common attributes.

1.4.R.5 Students will use a dictionary (*print and/or electronic*) to find words.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

PK.4.W.1 Students will begin to use new vocabulary to produce and expand complete sentences in shared language activities.

PK.4.W.2 Students will begin to select appropriate language according to purpose.

K.4.W.1 Students will use new vocabulary to produce and expand complete sentences in shared language activities with guidance and support.

K.4.W.2 Students will select appropriate language according to purpose with guidance and support.

1.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing with guidance and support.

1.4.W.2 Students will select appropriate language according to purpose in writing with guidance and support.

4: Vocabulary Students will expand their working vocabularies to effectively communicate and understand texts.

2nd Grade

3rd Grade

4th Grade

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

2.4.R.1 Students will acquire new academic, content-specific, grade-level vocabulary, relate new words to prior knowledge, and apply vocabulary in new situations.

2.4.R.2 Students will use word parts (*e.g., affixes, roots, stems*) to define and determine the meaning of new words.

2.4.R.3 Students will use context clues to determine the meaning of words with guidance and support.

2.4.R.4 Students will infer relationships among words, including synonyms, antonyms, and simple multiple-meaning words.

2.4.R.5 Students will use a dictionary or glossary (*print and/or electronic*) to determine or clarify the meanings of words or phrases.

3.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

3.4.R.2 Students will use word parts (*e.g., affixes, roots, stems*) to define and determine the meaning of new words.

3.4.R.3 Students will use context clues to determine the meaning of words or distinguish among multiple-meaning words.

3.4.R.4 Students will infer relationships among words, including synonyms, antonyms, homographs, and homonyms.

3.4.R.5 Students will use a dictionary or glossary (*print and/or electronic*) to determine or clarify the meanings, syllabication, and pronunciation of words.

4.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

4.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of new words.

4.4.R.3 Students will use context clues to determine the meaning of words or distinguish among multiple-meaning words.

4.4.R.4 Students will infer relationships among words with multiple meanings, including synonyms, antonyms, and more complex homographs and homonyms.

4.4.R.5 Students will use a dictionary or glossary (*print and/or electronic*) to determine or clarify the meanings, syllabication, and pronunciation of words.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

2.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing.

2.4.W.2 Students will select appropriate language according to purpose in writing.

3.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing.

3.4.W.2 Students will select appropriate language according to purpose in writing.

4.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing.

4.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

4: Vocabulary Students will expand their working vocabularies to effectively communicate and understand texts.

5th Grade

6th Grade

7th Grade

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

5.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

5.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define new words and determine the meaning of new words.

5.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

5.4.R.4 Students will infer the relationships among words with multiple meanings, including synonyms, antonyms, analogies, and more complex homographs and homonyms.

5.4.R.5 Students will use a dictionary, glossary, or a thesaurus (*print and/or electronic*) to determine or clarify the meanings, syllabication, pronunciation, synonyms, and parts of speech of words.

6.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

6.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

6.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

6.4.R.4 Students will infer the relationships among words with multiple meanings, including synonyms, antonyms, analogies, and more complex homographs and homonyms.

6.4.R.5 Students will use a dictionary, glossary, or a thesaurus (*print and/or electronic*) to determine or clarify the meanings, syllabication, pronunciation, synonyms, and parts of speech of words.

7.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

7.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

7.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

7.4.R.4 Students will infer the relationships among words with multiple meanings and recognize the connotation and denotation of words.

7.4.R.5 Students will use a dictionary, glossary, or a thesaurus (*print and/or electronic*) to determine or clarify the meanings, syllabication, pronunciation, synonyms, and parts of speech of words.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

5.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing clearly.

5.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

6.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing clearly.

6.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

7.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing clearly.

7.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

4: Vocabulary Students will expand their working vocabularies to effectively communicate and understand texts.

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

8.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

8.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

8.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

8.4.R.4 Students will infer the relationships among words with multiple meanings and recognize the connotation and denotation of words.

8.4.R.5 Students will use a dictionary, glossary, or a thesaurus (*print and/or electronic*) to determine or clarify the meanings, syllabication, pronunciation, synonyms, and parts of speech of words.

9.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

9.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

9.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

9.4.R.4 Students will analyze the relationships among words with multiple meanings and recognize the connotation and denotation of words.

9.4.R.5 Students will use a dictionary, glossary, or a thesaurus (*print and/or electronic*) to determine or clarify the meanings, syllabication, pronunciation, synonyms, parts of speech, and etymology of words or phrases.

10.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

10.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

10.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

10.4.R.4 Students will analyze the relationships among words with multiple meanings and recognize the connotation and denotation of words.

10.4.R.5 Students will use a dictionary, glossary, or a thesaurus (*print and/or electronic*) to determine or clarify the meanings, syllabication, pronunciation, synonyms, parts of speech, and etymology of words or phrases.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

8.4.W.1 Students will use domain-appropriate vocabulary to communicate ideas in writing clearly.

8.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

9.4.W.1 Students will use domain-appropriate vocabulary to communicate complex ideas in writing clearly.

9.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

10.4.W.1 Students will use domain-appropriate vocabulary to communicate complex ideas in writing clearly.

10.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

11th Grade - English III

12th Grade - English IV

Reading

Students will expand academic, domain-appropriate, grade-level vocabularies through reading, word study, and class discussion.

11.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

11.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

11.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

11.4.R.4 Students will analyze and evaluate the relationships among words with multiple meanings and recognize the connotation and denotation of words.

11.4.R.5 Students will use general and specialized dictionaries, thesauri, glossaries, histories of language, books of quotations, and other related references (*print and/or electronic*) as needed.

Writing

Students will apply knowledge of vocabularies to communicate by using descriptive, academic, and domain-appropriate abstract and concrete words in their writing.

11.4.W.1 Students will use domain-appropriate vocabulary to communicate complex ideas in writing clearly.

11.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

12.4.R.1 Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

12.4.R.2 Students will use word parts (*e.g., affixes, Greek and Latin roots, stems*) to define and determine the meaning of increasingly complex words.

12.4.R.3 Students will use context clues to determine or clarify the meaning of words or distinguish among multiple-meaning words.

12.4.R.4 Students will analyze and evaluate the relationships among words with multiple meanings and recognize the connotation and denotation of words.

12.4.R.5 Students will use general and specialized dictionaries, thesauri, glossaries, histories of language, books of quotations, and other related references (*print and/or electronic*) as needed.

12.4.W.1 Students will use domain-appropriate vocabulary to communicate complex ideas in writing clearly.

12.4.W.2 Students will select appropriate language to create a specific effect according to purpose in writing.

Language

Students will apply knowledge of grammar and rhetorical style to reading and writing.

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

5: Language Students will apply knowledge of grammar and rhetorical style to reading and writing.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

PK.5.R.1 Students will begin to understand the function of grammar through exposure to conversations, read-alouds, and interactive reading.

PK.5.R.2 Students will recognize concrete objects as persons, places or things (*i.e., nouns*) with guidance and support.

PK.5.R.3 Students will recognize words as actions (*i.e., verbs*) with guidance and support.

PK.5.R.4 Students will group pictures and movement, and determine spatial and time relationships such as up, down, before, and after with guidance and support.

K.5.R.1 Students will begin to understand the function of grammar through exposure to conversations, read-alouds, and interactive reading.

K.5.R.2 Students will recognize concrete objects as persons, places or things (*i.e., nouns*) with guidance and support.

K.5.R.3 Students will recognize words as actions (*i.e., verbs*) with guidance and support.

K.5.R.4 Students will group pictures and movement, and determine spatial and time relationships such as up, down, before, and after with guidance and support.

1.5.R.1 Students will recognize nouns as concrete objects (*i.e., people persons, places, and things*) and use the pronoun “I.”

1.5.R.2 Students will recognize verbs as actions

1.5.R.3 Students will recognize color and number adjectives.

1.5.R.4 Students will recognize the prepositions (*e.g., The dog is on top of the doghouse*) through pictures and movement.

1.5.R.5 Students will recognize singular and plural nouns with correct verbs in simple sentences (*e.g. He sits; we sit*).

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

These standards begin in Kindergarten.

K.5.W.1 Students will capitalize, with guidance and support:

- their first name
- the pronoun “I.”

K.5.W.2 Students will begin to compose simple sentences that begin with a capital letter and end with a period or question mark.

1.5.W.1 Students will capitalize:

- the first letter of a sentence
- proper names
- months and days of the week

1.5.W.2 Students will compose grammatically correct simple and compound sentences and questions (interrogatives) with appropriate end marks.

5: Language Students will apply knowledge of grammar and rhetorical style to reading and writing.

2nd Grade

3rd Grade

4th Grade

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

2.5.R.1 Students will recognize nouns, pronouns, and irregular plural nouns.

2.5.R.2 Students will recognize different types and tenses of verbs.

2.5.R.3 Students will recognize adjectives.

2.5.R.4 Students will recognize prepositions.

2.5.R.5 Students will recognize the subject and predicate of a sentence.

3.5.R.1 Students will recognize pronouns and possessive nouns.

3.5.R.2 Students will recognize irregular and past participle verbs and verb tense to identify settings, times, and sequences in text.

3.5.R.3 Students will recognize adjectives, articles as adjectives, and adverbs.

3.5.R.4 Students will recognize prepositions and conjunctions.

3.5.R.5 Students will recognize the subject and verb agreement.

4.5.R.1 Students will recognize pronouns and irregular possessive nouns.

4.5.R.2 Students will recognize present perfect verbs and verb tense to identify settings, times, sequences, and conditions in text.

4.5.R.3 Students will recognize comparative and superlative adjectives and adverbs.

4.5.R.4 Students will recognize prepositional phrases and conjunctions.

4.5.R.5 Students will recognize the subject and verb agreement.

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

2.5.W.1 Students will capitalize and appropriately punctuate:

- the first letter of a quotation
- holidays
- product names
- initials
- months and days of the week

2.5.W.2 Students will use simple contractions (*e.g., isn't, aren't, can't*).

2.5.W.3 Students will compose grammatically correct simple and compound declarative, interrogative, imperative, and exclamatory sentences with appropriate end marks.

3.5.W.1 Students will capitalize and appropriately punctuate:

- titles of respect
- appropriate words in titles
- geographical names

3.5.W.2 Students will use complex contractions (*e.g., should've, won't*).

3.5.W.3 Students will compose and expand grammatically correct sentences and questions with appropriate commas, apostrophes, quotation marks, and end marks as needed for dialogue.

3.5.W.4 Students will compose simple, compound and complex declarative, interrogative, imperative, and exclamatory sentences.

4.5.W.1 Students will capitalize

- familial relations
- proper adjectives
- conventions of letter writing

4.5.W.2 Students will compose and expand grammatically correct sentences and questions with appropriate commas, end marks, apostrophes, and quotation marks as needed for dialogue.

4.5.W.3 Students will compose simple, compound, and complex sentences and questions, create sentences with an understood subject, and correct fragments and run-on sentences.

4.5.W.4 Students will compose declarative, interrogative, imperative, and exclamatory sentences.

5: Language Students will apply knowledge of grammar and rhetorical style to reading and writing.

5th Grade

6th Grade

7th Grade

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

5.5.R.1 Students will recognize conjunctions, prepositions, and interjections and explain their effect in particular sentences.

5.5.R.2 Students will recognize verb tense to signify various times, sequences, states, and conditions in text.

5.5.R.3 Students will recognize the subject and verb agreement.

6.5.R.1 Students will recognize simple and compound sentences to signal differing relationships among ideas.

6.5.R.2 Students will recognize verb tense to signify various times, sequences, states, and conditions in text.

6.5.R.3 Students will recognize the subject and verb agreement.

7.5.R.1 Students will recognize the correct use of prepositional phrases and dependent clauses.

7.5.R.2 Students will recognize simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.

7.5.R.3 Students will recognize the subject and verb agreement.

7.5.R.4 Students will recognize and correct misplaced and dangling modifiers.

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

5.5.W.1 Students will write using correct mechanics with a focus on commas, apostrophes, and quotation marks as needed for dialogue and quoted material.

5.5.W.2 Students will compose simple, compound, and complex sentences and questions, create sentences with an understood subject, and correct fragments and run-on sentences.

5.5.W.3 Students will form and use the present and past verb tenses.

5.5.W.4 Students will form and use verb tense to convey various times, sequences, states, and conditions.

5.5.W.5 Students will recognize and correct inappropriate shifts in verb tense.

6.5.W.1 Students will write using correct mechanics with a focus on commas, apostrophes, quotation marks, colons, and semi-colons.

6.5.W.2 Students will compose simple, compound, and complex sentences and questions to signal differing relationships among ideas.

6.5.W.3 Students will use intensive and reflexive pronouns.

6.5.W.4 Students will recognize and correct inappropriate shifts in pronoun number and person.

6.5.W.5 Students will recognize and correct vague pronouns (*i.e., ones with unclear or ambiguous antecedents*).

7.5.W.1 Students will write using correct mechanics with a focus on commas, apostrophes, quotation marks, colons, and semi-colons.

7.5.W.2 Students will compose simple, compound, complex, and compound-complex sentences and questions to signal differing relationships among ideas.

7.5.W.3 Students will use prepositional phrases and clauses (*e.g., dependent and independent*) in writing.

5: Language Students will apply knowledge of grammar and rhetorical style to reading and writing.

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

8.5.R.1 Students will recognize the use of verbals (*e.g., gerunds, participles, infinitives*) and clauses.

8.5.R.2 Students will recognize the use of active and passive voice.

8.5.R.3 Students will recognize and correct inappropriate shifts in verb tense.

8.5.R.4 Students will recognize the subject and verb agreement, and correct as necessary.

9.5.R.1 Students will examine the function of parallel structures, various types of phrases, and clauses to convey specific meanings.

9.5.R.2 Students will recognize the use of active and passive voice.

9.5.R.3 Students will recognize and correct inappropriate shifts in verb tense.

9.5.R.4 Students will recognize the subject and verb agreement, and correct as necessary.

10.5.R Students will examine the function of parallel structures, various types of phrases, clauses, and active and passive voice to convey specific meanings and/or reflect specific rhetorical styles.

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

8.5.W.1 Students will write using correct mechanics with a focus on commas, apostrophes, quotation marks, colons, and semi-colons.

8.5.W.2 Students will compose simple, compound, complex, and compound-complex sentences and questions to signal differing relationships among ideas.

8.5.W.3 Students will use verbals (*e.g., gerunds, participles, infinitives*) in writing.

8.5.W.4 Students will form and use verbs in the active and passive voice.

8.5.W.5 Students will form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood.

9.5.W.1 Students will write using correct mechanics with a focus on punctuation marks as needed.

9.5.W.2 Students will compose simple, compound, complex, and compound-complex sentences and questions to signal differing relationships among ideas.

9.5.W.3 Students will use parallel structure.

9.5.W.4 Students will use various types of phrases (*e.g., appositive, adjectival, adverbial, participial, prepositional*) and clauses (*e.g., independent, dependent, adverbial*) to convey specific meanings and add variety and interest to writing or presentations.

10.5.W.1 Students will write using correct mechanics.

10.5.W.2 Students will compose simple, compound, complex, and compound-complex sentences and questions, to signal differing relationships among ideas.

10.5.W.3 Students will practice their use of Standard American English, grammar, mechanics, and usage through writing, presentations, and/or other modes of communication to convey specific meanings and interests.

11th Grade - English III

12th Grade - English IV

Reading

Students will apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts.

11.5.R Students will apply their knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts, understanding that usage and convention change over time and using that understanding to manipulate style when appropriate.

12.5.R Students will apply their knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts, understanding that usage and convention change over time and using that understanding to manipulate style when appropriate.

Writing

Students will demonstrate command of Standard English grammar, mechanics, and usage through writing and other modes of communication.

11.5.W.1 Students will write using correct mechanics.

12.5.W.1 Students will write using correct mechanics.

11.5.W.2 Students will compose simple, compound, complex, and compound-complex sentences and questions, including the use of phrases and clauses, to signal differing relationships among ideas.

12.5.W.2 Students will compose simple, compound, complex, and compound-complex sentences and questions, including the use of phrases and clauses, to signal differing relationships among ideas.

11.5.W.3 Students will demonstrate command of Standard American English, grammar, mechanics, and usage through writing, presentations, and/or other modes of communication to convey specific meanings and interests.

12.5.W.3 Students will demonstrate command of Standard American English, grammar, mechanics, and usage through writing, presentations, and/or other modes of communication to convey specific meanings and interests.

Research

Students will engage in inquiry to acquire, refine, and share knowledge.

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

6: Research Students will engage in inquiry to acquire, refine, and share knowledge.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

PK.6.R Students will begin to identify pictures, charts, grade-appropriate texts, or people as sources of information on a topic of interest.

K.6.R.1 Students will identify relevant pictures, charts, grade-appropriate texts, or people as sources of information on a topic of interest.

1.6.R.1 Students will decide who can answer questions about their topic or what resources they will need to find the information.

K.6.R.2 Students will identify graphic features to understand a text including photos, illustrations, and titles to understand a text.

1.6.R.2 Students will identify graphic features including photos, illustrations, titles, labels, headings, charts, and graphs to understand a text.

1.6.R.3 Students will identify the location and purpose of various visual and text reference sources.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

PK.6.W Students will generate topics of interest and decide if a friend, teacher, or expert can answer their questions with guidance and support.

K.6.W.1 Students will generate topics of interest and decide if a friend, teacher, or expert can answer their questions with guidance and support.

1.6.W.1 Students will generate questions about topics of interest.

K.6.W.2 Students will find information from provided sources during group research with guidance and support.

1.6.W.2 Students will organize information found during group or individual research, using graphic organizers or other aids with guidance and support.

1.6.W.3 Students will make informal presentations of information gathered.

6: Research Students will engage in inquiry to acquire, refine, and share knowledge.

2nd Grade

3rd Grade

4th Grade

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

2.6.R.1 Students will create their own questions to find information on their topic.

2.6.R.2 Students will use graphic features including photos, illustrations, titles, labels, headings, subheadings, charts, and graphs to understand a text.

2.6.R.3 Students will consult various visual and text reference sources to gather information.

3.6.R.1 Students will use their own questions to find information on their topic.

3.6.R.2 Students will use graphic features including photos, illustrations, captions, titles, labels, headings, subheadings, italics, sidebars, charts, graphs, and legends to define a text.

3.6.R.3 Students will locate information in visual and text reference sources, electronic resources, and/or interviews.

3.6.R.4 Students will determine the relevance and reliability of the information for their specific topic of interest with guidance and support.

4.6.R.1 Students will use their own viable research questions to find information about a specific topic.

4.6.R.2 Students will use graphic features including photos, illustrations, captions, titles, labels, headings, subheadings, italics, sidebars, charts, graphs, and legends to interpret a text.

4.6.R.3 Students will determine the relevance and reliability of the information gathered.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

2.6.W.1 Students will generate a list of topics of interest and individual questions about one specific topic of interest.

2.6.W.2 Students will organize information found during group or individual research, using graphic organizers or other aids.

2.6.W.3 Students will organize and present their information in written and/or oral reports or display.

3.6.W.1 Students will generate a list of topics of interest and individual questions about one specific topic of interest.

3.6.W.2 Students will organize information found during group or individual research, using graphic organizers or other aids.

3.6.W.3 Students will summarize and present information in a report.

4.6.W.1 Students will generate a viable research question about a specific topic.

4.6.W.2 Students will organize information found during research, following a modified citation style (*e.g., author, title, publication date*) with guidance and support.

4.6.W.3 Students will summarize and present information in a report.

6: Research Students will engage in inquiry to acquire, refine, and share knowledge.

5th Grade

6th Grade

7th Grade

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

5.6.R.1 Students will use their own viable research questions to find information about a specific topic.

5.6.R.2 Students will record and organize information from various print and/or digital sources.

5.6.R.3 Students will determine the relevance and reliability of the information gathered.

6.6.R.1 Students will use their own viable research questions to find information about a specific topic.

6.6.R.2 Students will record and organize information from various primary and secondary sources (*e.g., print and digital*).

6.6.R.3 Students will determine the relevance, reliability, and validity of the information gathered.

7.6.R.1 Students will use their own viable research questions and thesis statements to find information about a specific topic.

7.6.R.2 Students will follow ethical and legal guidelines for finding and recording information from a variety of primary and secondary sources (*e.g., print and digital*).

7.6.R.3 Students will determine the relevance, reliability, and validity of the information gathered.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

5.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

5.6.W.2 Students will formulate a viable research question from findings.

5.6.W.3 Students will organize information found during research, following a modified citation style (*e.g., author, title, publication date*) with guidance and support.

5.6.W.4 Students will summarize and present information in a report.

6.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

6.6.W.2 Students will refine and formulate a viable research question and/or topic from initial findings.

6.6.W.3 Students will organize information found during research, following a citation style (*e.g., MLA, APA, etc.*) with guidance and support.

6.6.W.4 Students will summarize and present information in a report.

7.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

7.6.W.2 Students will refine and formulate a viable research question and report findings clearly and concisely, using a thesis statement.

7.6.W.3 Students will quote, paraphrase, and summarize findings following an appropriate citation style (*e.g., MLA, APA, etc.*) and avoiding plagiarism.

7.6.W.4 Students will summarize and present information in a report.

6: Research Students will engage in inquiry to acquire, refine, and share knowledge.

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

8.6.R.1 Students will use their own viable research questions and well-developed thesis statements to find information about a specific topic.

8.6.R.2 Students will follow ethical and legal guidelines for finding and recording information from a variety of primary and secondary sources (*e.g., print and digital*).

8.6.R.3 Students will determine the relevance, reliability, and validity of the information gathered.

9.6.R.1 Students will use their own viable research questions and well-developed thesis statements to find information about a specific topic.

9.6.R.2 Students will follow ethical and legal guidelines for finding and recording information from a variety of primary and secondary sources (*e.g., print and digital*).

9.6.R.3 Students will evaluate the relevance, reliability, and validity of the information gathered.

10.6.R.1 Students will use their own viable research questions and well-developed thesis statements to find information about a specific topic.

10.6.R.2 Students will synthesize the most relevant information from a variety of primary and secondary sources (*e.g., print and digital*), following ethical and legal citation guidelines.

10.6.R.3 Students will evaluate the relevance, reliability, and validity of the information gathered.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

8.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

8.6.W.2 Students will refine and formulate a viable research question and report findings clearly and concisely, using a well-developed thesis statement.

8.6.W.3 Students will quote, paraphrase, and summarize findings following an appropriate citation style (*e.g., MLA, APA, etc.*) and avoiding plagiarism.

8.6.W.4 Students will summarize and present information in a report.

9.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

9.6.W.2 Students will refine and formulate a viable research question, integrate findings from sources, and clearly use a well-developed thesis statement.

9.6.W.3 Students will quote, paraphrase, and summarize findings following an appropriate citation style (*e.g., MLA, APA, etc.*) and avoiding plagiarism.

9.6.W.4 Students will summarize and present information in a report.

10.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

10.6.W.2 Students will refine and formulate a viable research question, integrate findings from sources, and clearly use a well-developed thesis statement.

10.6.W.3 Students will integrate into their own writing quotes, paraphrases, and summaries of findings following an appropriate citation style (*e.g., MLA, APA, etc.*) and avoiding plagiarism.

10.6.W.4 Students will synthesize and present information in a report.

11th Grade - English III

12th Grade - English IV

Reading

Students will comprehend, evaluate, and synthesize resources to acquire and refine knowledge.

11.6.R.1 Students will use their own viable research questions and well-developed thesis statements to find information about a specific topic.

11.6.R.2 Students will synthesize the most relevant information from a variety of primary and secondary sources (*e.g., print and digital*), following ethical and legal citation guidelines.

11.6.R.3 Students will evaluate the relevance, reliability, and validity of the information gathered.

Writing

Students will summarize and paraphrase, integrate evidence, and cite sources to create reports, projects, papers, texts, and presentations for multiple purposes.

11.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

11.6.W.2 Students will integrate findings from sources using a well-developed thesis statement.

11.6.W.3 Students will integrate into their own writing quotes, paraphrases, and summaries of findings following an appropriate citation style (*e.g., MLA, APA, etc.*) and avoiding plagiarism.

11.6.W.4 Students will synthesize and present information in a report.

12.6.R.1 Students will use their own viable research questions and well-developed thesis statements to find information about a specific topic.

12.6.R.2 Students will synthesize resources to acquire and refine knowledge, following ethical and legal citation guidelines.

12.6.R.3 Students will evaluate the relevance, reliability, and validity of the information gathered.

12.6.W.1 Students will write research papers and/or texts independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

12.6.W.2 Students will integrate findings from sources using a well-developed thesis statement.

12.6.W.3 Students will integrate into their own writing quotes, paraphrases, and summaries of findings following an appropriate citation style (*e.g., MLA, APA, etc.*) and avoiding plagiarism.

12.6.W.4 Students will synthesize and present information in a report.

Multimodal Literacies

Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non-verbal, and interactive texts.

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

7: Multimodal Literacies Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non verbal, and interactive texts.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

PK.7.R Students will recognize formats of print and digital text with guidance and support.

K.7.R.1 Students will recognize formats of print and digital text with guidance and support.

1.7.R.1 Students will use provided print and digital resources with guidance and support.

K.7.R.2 Students will explore how ideas and topics are depicted in a variety of media and formats.

1.7.R.2 Students will explore and compare how ideas and topics are depicted in a variety of media and formats.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

PK.7.W Students will use appropriate technology to communicate with others with guidance and support.

K.7.W.1 Students will use appropriate technology to communicate with others with guidance and support.

1.7.W.1 Students will select and use appropriate technology or media to communicate with others with guidance and support.

K.7.W.2 Students will use appropriate props, images, or illustrations to support verbal communication.

1.7.W.2 Students will use visual displays to support verbal communication and clarify ideas, thoughts, and feelings.

7: Multimodal Literacies Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non verbal, and interactive texts.

2nd Grade

3rd Grade

4th Grade

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

2.7.R.1 Students will locate and use print and digital resources with guidance and support.

2.7.R.2 Students will explain how ideas and topics are depicted in a variety of media and formats.

3.7.R.1 Students will locate, organize, and use information from a variety of written, oral, visual, digital, non-verbal, and interactive texts to generate and answer literal questions.

3.7.R.2 Students will compare how ideas and topics are depicted in a variety of media and formats

4.7.R.1 Students will locate, organize, and analyze information from a variety of written, oral, visual, digital, non-verbal, and interactive texts to generate and answer literal and interpretive questions to create new understandings.

4.7.R.2 Students will compare and contrast how ideas and topics are depicted in a variety of media and formats.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

2.7.W.1 Students will select and use appropriate technology or media to communicate with others with guidance and support.

2.7.W.2 Students will create a simple presentation using audio, visual, and/or multimedia tools to support communication and clarify ideas, thoughts, and feelings

3.7.W.1 Students will create multimodal content that communicates an idea using technology or appropriate media.

3.7.W.2 Students will create presentations using video, photos, and other multimedia elements to support communication and clarify ideas, thoughts, and feelings.

4.7.W.1 Students will create multimodal content that effectively communicates an idea using technology or appropriate media.

4.7.W.2 Students will create presentations using videos, photos, and other multimedia elements to support communication and clarify ideas, thoughts, and feelings.

7: Multimodal Literacies Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non verbal, and interactive texts.

5th Grade

6th Grade

7th Grade

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

5.7.R.1 Students will analyze the characteristics and effectiveness of a variety of written, oral, visual, digital, non-verbal, and interactive texts to generate and answer literal and interpretive questions to create new understandings.

5.7.R.2 Students will compare and contrast how ideas and topics are depicted in a variety of media and formats.

6.7.R.1 Students will compare and contrast the effectiveness of a variety of written, oral, visual, digital, non-verbal, and interactive texts to generate and answer literal, interpretive, and applied questions to create new understandings.

6.7.R.2 Students will analyze the impact of selected media and formats on meaning.

7.7.R.1 Students will compare and contrast the effectiveness of techniques used in a variety of written, oral, visual, digital, non-verbal, and interactive texts to generate and answer literal, interpretive, and applied questions to create new understandings.

7.7.R.2 Students will analyze the impact of selected media and formats on meaning.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

5.7.W.1 Students will create multimodal content that effectively communicates an idea using technology and appropriate media.

5.7.W.2 Students will create presentations that integrate visual displays and other multimedia to enrich the presentation.

6.7.W.1 Students will create multimodal content that effectively communicates ideas using technologies and appropriate media.

6.7.W.2 Students will create presentations that integrate visual displays and other multimedia to enrich the presentation.

7.7.W.1 Students will select, organize, or create multimodal content to complement and extend meaning for a selected topic.

7.7.W.2 Students will utilize multimedia to clarify information and strengthen claims or evidence.

7: Multimodal Literacies Students will acquire, refine, and share knowledge through a variety of written, oral, visual, digital, non verbal, and interactive texts.

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

8.7.R.1 Students will determine the intended purposes of techniques used for rhetorical effects in written, oral, visual, digital, non-verbal, and interactive texts to generate and answer interpretive and applied questions to create new understandings.

8.7.R.2 Students will analyze the impact of selected media and formats on meaning.

9.7.R.1 Students will analyze and evaluate the effectiveness of techniques used in a variety of written, oral, visual, digital, non-verbal, and interactive texts with a focus on persuasion and argument to generate and answer literal, interpretive, and applied questions to create new understandings.

9.7.R.2 Students will analyze the impact of selected media and formats on meaning.

10.7.R.1 Students will analyze techniques used to achieve the intended rhetorical purposes in written, oral, visual, digital, non-verbal, and interactive texts to generate and answer interpretive and applied questions to create new understandings.

10.7.R.2 Students will analyze the impact of selected media and formats on meaning.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

8.7.W.1 Students will select, organize, or create multimodal content that encompasses different points of view.

8.7.W.2 Students will utilize multimedia to clarify information and emphasize salient points.

9.7.W.1 Students will create a variety of multimodal content to engage specific audiences.

9.7.W.2 Students will create engaging visual and/or multimedia presentations, using a variety of media forms to enhance understanding of findings, reasoning, and evidence for diverse audiences.

10.7.W.1 Students will critique the sources of multimodal content.

10.7.W.2 Students will create visual and/or multimedia presentations using a variety of media forms to enhance understanding of findings, reasoning, and evidence for diverse audiences.

11th Grade - English III

12th Grade - English IV

Reading

Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments.

11.7.R.1 Students will analyze and evaluate the various techniques used to construct arguments in written, oral, visual, digital, non-verbal, and interactive texts, to generate and answer applied questions, and to create new understandings.

11.7.R.2 Students will analyze the impact of selected media and formats on meaning.

12.7.R.1 Students will analyze and evaluate written, oral, visual, digital, non-verbal, and interactive texts in order to draw conclusions and defend arguments.

12.7.R.2 Students will analyze the impact of selected media and formats on meaning.

Writing

Students will create multimodal texts to communicate knowledge and develop arguments.

11.7.W.1 Students will design and develop multimodal content for a variety of purposes.

11.7.W.2 Students will construct engaging visual and/or multimedia presentations using a variety of media forms to enhance understanding of findings, reasoning, and evidence for diverse audiences.

12.7.W.1 Students will create multimodal content to communicate knowledge and defend arguments.

12.7.W.2 Students will construct engaging visual and/or multimedia presentations using a variety of media forms to enhance understanding of findings, reasoning, and evidence for diverse audiences.

Independent Reading and Writing

Students will read and write for a variety of purposes including, but not limited to, academic and personal, for extended periods of time.

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

8: Independent Reading and Writing Students will read and write for a variety of purposes including, but not limited to, academic and personal.

Pre-Kindergarten

Kindergarten

1st Grade

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

PK.8.R Students will demonstrate interest in books during read-alouds and shared reading, and interact independently with books.

K.8.R Students will demonstrate interest in books during read-alouds and shared reading, and interact independently with books.

1.8.R Students will select appropriate texts for academic and personal purposes and read independently for extended periods of time with guidance and support.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

PK.8.W Students will express their ideas through a combination of drawing and emergent writing with guidance and support.

K.8.W Students will express their ideas through a combination of drawing and emergent writing with guidance and support.

1.8.W Students will write independently for extended and shorter periods of time through a combination of emergent and conventional writing with guidance and support.

8: Independent Reading and Writing Students will read and write for a variety of purposes including, but not limited to, academic and personal.

2nd Grade

3rd Grade

4th Grade

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

2.8.R Students will select appropriate texts for academic and personal purposes and read independently for extended periods of time.

3.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

4.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

2.8.W Students will write independently over extended periods of time (*e.g., time for reflection and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*).

3.8.W Students will write independently over extended periods of time (*e.g., time for reflection and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*) to communicate with different audiences for a variety of purposes.

4.8.W Students will write independently over extended periods of time (*e.g., time for reflection and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*) to communicate with different audiences for a variety of purposes.

8: Independent Reading and Writing Students will read and write for a variety of purposes including, but not limited to, academic and personal.

5th Grade

6th Grade

7th Grade

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

5.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

6.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

7.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

5.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*) to communicate with different audiences for a variety of purposes.

6.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, and explain how concepts relate to one another.

7.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, and discover different perspectives.

8: Independent Reading and Writing Students will read and write for a variety of purposes including, but not limited to, academic and personal.

8th Grade

9th Grade - English I

10th Grade - English II

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

8.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

9.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

10.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

8.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, and analyze different perspectives.

9.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, and draw appropriate conclusions.

10.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, and draw and justify appropriate conclusions.

11th Grade - English III

12th Grade - English IV

Reading

Students will read independently for a variety of purposes and for extended periods of time. Students will select appropriate texts for specific purposes.

11.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

12.8.R Students will select appropriate texts for specific purposes and read independently for extended periods of time.

Writing

Students will write independently for extended periods of time. Students will vary their modes of expression to suit audience and task.

11.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, and be able to apply new understandings in an original way.

12.8.W Students will write independently over extended periods of time (*e.g., time for research, reflection, and revision*) and for shorter timeframes (*e.g., a single sitting or a day or two*), vary their modes of expression to suit audience and task, synthesize information across multiple sources, and articulate new perspectives.

Glossary

A

Academic vocabulary : refers to words associated with content knowledge. Within every discipline there is a specific set of words to represent its concepts and processes.

Abbreviation : a shortened or contracted form of a word or phrase, used to represent the whole, as Dr. for Doctor, U.S. for United States, and lb. for pound.

Active listening : the active pursuit of what another person is saying and feeling, as a way to improve mutual understanding. Active listening involves hearing content, listening for tone, observing body language, paraphrasing, summarizing, questioning, clarifying, and reflecting.

Affix : a morpheme or meaningful part of a word attached before or after a root to modify its meaning. Principal kinds of affixes are prefixes and suffixes. The prefix un- is an affix, which added to balanced, makes unbalanced. The suffix -ed is an affix which, added to wish, makes wished.

Alliteration : the repetition of the same initial consonant sound of each word in connected text (e.g., Harry the happy hippo hula-hoops with Henrietta).

Allusion : a brief and indirect reference to a person, place, thing, or idea of historical, cultural, literary, or political significance.

Analogy : a comparison of the similar aspects of two different things.

Annotation : a critical or explanatory note or body of notes added to a text.

Antagonist : the adversary of the hero or protagonist of a drama or other literary work.

Antonyms : words which have opposite meanings (e.g., hot and cold).

Appropriate technology : technology that students can use independently or with minimal scaffolding.

Archetype : a symbol, plot pattern, character type, or theme that recurs in many different cultures.

Argument essay : a genre of writing that requires the student to investigate a topic; collect, generate, and evaluate evidence; and establish and defend a position on the topic in a concise manner.

Argumentation : writing that seeks to influence through appeals that direct readers to specific goals or try to win them to specific beliefs.

Audience : writer's targeted reader or readers.

Author's craft : specific techniques that an author chooses to relay an intended message.

Automaticity : reading without conscious effort or attention to decoding.

B

Base : a free morpheme to which affixes can be added, usually of Anglo-Saxon origin.

Blending : the task of combining sounds rapidly to accurately represent the word.

C

Cause & effect : text structure that notes a relationship in which an event or events (the cause) make(s) another event or action happen (effect).

Citing sources : a quotation of or explicit reference to a source indicating where the paraphrased or quoted materials came. Examples of citation style include MLA (Modern Language Association) and APA (American Psychological Association).

Claim : an assertion of the truth of something.

Close reading : a strategy that requires a student to focus on and arrive at a deep understanding of individual texts by reading and re-reading. Fisher, Frey, and Lapp (2012) describe four reader roles that help the reader uncover meaning in a text:

- 1. Code Breaker:** understanding the text at the surface level (i.e., alphabetic, structural)
- 2. Meaning maker:** comprehending the text at the level intended by the author
- 3. Text user:** analyzing the factors that influenced the author and the text, including a historical grounding of the context within which it was written
- 4. Text critic:** understanding that the text is not neutral and that existing biases inform calls to action.

Closed syllable : a written syllable containing a single vowel and ending in one or more consonants; the vowel sound is short.

Coherence : continuity of meaning that enables others to make sense of a text.

Collaborative discussions : discussions that provide opportunities for speakers and listeners to use dialogue and interaction to raise issues, explore ideas, make claims, discover differences, and find ways to explore all aspects of ELA. These take many forms like a Socratic seminar, debate, or blog and combine students in small or large discourse communities.

Compare : find similarities between two or more texts or text elements.

Comparison : text structure in which ideas are related to one another on the basis of similarities and differences. The text presents ideas organized to compare, to contrast, or to provide an alternative perspective.

Compound word : a word made by putting two or more words together (e.g., cowboy).

Comprehension : understanding what one is reading, the ultimate goal of all reading activity.

Conflict : struggle or clash between opposing characters, forces, or emotions.

Connotation : a meaning that is implied by a word apart from the thing it describes explicitly. Words carry cultural and emotional associations or meanings in addition to their literal meanings or denotations.

Consonant blend : two or more consecutive consonants that retain their individual sounds (e.g., /bl/ in block; /str/ in string).

Consonant digraph : two consecutive consonants that represent one phoneme, or sound (e.g., /ch/, /sh/).

Consonant trigraph : a combination of three letters used to represent a single speech sound or phoneme. (e.g./tch/)

Content-specific : vocabulary that includes technical words related to specific academic disciplines. *(See also academic and domain-specific vocabulary)*

Context : the parts of a written or spoken statement/text that precede or follow a specific word or passage, usually influencing its meaning or effect.

Context clue : the information from the textual setting that helps identify a word or word group.

Contraction : a short way to write two words as one by writing the two words together, leaving out one or more letters and replacing the missing letters with an apostrophe (e.g., cannot = can't).

Conventional writing : expressing thoughts and ideas with agreed upon symbols, like the alphabet.

Counterclaim : a claim made to rebut a previous claim.

D

Declarative sentence : the kind of sentence that makes a statement or “declares” something.

Decode : translate a word from print to speech, usually by employing knowledge of sound symbol correspondences; also the act of deciphering a new word by sounding it out.

Denotation : the literal or dictionary meaning of a word.

Description : text structure that presents a topic, along with the attributes, specifics, or setting information that describe that topic.

Detail : piece of information revealed by the author or speaker that supports the attitude or tone in a piece of poetry or prose. In informational text, details provide information to support the author’s main point.

Diction : the choice and use of words by a speaker or a writer.

Digital media : media created, viewed, distributed, modified, and preserved on digital devices (e.g. computers, tablets, phones). Digital media include computer programs, digital videos, video games, web pages and websites, social media, databases, audio, and e-books. Digital media are contrasted with print media such as books, newspapers, magazines, pictures, film, and audiotape.

Domain-specific vocabulary : “relatively low-frequency, content-specific words that appear in textbooks and other instructional materials; for example, apex in math, escarpment in geography, and isobar in science” (Blachowicz, C. & Fisher, P., p.1). *(See also academic and content-specific vocabulary)*

E

Edit : to review writing to make sure that it is free of any grammatical errors or strange phrases that make it difficult for readers to understand the meaning.

Emergent writing : “means that children begin to understand that writing is a form of communication and their marks on paper convey a message” (Mayer, 2007, p. 35). Emergent writing progresses along a developmental continuum.

Ethical and legal guidelines for research : guidelines for correctly citing print and digital text when using primary and secondary sources for research. In addition, copying and pasting texts, purchasing essays online, using another author’s work, or violating copyright laws are unethical and could result in legal action.

Exclamatory sentence : a type of sentence that expresses strong feelings by making an exclamation.

F

Fiction : imaginative literary works representing invented rather than actual persons, places, or events.

Figurative language : writing or speech not meant to be taken literally but used to express ideas in vivid or imaginative ways. Figurative language includes simile, metaphor, personification, analogy, hyperbole, and idiom.

Flashback : scene that interrupts the action of a work to show a previous event.

Fluency : ability to read grade-level text accurately, with expression, and with automaticity. The combination of accuracy, automaticity, and prosody allow the reader to build comprehension.

Foreshadowing : use of hints or clues in a narrative to suggest future action.

G

Generalize : to make general or broad statements by inferring from text details.

Genre : a category used to classify literary and other works, usually by form, technique, or content. The novel, the short story, and the lyric poems are all examples of literary genres.

Grammar : rules of language.

Grapheme : a letter or letter combination that spells a phoneme; can be one, two, three, or four letters in English (e.g., e, ei, igh, eigh).

Graphic features : pictorial representation of data or ideas using columns, matrices, or other formats. Graphics can be simple or complex, present information in a straightforward way as in a list or pie graph, or embed or nest information within the document's structure. Graphics may be included in texts or be stand-alone documents.

H

High frequency Irregular words : words in print containing letters that stray from the most common sound pronunciation because they do not follow common phonic patterns (e.g., were, was, laugh, been).

High frequency words : a small group of words (300-500) that account for a large percentage of the words in print and can be regular or irregular words. Often, they are referred to as “sight words” since automatic recognition of these words is required for fluent reading.

Homographs : words that are spelled alike but have different sounds and meanings (e.g., bow used with an arrow vs. bow of a ship).

Homonyms : words that sound the same but have different spellings and meanings (e.g., bear, bare).

Hyperbole : obvious and deliberate exaggeration; an extravagant statement.

I

Idiom : an expression that does not mean what it literally says (e.g., to have the upper hand has nothing to do with the hands).

Imagery : multiple words or a continuous phrase that a writer uses to represent persons, objects, actions, feelings, or ideas descriptively by appealing to the senses.

Imperative sentence : a sentence that gives a command, makes a request, or expresses a wish.

Indent : to set in or back from the margin, as the first line of a paragraph.

Independent reading levels : the level at which a reader can read text with 95% accuracy (i.e., no more than one error per 20 words read). Independent reading level is relatively easy text for the reader.

Inference : act or process of deriving logical conclusions from premises known or assumed to be true; the conclusions drawn from this process.

Inferring : making a reasonable assumption about meaning that is not explicitly stated in the text.

Inflectional endings : in English, a suffix that expresses plurality or possession when added to a noun, tense when added to a verb, and comparison when added to an adjective and some adverbs; Added to verbs, nouns, or adjectives do not change the grammatical role or part of speech of the base words (-s, -es,-ing, -ed).

Informational : non-fiction books; also referred to as expository text, that contain facts and information.

Interactive texts : multimodal texts in which readers may determine the order and duration of reading. For example, interactive texts, may include hyperlinks to other pages containing embedded images, videos and audio.

Interrogative sentence : the kind of sentence that asks a question and uses a question mark.

Irony : the use of words to express something other than and especially the opposite of the literal meaning.

L

Legend : inscription or title on an object (e.g., a key to symbols used on a map).

Letter-sound correspondences : the matching of an oral sound to its corresponding letter or group of letters.

Lexile : a quantitative measure of text complexity and individual reading level that can be used to predict how well a reader will likely comprehend a text.

Literal : information directly from the text (e.g., on the line).

Literary nonfiction : text that conveys factual information. The text may or may not employ a narrative structure and characteristics such as dialogue.

Main idea : the central thought or premise of a reading passage.

Meaning vocabulary : application of one’s understanding of word meanings to passage comprehension.

Memoir : type of autobiography that usually focuses on a single time period or historical event.

Metaphor : a direct comparison of two unlike things.

Modified citation style : using author, title, and publication date of sources to document research. This special style is used only at the fifth grade level to ease students into more stringent citation styles which are used in later grades.

Mood : atmosphere or predominant emotion in a literary work.

Morpheme : the smallest meaningful unit of the language.

Morphology : the study and description of how words are formed from prefixes, roots, and suffixes (e.g., mis-spell-ing), and how words are related to each other.

Multimodal : multiple + mode. A mode refers to a way of meaning-making or communicating. The New London Group (1996) outlines five modes through which meaning is made: Linguistic, Aural, Visual, Gestural, and Spatial. Any combination of modes makes a multimodal text, and all texts—every piece of communication that a human composes—use more than one mode. Thus, all writing is multimodal. “All Writing is Multimodal,” Cheryl Ball and Colin Charlton, in *Naming What We Know: Threshold Concepts of Writing Studies*, Linda Adler-Kassner & Elizabeth Wardle (Eds.), forthcoming from Utah State University Press.

Multimodal content : content utilizing more than one mode (e.g. still images + words, words + video) to convey a meaning.

Multimodal literacy : “the interplay of meaning-making systems (alphabetic, oral, visual, etc.) that teachers and students should strive to study and produce.” NCTE Position Statement on Multimodal Literacies.

Multisyllabic : these are words with more than one syllable. A systematic introduction of prefixes, suffixes, and multisyllabic words should occur throughout a reading program. The average number of syllables in the words students read should increase steadily throughout the grades.

N

Narrative writing : writing that tells a story. This writing is often anecdotal, experiential, and personal—allowing students to express themselves in creative and, quite often, moving ways.

Nonfiction : text that is factual and may be presented by detailed descriptions or examples; organization follows a logical pattern and may include textual aids.

Nonverbal cues : nonverbal messages that are a key aspect of speaking, for example, intonation, pauses, facial expressions, eye contact, gestures, and body language. Listeners should study these cues to determine a speaker’s message, argument, and credibility.

Nonverbal texts : In place of words, nonverbal texts may include images, gestures, and movement.

O

Onomatopoeia : use of words that mimic the sounds they describe; imitative harmony.

Onset : all of the sounds in a syllable that come before the first vowel.

Opinion writing : writing that clearly states a view or judgment about a topic, supported by examples, and offering reasons for assertions and/or explaining cause and effect.

P

Parallel structure : repetition of words, phrases, or sentences that have the same grammatical structure or that restate a similar idea.

Paraphrase : to sum something up or clarify a statement by rephrasing it; to say something in other simpler words.

Personification : the bestowing of human qualities on animals, ideas, or things.

Persuasion : form of discourse whose function is to convince an audience or to prove or refute a point of view or an issue.

Phoneme : a speech sound that combines with others in a language system to make words.

Phonemic awareness : the ability to notice, think about, or manipulate the individual phonemes (sounds) in words. It is the ability to understand that sounds in spoken language work together to make words. This term is used to refer to the highest level of phonological awareness: awareness of individual phonemes in words.

Phonics : the study of the relationships between letters and the sounds they represent; also used to describe reading instruction that teaches sound-symbol correspondences. Sound-symbol correspondences are the rules and patterns by which letters and letter combinations represent speech sounds.

Phonological awareness : one's sensitivity to, or explicit awareness of, the phonological structure of words in one's language. This is an "umbrella" term that is used to refer to a student's sensitivity to any aspect of phonological structure in language. It encompasses awareness of individual words in sentences, syllables, and onset-rime segments, as well as awareness of individual phonemes.

Picture walk : a strategy for previewing a book prior to reading by looking at the cover and illustrations and asking questions that require students to make predictions about the text.

Plagiarism : using another person or source's words or ideas without giving credit or obtaining permission.

Plot : sequence of events or actions in a short story, novel, drama, or narrative poem.

Point of view : the way in which an author reveals a viewpoint or perspective. This can be done through characters, ideas, events, and narration.

Prefix : a morpheme that precedes a root and that contributes to or modifies the meaning of a word, as "re" in reprint.

Pre-reading strategies : strategies for preparing students to read a text prior to reading. Examples include: picture walk, brainstorming about the topic/text, advance organizers, activating prior knowledge, vocabulary previews, structural organizers, establishing a purpose for reading, etc.

Primary source : firsthand account of an event or a time period written or created during that time period (examples: *Diary of Anne Frank*, Dorothea Lange's photographs, newspaper article about Hurricane Katrina).

Print concepts : the ability of a child to know and recognize the ways in which print "works" for the purposes of reading, particularly with regard to books.

Prior knowledge : refers to schema, the knowledge and experience that readers bring to the text.

Problem/solution : text structure in which the main ideas are organized into two parts: a problem and a subsequent solution that responds to the problem, or a question and an answer that responds to the question.

Protagonist : central character of a short story, novel, or narrative poem. The antagonist is the character who stands directly opposed to the protagonist.

Purpose : specific reason or reasons for the writing. It conveys what the readers have to gain by reading the selection. Purpose is the objective or the goal that the writer wishes to establish.

Q

Quote : in research, to directly copy down the words from a source, set off in quotation marks.

R

R-controlled vowels : the modified sound of a vowel immediately preceding /r/ in the same syllable (e.g., care, never, sir, or).

Rate : the speed at which a person reads.

Recursive : moving back and forth through a text in either reading or writing, as new ideas are developed or problems encountered. In reading a text, recursive processes might include rereading earlier portions in light of later ones, looking ahead to see what topics are addressed or how a narrative ends, and skimming through text to search for particular ideas or events before continuing a linear reading. In creating a written composition, recursive processes include moving back and forth among the planning, drafting, and revising phases of writing.

Reenact : to act out the events of a text.

Retell : recall the content of what was read or heard.

Revise : the process of rereading a text and making changes (in content, organization, sentence structures, and word choice) to improve it; not to be confused with edit.

Rhetorical device : technique used by writers to persuade an audience. (e.g. alliteration, hyperbole, metaphor, etc.)

Rhyme : words that have the same ending sound.

Rime : a vowel plus the consonants that follow in a syllable; (e.g., -ame, -ick, -out).

Root : a bound morpheme, usually of Latin origin, that cannot stand alone but is used to form a family of words with related meanings.

Schema : refers to prior knowledge, the knowledge and experience that readers bring to the text.

Secondary source : an interpretation or analysis of a primary source (examples: book about diaries kept during the Holocaust, book about Great Depression photography, an op-ed about how New Orleans handled the Hurricane Katrina aftermath from a later date).

Segmenting : separating the individual phonemes, or sounds, of a word into discrete units.

Semantics : the study of meaning in language.

Semantic relationships : associations that exist between the meanings of words.

Sequential structure: text structure in which ideas are grouped on the basis of order or time.

Setting : time and place in which events in a short story, novel, drama, or narrative poem take place.

Shared reading : an interactive reading experience that occurs when students join in or share the reading of a big book or other enlarged text while guided and supported by a teacher or other experienced reader.

Simile : a combination of two things that are unlike, usually using the words like or as.

Stem : the base form of a word; also called the root word.

Structural analysis : a procedure for teaching students to read words formed with prefixes, suffixes, or other meaningful word parts.

Style : writer's characteristic manner of employing language.

Suffix : a derivational morpheme added to the end of root or base that often changes the word's part of speech and that modifies its meaning.

Summarize : reducing large selections of text to their base essentials: the gist, the key ideas, the main points that are worth noting and remembering.

Supporting details : reasons, examples, facts, steps, or other kinds of evidence that back up and explain a main idea. Details make up most of the information in what a person reads, but some details are more important than others.

Syllable : a unit of pronunciation that is organized around a vowel sound; it may or may not have consonants before or after the vowel.

Symbol : object, person, place, or action that has both a meaning in itself and that stands for something larger than itself, such as a quality, attitude, belief, or value.

Synonyms : words which have the same meaning. (e.g. example, instance, occurrence)

Syntax : arrangement of words and order of grammatical elements in a sentence.

Synthesize : creating original insights, perspectives, and understanding by reflecting on text(s) and merging elements from text and existing schema.

T

Text complexity : based on Fisher and Frey (2013), three inter-related aspects determine text complexity: quantitative evaluation, qualitative evaluation, and matching readers with texts and tasks.

1. Quantitative evaluation: readability measures and other scores of text complexity

2. Qualitative evaluation: levels of meaning, structure, language features, and knowledge demands

3. Matching readers with texts and tasks: reader variables (such as motivation, knowledge, and experiences) and task variables (such as purpose and the complexity generated by the task assigned and the questions posed) (p.7)

Theme : central meaning of a literary work. A literary work can have more than one theme. Most themes are not directly stated but rather are implied. A literary theme is not the same as a topic or main idea.

Thesis statement : the guiding, arguable statement or claim an essay attempts to prove through evidence and reasoning.

Tone : writer or speaker's attitude toward a subject, character, or audience conveyed through the author's choice of words and detail. Tone can be serious, humorous, sarcastic, objective, etc.

Topic : the subject of the entire paragraph/text selection; tells what the passage is mainly about.

Track print : look and process all the letters in order from left-to-right.

Trait : distinguishing feature, as of a person's character.

V

Verbal cues : words and phrases that speakers use to add emphasis, clarify organization, make connections, and create ethos. Listeners should be focusing on these cues as it helps listeners determine a speaker’s message, argument, and credibility.

Vocabulary notebook : a teaching strategy used to help students learn new vocabulary.

Voice : distinctive style or manner of expression of an author or of a character.

Vowel digraph : two vowels together that represent one phoneme, or sound (e.g., ea, ai, oa).

Vowel diphthong : a sound made by combining two vowels, specifically when it starts as one vowel sound and proceeds to another, like the oy sound in *oil*.

W

Word study : the integration of phonics, spelling, and vocabulary instruction. This approach teaches students how to look closely at words to discover the regularities and conventions of English orthography, or spelling. The purpose is twofold: (1) develop a general knowledge of English spelling and discover generalizations about spelling, and (2) increase students’ specific knowledge of words and their meanings.

Word family : group of words that share a rime (a vowel plus the consonants that follow; e.g., -ame, -ick, -out).

Word wall : a literacy tool used for displaying commonly used vocabulary and/or sight words in large print so that all students can read the words from their desks. The purpose of a word wall is to help students naturally gain familiarity with high frequency words, as well as to gain reinforcement of vocabulary.

Writing Modes : major types of writing. (Narrative, Opinion, Informational, Argumentation).

Writing process : steps contained in the writing process include prewriting, drafting, revising, editing, and publishing. This process is often recursive.

The 44* Phonemes of the English Language

Phoneme	Graphemes**	Examples	Phoneme	Graphemes**	Examples		
Consonant Sounds:							
1	/b/	b, bb	big, rubber	14	/t/	t,tt,ed	top,letter,stopped
2	/d/	d,dd,ed	dog, add, filled	15	/v/	v,ve	vet, give
3	/f/	f,ph	fish, phone	16	/w/	w	wet, win, swim
4	/g/	g,gg	go,egg	17	/y/	y,i	yes, onion
5	/h/	h	hot	18	/z/	z,zz,ze,s,se,x	zip, fizz, sneeze, laser, is, was, please, xylophone
6	/j/	j,g,ge,dge	jet,cage,barge,judge	Consonant Digraphs:			
7	/k/	c,k,ck,ch,cc,que	cat,kitten,duck,school,occur, antique	19	/th/ (not voiced)	th	thumb, thin, thing
8	/l/	l,ll	leg, bell	20	/th/ (voiced)	th	this, feather, then
9	/m/	m,mm, mb	mad, hammer, lamb	21	/ng/	ng,n	sing, monkey, sink
10	/n/	n,nn,kn,gn	no,dinner,knee, gnome	22	/sh/	sh,ss,ch,ti,ci	ship, mission, chef, motion, special
11	/p/	p,pp	pie, apple	23	/ch/	ch,tch	chip, match
12	/r/	r,rr,wr	run, marry, write	24	/zh/	ge,s	garage, measure, division
13	/s/	s,se,ss,c,ce,sc	sun,mouse,dress,city,ice, science	25	/wh/ (with breath)	wh	what, when, where, why

The 44* Phonemes of the English Language

Phoneme	Graphemes**	Examples	Phoneme	Graphemes**	Examples		
Short Vowel Sounds:			Vowel Diphthongs:				
26	/a/	a, au	hat, laugh	38	/ow/	ow, ou, ou_e	cow, out, mouse, house
27	/e/	e, ea	bed, bread	39	/oy/	oi, oy	coin, toy
28	/i/	i	if	Vowel Sounds Influenced by r:			
29	/o/	o, a, au, aw, ough	hot, want, haul, draw, bought	40	/a(r)/	ar	car
30	/u/	u, o	up, ton	41	/ā(r)/	air, ear, are	air, chair, fair, hair, bear, care
Long Vowel Sounds:			42	/i(r)/	irr, ere, eer	mirror, here, cheer	
31	/ā/	a, a_e, ay, ai, ey, ei	bacon, late, day, train, they, eight, vein	43	/o(r)/	or, ore, oor	for, core, door
32	/ē/	e, e_e, ea, ee, ey, ie, y	me, these, beat, feet, key, chief, baby	44	/u(r)/	ur, ir, er, ear, or, ar	burn, first, fern, heard, work, dollar
33	/ī/	i, i_e, igh, y, ie	find, ride, light, fly, pie	Phoneme (speech sound) Grapheme (letters or groups of letters representing the most common spellings for the individual phonemes) * The number of phonemes is different in some linguistics textbooks; this is evidence of the difficulty of classifying (Moats, 1998). ** This list does not include all possible graphemes for a given phoneme. Source: Orchestrating Success in Reading by Dawn Reithaug (2002)			
34	/ō/	o, o_e, oa, ou, ow	no, note, boat, soul, row				
35	/ū/	u, u_e, ew	human, use, few, chew				
Other Vowel Sounds:							
36	/oo/	oo,u,oul	book, put, could				
37	/ōō/	oo,u,u_e	moon, truth, rule				

Standard 3: Critical Reading and Writing

Genre Guidance

The following provides a broad index of appropriate genres. This index does not include all genres or subgenres that students are expected to read. The genres align with expectations of the Standard 3 Critical Reading and Writing: Reading Strand - *Students will comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres from a variety of historical, cultural, ethnic, and global perspectives.*

By end of third grade , students will have read grade-level appropriate texts in following:	By end of fifth grade , students will have read grade-level appropriate texts in following:	By end of eighth grade , students will have read grade-level appropriate texts in following:	By end of English IV , students will have read grade-level appropriate texts in following:
informational text	informational text	informational text	informational text
fiction	fiction	fiction	fiction
nonfiction	nonfiction	nonfiction	nonfiction
poetry	poetry	poetry	poetry
drama	drama	drama	drama
nursery rhyme	fable	fable	<i>Plus increasingly complex application of previous grades</i>
fable	legend	legend	
folk, fairy, and tall tale	fairy tale	fairy tale	
autobiography and biography	myth	myth	
	autobiography and biography	autobiography and biography	
	<i>Plus increasingly complex application of previous grades</i>	<i>Plus increasingly complex application of previous grades</i>	

Standard 3: Critical Reading and Writing

Text Complexity Bands

In order to determine the complexity of a text, it is essential to consider three inter-related aspects: quantitative measures, qualitative measures, and reader-task considerations, (Fisher, Frey and Lapp, 2012).

Quantitative measures

Readability ranges (e.g. ATOS, Lexile Framework, Flesch-Kincaid) are available in order to measure the difficulty of the text. These ranges are created from an evaluation of word frequency and sentence length to determine text difficulty. Word frequency and sentence length are strong predictors of how difficult a text is to comprehend.

Qualitative measures

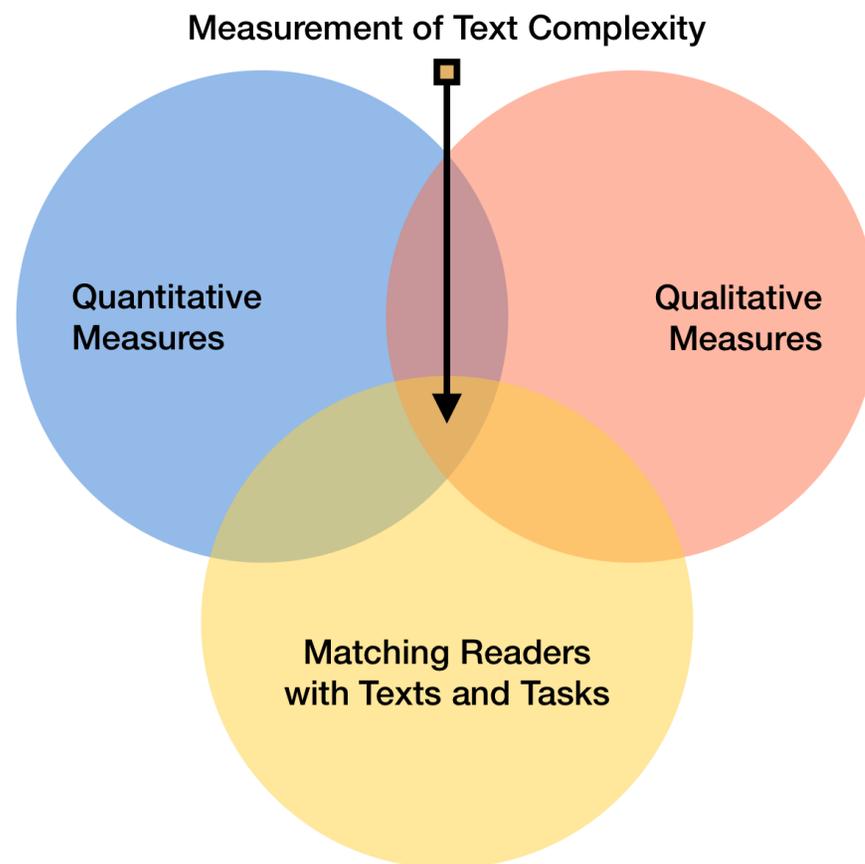
Readability ranges (quantitative measures) are not capable of assessing the subtleties of meaning, structure, language features and knowledge demands; therefore, Oklahoma educators will evaluate these qualitative measures using their professional judgment and expertise through a research-based rubric.

Matching readers with texts and tasks

Input from parents, local classroom teachers, reading specialists, and/ or school librarians help determine the appropriateness of a text in regards to the reader's age, interests and the content of the text. Matching readers with texts and tasks are foremost in selecting appropriate texts for readers. Reader variables include motivation, knowledge, and experiences, and task variables consist of purpose and the complexity generated by the task assigned and the questions posed.

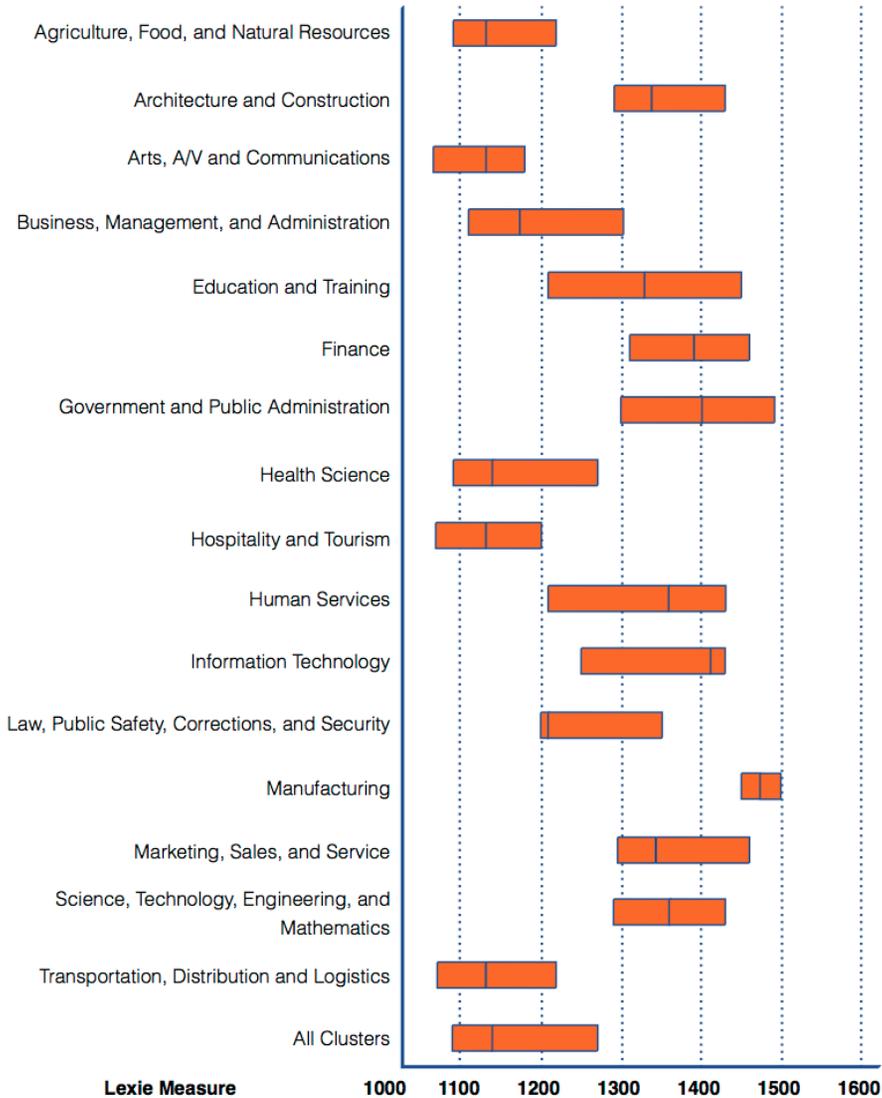
Prekindergarten through Kindergarten guidance

According to Dr. Douglas Fisher in *Text Complexity, Raising the Rigor in Reading*, "text complexity is a staircase effect and the first steps on this staircase need to be carefully scaled so the youngest readers successfully acquire the fundamental of reading, which means that they are reading texts that allow for practice with decoding and fluency" (p. 37)



College- and Career-Readiness Reading Range

**National Career Clusters® Framework
Text Complexity for 16 Career Clusters**



Minimum reading range required for careers.

Typical Lexile Reader Measures, by Grade
lexile.com/about-lexile/grade-equivalent/grade-equivalent-chart

Grade	Lexie Reader Measures, Mid-Year 25th Percentile to 75th percentile (IQR)
1	Up to 300L
2	140L to 500L
3	330L 700L
4	445L to 810L
5	565L to 910L
6	665L to 1000L
7	735L to 1065L
8	805L to 1100L
9	855L to 1165L
10	905L to 1195L
11 and 12	940L to 1210L

If students read in the mid range and continue to progress through the grades, they should be effectively prepared for postsecondary education or the workforce.

Grammar Companion

Eight Parts of Speech

Noun - a word that names a person, place, thing, or idea.

- Proper Noun - the specific name of a particular person, place, or thing. These will always be capitalized.

Ex: Mr. Smith, Riverdale Elementary, American

- Common noun - refers to a general group of persons, places, things, or ideas.

Ex: teacher, school, citizen

- Concrete noun - these can be sensed by your five senses; they can be seen, touched, felt, tasted, heard, or smelled.

Ex: apple, ball, telephone

- Abstract noun - represents a feeling, idea, or quality. These cannot be sensed by your five senses.

Ex: hope, love, peace, hatred

- Collective noun - refers to things or people as a unit.

Ex: team, family, class

Pronoun - a word that takes the place of a noun.

- Personal pronoun - refers to who is speaking, being spoken to, or spoken about.

	Personal Pronouns	
	Singular	Plural
First Person	I, me	we, us
Second Person	you	you
Third Person	he, him, she, it	they, them

- Possessive pronoun - a word that shows possession and defines who owns a particular object.

	Possessive Pronouns	
	Singular	Plural
First Person	my, mine	our, ours
Second Person	your, yours	your, yours
Third Person	his, her, hers, its	their, theirs

- Reflexive pronoun - a word that refers back to the subject of a sentence, clause, or phrase. It is formed by adding **-self** or **-selves** to a personal pronoun.

Ex: myself, herself, himself, itself, ourselves, themselves

- Demonstrative pronoun - **this, that, these, those**. Points out a person, place, thing, or idea.

Ex: This is my book. Those are my shoes. These are mine.

- Interrogative pronoun - **what, which, who, whom, whose**. Used at the beginning of a question.

- Antecedent - the noun the pronoun replaces.

Ex: **Joann** placed **her** coat in the closet. **Joann** is the antecedent for **her**.

Verb - a word that expresses action or state of being.

- Action verb - a verb that expresses physical or mental action of the subject.

Ex: Joe **walks** to school. The team **played** a great game. She is **talking** to me.

- Linking verb - **am, is, are, was, were, be, being, been**. These words are used to link the subject to some other word in the sentence that describes, identifies, or gives more information about it.

Ex: John **was** sick for two days. (sick describes John) | John **is** hungry. (hungry describes John)

- Helping verb - used with the main verb to tell what happens or what exists.

may	am	do	should	have	will
might	is	does	could	had	can
must	are	did	would	has	shall
	was				
	were				
	be				
	being				
	been (also linking)				

Ex: We **might win** the game tomorrow. (might is the helping verb and win is the main verb)

Adjectives - a word that modifies or describes a noun or pronoun. Adjectives tell **what kind, how many, how much, and which one.**

- Articles- **a, an, the,** are always adjectives.
- Adjectives tell What Kind. Ex: We stayed in a **large high-rise** hotel.
- Adjectives tell How Many. Ex: I have attended **four** schools.
- Adjectives tell How Much. Ex: We have **some** books to shelve in the library.
- Adjectives tell Which One. Ex: I live in **the blue** house.
 - Demonstrative Adjectives: **this, that, these, those.** When these words are used to describe a noun, they are adjectives. When they are used in place of a noun, they are demonstrative pronouns.

Ex: This is my book. – demonstrative pronoun taking the place of book.

 This book is mine. – demonstrative adjective describing book.
- Adjectives that Compare - these are usually formed by adding **-er, -ier, -est, -iest.** Ex: **larger** hat, **angrier** than you, **biggest** car.
- Other comparative adjectives - better, best, more, most, little, less

Adverbs - a word that modifies or describes a verb, adjective, or other adverb. Adverbs tell **when, where, how, how often, how much, to what extent**. Common adverbs end in **-ly**.

- Adverbs tell **How**.

Ex: The dolphin floated **gracefully** in the water.

John finished the race **strong**.

- Adverbs tell **When**.

Ex: Lisa will go **first**.

Sometimes I eat cereal for dinner.

- Adverbs tell **Where**.

Ex: Turn **left** at the stoplight.

The dogs are **outside**.

- Adverbs modify other Adjectives and other Adverbs by showing the degree such as **almost, entirely, early, so, frequently, extremely, occasionally, too, awfully, completely, always, very**.

Ex: It is **very** cold here. (The adverb *very* tells about the adjective *cold*.)

I work **extremely** fast. (The adverb *extremely* tells about the adverb *fast*.)

Prepositions and Prepositional Phrases - a word or group of words linked to a noun or verb to describe direction or condition.

- One-word Prepositions - consists of one word

Examples in sentences: The deer ran across the road. We stopped at the store down the street.

Common One-word Prepositions

about	at	but (meaning except)	in	out	under
above	before	by	inside	outside	underneath
across	behind	concerning	into	over	until
after	below	despite	like	past	unto
against	beneath	down	near	since	up
along	beside	during	of	through	upon
among	besides	except	off	throughout	with
around	between	for	on	toward	within
as	beyond	from	onto	to (unless a verb comes after it)	without

- Phrasal Prepositions- consist of more than one word.
Example in a sentence: Water flowed in front of the rocks.

Common Phrasal Prepositions

according to	from among	in case of	in spite of	out of
along with	from between	in front of	instead of	next to
as for	in accordance with	in place of	on account of	with reference
except for	in addition to	in regard to	on top of	with regard to

Conjunction - a word that connects parts of a sentence.

- Coordinate conjunctions - **and, or, nor, for, so, but, yet** - connect equal parts of a sentence.

Ex: I like to read **and** watch TV.

We are going to go to a movie **and** we are going to go to dinner.

- Subordinate conjunctions - connect a dependent clause to an independent clause.

Common Subordinating Conjunctions

after	if	than	until	which
although	how	that	when	
as	since	though	where	
because	supposing	unless	whether	

- Correlative conjunctions - connect two ideas in pairs. **Neither...nor, either...or, not only...but also**

Ex: **Not only** do I like football, **but I also** like baseball.

Interjection - a word or phrase that expresses emotion and often stands alone in a sentence.

Ex: wow, yes, well, please, yuck

Parts of the Sentence

Subject

The subject of a sentence is the person, place, or thing that is performing the action of the sentence. It is what or whom the sentence is about.

Ex: The young **man** built the family a the new house.

The simple subject is the subject and any modifiers.

Ex. **The young man** built the family a new house.

Predicate

The predicate of a sentence expresses the action or being within the sentence.

Ex: The young man **built** the family a new house.

The simple predicate contains the verb and words that modify the verb.

Ex: The young man **built the family a new house.**

Direct Object

The direct object receives the action of the sentence. It is usually a noun or pronoun.

Ex: The young man built the family a new **house.**

Indirect Object

The indirect object indicates to whom or for whom the action of the sentence is being done.

Ex: The young man built the **family** a new house.

Subject Complement

A subject complement either renames or describes the subject and is usually a noun, pronoun, or adjective. Subject complements follow a linking verb within the sentence.

Ex: The man is a good **father.** (father is the noun complement of man.) | The man seems **kind.** (kind is the adjective complement of man.)

Phrases - groups of words that do not contain both a subject and a verb.

Prepositional Phrase -made up of a preposition and its modifiers. It can function as an adjective or adverb in a sentence.

- Adjectival prepositional phrase: The store **around the corner** is green. (around the corner describes the noun store.)
- Adverbial prepositional phrase: Sally is coloring **outside the lines**. (outside the lines describes where the coloring takes place.)

Verbal Phrases - groups of words using verbs as other parts of the sentence. Infinitive, Gerund, and Participial

- **Infinitive Phrase - the word “to” plus a verb. Infinitive phrases can function as adjective, adverbs, or nouns**

Ex: **To dance gracefully** is my ambition. (noun as the subject of a sentence)

Her plan **to become a millionaire** fell through when the stock market crashed. (adjective describing plan)

John went to college **to study engineering**. (adverb describing why he went)

- **Participial Phrase - a verb form functioning as an adjective.**

Ex: **Swimming for his life**, John made it to shore. (swimming for his life describes John)

- **Gerund Phrase - an –ing verb form functioning as a noun.**

Ex: **Walking the dog** is not my favorite task. (subject)

Appositive Phrase - renames or identifies a noun or pronoun. It is set off by commas if the added information is nonessential to the meaning of the sentence.

Ex: My teacher, **a woman with curly hair**, is very fun. (curly hair is nonessential to the teacher being fun)

The dog with the sharp teeth **Bowser** is the one who bit me. (Bowser is essential to identifying which dog bites)

Absolute Phrase - is a modifier, or a modifier and a few other words, that attaches to a sentence or a noun, with no conjunction. It cannot contain a finite verb.

Absolute phrases usually consist of a noun and a modifier that modifies this noun, NOT another noun in the sentence.

Absolute phrases are optional in sentences, i.e., they can be removed without damaging the grammatical integrity of the sentence. Since absolute phrases are optional in the sentence, they are often set off from the sentence with commas or, less often, with dashes. We normally explain absolute phrases by saying that they modify entire sentences, rather than one word.

Ex: **Their minds whirling from the events of the school day**, the students made their way to the parking lot.

His head pounding, his hands shaking, the young man knelt and proposed marriage to his girlfriend.

Clauses

Clauses - a group of related words that contains a subject and a verb. Independent clauses can stand alone as complete sentences. Dependent or subordinate clauses cannot stand alone and must be in the sentence with an independent clause.

Adjective Clauses - dependent clauses that describe nouns or pronouns. They begin with relative pronouns: **that, where, which, who, whose**.

Ex: The teacher **who left her papers on the desk** will be late turning in her grades.

Adverb Clauses - dependent clauses that describe verbs, adjectives, or adverbs. They begin with subordinating conjunctions.

Subordinating conjunctions to show time: **after, before, when, while, as, whenever, since, until, as soon as, as long as, once**

Subordinating conjunctions to show cause and effect: **because, since, now that, as, so, in order that**

Subordinating conjunctions to show condition: **if, unless, whether, providing**

Subordinating conjunctions to show contrast: **although, even though, though, whereas, while**

Examples:

Time: **After the family spent the day at the zoo**, they were very tired.

Cause and Effect: The family was very tired **since they spent the day at the zoo**.

Condition: **Unless you plan your trip to the zoo carefully**, you won't be able to see all the animals in one day.

Contrast: The family visited the park, **although they really wanted to spend the day at the zoo**.

Noun Clauses - dependent clauses that function as the subject, object, or compliment of a sentence.

They begin with subordinating conjunctions.

how

when

who

however

whenever

whoever

if

where

whom

that

wherever

whomever

what

which

whose

whether

whichever

why

whatever

Examples:

Whatever you want for dinner is fine with me. (subject)

John will make **whatever you want for dinner**. (direct object)

I have dinner ready for **whoever wants to eat**. (object of the preposition)

Verb Tense

The tense of a verb is determined by when the action took place. The three tenses are:

- The Past Tense
- The Present Tense
- The Future Tense

Examples of Tenses

Here are some examples of verbs in different tenses:

- I walked to work. (The verb *walked* is in the **past tense**.)
- I walk to work. (The verb *walk* is in the **present tense**.)
- I will walk to work. (The verb *will walk* is in the **future tense**.)

Verbs do not just express actions. They can also express a state of being. For example:

- I was happy. (The verb *was* is in the **past tense**.)
- I am happy. (The verb *am* is in the **present tense**.)
- I will be happy. (The verb *will be* is in the **future tense**.)

Some of the verbs in the past tense are made up of more than one word. We need these different versions of the tenses because the tenses are further categorized depending on whether the action (or state of being) they describe is in progress or completed. For example, the different versions of the verb *to laugh* are:

- **Past Tense:** laughed, was/were laughing, had laughed, had been laughing
- **Present Tense:** laugh, am/is/are laughing, has/have laughed, has/have been laughing
- **Future Tense:** will laugh, will be laughing, will have laughed, will have been laughing

The Full List of Tenses

The table below shows the full list of the tenses:

The 4 Past Tenses	Example
simple past tense	I went
past progressive tense	I was going
past perfect tense	I had gone
past perfect progressive tense	I had been going
The 4 Present Tenses	Example
simple present tense	I go
present progressive tense	I am going
present perfect tense	I have gone
present perfect progressive tense	I have been going
The 4 Future Tenses	Example
simple future tense	I will go
future progressive tense	I will be going
future perfect tense	I will have gone
future perfect progressive tense	I will have been going

Sentence Structure

1. Simple - a simple sentence contains one independent clause.

Ex: Judy laughed.

2. Compound - a compound sentence contains two or more independent clauses joined by a conjunction.

Ex: Judy laughed and Jimmy cried.

3. Complex - a complex sentence contains an independent clause and at least one dependent clause.

Ex: Jimmy cried when Judy laughed.

4. Compound Complex - a compound-complex sentence contains two or more independent clauses and at least one dependent clause.

Ex: Judy laughed and Jimmy cried when the clowns ran past their seats.

Types of Sentences

1. Declarative sentences make a statement to relay information or ideas. They are punctuated with a simple period. Formal essays or reports are composed almost entirely of declarative sentences.

Ex: The concert begins in two hours. July 4th is Independence Day.

2. Imperative sentences issue commands or requests or they can express a desire or wish. They are punctuated with a simple period or they can be exclamations requiring an exclamation mark. It all depends on the strength of emotion you want to express. Imperative sentences can consist of a single verb or they can be more lengthy and complex.

Ex: Watch out for oncoming traffic. Please do your homework.

3. Exclamatory sentences express strong emotion. It doesn't really matter what the emotion is, an exclamatory sentence is the type of sentence needed to express it. Exclamatory sentences always end in an exclamation mark, so it's pretty easy to spot them.

Ex: The river is rising! I can't wait for the party!

4. Interrogative sentences are also easy to spot. That's because they always ask a question and end in a question mark.

Ex: Is it snowing? Have you had breakfast?

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OKLAHOMA ACADEMIC STANDARDS

MATHEMATICS



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —



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Introduction

The Oklahoma Academic Standards for Mathematics 2016 is the result of the contributions of hundreds of mathematics teachers, mathematics educators, and mathematicians from across the state of Oklahoma. This document reflects a balanced synthesis of the work of all members of the Oklahoma Academic Standards for Mathematics Writing Committee and feedback from teachers, mathematicians, external reviews, and numerous education stakeholders including business, industry and commerce, parent groups, career tech, higher education, and external reviewers.

The Oklahoma Academic Standards for Mathematics 2016 specify what students should know and be able to do as learners of mathematics at the end of each grade level or course. Students are held responsible for learning standards listed at earlier grade levels as well as their current grade level. Throughout this document, the standards are written to allow time for study of additional material at every grade level. The order of the standards at any grade level is not meant to imply a sequence of topics and should be considered flexible for the organization of any course. The document provides standards for PK-7, Pre-Algebra, Algebra I, Geometry, and Algebra II with Algebra I as the pre-requisite for both Geometry and Algebra II.

Development of the Oklahoma Academic Standards for Mathematics

The Oklahoma Academic Standards for Mathematics writing team drew on the work of the National Council of Teachers of Mathematics (NCTM) standards documents; the National Research Council's report Adding It Up, the Oklahoma Priority Academic Standards (PASS), and other states' standards documents and curriculum framework guides (e.g., Minnesota, Virginia, and Massachusetts). Please see the reference list at the end of this document for a more complete list of all resources consulted.

Vision and Guiding Principles

These standards envision all students in Oklahoma will become mathematically proficient and literate through a strong mathematics program that emphasizes and engages them in problem solving, communicating, reasoning and proof, making connections, and using representations. Mathematically proficient and literate students can confidently and effectively use mathematics concepts, computation skills, and numbers to problem-solve, reason, and analyze information. Developing mathematical proficiency and literacy for Oklahoma students depends in large part on a clear, comprehensive, coherent, and developmentally appropriate set of standards to guide curricular decisions. The understanding and implementation of these standards throughout PK-12 mathematics experience for students is based on the following guiding principles:

Guiding Principle 1: Excellence in mathematics education requires equity—high expectations and strong support for all students.

All students must have opportunities to study—and support to learn—mathematics. Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students.

Guiding Principle 2: Mathematical ideas should be explored in ways that stimulate curiosity, create enjoyment of mathematics, and develop depth of understanding.

Students need to understand mathematics deeply and use it effectively. To achieve mathematical understanding, students should be actively engaged in doing meaningful mathematics, discussing mathematical ideas, and applying mathematics in interesting, thought provoking situations. Student understanding is



Oklahoma Academic Standards for Mathematics

further developed through ongoing reflection about cognitively demanding and tasks relevant to their lives.

Tasks should challenge and engage students in mathematics in multiple ways. Short- and long-term investigations that connect procedures and skills with conceptual understanding are integral components of an effective mathematics program. Activities should build upon curiosity and prior knowledge, and enable students to solve progressively deeper, broader, and more sophisticated problems. Mathematical tasks reflecting significant mathematics should generate active classroom talk, promote the development of conjectures, and lead to an understanding of the necessity for mathematical reasoning.

Guiding Principle 3: An effective mathematics program focuses on problem solving.

Mathematical problem solving is the hallmark of an effective mathematics program. Skill in mathematical problem solving requires practice with a variety of mathematical problems as well as a firm grasp of mathematical techniques and their underlying principles. Students who possess a deeper knowledge of mathematics can then use mathematics in a flexible way to attack various problems and devise different ways of solving any particular problem. Mathematical problem solving calls for reflective thinking, persistence, and learning from the ideas of others. Success in solving mathematical problems helps to create an abiding interest in mathematics.

Guiding Principle 4: Technology is essential in teaching and learning mathematics.

Technology enhances the mathematics curriculum in many ways. Technology enables students to communicate ideas within the classroom or to search for needed information. It can be especially helpful in assisting students with special needs in regular and special classrooms, at home, and in the community. Technology changes what mathematics is to be learned and when and how it is

learned. Tools such as measuring instruments, manipulatives (such as base ten blocks and fraction pieces), scientific and graphing calculators, and computers with appropriate software, if properly used, contribute to a rich learning environment for developing and applying mathematical concepts. Appropriate use of calculators is essential; calculators should not be used as a replacement for basic understanding and skills. Although the use of a graphing calculator can help middle and secondary students to visualize properties of functions and their graphs, graphing calculators should be used to enhance their understanding and skills rather than replace them.

Standards Overview

The Oklahoma Academic Standards for Mathematics are developed around four main content strands, Algebraic Reasoning and Algebra, Number and Operations, Geometry and Measurement, and Data and Probability organize the content standards throughout PK-7 and Pre-Algebra. The standards for Algebra I, Algebra II, and Geometry are fundamentally organized around these strands as well. The process standards are defined as the Mathematical Actions and Processes and are comprised of the skills and abilities students should develop and be engaged in throughout their PK-12 mathematics education. Among these are the ability to problem solve, communicate, and reason about mathematics which will help students be ready for the mathematics expectations of college and the skills desired by many employers. While the process and content standards work in concert to create clear, concise, and rigorous mathematics standards and expectations for Oklahoma students with the aim of helping them be college and career ready, it is not intended that each mathematical action and process will be utilized or developed with each standard. Certainly some standards and objectives can be achieved more readily with particular mathematics actions and processes. For example, an objective that involves explaining a particular concept may be best accomplished by also engaging students in communicating mathematically. Whereas, standards and objectives that focus in the early grades on fluency with operations will align well with the mathematical action and process focused on procedural fluency.



Number and Operations Strand: A focus on number and operations is the cornerstone of a strong mathematics program. Developing students' fluency with number and operations throughout their PK-12 mathematics experience requires a balance and connection between conceptual understanding and computational proficiency and efficiency. This strand provides focus on the importance of students' understanding of numbers, ways of representing numbers, relationships among numbers, relationships among number systems, and meanings of operations and how they relate to one another. An emphasis is placed on the development of estimation so students can determine the reasonableness of solutions and answers. Further, it requires that students should be able to compute efficiently and proficiently.

Algebraic Reasoning and Algebra Strand: All students should be able to reason algebraically and learn algebra. This strand provides focus for the PK-7 and Pre-Algebra standards around the notion that algebra is more than moving symbols around. It is about understanding patterns, relations and functions, representing and analyzing mathematical situations and structures using algebraic symbols, using mathematical models to represent and understand quantitative relationships, and analyzing change in various contexts. Understanding change is fundamental to algebraic reasoning and the concept of function with depth. This understanding is critical for success in college-level mathematics. It is also fundamental to understanding many real-world problems and situations students will face in their future careers.

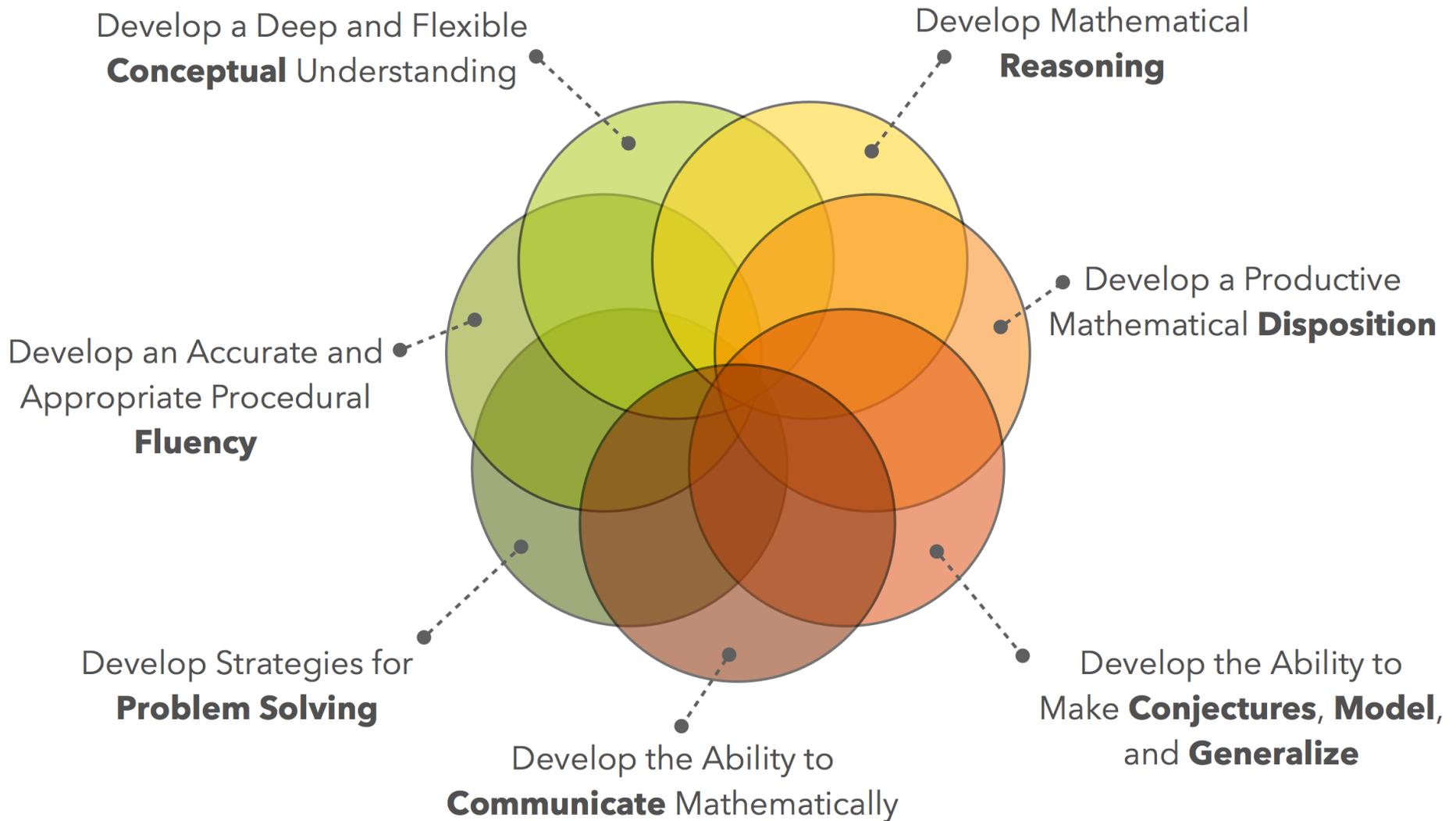
Geometry and Measurement Strand: All students should gain experience using a variety of visual and coordinate representations to analyze and solve problems and learn how to use appropriate

units and tools for measuring. This strand provides focus for the PK-7 and Geometry standards around the notion that geometry and measurement help students understand and represent ideas and solve problems they will encounter in their daily lives. A focus on geometry should enable students to analyze characteristics of two- and three-dimensional objects, develop arguments based on geometric relationships, describe spatial relationships using coordinate geometry and other representational systems, apply transformations and symmetry to analyze mathematical situations, and utilize visualization, spatial reasoning and geometric modeling to solve problems. A focus on measurement should enable students to understand measurable attributes of objects and the units, systems, and processes of measurement, and apply appropriate techniques, tools, and formulas to determine measurements.

Data and Probability Strand: An increased emphasis on understanding data should span all grade levels. Making sense of data and probability has become a part of our daily lives, supporting the importance of this strand throughout a students' PK-12 mathematics experience. A focus on data and probability should enable all students to formulate questions that can be addressed with data, and to collect, organize, and display relevant data to answer them. Students should select and use appropriate statistical methods to analyze data, develop and evaluate inferences and predictions that are based on data, and understand and apply basic concepts of probability. The study of data is also an opportunity to apply the basic skills of computing with numbers and being an educated consumer of information presented in the news and media while the study of probability provides application and use of fractions in daily life.



Mathematical Actions and Processes





Mathematical Actions and Processes

The Mathematical Actions and Processes simultaneously reflect the holistic nature of mathematics as a discipline in which patterns and relationships among quantities, numbers, and space are studied (National Academies of Sciences, 2014) and as a form of literacy such that all students are supported in accessing and understanding mathematics for life, for the workplace, for the scientific and technical community, and as a part of cultural heritage (NCTM, 2000). The seven Mathematical Actions and Processes leverage both the NCTM Process Standards and the Five Mathematical Proficiencies (NRC, 2001) to capture the mathematical experience of Oklahoma students as they pursue mathematical literacy.

Throughout their Pk-12 education experience, mathematically literate students will:

- Develop a Deep and Flexible Conceptual Understanding**
Demonstrate a deep and flexible conceptual understanding of mathematical concepts, operations, and relations while making mathematical and real-world connections. Students will develop an understanding of how and when to apply and use the mathematics they know to solve problems.
- Develop Accurate and Appropriate Procedural Fluency**
Learn efficient procedures and algorithms for computations and repeated processes based on a strong sense of numbers. Develop fluency in addition, subtraction, multiplication, and division of numbers and expressions. Students will generate a sophisticated understanding of the development and application of algorithms and procedures.
- Develop Strategies for Problem Solving**
Analyze the parts of complex mathematical tasks and identify entry points to begin the search for a solution. Students will select from a variety of problem solving strategies and use corresponding multiple representations (verbal, physical, symbolic, pictorial, graphical, tabular) when appropriate. They will pursue solutions to various tasks from real-world situations and applications that are often interdisciplinary in nature. They will find methods to verify their answers in context and will always question the reasonableness of solutions.
- Develop Mathematical Reasoning**
Explore and communicate a variety of reasoning strategies to think through problems. Students will apply their logic to critique the thinking and strategies of others to develop and evaluate mathematical arguments, including making arguments and counterarguments and making connections to other contexts.
- Develop a Productive Mathematical Disposition**
Hold the belief that mathematics is sensible, useful and worthwhile. Students will develop the habit of looking for and making use of patterns and mathematical structures. They will persevere and become resilient, effective problem solvers.
- Develop the Ability to Make Conjectures, Model, and Generalize**
Make predictions and conjectures and draw conclusions throughout the problem solving process based on patterns and the repeated structures in mathematics. Students will create, identify, and extend patterns as a strategy for solving and making sense of problems.
- Develop the Ability to Communicate Mathematically**
Students will discuss, write, read, interpret and translate ideas and concepts mathematically. As they progress, students' ability to communicate mathematically will include their increased use of mathematical language and terms and analysis of mathematical definitions.



Reading the Oklahoma Academic Standards for Mathematics

Math Actions and Processes Oklahoma Academic Standards for Mathematics **5th Grade (5)** Grade or Course

Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically	
Number & Operations (N)							
5.N.1 Divide multi-digit numbers and solve real-world and mathematical problems using arithmetic.	Strands						
	5.N.1.1 Estimate quotients of division problems in order to assess the reasonableness of results.						
	5.N.1.2 Divide multi-digit numbers, by one- and two-digit divisors, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms.						
	5.N.1.3 Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal and consider the context in which a problem is situated to select and interpret the most useful form of the quotient for the solution.						
Standards	5.N.1.4 Solve real-world and mathematical problems requiring addition, subtraction, multiplication, and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology, and the context of the problem to assess the reasonableness of results.						
	5.N.2 Read, write, represent, and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.	Objectives					
		5.N.2.1 Represent and compare decimals (e.g., $\frac{1}{10}$, $\frac{1}{100}$) using a variety of models (e.g., 10 by 10 grids, rational number wheel, base-ten blocks, meter stick) and make comparisons of fractions and decimals.					
		5.N.2.2 Represent, read and write decimals using place value to describe decimal numbers including fractional numbers as small as thousandths and whole numbers as large as millions.					
5.N.2.3 Compare and order fractions and decimals, including mixed numbers and fractions less than one, and locate on a number line.							
5.N.3 Add and subtract fractions with like and unlike denominators, mixed numbers and decimals to solve real-world and mathematical problems.	5.N.2.4 Recognize and generate equivalent decimals, fractions, mixed numbers, and fractions less than one in various contexts.						
	5.N.3.1 Estimate sums and differences of fractions with like and unlike denominators, mixed numbers, and decimals to assess the reasonableness of the results.						
	5.N.3.2 Illustrate addition and subtraction of fractions with like and unlike denominators, mixed numbers, and decimals using a variety of representations (e.g., fraction strips, area models, number lines, fraction rods).						
	5.N.3.3 Add and subtract fractions with like and unlike denominators, mixed numbers, and decimals, using efficient and generalizable procedures, including but not limited to standard algorithms in order to solve real-world and mathematical problems including those involving money, measurement, geometry, and data.						
5.N.3.4 Find 0.1 more than a number and 0.1 less than a number. Find 0.01 more than a number and 0.01 less than a number. Find 0.001 more than a number and 0.001 less than a number.							



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
PK.N.1 Know number names and count in sequence.	PK.N.1.1 Count aloud forward in sequence by 1s to 20.					
	PK.N.1.2 Recognize and name written numerals 0-10.					
	PK.N.1.3 Recognize that zero represents the count of no objects.					
PK.N.2 Count to tell the number of objects.	PK.N.2.1 Identify the number of objects, up to 10, in a row or column.					
	PK.N.2.2 Use one-to-one correspondence in counting objects and matching groups of objects.					
	PK.N.2.3 Understand the last numeral spoken, when counting aloud, tells how many total objects are in a set.					
	PK.N.2.4 Count up to 5 items in a scattered configuration; not in a row or column.					
PK.N.3 Compare sets using number.	PK.N.3.1 Compare two sets of 1-5 objects using comparative language such as same, more, or fewer.					
Algebraic Reasoning & Algebra (A)						
PK.A.1 Recognize, duplicate, and extend patterns.	PK.A.1.1 Sort and group up to 5 objects into a set based upon characteristics such as color, size, and shape and explain verbally what the objects have in common.					
	PK.A.1.2 Recognize, duplicate, and extend repeating patterns involving manipulatives, sound, movement, and other contexts.					
Geometry & Measurement (GM)						
PK.GM.1 Identify common shapes.	PK.GM.1.1 Identify circles, squares, rectangles, and triangles by pointing to the shape when given the name.					
PK.GM.2 Describe and compare measureable attributes.	PK.GM.2.1 Identify measurable attributes of objects. Describe them as little, big, long, short, tall, heavy, light, or other age appropriate vocabulary.					
	PK.GM.2.2 Directly compare two objects with a common measurable attribute using words such as longer/shorter; heavier/lighter; or taller/shorter.					
	PK.GM.2.3 Sort objects into sets by one or more attributes.					



Data & Probability (D)

PK.D.1 Collect and organize categorical data.

PK.D.1.1 Collect and organize information about objects and events in the environment.

PK.D.1.2 Use categorical data to create real-object graphs.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>K.N.1 Understand the relationship between quantities and whole numbers.</p>	<p>K.N.1.1 Count aloud forward in sequence to 100 by 1's and 10's.</p>					
	<p>K.N.1.2 Recognize that a number can be used to represent how many objects are in a set up to 10.</p>					
	<p>K.N.1.3 Use ordinal numbers to represent the position of an object in a sequence up to 10.</p>					
	<p>K.N.1.4 Recognize without counting (subitize) the quantity of a small group of objects in organized and random arrangements up to 10. Clarification statement: Subitizing is defined as instantly recognizing the quantity of a set without having to count. "Subitizing" is not a vocabulary word and is not meant for student discussion at this age.</p>					
	<p>K.N.1.5 Count forward, with and without objects, from any given number up to 10.</p>					
	<p>K.N.1.6 Read, write, discuss, and represent whole numbers from 0 to at least 10. Representations may include numerals, pictures, real objects and picture graphs, spoken words, and manipulatives.</p>					
	<p>K.N.1.7 Find a number that is 1 more or 1 less than a given number up to 10.</p>					
	<p>K.N.1.8 Using the words more than, less than or equal to compare and order whole numbers, with and without objects, from 0 to 10.</p>					
<p>K.N.2 Develop conceptual fluency with addition and subtraction (up to 10) using objects and pictures.</p>	<p>K.N.2.1 Compose and decompose numbers up to 10 with objects and pictures.</p>					
<p>K.N.3 Understand the relationship between whole numbers and fractions through fair share.</p>	<p>K.N.3.1 Distribute equally a set of objects into at least two smaller equal sets.</p>					
<p>K.N.4 Identify coins by name.</p>	<p>K.N.4.1 Identify pennies, nickels, dimes, and quarters by name.</p>					



Algebraic Reasoning & Algebra (A)

K.A.1 Duplicate patterns in a variety of contexts.	K.A.1.1 Sort and group up to 10 objects into a set based upon characteristics such as color, size, and shape. Explain verbally what the objects have in common.
	K.A.1.2 Recognize, duplicate, complete, and extend repeating, shrinking and growing patterns involving shape, color, size, objects, sounds, movement, and other contexts.

Geometry & Measurement (GM)

K.GM.1 Recognize and sort basic two-dimensional shapes and use them to represent real-world objects.	K.GM.1.1 Recognize squares, circles, triangles, and rectangles.
	K.GM.1.2 Sort two-dimensional objects using characteristics such as shape, size, color, and thickness.
	K.GM.1.3 Identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably.
	K.GM.1.4 Use smaller shapes to form a larger shape when there is an outline to follow.
	K.GM.1.5 Compose free-form shapes with blocks.
	K.GM.1.6 Use basic shapes and spatial reasoning to represent objects in the real world.
K.GM.2 Compare and order objects according to location and measurable attributes.	K.GM.2.1 Use words to compare objects according to length, size, weight, position, and location.
	K.GM.2.2 Order up to 6 objects using measurable attributes, such as length and weight.
	K.GM.2.3 Sort objects into sets by more than one attribute.
	K.GM.2.4 Compare the number of objects needed to fill two different containers.
K.GM.3 Tell time as it relates to daily life.	K.GM.3.1 Develop an awareness of simple time concepts using words such as yesterday, today, tomorrow, morning, afternoon, and night within his/her daily life.

Data & Probability (D)

K.D.1 Collect, organize, and interpret categorical data.	K.D.1.1 Collect and sort information about objects and events in the environment.
	K.D.1.2 Use categorical data to create real-object and picture graphs.
	K.D.1.3 Draw conclusions from real-object and picture graphs.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>1.N.1 Count, compare, and represent whole numbers up to 100, with an emphasis on groups of tens and ones.</p>	<p>1.N.1.1 Recognize numbers to 20 without counting (subitize) the quantity of structured arrangements. Clarification statement: Subitizing is defined as instantly recognizing the quantity of a set without having to count. “Subitizing” is not a vocabulary word and is not meant for student discussion at this age.</p>					
	<p>1.N.1.2 Use concrete representations to describe whole numbers between 10 and 100 in terms of tens and ones.</p>					
	<p>1.N.1.3 Read, write, discuss, and represent whole numbers up to 100. Representations may include numerals, addition and subtraction, pictures, tally marks, number lines and manipulatives, such as bundles of sticks and base 10 blocks.</p>					
	<p>1.N.1.4 Count forward, with and without objects, from any given number up to 100 by 1s, 2s, 5s and 10s.</p>					
	<p>1.N.1.5 Find a number that is 10 more or 10 less than a given number up to 100.</p>					
	<p>1.N.1.6 Compare and order whole numbers from 0 to 100.</p>					
	<p>1.N.1.7 Use knowledge of number relationships to locate the position of a given whole number on an open number line up to 20.</p>					
	<p>1.N.1.8 Use objects to represent and use words to describe the relative size of numbers, such as more than, less than, and equal to.</p>					
<p>1.N.2 Solve addition and subtraction problems up to 10 in real-world and mathematical contexts.</p>	<p>1.N.2.1 Represent and solve real-world and mathematical problems using addition and subtraction up to ten.</p>					
	<p>1.N.2.2 Determine if equations involving addition and subtraction are true.</p>					
	<p>1.N.2.3 Demonstrate fluency with basic addition facts and related subtraction facts up to 10.</p>					
<p>1.N.3 Develop foundational ideas for fractions.</p>	<p>1.N.3.1 Partition a regular polygon using physical models and recognize when those parts are equal.</p>					
	<p>1.N.3.2 Partition (fair share) sets of objects into equal groupings.</p>					



1.N.4 Identify coins and their values.	1.N.4.1 Identifying pennies, nickels, dimes, and quarters by name and value.
	1.N.4.2 Write a number with the cent symbol to describe the value of a coin.
	1.N.4.3 Determine the value of a collection of pennies, nickels, or dimes up to one dollar counting by ones, fives, or tens.
Algebraic Reasoning & Algebra (A)	
1.A.1 Identify patterns found in real-world and mathematical situations.	1.A.1.1 Identify, create, complete, and extend repeating, growing, and shrinking patterns with quantity, numbers, or shapes in a variety of real-world and mathematical contexts-
Geometry & Measurement (GM)	
1.GM.1 Recognize, compose, and decompose two- and three-dimensional shapes.	1.GM.1.1 Identify trapezoids and hexagons by pointing to the shape when given the name.
	1.GM.1.2 Compose and decompose larger shapes using smaller two-dimensional shapes.
	1.GM.1.3 Compose structures with three-dimensional shapes.
	1.GM.1.4 Recognize three-dimensional shapes such as cubes, cones, cylinders, and spheres.
1.GM.2 Select and use nonstandard and standard units to describe length and volume/capacity.	1.GM.2.1 Use nonstandard and standard measuring tools to measure the length of objects to reinforce the continuous nature of linear measurement.
	1.GM.2.2 Illustrate that the length of an object is the number of same-size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other.
	1.GM.2.3 Measure the same object/distance with units of two different lengths and describe how and why the measurements differ.
	1.GM.2.4 Describe a length to the nearest whole unit using a number and a unit.
	1.GM.2.5 Use standard and nonstandard tools to identify volume/capacity. Compare and sort containers that hold more, less, or the same amount.
1.GM.3 Tell time to the half and full hour.	1.GM.3.1 Tell time to the hour and half-hour (analog and digital).
Data & Probability (D)	
1.D.1 Collect, organize, and interpret categorical and numerical data.	1.D.1.1 Collect, sort, and organize data in up to three categories using representations (e.g., tally marks, tables, Venn diagrams).
	1.D.1.2 Use data to create picture and bar-type graphs to demonstrate one-to-one correspondence.
	1.D.1.3 Draw conclusions from picture and bar-type graphs.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>2.N.1 Compare and represent whole numbers up to 1,000 with an emphasis on place value and equality.</p>	<p>2.N.1.1 Read, write, discuss, and represent whole numbers up to 1,000. Representations may include numerals, words, pictures, tally marks, number lines and manipulatives.</p>					
	<p>2.N.1.2 Use knowledge of number relationships to locate the position of a given whole number on an open number line up to 100.</p>					
	<p>2.N.1.3 Use place value to describe whole numbers between 10 and 1,000 in terms of hundreds, tens and ones. Know that 100 is 10 tens, and 1,000 is 10 hundreds.</p>					
	<p>2.N.1.4 Find 10 more or 10 less than a given three-digit number. Find 100 more or 100 less than a given three-digit number.</p>					
	<p>2.N.1.5 Recognize when to round numbers to the nearest 10 and 100.</p>					
	<p>2.N.1.6 Use place value to compare and order whole numbers up to 1,000 using comparative language, numbers, and symbols (e.g., $425 > 276$, $73 < 107$, page 351 comes after page 350, 753 is between 700 and 800).</p>					
<p>2.N.2 Add and subtract one- and two-digit numbers in real-world and mathematical problems.</p>	<p>2.N.2.1 Use the relationship between addition and subtraction to generate basic facts up to 20.</p>					
	<p>2.N.2.2 Demonstrate fluency with basic addition facts and related subtraction facts up to 20.</p>					
	<p>2.N.2.3 Estimate sums and differences up to 100.</p>					
	<p>2.N.2.4 Use strategies and algorithms based on knowledge of place value and equality to add and subtract two-digit numbers.</p>					
	<p>2.N.2.5 Solve real-world and mathematical addition and subtraction problems involving whole numbers up to 2 digits.</p>					
	<p>2.N.2.6 Use concrete models and structured arrangements, such as repeated addition, arrays and ten frames to develop understanding of multiplication.</p>					
<p>2.N.3 Explore the foundational ideas of fractions.</p>	<p>2.N.3.1 Identify the parts of a set and area that represent fractions for halves, thirds, and fourths.</p>					
	<p>2.N.3.2 Construct equal-sized portions through fair sharing including length, set, and area models for halves, thirds, and fourths.</p>					
<p>2.N.4 Determine the value of a set of coins.</p>	<p>2.N.4.1 Determine the value of a collection(s) of coins up to one dollar using the cent symbol.</p>					
	<p>2.N.4.2 Use a combination of coins to represent a given amount of money up to one dollar.</p>					



Algebraic Reasoning & Algebra (A)

2.A.1 Describe the relationship found in patterns to solve real-world and mathematical problems.	2.A.1.1 Represent, create, describe, complete, and extend growing and shrinking patterns with quantity and numbers in a variety of real-world and mathematical contexts.
	2.A.1.2 Represent and describe repeating patterns involving shapes in a variety of contexts.
2.A.2 Use number sentences involving unknowns to represent and solve real-world and mathematical problems.	2.A.2.1 Use objects and number lines to represent number sentences.
	2.A.2.2 Generate real-world situations to represent number sentences and vice versa.
	2.A.2.3 Apply commutative and identity properties and number sense to find values for unknowns that make number sentences involving addition and subtraction true or false.

Geometry & Measurement (GM)

2.GM.1 Analyze attributes of two-dimensional figures and develop generalizations about their properties.	2.GM.1.1 Recognize trapezoids and hexagons.
	2.GM.1.2 Describe, compare, and classify two-dimensional figures according to their geometric attributes.
	2.GM.1.3 Compose two-dimensional shapes using triangles, squares, hexagons, trapezoids, and rhombi.
	2.GM.1.4 Recognize right angles and classify angles as smaller or larger than a right angle.
2.GM.2 Understand length as a measurable attribute and explore capacity.	2.GM.2.1 Explain the relationship between the size of the unit of measurement and the number of units needed to measure the length of an object.
	2.GM.2.2 Explain the relationship between length and the numbers on a ruler by using a ruler to measure lengths to the nearest whole unit.
	2.GM.2.3 Explore how varying shapes and styles of containers can have the same capacity.
2.GM.3 Tell time to the quarter hour.	2.GM.3.1 Read and write time to the quarter-hour on an analog and digital clock. Distinguish between a.m. and p.m.

Data & Probability (D)

2.D.1 Collect, organize, and interpret data.	2.D.1.1 Explain that the length of a bar in a bar graph or the number of objects in a picture graph represents the number of data points for a given category.
	2.D.1.2 Organize a collection of data with up to four categories using pictographs and bar graphs with intervals of 1s, 2s, 5s or 10s.
	2.D.1.3 Write and solve one-step word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one.
	2.D.1.4 Draw conclusions and make predictions from information in a graph.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>3.N.1 Compare and represent whole numbers up to 100,000 with an emphasis on place value and equality.</p>	<p>3.N.1.1 Read, write, discuss, and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives.</p>					
	<p>3.N.1.2 Use place value to describe whole numbers between 1,000 and 100,000 in terms of ten thousands, thousands, hundreds, tens and ones, including expanded form.</p>					
	<p>3.N.1.3 Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.</p>					
	<p>3.N.1.4 Use place value to compare and order whole numbers up to 100,000, using comparative language, numbers, and symbols.</p>					
<p>3.N.2 Add and subtract multi-digit whole numbers; multiply with factors up to 10; represent multiplication and division in various ways; Solve real-world and mathematical problems through the representation of related operations.</p>	<p>3.N.2.1 Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting.</p>					
	<p>3.N.2.2 Demonstrate fluency of multiplication facts with factors up to 10.</p>					
	<p>3.N.2.3 Use strategies and algorithms based on knowledge of place value and equality to fluently add and subtract multi-digit numbers.</p>					
	<p>3.N.2.4 Recognize when to round numbers and apply understanding to round numbers to the nearest ten thousand, thousand, hundred, and ten and use compatible numbers to estimate sums and differences.</p>					
	<p>3.N.2.5 Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.</p>					
	<p>3.N.2.6 Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups.</p>					
	<p>3.N.2.7 Recognize the relationship between multiplication and division to represent and solve real-world problems.</p>					
	<p>3.N.2.8 Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two-digit number by a one-digit number.</p>					



3.N.3 Understand meanings and uses of fractions in real-world and mathematical situations.	3.N.3.1 Read and write fractions with words and symbols.
	3.N.3.2 Construct fractions using length, set, and area models.
	3.N.3.3 Recognize unit fractions and use them to compose and decompose fractions related to the same whole. Use the numerator to describe the number of parts and the denominator to describe the number of partitions.
	3.N.3.4 Use models and number lines to order and compare fractions that are related to the same whole.
3.N.4 Determine the value of a set of coins or bills.	3.N.4.1 Use addition to determine the value of a collection of coins up to one dollar using the cent symbol and a collection of bills up to twenty dollars.
	3.N.4.2 Select the fewest number of coins for a given amount of money up to one dollar.
Algebraic Reasoning & Algebra (A)	
3.A.1 Describe and create representations of numerical and geometric patterns.	3.A.1.1 Create, describe, and extend patterns involving addition, subtraction, or multiplication to solve problems in a variety of contexts.
	3.A.1.2 Describe the rule (single operation) for a pattern from an input/output table or function machine involving addition, subtraction, or multiplication.
	3.A.1.3 Explore and develop visual representations of growing geometric patterns and construct the next steps.
3.A.2 Use number sentences involving multiplication and unknowns to represent and solve real-world and mathematical problems.	3.A.2.1 Find unknowns represented by symbols in arithmetic problems by solving one-step open sentences (equations) and other problems involving addition, subtraction, and multiplication. Generate real-world situations to represent number sentences.
	3.A.2.2 Recognize, represent and apply the number properties (commutative, identity, and associative properties of addition and multiplication) using models and manipulatives to solve problems.
Geometry & Measurement (GM)	
3.GM.1 Use geometric attributes to describe and create shapes in various contexts.	3.GM.1.1 Sort three-dimensional shapes based on attributes.
	3.GM.1.2 Build a three-dimensional figure using unit cubes when picture/shape is shown.
	3.GM.1.3 Classify angles as acute, right, obtuse, and straight.
3.GM.2 Understand measurable attributes of real-world and mathematical objects using various tools.	3.GM.2.1 Find perimeter of polygon, given whole number lengths of the sides, in real-world and mathematical situations.
	3.GM.2.2 Develop and use formulas to determine the area of rectangles. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.
	3.GM.2.3 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole centimeter or meter.
	3.GM.2.4 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole yard, whole foot, or half inch.



	3.GM.2.5 Using common benchmarks, estimate the lengths (customary and metric) of a variety of objects.
	3.GM.2.6 Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.
	3.GM.2.7 Count cubes systematically to identify number of cubes needed to pack the whole or half of a three-dimensional structure.
	3.GM.2.8 Find the area of two-dimensional figures by counting total number of same size unit squares that fill the shape without gaps or overlaps.
3.GM.3 Solve problems by telling time to the nearest 5 minutes.	3.GM.3.1 Read and write time to the nearest 5-minute (analog and digital).
	3.GM.3.2 Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.
Data & Probability (D)	
3.D.1 Summarize, construct, and analyze data.	3.D.1.1 Summarize and construct a data set with multiple categories using a frequency table, line plot, pictograph, and/or bar graph with scaled intervals.
	3.D.1.2 Solve one- and two-step problems using categorical data represented with a frequency table, pictograph, or bar graph with scaled intervals.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>4.N.1 Solve real-world and mathematical problems using multiplication and division.</p>	<p>4.N.1.1 Demonstrate fluency with multiplication and division facts with factors up to 12.</p>					
	<p>4.N.1.2 Use an understanding of place value to multiply or divide a number by 10, 100 and 1,000.</p>					
	<p>4.N.1.3 Multiply 3-digit by 1-digit or a 2-digit by 2-digit whole numbers, using efficient and generalizable procedures and strategies, based on knowledge of place value, including but not limited to standard algorithms.</p>					
	<p>4.N.1.4 Estimate products of 3-digit by 1-digit or 2-digit by 2-digit whole numbers using rounding, benchmarks and place value to assess the reasonableness of results. Explore larger numbers using technology to investigate patterns.</p>					
	<p>4.N.1.5 Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of appropriate technology, and the context of the problem to assess the reasonableness of results.</p>					
	<p>4.N.1.6 Use strategies and algorithms based on knowledge of place value, equality and properties of operations to divide 3-digit dividend by 1-digit whole number divisors. (e.g., mental strategies, standard algorithms, partial quotients, repeated subtraction, the commutative, associative, and distributive properties).</p>					
	<p>4.N.1.7 Determine the unknown addend(s) or factor(s) in equivalent and non-equivalent expressions. (e.g., $5 + 6 = 4 + \square$, $3 \times 8 < 3 \times \square$).</p>					
<p>4.N.2 Represent and compare fractions and decimals in real-world and mathematical situations; use place value to understand how decimals represent quantities.</p>	<p>4.N.2.1 Represent and rename equivalent fractions using fraction models (e.g. parts of a set, area models, fraction strips, number lines).</p>					
	<p>4.N.2.2 Use benchmark fractions ($0, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, 1$) to locate additional fractions on a number line. Use models to order and compare whole numbers and fractions less than and greater than one using comparative language and symbols.</p>					
	<p>4.N.2.3 Decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$).</p>					
	<p>4.N.2.4 Use fraction models to add and subtract fractions with like denominators in real-world and mathematical situations.</p>					
	<p>4.N.2.5 Represent tenths and hundredths with concrete models, making connections between fractions and decimals.</p>					
	<p>4.N.2.6 Represent, read and write decimals up to at least the hundredths place in a variety of contexts including money.</p>					



	4.N.2.7 Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks.
	4.N.2.8 Compare benchmark fractions ($\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}$) and decimals (0.25, 0.50, 0.75) in real-world and mathematical situations.
4.N.3 Determine the value of coins in order to solve monetary transactions.	4.N.3.1 Given a total cost (whole dollars up to \$20 or coins) and amount paid (whole dollars up to \$20 or coins), find the change required in a variety of ways. Limited to whole dollars up to \$20 or sets of coins.
Algebraic Reasoning & Algebra (A)	
4.A.1 Use multiple representations of patterns to solve real-world and mathematical problems.	4.A.1.1 Create an input/output chart or table to represent or extend a numerical pattern.
	4.A.1.2 Describe the single operation rule for a pattern from an input/output table or function machine involving any operation of a whole number.
	4.A.1.3 Create growth patterns involving geometric shapes and define the single operation rule of the pattern.
4.A.2 Use multiplication and division with unknowns to create number sentences representing a given problem situation.	4.A.2.1 Use number sense, properties of multiplication and the relationship between multiplication and division to solve problems and find values for the unknowns represented by letters and symbols that make number sentences true.
	4.A.2.2 Solve for unknowns in problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, or division with whole numbers. Use real-world situations to represent number sentences and vice versa.
Geometry & Measurement (GM)	
4.GM.1 Name, describe, classify and construct polygons, and three-dimensional figures.	4.GM.1.1 Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.
	4.GM.1.2 Describe, classify, and sketch quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms, and kites. Recognize quadrilaterals in various contexts.
	4.GM.1.3 Given two three-dimensional shapes, identify similarities, and differences.
4.GM.2 Understand angle, length, and area as measurable attributes of real-world and mathematical objects. Use various tools to measure angles, length, area, and volume.	4.GM.2.1 Measure angles in geometric figures and real-world objects with a protractor or angle ruler.
	4.GM.2.2 Find the area of polygons that can be decomposed into rectangles.
	4.GM.2.3 Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with whole-number edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as cm^3 .
	4.GM.2.4 Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or quarter-inch.
	4.GM.2.5 Solve problems that deal with measurements of length, when to use liquid volumes, when to use mass, temperatures above zero and money using addition, subtraction, multiplication, or division as appropriate (customary and metric).



4.GM.3 Determine elapsed time and convert between units of time.	4.GM.3.1 Determine elapsed time.
	4.GM.3.2 Solve problems involving the conversion of one measure of time to another.
Data & Probability (D)	
4.D.1 Collect, organize, and analyze data.	4.D.1.1 Represent data on a frequency table or line plot marked with whole numbers and fractions using appropriate titles, labels, and units.
	4.D.1.2 Use tables, bar graphs, timelines, and Venn diagrams to display data sets. The data may include benchmark fractions or decimals ($\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, 0.25, 0.50, 0.75).
	4.D.1.3 Solve one- and two-step problems using data in whole number, decimal, or fraction form in a frequency table and line plot.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>5.N.1 Divide multi-digit numbers and solve real-world and mathematical problems using arithmetic.</p>	<p>5.N.1.1 Estimate solutions to division problems in order to assess the reasonableness of results.</p>					
	<p>5.N.1.2 Divide multi-digit numbers, by one- and two-digit divisors, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms.</p>					
	<p>5.N.1.3 Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal and consider the context in which a problem is situated to select and interpret the most useful form of the quotient for the solution.</p>					
	<p>5.N.1.4 Solve real-world and mathematical problems requiring addition, subtraction, multiplication, and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology, and the context of the problem to assess the reasonableness of results.</p>					
<p>5.N.2 Read, write, represent, and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.</p>	<p>5.N.2.1 Represent decimal fractions (e.g., $\frac{1}{10}$, $\frac{1}{100}$) using a variety of models (e.g., 10 by 10 grids, rational number wheel, base-ten blocks, meter stick) and make connections between fractions and decimals.</p>					
	<p>5.N.2.2 Represent, read and write decimals using place value to describe decimal numbers including fractional numbers as small as thousandths and whole numbers as large as millions.</p>					
	<p>5.N.2.3 Compare and order fractions and decimals, including mixed numbers and fractions less than one, and locate on a number line.</p>					
	<p>5.N.2.4 Recognize and generate equivalent decimals, fractions, mixed numbers, and fractions less than one in various contexts.</p>					
<p>5.N.3 Add and subtract fractions with like and unlike denominators, mixed numbers and decimals to solve real-world and mathematical problems.</p>	<p>5.N.3.1 Estimate sums and differences of fractions with like and unlike denominators, mixed numbers, and decimals to assess the reasonableness of the results.</p>					
	<p>5.N.3.2 Illustrate addition and subtraction of fractions with like and unlike denominators, mixed numbers, and decimals using a variety of representations (e.g., fraction strips, area models, number lines, fraction rods).</p>					
	<p>5.N.3.3 Add and subtract fractions with like and unlike denominators, mixed numbers, and decimals, using efficient and generalizable procedures, including but not limited to standard algorithms in order to solve real-world and mathematical problems including those involving money, measurement, geometry, and data.</p>					
	<p>5.N.3.4 Find 0.1 more than a number and 0.1 less than a number. Find 0.01 more than a number and 0.01 less than a number. Find 0.001 more than a number and 0.001 less than a number.</p>					



Algebraic Reasoning & Algebra (A)

5.A.1 Describe and graph patterns of change created through numerical patterns.	5.A.1.1 Use tables and rules of up to two operations to describe patterns of change and make predictions and generalizations about real-world and mathematical problems.
	5.A.1.2 Use a rule or table to represent ordered pairs of whole numbers and graph these ordered pairs on a coordinate plane, identifying the origin and axes in relation to the coordinates.
5.A.2 Understand and interpret expressions, equations, and inequalities involving variables and whole numbers, and use them to represent and evaluate real-world and mathematical problems.	5.A.2.1 Generate equivalent numerical expressions and solve problems involving whole numbers by applying the commutative, associative, and distributive properties and order of operations (no exponents).
	5.A.2.2 Determine whether an equation or inequality involving a variable is true or false for a given value of the variable.
	5.A.2.3 Evaluate expressions involving variables when values for the variables are given.

Geometry & Measurement (GM)

5.GM.1 Describe, classify, and draw representations of two- and three-dimensional figures.	5.GM.1.1 Describe, classify and construct triangles, including equilateral, right, scalene, and isosceles triangles. Recognize triangles in various contexts.
	5.GM.1.2 Describe and classify three-dimensional figures including cubes, rectangular prisms, and pyramids by the number of edges, faces or vertices as well as the shapes of faces.
	5.GM.1.3 Recognize and draw a net for a three-dimensional figure (e.g., cubes, rectangular prisms, pyramids).
5.GM.2 Understand how the volume of rectangular prisms and surface area of shapes with polygonal faces are determined by the dimensions of the object and that shapes with varying dimensions can have equivalent values of surface area or volume.	5.GM.2.1 Recognize that the volume of rectangular prisms can be determined by the number of cubes (n) and by the product of the dimensions of the prism ($a \times b \times c = n$). Know that rectangular prisms of different dimensions ($p, q,$ and r) can have the same volume if $a \times b \times c = p \times q \times r = n$.
	5.GM.2.2 Recognize that the surface area of a three-dimensional figure with rectangular faces with whole numbered edges can be found by finding the area of each component of the net of that figure. Know that three-dimensional shapes of different dimensions can have the same surface area.
	5.GM.2.3 Find the perimeter of polygons and create arguments for reasonable values for the perimeter of shapes that include curves.
5.GM.3 Understand angle and length as measurable attributes of real-world and mathematical objects. Use various tools to measure angles and lengths.	5.GM.3.1 Measure and compare angles according to size.
	5.GM.3.2 Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or 1/16-inch.
	5.GM.3.3 Recognize and use the relationship between inches, feet, and yards to measure and compare objects.
	5.GM.3.4 Recognize and use the relationship between millimeters, centimeters, and meters to measure and compare objects.



Data & Probability (D)

5.D.1 Display and analyze data to find the range and measures of central tendency (mean, median, and mode).

5.D.1.1 Find the measures of central tendency (mean, median, or mode) and range of a set of data. Understand that the mean is a “leveling out” or central balance point of the data.

5.D.1.2 Create and analyze line and double-bar graphs with whole numbers, fractions, and decimals increments.



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Number & Operations (N)						
<p>6.N.1 Read, write, and represent integers and rational numbers expressed as fractions, decimals, percents, and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.</p>	<p>6.N.1.1 Represent integers with counters and on a number line and rational numbers on a number line, recognizing the concepts of opposites, direction, and magnitude; use integers and rational numbers in real-world and mathematical situations, explaining the meaning of 0 in each situation.</p>					
	<p>6.N.1.2 Compare and order positive rational numbers, represented in various forms, or integers using the symbols $<$, $>$, and $=$.</p>					
	<p>6.N.1.3 Explain that a percent represents parts “out of 100” and ratios “to 100.”</p>					
	<p>6.N.1.4 Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.</p>					
	<p>6.N.1.5 Factor whole numbers and express prime and composite numbers as a product of prime factors with exponents.</p>					
	<p>6.N.1.6 Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions, and express the sum of two-digit numbers with a common factor using the distributive property.</p>					
<p>6.N.2 Add and subtract integers in order to solve real-world and mathematical problems.</p>	<p>6.N.2.1 Estimate solutions to addition and subtraction of integers problems in order to assess the reasonableness of results.</p>					
	<p>6.N.2.2 Illustrate addition and subtraction of integers using a variety of representations.</p>					
	<p>6.N.2.3 Add and subtract integers; use efficient and generalizable procedures including but not limited to standard algorithms.</p>					
<p>6.N.3 Understand the concept of ratio and its relationship to fractions and percents and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems.</p>	<p>6.N.3.1 Identify and use ratios to compare quantities. Recognize that multiplicative comparison and additive comparison are different.</p>					
	<p>6.N.3.2 Determine the unit rate for ratios.</p>					
	<p>6.N.3.3 Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixture and concentrations.</p>					
	<p>6.N.3.4 Use multiplicative reasoning and representations to solve ratio and unit rate problems.</p>					
<p>6.N.4 Multiply and divide decimals, fractions, and mixed numbers; solve real-world and mathematical problems with rational numbers.</p>	<p>6.N.4.1 Estimate solutions to problems with whole numbers, decimals, fractions, and mixed numbers and use the estimates to assess the reasonableness of results in the context of the problem.</p>					
	<p>6.N.4.2 Illustrate multiplication and division of fractions and decimals to show connections to fractions, whole number multiplication, and inverse relationships.</p>					



	<p>6.N.4.3 Multiply and divide fractions and decimals using efficient and generalizable procedures.</p> <p>6.N.4.4 Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions and mixed numbers.</p>
Algebraic Reasoning & Algebra (A)	
<p>6.A.1 Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems.</p>	<p>6.A.1.1 Plot integer- and rational-valued (limited to halves and fourths) ordered-pairs as coordinates in all four quadrants and recognize the reflective relationships among coordinates that differ only by their signs.</p>
	<p>6.A.1.2 Represent relationships between two varying quantities involving no more than two operations with rules, graphs, and tables; translate between any two of these representations.</p>
	<p>6.A.1.3 Use and evaluate variables in expressions, equations, and inequalities that arise from various contexts, including determining when or if, for a given value of the variable, an equation or inequality involving a variable is true or false.</p>
<p>6.A.2 Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers.</p>	<p>6.A.2.1 Generate equivalent expressions and evaluate expressions involving positive rational numbers by applying the commutative, associative, and distributive properties and order of operations to solve real-world and mathematical problems.</p>
<p>6.A.3 Use equations and inequalities to represent real-world and mathematical problems and use the idea of maintaining equality to solve equations. Interpret solutions in the original context.</p>	<p>6.A.3.1 Represent real-world or mathematical situations using expressions, equations and inequalities involving variables and rational numbers.</p>
	<p>6.A.3.2 Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form $x + p = q$ and $px = q$, where x, p, and q are nonnegative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.</p>
Geometry & Measurement (GM)	
<p>6.GM.1 Calculate area of squares, parallelograms, and triangles to solve real-world and mathematical problems.</p>	<p>6.GM.1.1 Develop and use formulas for the area of squares and parallelograms using a variety of methods including but not limited to the standard algorithm.</p>
	<p>6.GM.1.2 Develop and use formulas to determine the area of triangles.</p>
	<p>6.GM.1.3 Find the area of right triangles, other triangles, special quadrilaterals, and polygons that can be decomposed into triangles and other shapes to solve real-world and mathematical problems.</p>
<p>6.GM.2 Understand and use relationships between angles in geometric figures.</p>	<p>6.GM.2.1 Solve problems using the relationships between the angles (vertical, complementary, and supplementary) formed by intersecting lines.</p>
	<p>6.GM.2.2 Develop and use the fact that the sum of the interior angles of a triangle is 180° to determine missing angle measures in a triangle.</p>



6.GM.3 Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.	6.GM.3.1 Estimate weights, capacities and geometric measurements using benchmarks in customary and metric measurement systems with appropriate units.
	6.GM.3.2 Solve problems in various real-world and mathematical contexts that require the conversion of weights, capacities, geometric measurements, and time within the same measurement systems using appropriate units.
6.GM.4 Use translations, reflections, and rotations to establish congruency and understand symmetries.	6.GM.4.1 Predict, describe, and apply translations (slides), reflections (flips), and rotations (turns) to a two-dimensional figure.
	6.GM.4.2 Recognize that translations, reflections, and rotations preserve congruency and use them to show that two figures are congruent.
	6.GM.4.3 Use distances between two points that are either vertical or horizontal to each other (not requiring the distance formula) to solve real-world and mathematical problems about congruent two-dimensional figures.
	6.GM.4.4 Identify and describe the line(s) of symmetry in two-dimensional shapes.
Data & Probability (D)	
6.D.1 Display and analyze data.	6.D.1.1 Calculate the mean, median, and mode for a set of real-world data.
	6.D.1.2 Explain and justify which measure of central tendency (mean, median, or mode) would provide the most descriptive information for a given set of data.
	6.D.1.3 Create and analyze box and whisker plots observing how each segment contains one quarter of the data.
6.D.2 Use probability to solve real-world and mathematical problems; represent probabilities using fractions and decimals.	6.D.2.1 Represent possible outcomes using a probability continuum from impossible to certain.
	6.D.2.2 Determine the sample space for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations.
	6.D.2.3 Demonstrate simple experiments in which the probabilities are known and compare the resulting relative frequencies with the known probabilities, recognizing that there may be differences between the two results.



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Number & Operations (N)						
<p>7.N.1 Read, write, represent, and compare rational numbers, expressed as integers, fractions, and decimals.</p>	<p>7.N.1.1 Know that every rational number can be written as the ratio of two integers or as a terminating or repeating decimal.</p>					
	<p>7.N.1.2 Compare and order rational numbers expressed in various forms using the symbols $<$, $>$, and $=$.</p>					
	<p>7.N.1.3 Recognize and generate equivalent representations of rational numbers, including equivalent fractions.</p>					
<p>7.N.2 Calculate with integers and rational numbers, with and without positive integer exponents, to solve real-world and mathematical problems; explain the relationship between absolute value of a rational number and the distance of that number from zero.</p>	<p>7.N.2.1 Estimate solutions to multiplication and division of integers in order to assess the reasonableness of results.</p>					
	<p>7.N.2.2 Illustrate multiplication and division of integers using a variety of representations.</p>					
	<p>7.N.2.3 Solve real-world and mathematical problems involving addition, subtraction, multiplication and division of rational numbers; use efficient and generalizable procedures including but not limited to standard algorithms.</p>					
	<p>7.N.2.4 Raise integers to positive integer exponents.</p>					
	<p>7.N.2.5 Solve real-world and mathematical problems involving calculations with rational numbers and positive integer exponents.</p>					
	<p>7.N.2.6 Explain the relationship between the absolute value of a rational number and the distance of that number from zero on a number line. Use the symbol for absolute value.</p>					
Algebraic Reasoning & Algebra (A)						
<p>7.A.1 Understand the concept of proportionality in real-world and mathematical situations, and distinguish between proportional and other relationships.</p>	<p>7.A.1.1 Describe that the relationship between two variables, x and y, is proportional if it can be expressed in the form $\frac{y}{x} = k$ or $y = kx$; distinguish proportional relationships from other relationships, including inversely proportional relationships ($xy = k$ or $y = \frac{k}{x}$).</p>					
	<p>7.A.1.2 Recognize that the graph of a proportional relationship is a line through the origin and the coordinate $(1, r)$, where both r and the slope are the unit rate (constant of proportionality, k).</p>					



<p>7.A.2 Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols, and graphs; solve problems involving proportional relationships and interpret results in the original context.</p>	<p>7.A.2.1 Represent proportional relationships with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope, or rate of change) given any of these representations.</p>
	<p>7.A.2.2 Solve multi-step problems involving proportional relationships involving distance-time, percent increase or decrease, discounts, tips, unit pricing, similar figures, and other real-world and mathematical situations.</p>
	<p>7.A.2.3 Use proportional reasoning to solve real-world and mathematical problems involving ratios.</p>
	<p>7.A.2.4 Use proportional reasoning to assess the reasonableness of solutions.</p>
<p>7.A.3 Represent and solve linear equations and inequalities.</p>	<p>7.A.3.1 Write and solve problems leading to linear equations with one variable in the form $px + q = r$ and $p(x + q) = r$, where $p, q,$ and r are rational numbers.</p>
	<p>7.A.3.2 Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $x + p > q$ and $x + p < q$, where $p,$ and q are nonnegative rational numbers.</p>
	<p>7.A.3.3 Represent real-world or mathematical situations using equations and inequalities involving variables and rational numbers.</p>
<p>7.A.4 Use order of operations and properties of operations to generate equivalent numerical and algebraic expressions containing rational numbers and grouping symbols; evaluate such expressions.</p>	<p>7.A.4.1 Use properties of operations (limited to associative, commutative, and distributive) to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents.</p>
	<p>7.A.4.2 Apply understanding of order of operations and grouping symbols when using calculators and other technologies.</p>
<p>Geometry & Measurement (GM)</p>	
<p>7.GM.1 Develop and understand the concept of surface area and volume of rectangular prisms.</p>	<p>7.GM.1.1 Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism with rational-valued edge lengths can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements such as cm^2.</p>
	<p>7.GM.1.2 Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with rational-valued edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as cm^3.</p>
<p>7.GM.2 Determine the area of trapezoids and area and perimeter of composite figures.</p>	<p>7.GM.2.1 Develop and use the formula to determine the area of a trapezoid to solve problems.</p>
	<p>7.GM.2.2 Find the area and perimeter of composite figures to solve real-world and mathematical problems.</p>
<p>7.GM.3 Use reasoning with proportions and ratios to determine measurements, justify formulas, and solve real-world and mathematical problems involving circles and related geometric figures.</p>	<p>7.GM.3.1 Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is π and can be approximated by rational numbers such as $\frac{22}{7}$ and 3.14.</p>
	<p>7.GM.3.2 Calculate the circumference and area of circles to solve problems in various contexts, in terms of π and using approximations for π.</p>



7.GM.4 Analyze the effect of dilations, translations, and reflections on the attributes of two-dimensional figures on and off the coordinate plane.	7.GM.4.1 Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors resulting from dilations.
	7.GM.4.2 Apply proportions, ratios, and scale factors to solve problems involving scale drawings and determine side lengths and areas of similar triangles and rectangles.
	7.GM.4.3 Graph and describe translations and reflections of figures on a coordinate plane and determine the coordinates of the vertices of the figure after the transformation.
Data & Probability (D)	
7.D.1 Display and analyze data in a variety of ways.	7.D.1.1 Design simple experiments, collect data and calculate measures of central tendency (mean, median, and mode) and spread (range). Use these quantities to draw conclusions about the data collected and make predictions.
	7.D.1.2 Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. Choose the appropriate data display and know how to create the display using a spreadsheet or other graphing technology.
7.D.2 Calculate probabilities and reason about probabilities using proportions to solve real-world and mathematical problems.	7.D.2.1 Determine the theoretical probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1.
	7.D.2.2 Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.
	7.D.2.3 Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on probabilities.



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Number & Operations (N)						
PA.N.1 Read, write, compare, classify, and represent real numbers and use them to solve problems in various contexts.	PA.N.1.1 Develop and apply the properties of integer exponents, including $a^0 = 1$ (with $a \neq 0$), to generate equivalent numerical and algebraic expressions.					
	PA.N.1.2 Express and compare approximations of very large and very small numbers using scientific notation.					
	PA.N.1.3 Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation.					
	PA.N.1.4 Classify real numbers as rational or irrational. Explain why the rational number system is closed under addition and multiplication and why the irrational system is not. Explain why the sum of a rational number and an irrational number is irrational; and the product of a non-zero rational number and an irrational number is irrational.					
	PA.N.1.5 Compare real numbers; locate real numbers on a number line. Identify the square root of a perfect square to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers.					
Algebraic Reasoning & Algebra (A)						
PA.A.1 Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions.	PA.A.1.1 Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable.					
	PA.A.1.2 Use linear functions to represent and explain real-world and mathematical situations.					
	PA.A.1.3 Identify a function as linear if it can be expressed in the form $y = mx + b$ or if its graph is a straight line.					
PA.A.2 Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols, and graphs; solve problems involving linear functions and interpret results in the original context.	PA.A.2.1 Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.					
	PA.A.2.2 Identify, describe, and analyze linear relationships between two variables.					
	PA.A.2.3 Identify graphical properties of linear functions including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.					
	PA.A.2.4 Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects.					
	PA.A.2.5 Solve problems involving linear functions and interpret results in the original context.					



<p>PA.A.3 Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.</p>	<p>PA.A.3.1 Use substitution to simplify and evaluate algebraic expressions.</p>
	<p>PA.A.3.2 Justify steps in generating equivalent expressions by identifying the properties used, including the properties of operations (associative, commutative, and distributive laws) and the order of operations, including grouping symbols.</p>
<p>PA.A.4 Represent real-world and mathematical problems using equations and inequalities involving linear expressions. Solve and graph equations and inequalities symbolically and graphically. Interpret solutions in the original context.</p>	<p>PA.A.4.1 Illustrate, write, and solve mathematical and real-world problems using linear equations with one variable with one solution, infinitely many solutions, or no solutions. Interpret solutions in the original context.</p>
	<p>PA.A.4.2 Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $px + q > r$ and $px + q < r$, where p, q, and r are rational numbers.</p>
	<p>PA.A.4.3 Represent real-world situations using equations and inequalities involving one variable.</p>
<p>Geometry & Measurement (GM)</p>	
<p>PA.GM.1 Solve problems involving right triangles using the Pythagorean Theorem.</p>	<p>PA.GM.1.1 Informally justify the Pythagorean Theorem using measurements, diagrams, or dynamic software and use the Pythagorean Theorem to solve problems in two and three dimensions involving right triangles.</p>
	<p>PA.GM.1.2 Use the Pythagorean Theorem to find the distance between any two points in a coordinate plane.</p>
<p>PA.GM.2 Calculate surface area and volume of three-dimensional figures.</p>	<p>PA.GM.2.1 Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate measurements such as cm^2.</p>
	<p>PA.GM.2.2 Calculate the surface area of a cylinder, in terms of π and using approximations for π, using decomposition or nets. Use appropriate measurements such as cm^2.</p>
	<p>PA.GM.2.3 Develop and use the formulas $V = lwh$ and $V = Bh$ to determine the volume of rectangular prisms. Justify why base area (B) and height (h) are multiplied to find the volume of a rectangular prism. Use appropriate measurements such as cm^3.</p>
	<p>PA.GM.2.4 Develop and use the formulas $V = \pi r^2 h$ and $V = Bh$ to determine the volume of right cylinders, in terms of π and using approximations for π. Justify why base area (B) and height (h) are multiplied to find the volume of a right cylinder. Use appropriate measurements such as cm^3.</p>



Data & Probability (D)	
PA.D.1 Display and interpret data in a variety of ways, including using scatterplots and approximate lines of best fit. Use line of best fit and average rate of change to make predictions and draw conclusions about data.	PA.D.1.1 Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet and use a calculator to examine this impact.
	PA.D.1.2 Explain how outliers affect measures of central tendency.
	PA.D.1.3 Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit, make statements about average rate of change, and make predictions about values not in the original data set. Use appropriate titles, labels and units.
PA.D.2 Calculate experimental probabilities and reason about probabilities to solve real-world and mathematical problems.	PA.D.2.1 Calculate experimental probabilities and represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.
	PA.D.2.2 Determine how samples are chosen (random, limited, biased) to draw and support conclusions about generalizing a sample to a population.
	PA.D.2.3 Compare and contrast dependent and independent events.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
A1.N.1 Extend the understanding of number and operations to include square roots and cube roots.		A1.N.1.1 Write square roots and cube roots of monomial algebraic expressions in simplest radical form.				
		A1.N.1.2 Add, subtract, multiply, and simplify square roots of monomial algebraic expressions and divide square roots of whole numbers, rationalizing the denominator when necessary.				
Algebraic Reasoning & Algebra (A)						
A1.A.1 Represent and solve mathematical and real-world problems using linear equations, absolute value equations, and systems of equations; interpret solutions in the original context.		A1.A.1.1 Use knowledge of solving equations with rational values to represent and solve mathematical and real-world problems (e.g., angle measures, geometric formulas, science, or statistics) and interpret the solutions in the original context.				
		A1.A.1.2 Solve absolute value equations and interpret the solutions in the original context.				
		A1.A.1.3 Analyze and solve real-world and mathematical problems involving systems of linear equations with a maximum of two variables by graphing (may include graphing calculator or other appropriate technology), substitution, and elimination. Interpret the solutions in the original context.				
A1.A.2 Represent and solve real-world and mathematical problems using linear inequalities, compound inequalities and systems of linear inequalities; interpret solutions in the original context.		A1.A.2.1 Represent relationships in various contexts with linear inequalities; solve the resulting inequalities, graph on a coordinate plane, and interpret the solutions.				
		A1.A.2.2 Represent relationships in various contexts with compound and absolute value inequalities and solve the resulting inequalities by graphing and interpreting the solutions on a number line.				
		A1.A.2.3 Solve systems of linear inequalities with a maximum of two variables; graph and interpret the solutions on a coordinate plane.				
A1.A.3 Generate equivalent algebraic expressions and use algebraic properties to evaluate expressions and arithmetic and geometric sequences.		A1.A.3.1 Solve equations involving several variables for one variable in terms of the others.				
		A1.A.3.2 Simplify polynomial expressions by adding, subtracting, or multiplying.				
		A1.A.3.3 Factor common monomial factors from polynomial expressions and factor quadratic expressions with a leading coefficient of 1.				
		A1.A.3.4 Evaluate linear, absolute value, rational, and radical expressions. Include applying a nonstandard operation such as $a \odot b = 2a + b$.				
		A1.A.3.5 Recognize that arithmetic sequences are linear using equations, tables, graphs, and verbal descriptions. Use the pattern, find the next term.				
		A1.A.3.6 Recognize that geometric sequences are exponential using equations, tables, graphs and verbal descriptions. Given the formula $f(x) = a(r)^x$, find the next term and define the meaning of a and r within the context of the problem.				



<p>A1.A.4 Analyze mathematical change involving linear equations in real-world and mathematical problems.</p>	<p>A1.A.4.1 Calculate and interpret slope and the x- and y-intercepts of a line using a graph, an equation, two points, or a set of data points to solve real-world and mathematical problems.</p>
	<p>A1.A.4.2 Solve mathematical and real-world problems involving lines that are parallel, perpendicular, horizontal, or vertical.</p>
	<p>A1.A.4.3 Express linear equations in slope-intercept, point-slope, and standard forms and convert between these forms. Given sufficient information (slope and y-intercept, slope and one-point on the line, two points on the line, x- and y-intercept, or a set of data points), write the equation of a line.</p>
	<p>A1.A.4.4 Translate between a graph and a situation described qualitatively.</p>
<p>Functions (F)</p>	
<p>A1.F.1 Understand functions as descriptions of covariation (how related quantities vary together) in real-world and mathematical problems.</p>	<p>A1.F.1.1 Distinguish between relations and functions.</p>
	<p>A1.F.1.2 Identify the dependent and independent variables as well as the domain and range given a function, equation, or graph. Identify restrictions on the domain and range in real-world contexts.</p>
	<p>A1.F.1.3 Write linear functions, using function notation, to model real-world and mathematical situations.</p>
	<p>A1.F.1.4 Given a graph modeling a real-world situation, read and interpret the linear piecewise function (excluding step functions).</p>
<p>A1.F.2 Recognize functions and understand that families of functions are characterized by their rate of change.</p>	<p>A1.F.2.1 Distinguish between linear and nonlinear (including exponential) functions arising from real-world and mathematical situations that are represented in tables, graphs, and equations. Understand that linear functions grow by equal intervals and that exponential functions grow by equal factors over equal intervals.</p>
	<p>A1.F.2.2 Recognize the graph of the functions $f(x) = x$ and $f(x) = x$ and predict the effects of transformations [$f(x + c)$ and $f(x) + c$, where c is a positive or negative constant] algebraically and graphically using various methods and tools that may include graphing calculators.</p>
<p>A1.F.3 Represent functions in multiple ways and use the representation to interpret real-world and mathematical problems.</p>	<p>A1.F.3.1 Identify and generate equivalent representations of linear equations, graphs, tables, and real-world situations.</p>
	<p>A1.F.3.2 Use function notation; evaluate a function, including nonlinear, at a given point in its domain algebraically and graphically. Interpret the results in terms of real-world and mathematical problems.</p>
	<p>A1.F.3.3 Add, subtract, and multiply functions using function notation.</p>



Data & Probability (D)	
A1.D.1 Display, describe, and compare data. For linear relationships, make predictions and assess the reliability of those predictions.	A1.D.1.1 Describe a data set using data displays, describe and compare data sets using summary statistics, including measures of central tendency, location, and spread. Know how to use calculators, spreadsheets, or other appropriate technology to display data and calculate summary statistics.
	A1.D.1.2 Collect data and use scatterplots to analyze patterns and describe linear relationships between two variables. Using graphing technology, determine regression lines and correlation coefficients; use regression lines to make predictions and correlation coefficients to assess the reliability of those predictions.
	A1.D.1.3 Interpret graphs as being discrete or continuous.
A1.D.2 Calculate probabilities and apply probability concepts.	A1.D.2.1 Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
	A1.D.2.2 Describe the concepts of intersections, unions, and complements using Venn diagrams to evaluate probabilities. Understand the relationships between these concepts and the words AND, OR, and NOT.
	A1.D.2.3 Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.
	A1.D.2.4 Apply probability concepts to real-world situations to make informed decisions.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Geometry: Reasoning & Logic (G.RL)						
G.RL.1 Use appropriate tools and logic to evaluate mathematical arguments.		G.RL.1.1 Understand the use of undefined terms, definitions, postulates, and theorems in logical arguments/proofs.				
		G.RL.1.2 Analyze and draw conclusions based on a set of conditions using inductive and deductive reasoning. Recognize the logical relationships between a conditional statement and its inverse, converse, and contrapositive.				
		G.RL.1.3 Assess the validity of a logical argument and give counterexamples to disprove a statement.				
Geometry: Two Dimensional Shapes (G.2D)						
G.2D.1 Discover, evaluate and analyze the relationships between lines, angles, and polygons to solve real-world and mathematical problems; express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts, or illustrations.		G.2D.1.1 Apply the properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve real-world and mathematical problems and determine if two lines are parallel, using algebraic reasoning and proofs.				
		G.2D.1.2 Apply the properties of angles, including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve real-world and mathematical problems using algebraic reasoning and proofs.				
		G.2D.1.3 Apply theorems involving the interior and exterior angle sums of polygons and use them to solve real-world and mathematical problems using algebraic reasoning and proofs.				
		G.2D.1.4 Apply the properties of special quadrilaterals (square, rectangle, trapezoid, isosceles trapezoid, rhombus, kite, parallelogram) and use them to solve real-world and mathematical problems involving angle measures and segment lengths using algebraic reasoning and proofs.				
		G.2D.1.5 Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints, and slopes of line segments.				
		G.2D.1.6 Apply the properties of polygons to solve real-world and mathematical problems involving perimeter and area (e.g., triangles, special quadrilaterals, regular polygons up to 12 sides, composite figures).				
		G.2D.1.7 Apply the properties of congruent or similar polygons to solve real-world and mathematical problems using algebraic and logical reasoning.				
		G.2D.1.8 Construct logical arguments to prove triangle congruence (SSS, SAS, ASA, AAS and HL) and triangle similarity (AA, SSS, SAS).				
		G.2D.1.9 Use numeric, graphic and algebraic representations of transformations in two dimensions, such as reflections, translations, dilations, and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate plane and identify types of symmetry.				



Geometry: Three Dimensional Shapes (G.3D)

G.3D.1 Solve real-world and mathematical problems involving three-dimensional figures.

G.3D.1.1 Solve real-world and mathematical problems using the surface area and volume of prisms, cylinders, pyramids, cones, spheres, and composites of these figures. Use nets, measuring devices, or formulas as appropriate.

G.3D.1.2 Use ratios derived from similar three-dimensional figures to make conjectures, generalize, and to solve for unknown values such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.

Geometry: Circles (G.C)

G.C.1 Solve real-world and mathematical problems using the properties of circles.

G.C.1.1 Apply the properties of circles to solve problems involving circumference and area, approximate values and in terms of π , using algebraic and logical reasoning.

G.C.1.2 Apply the properties of circles and relationships among angles; arcs; and distances in a circle among radii, chords, secants and tangents to solve problems using algebraic and logical reasoning.

G.C.1.3 Recognize and write the radius r , center (h, k) , and standard form of the equation of a circle $(x - h)^2 + (y - k)^2 = r^2$ with and without graphs.

G.C.1.4 Apply the distance and midpoint formula, where appropriate, to develop the equation of a circle in standard form.

Geometry: Right Triangle Trigonometry (G.RT)

G.RT.1 Develop and verify mathematical relationships of right triangles and trigonometric ratios to solve real-world and mathematical problems.

G.RT.1.1 Apply the distance formula and the Pythagorean Theorem and its converse to solve real-world and mathematical problems, as approximate and exact values, using algebraic and logical reasoning (include Pythagorean Triples).

G.RT.1.2 Verify and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems using algebraic and logical reasoning.

G.RT.1.3 Use the definition of the trigonometric functions to determine the sine, cosine, and tangent ratio of an acute angle in a right triangle. Apply the inverse trigonometric functions to find the measure of an acute angle in right triangles.

G.RT.1.4 Apply the trigonometric functions as ratios (sine, cosine, and tangent) to find side lengths in right triangles in real-world and mathematical problems.



Develop a Deep and Flexible Conceptual Understanding	Develop Accurate and Appropriate Procedural Fluency	Develop Strategies for Problem Solving	Develop Mathematical Reasoning	Develop a Productive Mathematical Disposition	Develop the Ability to Make Conjectures, Model, and Generalize	Develop the Ability to Communicate Mathematically
Number & Operations (N)						
<p>A2.N.1 Extend the understanding of number and operations to include complex numbers, matrices, radical expressions, and expressions written with rational exponents.</p>		<p>A2.N.1.1 Find the value of i^n for any whole number n.</p>				
		<p>A2.N.1.2 Simplify, add, subtract, multiply, and divide complex numbers.</p>				
		<p>A2.N.1.3 Use matrices to organize and represent data. Identify the order (dimension) of a matrix, add and subtract matrices of appropriate dimensions, and multiply a matrix by a scalar to create a new matrix to solve problems.</p>				
		<p>A2.N.1.4 Understand and apply the relationship of rational exponents to integer exponents and radicals to solve problems.</p>				
Algebraic Reasoning & Algebra (A)						
<p>A2.A.1 Represent and solve mathematical and real-world problems using nonlinear equations and systems of linear equations; interpret the solutions in the original context.</p>		<p>A2.A.1.1 Represent real-world or mathematical problems using quadratic equations and solve using various methods (including graphing calculator or other appropriate technology), factoring, completing the square, and the quadratic formula. Find non-real roots when they exist.</p>				
		<p>A2.A.1.2 Represent real-world or mathematical problems using exponential equations, such as compound interest, depreciation, and population growth, and solve these equations graphically (including graphing calculator or other appropriate technology) or algebraically.</p>				
		<p>A2.A.1.3 Solve one-variable rational equations and check for extraneous solutions.</p>				
		<p>A2.A.1.4 Solve polynomial equations with real roots using various methods and tools that may include factoring, polynomial division, synthetic division, graphing calculators or other appropriate technology.</p>				
		<p>A2.A.1.5 Solve square root equations with one variable and check for extraneous solutions.</p>				
		<p>A2.A.1.6 Solve common and natural logarithmic equations using the properties of logarithms.</p>				
		<p>A2.A.1.7 Solve real-world and mathematical problems that can be modeled using arithmetic or finite geometric sequences or series given the n^{th} terms and sum formulas. Graphing calculators or other appropriate technology may be used.</p>				
		<p>A2.A.1.8 Represent real-world or mathematical problems using systems of linear equations with a maximum of three variables and solve using various methods that may include substitution, elimination, and graphing (may include graphing calculators or other appropriate technology).</p>				
		<p>A2.A.1.9 Solve systems of equations containing one linear equation and one quadratic equation using tools that may include graphing calculators or other appropriate technology.</p>				



A2.A.2 Represent and analyze mathematical situations and structures using algebraic symbols using various strategies to write equivalent forms of expressions.	A2.A.2.1 Factor polynomial expressions including but not limited to trinomials, differences of squares, sum and difference of cubes, and factoring by grouping using a variety of tools and strategies.
	A2.A.2.2 Add, subtract, multiply, divide, and simplify polynomial and rational expressions.
	A2.A.2.3 Recognize that a quadratic function has different equivalent representations [$f(x) = ax^2 + bx + c$, $f(x) = a(x - h)^2 + k$, and $f(x) = (x - h)(x - k)$]. Identify and use the representation that is most appropriate to solve real-world and mathematical problems.
	A2.A.2.4 Rewrite expressions involving radicals and rational exponents using the properties of exponents.
Functions (F)	
A2.F.1 Understand functions as descriptions of covariation (how related quantities vary together).	A2.F.1.1 Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.
	A2.F.1.2 Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [$f(x + c)$, $f(x) + c$, $f(cx)$, and $cf(x)$, where c is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.
	A2.F.1.3 Graph a quadratic function. Identify the x - and y -intercepts, maximum or minimum value, axis of symmetry, and vertex using various methods and tools that may include a graphing calculator or appropriate technology.
	A2.F.1.4 Graph exponential and logarithmic functions. Identify asymptotes and x - and y -intercepts using various methods and tools that may include graphing calculators or other appropriate technology. Recognize exponential decay and growth graphically and algebraically.
	A2.F.1.5 Analyze the graph of a polynomial function by identifying the domain, range, intercepts, zeros, relative maxima, relative minima, and intervals of increase and decrease.
	A2.F.1.6 Graph a rational function and identify the x - and y -intercepts, vertical and horizontal asymptotes, using various methods and tools that may include a graphing calculator or other appropriate technology. (Excluding slant or oblique asymptotes and holes.)
	A2.F.1.7 Graph a radical function (square root and cube root only) and identify the x - and y -intercepts using various methods and tools that may include a graphing calculator or other appropriate technology.
	A2.F.1.8 Graph piecewise functions with no more than three branches (including linear, quadratic, or exponential branches) and analyze the function by identifying the domain, range, intercepts, and intervals for which it is increasing, decreasing, and constant.



A2.F.2 Analyze functions through algebraic combinations, compositions, and inverses, if they exist.	A2.F.2.1 Add, subtract, multiply, and divide functions using function notation and recognize domain restrictions.
	A2.F.2.2 Combine functions by composition and recognize that $g(x) = f^{-1}(x)$, the inverse function of $f(x)$, if and only if $f(g(x)) = g(f(x)) = x$.
	A2.F.2.3 Find and graph the inverse of a function, if it exists, in real-world and mathematical situations. Know that the domain of a function f is the range of the inverse function f^{-1} , and the range of the function f is the domain of the inverse function f^{-1} .
	A2.F.2.4 Apply the inverse relationship between exponential and logarithmic functions to convert from one form to another.
Data & Probability (D)	
A2.D.1 Display, describe, and compare data. For linear and nonlinear relationships, make predictions and assess the reliability of those predictions.	A2.D.1.1 Use the mean and standard deviation of a data set to fit it to a normal distribution (bell-shaped curve).
	A2.D.1.2 Collect data and use scatterplots to analyze patterns and describe linear, exponential or quadratic relationships between two variables. Using graphing calculators or other appropriate technology, determine regression equation and correlation coefficients; use regression equations to make predictions and correlation coefficients to assess the reliability of those predictions.
	A2.D.1.3 Based upon a real-world context, recognize whether a discrete or continuous graphical representation is appropriate and then create the graph.
A2.D.2 Analyze statistical thinking to draw inferences, make predictions, and justify conclusions.	A2.D.2.1 Evaluate reports based on data published in the media by identifying the source of the data, the design of the study, and the way the data are analyzed and displayed. Given spreadsheets, tables, or graphs, recognize and analyze distortions in data displays. Show how graphs and data can be distorted to support different points of view.
	A2.D.2.2 Identify and explain misleading uses of data. Recognize when arguments based on data confuse correlation and causation.



Sample of Consulted Works

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Mathematical Glossary Terms and Tables

Whenever possible a reference was identified for glossary terms from the following resources:

(DPI) <http://dpi.wi.gov/standards>

(H) <http://www.hbschool.com/glossary/math2/>

(M) <http://www.merriam-webster.com/>

(MW) <http://www.mathwords.com>

(MA) <http://www.doe.mass.edu/frameworks/current.html>

(NCTM) <http://www.nctm.org>

(PASS) <http://www.ok.gov./sde/sites/ok.gov.sde/files/C3%20PASS%20math.pdf>

AA similarity (Angle-Angle similarity) If two triangles have two pairs of corresponding angles that are congruent, then the triangles are similar. (MW)

ASA congruence (Angle-Side-Angle congruence) If two triangles have two corresponding angles and the side adjacent to both angles congruent, then the triangles themselves are congruent. (MW)

Absolute value The absolute value of a real number is its (non-negative) distance from 0 on a number line. Formally,

$$|k| = \begin{cases} k & \text{if } k \geq 0 \\ -k & \text{if } k < 0 \end{cases}$$

Addend In the addition problem $3+2+6 = 11$, the addends are 3, 2, and 6. (PASS)

Addition and subtraction within 5, 10, 20, 100, or 1,000 Addition or subtraction of two whole numbers with whole number answers, and with sum or minuend in the range 0-5, 0-10, 0-20, or 0-100, respectively. *Example: $8 + 2 = 10$ is an addition within 10, $14 - 5 = 9$ is a subtraction within 20, and $55 - 18 = 37$ is a subtraction within 100.* (MA)

Additive inverses Two numbers whose sum is 0 are additive inverses of one another. *Example: $3/4$ and $-3/4$ are additive inverses of one another because $3/4 + (-3/4) = (-3/4) + 3/4 = 0$.* (MA)

Algorithm A finite set of steps for completing a procedure, e.g., long division. (H)

Analog Having to do with data represented by continuous variables, e.g., a clock with hour, minute, and second hands. (M)

Arc (minor and major) A portion of the circumference of a circle with ending points A and B. Unless stated otherwise, arc AB always refers to the shorter segment of the two (the minor arc). Together with the major arc the two portions beginning and ending at points A and B form the entire circumference of a circle.

Arc length The distance along the curved line forming the arc.

Arc measure The angle formed by the arc at the center of the circle.

Area A measurement of the amount of space within a closed two-dimensional shape. Area is usually measured in terms of “square units”, in which 1 square unit is the amount of space within a square that measures 1 unit by 1 unit (for a given unit of length). For example, area may be measured in “square centimeters”, 1 square centimeter being the amount of space within a 1cm by 1cm square.

Arithmetic sequence (progression) A sequence in which successive terms exhibit a common difference.

Array (rectangular) An orderly arrangement of objects into a rectangular configuration (e.g., take six tiles and arrange two long and three wide to form a rectangle). (PASS)

Associative property of addition See Table 1 in this Glossary.

Associative property of multiplication See Table 1 in this Glossary.

Assumption A fact or statement (as a proposition, axiom, postulate, or notion) taken for granted. (M)

Attribute Characteristic (e.g., size, shape, color, weight). (PASS)



Benchmark fraction A common fraction against which other fractions can be measured, such as $\frac{1}{2}$. (MA)

Bar graph A display of categorical data in which vertical or horizontal bars represent the count of a category. The relative lengths of the various bars in the graph are commensurate with the relative sizes of the counts of the data.

Bivariate data Pairs of linked numerical observations. *Example: a list of heights and weights for each player on a football team.* (MA)

Box plot A graphic method that shows the distribution of data values by using the median, quartiles, and extremes of the data set. A box shows the middle 50% of the data. (DPI)

Capacity The maximum amount or number that can be contained or accommodated, e.g., a jug with a one-gallon *capacity*; the auditorium was filled to *capacity*. (MA)

Cardinal number A number (such as 1, 5, 15) that is used in simple counting and that indicates how many elements there are in a set. (MA)

Cardinality The cardinality of a finite collection of objects is the number of objects in the set. (For example, in PK-Grade 1 students are still learning that "5" represents the number of objects in any group of "five" objects.)

Categorical data Data that measures the number of occurrences of a discrete set of outcomes (e.g., noticing the different colors of shoes in the class and then recording the number of each color).

Chord A chord is a line that connects two points on a circle.

Circle The set of all points that are equidistant from a given point, called the center of the circle. The set of all points that lie inside the circle is called the *interior* of the circle.

Radius of a circle Both a segment with one endpoint on the center of the circle and the other endpoint on the circle, and the length of this segment (which is necessarily the same for any point on the circle).

Diameter of a circle Both a segment with endpoints on the circle that contains the center, and the length of this segment.

Circumference of a circle The length of the circle if cut and opened up to make a straight line segment, which can be found with $C = 2\pi r$ where r is the radius and π is the irrational number "pi". (Can be thought of as the perimeter of the circle.)

Area of a circle The area of the interior of the circle, which can be found with $A = \pi r^2$ where r is the radius and π the irrational number "pi".

Combinations A selection of objects without regard to order. (PASS)

Coefficient Any of the factors of a product considered in relation to a specific factor. Often, this will be a numerical factor in a product of numbers and variables, e.g., $3x^2$ has coefficient 3. (W)

Commutative property See Table 1 in this Glossary.

Complement (of a set) A set A is typically considered to be a subset of an understood "universal set." The complement of A , denoted by A^c is the set of all elements of the universal set that are not members of A .

Complementary angles Two angles whose measures have a sum of 90 degrees. (PASS)

Complex fraction A fraction A/B where A and/or B are fractions ($B \neq 0$). (MA)

Complex number Numbers of the form $a + bi$, where a , a real number, is the "real part" and b , also a real number, is the "imaginary part," and i is the imaginary number. See also: **imaginary number**.

Complex plane A Cartesian plane in which the point (a,b) is used to represent $a + bi$.

Compose numbers To compose numbers is to create new numbers using any of the four operations with other numbers. For example, students compose 10 in many ways ($9+1$, $8+2$, ... , $5+5$, ...). Also, each place in the base ten place value is composed of ten units of the place to the left, i.e., one hundred is composed of ten bundles of ten, one ten is composed of ten ones, etc.

Compose shapes Join geometric shapes without overlaps to form new shapes. (MA)

Composite number Any positive integer divisible by one or more positive integers other than itself and 1. (PASS)



Computation algorithm A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly. See also: **algorithm**; **computation strategy**. (MA)

Computation strategy Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another. See also: **computation algorithm**. (MA)

Conditional statement A statement of the form, "If P , then Q ," where each of P and Q are themselves statements. For example, "If it rains, then the streets get wet," is a conditional statement. If the conditional statement "If P , then Q ," is true, then this means that it is never the case that the statement P is true while the statement Q is false. For example, it will never be the case that "it rained" but "the streets are not wet".

Related statements are:

Converse: "If Q , then P ." This may or may not be true if the original statement is true.

Inverse: "If NOT P , then NOT Q ." This may or may not be true if the original statement is true.

Contrapositive: "If NOT Q , then NOT P ." This is always true if the original statement is true, and vice versa. For an example, notice that, "If the streets are NOT wet, then it did NOT rain," is logically equivalent to the example statement above.

Congruent Two geometric objects are congruent if one can be mapped onto the other using a sequence of rigid motions (*rigid motions* are geometric transformations that preserve lengths and angles).

Conjugate The result of writing a sum of two terms as a difference, or vice versa. For example, the conjugate of $x - 2$ is $x + 2$. (MW)

Conjecture A statement believed to be true but not yet proved. (PASS)

Constant A number on its own, or sometimes a letter such as a , b or c to stand for a fixed number. Example: in " $x + 5 = 9$ ", 5 and 9 are constants. If it is not a constant it is called a variable.

Constant of proportionality Given a proportional relationship expressed as $y = kx$, the number k is often called the constant of proportionality.

Coordinate plane A plane in which a point is represented using two coordinates that determine the precise location of the point. In the Cartesian plane, two perpendicular number lines are used to determine the locations of points. In the polar coordinate plane, points are determined by their distance along a ray through that point and the origin, and the angle that ray makes with a pre-determined horizontal axis.

Cosine (of an acute angle) In a right triangle, the cosine of an acute angle is the ratio of the length of the leg adjacent to the angle to the length of the hypotenuse. (PASS)

Counterexample An example to show that a given statement is false. For example, to disprove the statement "All right triangles are isosceles," all one needs to do is produce a right triangle that is scalene.

Counting number A number used in counting objects, i.e., a number from the set $\{1, 2, 3, 4, 5, \dots\}$.

See also: **Natural number**.

Counting on A strategy for finding the number of objects in a group without having to count every member of the group. For example, if a stack of books is known to have 8 books and 3 more books are added to the top, it is not necessary to count the stack all over again; one can find the total by counting on—pointing to the top book and saying "eight," following this with, "nine, ten, eleven. There are eleven books now." (MA)

Continuous graph (of data) A graph is continuous if it contains intervals of data points.

Decimal expansion The resulting decimal number found when dividing a rational number in fraction form. May include terminating and repeating decimals.



Decimal fraction A fraction (as $0.25 = 25/100$ or $0.025 = 25/1000$) or mixed number (as $3.025 = 3 \frac{25}{1000}$) in which the denominator is a power of ten, usually expressed by the use of the decimal point. (M)

Decimal number Any real number expressed in base 10 notation, such as 2.673. (MA)

Decompose numbers Given a number, identify pairs, triples, etc. of numbers that combine to form the given number.

Decompose shapes. Given a geometric shape, identify geometric shapes that meet without overlap to form the given shape. (MA)

Deductive reasoning Informally, the process of using known facts and relationships to derive new facts and relationships.

Dependent events. Events that influence each other. If one of the events occurs, it changes the probability of the other event. (PASS)

Dependent variable The output of a function. The quantity that is affected when the input is changed.

Digit a) Any of the Arabic numerals 1 to 9 and usually the symbol 0; b) One of the elements that combine to form numbers in a system other than the decimal system. (MA)

Digital Having to do with data that is represented in the form of numerical digits; providing a readout in numerical digits, e.g., a digital watch. (MA)

Dilation A transformation that moves each point along the ray through the point emanating from a fixed center, and multiplies distances from the center by a common scale factor. (MA)

Discrete graph (of data) A graph is discrete if it consists of separated data points and contains no intervals of data.

Divisible A non-zero integer p is said to be divisible by a non-zero integer q if there exists an integer r such that $q \times r = p$.

Domain of a relation The set of all the first elements or x-coordinates of a relation. (PASS)

Dot plot See: *line plot*.

Equivalent expressions Two expressions (numerical or otherwise) are said to be equivalent if one can be obtained from the other using the properties of operations, such as the commutative, associative and distributive properties, as well as by representing numbers in the expressions in different but equivalent forms.

Equivalent fractions Two fractions a/b and c/d are said to be equivalent if there exists a non-zero number n such that $na/nb=c/d$. Equivalent fractions represent the same amount by changing both the size and the number of parts of a given fraction.

Equivalent ratios Two ratios $a:b$ and $c:d$ are equivalent if there is a non-zero number k such that $ka=c$ and $kb=d$. Equivalent ratios can be shown to have the same unit rate.

Expanded form A multi-digit number is expressed in expanded form when it is written as a sum of single-digit multiples of powers of ten. *For example, $643 = 600 + 40 + 3$.* (MA)

Expected value For a random variable, the weighted average of its possible values, with weights given by their respective probabilities. (MA)

Experimental probability When trials of a probability experiment are run and data is collected, the experimental probability of a desired outcome is the relative frequency of that outcome as a ratio of the number of such outcomes to the total number of outcomes. For example, if a coin is flipped 100 times, and heads comes up 45 times, then the experimental probability of heads is $45/100$ or 0.45. (The *theoretical probability* is 0.50, and if the number of trials is increased the experimental probability will get closer and closer to 0.50.)

Exponent (Integer) A negative integer exponent denotes the reciprocal of the base raised to the corresponding opposite integer. Thus $x^{-2} = \frac{1}{x^2}$.

Exponent (Whole Number) The number that indicates how many times the base is used as a factor, e.g., in $4^3 = 4 \times 4 \times 4 = 64$, the exponent is 3, indicating that 4 is repeated as a factor three times. (MA)

Exponential function An exponential function with base b is defined by $y = b^x$ where $b > 0$ and b is not equal to 1. (PASS).



Expression A mathematical phrase that combines operations, numbers, and/or variables (e.g., $3^2 \div a$). (H)

Exterior angles (of a polygon) The supplement of an interior angle of a polygon that is formed by extending one of the line segments determining the interior angle at a given vertex.

Extraneous solution A solution, such as that to an equation, that emerges from the process of solving the problem but is not a valid solution to the original problem. For example, consider the equation $\sqrt{2x + 12} - 2 = x$. After adding 2 to both sides and squaring both sides of the equation, we obtain $2x + 12 = x^2 + 4x + 4$. We can subtract $2x$ and 12 to both sides to obtain the quadratic equation $x^2 + 2x - 8 = 0$. Solving this quadratic equation, we obtain two possible solutions, $x = 2$ and $x = -4$. While the original equation is true when evaluated at $x = 2$, -4 is considered an extraneous solution because it is false when evaluated at $x = -4$.

$$\begin{aligned} \sqrt{2x + 12} - 2 &= x \\ \sqrt{2(-4) + 12} - 2 &= -4 \\ \sqrt{-8 + 12} - 2 &= -4 \\ \sqrt{4} - 2 &= -4 \\ 2 - 2 &= -4 \\ 0 &\neq -4 \end{aligned}$$

Fluency Easily and accurately responding to calculations (Van de Walle). See Table 4 in this Glossary.

First quartile¹ For a data set with median M , the first quartile is the median of the data values less than M . *Example: For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the first quartile is 6. See also: **median, third quartile, interquartile range.*** (MA)

Fraction A number expressible in the form a/b where a is a whole number and b is a positive whole number. (The word *fraction* in these standards always refers to a non-negative number.) See also: **rational number and complex fraction.** (MA)

¹ Many different methods for computing quartiles are in use. The method defined here is sometimes called the Moore and McCabe method. See Langford, E., "Quartiles in Elementary Statistics," *Journal of Statistics Education* Volume 14, Number 3 (2006).

Frequency table A representation of data in which categories are listed in one column (row) of a table and the number of occurrences (frequency) of each category is indicated in another column (row).

Function A rule that assigns to every element of one set (the domain) exactly one element of another set (the range). A function is often thought of as an "input/output" rule, as in every input determines an output (usually according to mathematical operations performed on the input).

Function machine An input/output model (often made with milk cartons, boxes, or drawn on the board) to show one number entering and a different number exiting. Students guess the rule that produced the second number (e.g., enter 3, exit 5, rule: add 2). (PASS)

Function notation A notation that describes a function. For a function f , when x is a member of the domain, the symbol $f(x)$ denotes the corresponding member of the range (e.g., $f(x) = x + 3$).

Geometric sequence (progression) An ordered list of numbers that has a common ratio between consecutive terms, e.g., 2, 6, 18, 54. (H)

Histogram A type of bar graph used to display the distribution of measurement data across a continuous range. (MA)

Hypotenuse The longest side of a right triangle, necessarily opposite to the right angle. The other sides are called the *legs* of the right triangle (*longer* and *shorter* if applicable).

HL (Hypotenuse-Leg) congruence If two right triangles have hypotenuse and one corresponding leg congruent, then the triangles are congruent.

Identity property of 0 See Table 1 in this Glossary.

Imaginary number A number i is considered imaginary if $i^2 = -1$. See also: **complex number.**

Independent events Events that do not influence one another. Each event occurs without changing the probability of the other event. Specifically, two events A and B are independent if $P(A \text{ AND } B) = P(A) \cdot P(B)$. (PASS)

Independent variable The input of a function. The quantity whose value is changed to affect the output.



Independently combined probability models. Two probability models are said to be combined independently if the probability of each ordered pair in the combined model equals the product of the original probabilities of the two individual outcomes in the ordered pair. (MA)

Inductive reasoning Informally, the process of examining patterns and making conclusions based on observed patterns.

Input/Output table Usually a two-column table (or two-row table) with one column (row) listing the inputs of a rule and the other column (row) listing the corresponding outputs for each input.

Integer The set of numbers that contains the whole numbers and their additive inverses (opposites). I.e., $\{\dots, -2, -1, 0, 1, 2, 3, \dots\}$.

Intercepts (of a graph) Geometrically, where a graph intersects an axis in a Cartesian plane.

Interquartile range A measure of variation in a set of numerical data, the interquartile range is the distance between the first and third quartiles of the data set. Example: For the data set $\{1, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the interquartile range is $15 - 6 = 9$. See also: **first quartile, third quartile**. (MA)

Intersection (of sets) For two sets A and B , the intersection $A \cap B$ is the set of all elements that are members of both sets simultaneously.

Inverse function. A function g that satisfies $g(f(x)) = x$ and $f(g(x)) = x$ is said to be an inverse function for f . The inverse of f is often denoted by f^{-1} .

Inverse operations Operations that undo each other (e.g., addition and subtraction are inverse operations; multiplication and division are inverse operations). (PASS)

Irrational number Numbers that are not rational. Irrational numbers have nonterminating, nonrepeating decimal expansions (e.g., square root of 2, pi). (MA)

Length (of a segment) The length of a (straight) line segment is a measurement of the distance from one endpoint of the object to the other. Once a unit of length is specified, the length of a segment is found by placing such units end-to-end without gaps or overlaps and counting how many such units are used.

Line Plot A representation of data in which categories are listed underneath points on a number line, and in which the number of occurrences (frequency) of each category is represented by a corresponding number of marks (X's, dots) above each category's point.

Linear association A set of bivariate data exhibits a linear association if a scatter plot of the data can be well-approximated by a line. (MA)

Linear equation Any equation that can be written in the form $Ax + By + C = 0$ where A and B cannot both be 0. The graph of such an equation is a line. (MA)

Linear function A function f is linear if it can be written in the form $f(x) = mx + b$.

Literal equation An equation involving multiple variables and numbers, often that cannot be solved for an explicit numerical value of any of the individual variables. In such a case one may solve for one variable as an expression of the others.

Logarithm The exponent that indicates the power to which a base number is raised to produce a given number. For example, the logarithm of 100 to the base 10 is 2. (M)

Logarithmic function Any function in which an independent variable appears in the form of a logarithm; they are the inverse functions of exponential functions. (MA)

Manipulatives Concrete materials (e.g., buttons, beans, egg and milk cartons, counters, attribute and pattern blocks, interlocking cubes, base-10 blocks, geometric models, geo-boards, fractions pieces, rulers, balances, spinners, dot paper) used to represent mathematical concepts, operations, and relationships. (PASS)

Matrix (pl. matrices) A rectangular array of numbers or variables. (MA)

Mean (arithmetic) A measure of center in a set of numerical data, computed by adding the values in a list and then dividing by the number of values in the list. Example: For the data set $\{1, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the mean is 21. (MA)

Mean absolute deviation A measure of variation in a set of numerical data, computed by adding the distances between each data value and the mean, then dividing by the number of data values. Example: For the data set $\{2, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the mean absolute deviation is 20. (MA)



Measure of central tendency A determination of the center of a data set meant to describe a set of data. See also: **mean, median, mode, and percentile.**

Measure of spread (or variability) A determination of how much the data in a set deviates from a measure of center. The most frequently used measure is standard deviation. See also: **standard deviation, range.**

Median A measure of center in a set of numerical data. The median of a list of values is the value appearing at the center of a sorted version of the list; or the mean of the two central values, if the list contains an even number of values. Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 90}, the median is 11. (MA)

Midline In the graph of a sine or cosine function, the horizontal line halfway between its maximum and minimum values. (MA)

Mixed number A number written in the form $A\frac{b}{c}$, which is a shorthand way to represent the quantity $A + \frac{b}{c}$. A mixed number may be written as a fraction greater than 1 by writing $A\frac{b}{c} = A + \frac{b}{c} = \frac{Ac}{c} + \frac{b}{c} = \frac{Ac+b}{c}$.

Model A mathematical representation (e.g., number, graph, matrix, equation(s), geometric figure) for real-world or mathematical objects, properties, actions, or relationships. (DPI)

Modulus of a complex number The distance between a complex number and the origin on the complex plane. The modulus of a complex number, $a + bi$ is written $|a + bi|$ and is found by finding the hypotenuse of the triangle with legs a and b . Thus, $|a + bi| = \sqrt{a^2 + b^2}$. For a complex number in polar form, $r(\cos\theta + i\sin\theta)$, the modulus is $|r|$.

Multiplication and division within 100 Multiplication or division of two whole numbers with whole number answers, and with product or dividend in the range 0-100. Example: $72 \div 8 = 9$. (MA)

Multiplication counting principle If k actions can be taken in N_1, N_2, \dots, N_k different ways, then there are a total of N_1, N_2, \dots, N_k different ways to perform those actions in sequence.

Multiplicative inverses Two numbers whose product is 1 are multiplicative inverses of one another. Example: $3/4$ and $4/3$ are multiplicative inverses of one another because $3/4 \cdot 4/3 = 4/3 \cdot 3/4 = 1$. (MA)

Natural number A number used in counting objects, i.e., a number from the set $\{1, 2, 3, 4, 5, \dots\}$.

See also: **Counting number.**

Net A two-dimensional representation of a three-dimensional figure constructed of polygons, such that if folds were made on certain edges of the net and appropriate sides were "glued" together, the resulting figure would be the original three-dimensional figure.

Network a) A figure consisting of vertices and edges that shows how objects are connected, b) A collection of points (vertices), with certain connections (edges) between them. (MA)

Non-linear association The relationship between two variables is nonlinear if the change in the second is not simply proportional to the change in the first, independent of the value of the first variable. (MA)

Nonstandard measurement A measurement determined by the use of nonstandard units such as hands, paper clips, beans, cotton balls, etc. (PASS)

Number line diagram A diagram of the number line used to represent numbers and support reasoning about them. In a number line diagram for measurement quantities, the interval from 0 to 1 on the diagram represents the unit of measure for the quantity. (MA)

Number sense The understanding of number size (relative magnitude), number representations, number operations, referents for quantities and measurement used in everyday situations, etc. (PASS)

Numeral A symbol or mark used to represent a number. (MA)

One-to-one correspondence A matching of the elements of two sets such that each element from the first set is matched with one and only one element of the second set, and such that each element of the second set is matched with some element of the first. Early grades students use this to establish the concept of cardinal use of numbers (as in "5" can represent any collection of five objects; if I can match the fingers on one hand to all the elements of a given set then that set has "5" objects.)

Operation General term for any one of addition, subtraction, multiplication, and division. (PASS)



Order of operations Convention adopted to perform mathematical operations in a consistent order.

- Step 1. Perform all operations inside grouping symbols, and/or above and below a fraction bar in the order specified in Steps 2, 3 and 4.
- Step 2. Find the value of any powers or roots;
- Step 3. Multiply, including division, from left to right;
- Step 4. Add, including subtraction, from left to right. (NCTM)

Ordinal number A number designating the place (as first, second, or third) occupied by an item in an ordered sequence. (M)

Outlier A data point that is far outside a representative range of the data set. For example, once the inter-quartile range (IQR) is computed, one might calculate the interval of $1.5 \times$ IQR above the median and $1.5 \times$ IQR below the median and decide that any data point that lies outside this range is considered an outlier.

Parallel lines Lines that do not intersect. Distinct lines can be shown to be parallel if and only if they have equal slopes.

Partition A process of dividing an object into parts or a set into (smaller) subsets. (MA)

Pascal's triangle A triangular arrangement of numbers in which each row starts and ends with 1, and each other number is the sum of the two numbers above it. (H)

Piecewise function A function that is defined differently on different intervals.

Percent rate of change A rate of change expressed as a percent. *Example: if a population grows from 50 to 55 in a year, it grows by $5/50 = 10\%$ per year.* (MA)

Perfect square A number that is a whole number squared, that is, a number that can be expressed as n^2 for n a whole number.

Perimeter (of a polygon) The total length of all the edges of a polygon. Often, perimeter is thought of as the distance around an object, traversed once along the edges starting from one vertex and ending at the same vertex.

Periodic phenomena Events that recur over regular intervals, for example, ocean tides, machine cycles. (MA)

Perpendicular lines Lines that intersect such that all four angles that are created are congruent. Two lines can be shown to be perpendicular if and only if the product of their slopes is -1 .

Pi (π) The irrational number that is derived by finding the ratio of the circumference to the diameter of circles. That this ratio is constant and an irrational number are important concepts and challenging to prove, so they are often arrived at empirically by students.

Picture graph A graph that uses pictures to show and compare information. (MA)

Place value The concept that the order in which digits are written in the base-10 number system determines the value of that digit. Thus, in the number 245, the digit 2 is in the "hundreds place", indicating that the value of that particular 2 is actually 2 hundreds or 200.

Polygon A closed, two-dimensional figure comprised of line segments connected end-to-end, and such that no two segments cross each other. The segments are typically called sides or edges, and the common endpoints of adjacent segments are called vertices (sing. vertex). The space within the polygon is called its *interior*. The angles formed by adjacent sides that lie in the interior of a polygon are called its *interior* angles.

Polynomial The sum or difference of terms which have variables raised to positive integer powers and which have coefficients that may be real or complex. The following are all polynomials: $5x^3 - 2x^2 + x - 13$, $x^2y^3 + xy$, and $(1 + i)a^2 + ib^2$. (MW)

Polynomial function Any function whose output is given by a polynomial expression of the input.

Postulate A statement accepted as true without proof. (MA)

Prime factorization A number written as the product of all its prime factors. (H)

Prime number A whole number greater than 1 whose only factors are 1 and itself. (MA)

Probability distribution The set of possible values of a random variable with a probability assigned to each. (MA)

Properties of equality See Table 2 in this Glossary.

Properties of inequality See Table 3 in this Glossary.



Properties of operations See Table 1 in this Glossary.

Probability The study and measure of the likelihood of an event happening. (PASS)

Probability model A probability model is used to assign probabilities to outcomes of a chance process by examining the nature of the process. The set of all outcomes is called the sample space, and their probabilities sum to 1. See also: **uniform probability model**. (MA)

Proof A method of constructing a valid argument using deductive reasoning. (MA)

Proportion An equation that states that two ratios are equivalent, e.g., $4/8 = 1/2$ or $4 : 8 = 1 : 2$. (MA)

Pyramid A three-dimensional shape constructed from a polygon (called the *base*) and triangles that have one edge matching the edges of the base and such that the triangles share a common vertex.

Pythagorean theorem For any right triangle, the sum of the squares of the lengths of the legs equals the square of the lengths of the hypotenuse. (MA)

Quadratic equation An equation that is equivalent to $ax^2 + bx + c = 0$, where $a \neq 0$.

Quadratic expression An expression that contains variables raised to whole number exponents no higher than 2.

Quadratic function A function that can be represented by an equation of the form $y = ax^2 + bx + c$, where a , b , and c are arbitrary, but fixed, numbers and $a \neq 0$. The graph of this function is a parabola. (DPI)

Quadratic polynomial A polynomial where the highest degree of any of its terms is 2. (MA)

Quadrilateral A polygon with 4 sides. Important classes of quadrilaterals:

Trapezoid A quadrilateral in which at least two sides are parallel.

Parallelogram A quadrilateral in which opposite sides are parallel.

Rhombus A parallelogram in which opposite sides are congruent (have the same length).

Rectangle A parallelogram that has at least one right interior angle.

Square A rectangle that has all sides congruent.

Kite A quadrilateral that has two pairs of congruent adjacent sides.

Quotient The result of a division problem. Also, given whole numbers n and m with $n > m$, if we write $n = mq + r$ with $0 \leq r < m$, then we say q is the quotient and r is the remainder.

Radical The $\sqrt{\quad}$ symbol, which is used to indicate square roots or n^{th} roots. (MW)

Random sampling A smaller group of people or objects chosen from a larger group or population by a process giving equal chance of selection to all possible people or objects. (H)

Random variable An assignment of a numerical value to each outcome in a sample space. (M)

Range (of a relation) The set of all the second elements or y-coordinates of a relation is called the range. (PASS)

Range (of a data set) The difference between the maximum and minimum values of a data set, a measure of the spread of the data.

Ratio A relationship between quantities such that for every a units of one quantity there are b units of the other. A ratio is often denoted by $a : b$, and read "a to b."

Rational expression A quotient of two polynomials with a non-zero denominator. (MA)

Rational number A number expressible in the form a/b or $-a/b$ for some fraction a/b . The rational numbers include the integers. (MA)

Real number An element of the set of numbers consisting of all rational and all irrational numbers. (MA)

Rectangular array An arrangement of mathematical elements into rows and columns. (MA)

Rectangular prism A three-dimensional object constructed from three pairs of parallel rectangles (called *faces* in this context) that share common edges so as to form an enclosed space and such that opposite rectangles are congruent. The vertices of the rectangles are the vertices of the prism, and the sides of the rectangles are called edges. A **cube** is a rectangular prism in which each face is a square of the same size as the other faces.



Rectilinear figure A polygon, all angles of which are right angles. (MA)

Recursive pattern (or sequence) Patterns in which each number is found from the previous number by repeating a process (e.g. Fibonacci numbers). (PASS)

Reflection A type of transformation that flips points about a line, called the *line of reflection*. Taken together, the image and the pre-image have the line of reflection as a line of symmetry. (MA)

Real numbers (set of) The set of all rational and irrational numbers (PASS)

Relation A collection of ordered pairs of real numbers.

Relative frequency The empirical counterpart of probability. If an event occurs N' times in N trials, its relative frequency is N'/N . (M)

Remainder Theorem If $f(x)$ is a polynomial in x then the remainder on dividing $f(x)$ by $x - a$ is $f(a)$. (M)

Repeating decimal. A decimal in which, after a certain point, a particular digit or sequence of digits repeats itself indefinitely. (M) See also: **terminating decimal**. (MA)

Right angle Informally, an angle whose measure is 90 degrees. Formally, if two congruent copies of a given angle are supplementary (that is, they form a straight line when one matches an edge of one copy with one edge of the other), then the given angle is said to be a right angle. (We can then define the measure of this angle to be 90 degrees and measure other angles in terms of a right angle.)

Rigid motion A transformation of points in space consisting of a sequence of one or more translations, reflections, and/or rotations. Rigid motions are here assumed to preserve distances and angle measures. (MA)

Rotation A type of transformation that turns a figure about a fixed point, called the *center of rotation*. (MA)

SAS congruence (Side-Angle-Side congruence) If in two triangles two corresponding sides and the angles formed by those sides are congruent, then the triangles are congruent. (MW)

SSS congruence (Side-Side-Side congruence) If two triangles have corresponding sides that are congruent, then the triangles are congruent. (MW)

Sample space In a probability model for a random process, a list of the individual outcomes that are to be considered. (MA)

Scale factor For similar shapes, the common ratio of corresponding side lengths is called the scale factor. Informally, it is the multiplicative amount by which the lengths of one shape are “blown up” or “shrunk down” to obtain the other shape to which it is similar.

Scatter plot A graph in the coordinate plane representing a set of bivariate data. For example, the heights and weights of a group of people could be displayed on a scatter plot. (DPI)

Scientific notation A widely used floating-point system in which numbers are expressed as products consisting of a number between 1 and 10 multiplied by an appropriate power of 10, e.g., $562 = 5.62 \times 10^2$. (MW)

Secant (of a circle) A line that intersects a circle at two points.

Sequence A set of elements ordered so that they can be labeled with consecutive positive integers starting with 1, e.g., 1, 3, 9, 27, 81. In this sequence, 1 is the *first term*, 3 is the *second term*, 9 is the *third term*, and so on. (MA)

Set model (for fractions) The use of a discrete set of objects to represent the whole and a subset of those objects to represent a fraction. For example, since 3 of the 15 students in class are wearing blue shirts, $3/15$ of the students are wearing blue shirts.

Significant figures (digits) Digits included in a measurement that purposely indicate the precision of the measurement. For example, writing a measurement as 3.50 seconds instead of 3.5 seconds indicates that the measurement is accurate to the hundredths place.

Similar (shapes) Two geometric shapes are said to be similar (to each other) if one can be mapped onto the other by a sequence of similarity transformations.

Similarity transformation A rigid motion followed by a dilation. (MA)

Simultaneous equations Two or more equations containing common variables. (MW)

Sine (of an acute angle) The trigonometric function that for an acute angle is the ratio between the leg opposite the angle when the angle is considered part of a right triangle and the hypotenuse. (M)



Slope (of a line) A measure of the steepness of a line in a Cartesian plane, found by determining the constant change in the y -coordinate per 1-unit change in the x -coordinate.

Spatial sense The ability to build and manipulate mental representations of 2- and 3-dimensional objects and ideas. (PASS)

Standard deviation A measurement of how much each value in the data differs from the mean of the data. (PASS)

Statistics The study of data. (PASS)

Stem-and-leaf plot A frequency distribution made by arranging data in the following way (e.g., student scores on a test were 96, 87, 77, 93, 85, 85, and 75 would be displayed as:

9] 6,3

8] 7,5,5

7] 7,5

Subitize Instantly knowing “how many.” Recognizing a number without using other mathematical processes. (Clements)

Substitution The substitution of one expression for an equivalent expression, used when rewriting expressions as equivalent ones or solving equations. It is based on the *transitive property of equality*, which states, “If $a = b$, and $b = c$, then $a = c$.”

Summary statistics A collection of statistics (measurements based on data) that describe the data set. For example, the range, mean, and standard deviation of a given data set indicate certain features of the data set and hence are summary statistics.

Supplementary angles Two angles whose measures have a sum of 180 degrees. (PASS)

Supposition (act of supposing) Making a statement or assumption without proof. (PASS)

Surface area (of a rectangular prism) The total measure of the area of the faces of a rectangular prism. Equivalently, the total area of a net for the prism.

Tangent a) Meeting a curve or surface in a single point if a sufficiently small interval is considered. b) (of an acute angle) The trigonometric function that, for an acute angle, is the ratio between the leg opposite the angle and the leg adjacent to the angle when the angle is considered part of a right triangle. (MW)

Tape diagram A drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model. (MA)

Terminating decimal A decimal is called terminating if its repeating digit is 0. Every terminating decimal is the decimal form of some rational number. *See also: repeating decimal.* (MA)

Third quartile For a data set with median M , the third quartile is the median of the data values greater than M . *Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the third quartile is 15.* *See also: median, first quartile, interquartile range.* (MA)

Transformation A prescription, or rule, that sets up a one-to-one correspondence between the points in a geometric object (the *pre-image*) and the points in another geometric object (the *image*). Reflections, rotations, translations, and dilations are particular examples of transformations. (MA)

Transitivity principle for indirect measurement If the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C. This principle applies to measurement of other quantities as well. (MA)

Translation A type of transformation that moves every point in a graph or geometric figure by the same distance in the same direction without a change in orientation or size. (MW)

Transversal line A line that crosses two or more other lines is called a transversal.

Triangle A polygon with three sides. Important classes of triangles:

Equilateral triangle A triangle with all sides congruent.

Right triangle Contains an interior angle that is a right angle.

Scalene triangle A triangle with no side congruent to another.

Isosceles triangle A triangle with two congruent sides.



Trigonometric function Trigonometric functions (sine, cosine, tangent, and their reciprocals) are commonly defined as ratios of two sides of a right triangle containing the angle, and can equivalently be defined as the lengths of various line segments from a unit circle.

Trigonometry The study of trigonometric functions.

Uniform probability model A probability model which assigns equal probability to all outcomes. See also: **probability model**.

Unit fraction A fraction with a numerator of 1, such as $\frac{1}{3}$ or $\frac{1}{5}$. (MA)

Unit of measurement When measuring a given attribute of an object, a “unit” is defined in terms of which all other measurements are determined. That a given unit is fixed is a concept to be learned by young students (e.g. we wouldn’t measure the length of a room in hands because your hand is different from mine, and we wouldn’t measure the length of a room using cm and inches at the same time).

Union (of sets) For two sets A and B , the union $A \cup B$ is the set of all elements that are members of one or both of the sets.

Variable (a) A quantity that can change or that may take on different values. (b) A symbol (often a letter of the alphabet, sometimes including the Greek alphabet) that represents a number in a mathematical expression.

Venn diagram A data display in which (typically) circles are used to represent categories and in which the overlapping of two (or more) circles indicates data that lies in each category in the overlap.

Visual fraction model A diagram or representation to show the relative size of a fraction, for example, a tape diagram, number line diagram, or area model. (MA)

Volume (of a 3D object) A measurement of the amount of space within a closed three-dimensional shape. Volume is often measured in terms of “cubic units”, in which 1 cubic unit is the amount of space within a cube that measures 1 unit by 1 unit by 1 unit (for a given unit of length). For example, volume may be measured in “cubic centimeters”, 1 cubic centimeter being the amount of space within a 1cm by 1cm by 1cm cube. Note that since one can measure the volume of a liquid by placing said liquid into a 3D shape, volume has historically been measured in various units such as cups, fluid ounces, and liters. Note that 1 cubic centimeter is equal to 1 milliliter, one way to connect such fluid units to cubic units.

Whole numbers The numbers 0, 1, 2, 3, ...



Table 1: The Properties of Operations

Here a , b and c stand for arbitrary numbers in a given number system. The properties of operations apply to the rational number system, the real number system, and the complex number system.

Associative property of addition	$(a + b) + c = a + (b + c)$
Commutative property of addition	$a + b = b + a$
Additive identity property of 0	$a + 0 = 0 + a = a$
Existence of additive inverses	For every a there exists $-a$ so that $a + (-a) = (-a) + a = 0$.
Associative property of multiplication	$(a \times b) \times c = a \times (b \times c)$
Commutative property of multiplication	$a \times b = b \times a$
Multiplicative identity property of 1	$a \times 1 = 1 \times a = a$
Existence of multiplicative inverses	For every a (where $a \neq 0$) there exists $\frac{1}{a}$ so that $a \times \frac{1}{a} = \frac{1}{a} \times a = 1$.
Distributive property of multiplication over addition	$a \times (b + c) = a \times b + a \times c$

Table 2: The Properties of Equality

Here a , b , and c stand for arbitrary numbers in the rational, real, or complex number systems.

Reflexive property of equality	$a = a$
Symmetric property of equality	If $a = b$, then $b = a$.
Transitive property of equality	If $a = b$ and $b = c$, then $a = c$.
Addition property of equality	If $a = b$, then $a + c = b + c$.
Subtraction property of equality	If $a = b$, then $a - c = b - c$.
Multiplication property of equality	If $a = b$, then $a \times c = b \times c$.
Division property of equality	If $a = b$ and $c \neq 0$, then $a \div c = b \div c$.
Substitution property of equality	If $a = b$, then b may be substituted for a in any expression containing a .



Table 3: The Properties of Inequality

Here a, b, and c stand for arbitrary numbers in the rational or real number systems.

Law of Trichotomy	Exactly one of the following is true: $a < b$, $a = b$, or $a > b$
Reversal Property	If $a > b$, then $b < a$.
Additive Inverse	If $a > b$, then $-a < -b$.
Addition and Subtraction Property of Inequality	If $a > b$, then $a \pm c > b \pm c$.
Positive Multiplication Property of Inequality	If $a > b$ and $c > 0$, then $a \times c > b \times c$.
Negative Multiplication Property of Inequality	If $a > b$ and $c < 0$, then $a \times c < b \times c$.
Positive Division Property of Inequality	If $a > b$ and $c > 0$, then $a \div c > b \div c$.
Negative Division Property of Inequality	If $a > b$ and $c < 0$, then $a \div c < b \div c$.

Table 4: Fluency Expectations

Grade level fluency expectations apply to operations of whole numbers.

	Addition	Subtraction	Multiplication	Division
1st Grade	Through 10	Through 10		
2nd Grade	Through 20	Through 20		
3rd Grade			Through factors of 10	
4th Grade			Through factors of 12	Through factors of 12



Number & Operations (N)

Topic	Pre-Kindergarten (PK)	Kindergarten (K)	First Grade (1)
Quantity	<p>PK.N.1 Know number names and count in sequence. PK.N.1.1 Count aloud forward in sequence by 1's to 20. PK.N.1.2 Recognize and name written numerals 0-10. PK.N.1.3 Recognize that zero represents the count of no objects.</p> <p>PK.N.2 Count to tell the number of objects. PK.N.2.1 Identify the number of objects, up to 10, in a row or column. PK.N.2.2 Use one-to-one correspondence in counting objects and matching groups of objects. PK.N.2.3 Understand the last numeral spoken, when counting aloud, tells how many total objects are in a set. PK.N.2.4 Count up to 5 items in a scattered configuration; not in a row or column.</p> <p>PK.N.3 Compare sets using number. PK.N.3.1 Compare two sets of 1-5 objects using comparative language such as same, more, or fewer.</p>	<p>K.N.1 Understand the relationship between quantities and whole numbers. K.N.1.1 Count aloud forward in sequence to 100 by 1's and 10's. K.N.1.2 Recognize that a number can be used to represent how many objects are in a set up to 10. K.N.1.3 Use ordinal numbers to represent the position of an object in a sequence up to 10. K.N.1.4 Recognize without counting (subitize) the quantity of a small group of objects in organized and random arrangements up to 10. Clarification statement: Subitizing is defined as instantly recognizing the quantity of a set without having to count. "Subitizing" is not a vocabulary word and is not meant for student discussion at this age. K.N.1.5 Count forward, with and without objects, from any given number up to 10. K.N.1.6 Read, write, discuss, and represent whole numbers from 0 to at least 10. Representations may include numerals, pictures, real objects and picture graphs, spoken words, and manipulatives. K.N.1.7 Find a number that is 1 more or 1 less than a given number up to 10. K.N.1.8 Using the words more than, less than or equal to compare and order whole numbers, with and without objects, from 0 to 10.</p>	<p>1.N.1 Count, compare and represent whole numbers up to 100, with an emphasis on groups of tens and ones. 1.N.1.1 Recognize numbers to 20 without counting (subitize) the quantity of structured arrangements. Clarification statement: Subitizing is defined as instantly recognizing the quantity of a set without having to count. "Subitizing" is not a vocabulary word and is not meant for student discussion at this age. 1.N.1.2 Use concrete representations to describe whole numbers between 10 and 100 in terms of tens and ones. 1.N.1.3 Read, write, discuss, and represent whole numbers up to 100. Representations may include numerals, addition and subtraction, pictures, tally marks, number lines and manipulatives, such as bundles of sticks and base 10 blocks. 1.N.1.4 Count forward, with and without objects, from any given number up to 100 by 1s, 2s, 5s and 10s. 1.N.1.5 Find a number that is 10 more or 10 less than a given number up to 100. 1.N.1.6 Compare and order whole numbers from 0 to 100. 1.N.1.7 Use knowledge of number relationships to locate the position of a given whole number on an open number line up to 20. 1.N.1.8 Use objects to represent and use words to describe the relative size of numbers, such as more than, less than, and equal to.</p>
Operations	<p>Topic addressed at other grade levels.</p>	<p>K.N.2 Develop conceptual fluency with addition and subtraction (up to 10) using objects and pictures. K.N.2.1 Compose and decompose numbers up to 10 with objects and pictures.</p>	<p>1.N.2 Solve addition and subtraction problems up to 10 in real-world and mathematical contexts. 1.N.2.1 Represent and solve real-world and mathematical problems using addition and subtraction up to ten. 1.N.2.2 Determine if equations involving addition and subtraction are true. 1.N.2.3 Demonstrate fluency with basic addition facts and related subtraction facts up to 10.</p>



Number & Operations (N)			
Topic	Pre-Kindergarten (PK)	Kindergarten (K)	First Grade (1)
Fractions	Topic addressed at other grade levels.	<p>K.N.3 Understand the relationship between whole numbers and fractions through fair share.</p> <p>K.N.3.1 Distribute equally a set of objects into at least two smaller equal sets.</p>	<p>1.N.3 Develop foundational ideas for fractions.</p> <p>1.N.3.1 Partition a regular polygon using physical models and recognize when those parts are equal.</p> <p>1.N.3.2 Partition (fair share) sets of objects into equal groupings.</p>
Money	Topic addressed at other grade levels.	<p>K.N.4 Identify coins by name.</p> <p>K.N.4.1 Identify pennies, nickels, dimes, and quarters by name.</p>	<p>1.N.4 Identify coins and their values.</p> <p>1.N.4.1 Identify pennies, nickels, dimes, and quarters by name and value.</p> <p>1.N.4.2 Write a number with the cent symbol to describe the value of a coin.</p> <p>1.N.4.3 Determine the value of a collection of pennies, nickels, or dimes up to one dollar counting by ones, fives, or tens.</p>
Algebraic Reasoning & Algebra (A)			
Topic	Pre-Kindergarten (PK)	Kindergarten (K)	First Grade (1)
Patterns	<p>PK.A.1 Recognize, duplicate, and extend patterns.</p> <p>PK.A.1.1 Sort and group up to 5 objects into a set based upon characteristics such as color, size, and shape and explain verbally what the objects have in common.</p> <p>PK.A.1.2 Recognize, duplicate, and extend repeating patterns involving manipulatives, sound, movement, and other contexts.</p>	<p>K.A.1 Duplicate patterns in a variety of contexts.</p> <p>K.A.1.1 Sort and group up to 10 objects into a set based upon characteristics such as color, size, and shape. Explain verbally what the objects have in common.</p> <p>K.A.1.2 Recognize, duplicate, complete, and extend repeating, shrinking and growing patterns involving shape, color, size, objects, sounds, movement, and other contexts.</p>	<p>1.A.1 Identify patterns found in real-world and mathematical situations.</p> <p>1.A.1.1 Identify, create, complete, and extend repeating, growing, and shrinking patterns with quantity, numbers, or shapes in a variety of real-world and mathematical contexts.</p>
Number Sentences	Topic addressed at other grade levels.	Topic addressed at other grade levels.	Topic addressed at other grade levels.



Geometry & Measurement (GM)			
Topic	Pre-Kindergarten (PK)	Kindergarten (K)	First Grade (1)
Geometry	<p>PK.GM.1 Identify common shapes. PK.GM.1.1 Identify circles, squares, rectangles, and triangles by pointing to the shape when given the name.</p>	<p>K.GM.1 Recognize and sort basic two-dimensional shapes and use them to represent real-world objects. K.GM.1.1 Recognize squares, circles, triangles, and rectangles. K.GM.1.2 Sort two-dimensional objects using characteristics such as shape, size, color, and thickness. K.GM.1.3 Identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably. K.GM.1.4 Use smaller shapes to form a larger shape when there is an outline to follow. K.GM.1.5 Compose free-form shapes with blocks. K.GM.1.6 Use basic shapes and spatial reasoning to represent objects in the real world.</p>	<p>1.GM.1 Recognize, compose, and decompose two- and three-dimensional shapes. 1.GM.1.1 Identify trapezoids and hexagons by pointing to the shape when given the name. 1.GM.1.2 Compose and decompose larger shapes using smaller two-dimensional shapes. 1.GM.1.3 Compose structures with three-dimensional shapes. 1.GM.1.4 Recognize three-dimensional shapes such as cubes, cones, cylinders, and spheres.</p>
Measurement	<p>PK.GM.2 Describe and compare measurable attributes. PK.GM.2.1 Identify measurable attributes of objects. Describe them as little, big, long, short, tall, heavy, light, or other age appropriate vocabulary. PK.GM.2.2 Directly compare two objects with a common measurable attribute using words such as longer/shorter; heavier/lighter; or taller/shorter. PK.GM.2.3 Sort objects into sets by one or more attributes.</p>	<p>K.GM.2 Compare and order objects according to location and measurable attributes. K.GM.2.1 Use words to compare objects according to length, size, weight, position, and location. K.GM.2.2 Order up to 6 objects using measurable attributes, such as length and weight. K.GM.2.3 Sort objects into sets by more than one attribute. K.GM.2.4 Compare the number of objects needed to fill two different containers.</p>	<p>1.GM.2 Select and use nonstandard and standard units to describe length and volume/capacity. 1.GM.2.1 Use nonstandard and standard measuring tools to measure the length of objects to reinforce the continuous nature of linear measurement. 1.GM.2.2 Illustrate that the length of an object is the number of same-size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other. 1.GM.2.3 Measure the same object/distance with units of two different lengths and describe how and why the measurements differ. 1.GM.2.4 Describe a length to the nearest whole unit using a number and a unit. 1.GM.2.5 Use standard and nonstandard tools to identify volume/capacity. Compare and sort containers that hold more, less, or the same amount.</p>
Time	<p>Topic addressed at other grade levels.</p>	<p>K.GM.3 Tell time as it relates to daily life. K.GM.3.1 Develop an awareness of simple time concepts using words such as yesterday, today, tomorrow, morning, afternoon, and night within his/her daily life.</p>	<p>1.GM.3 Tell time to the half and full hour. 1.GM.3.1 Tell time to the hour and half-hour (analog and digital).</p>



Data & Probability (D)

Topic	Pre-Kindergarten (PK)	Kindergarten (K)	First Grade (1)
Data Analysis	<p>PK.D.1 Collect and organize categorical data.</p> <p>PK.D.1.1 Collect and organize information about objects and events in the environment.</p> <p>PK.D.1.2 Use categorical data to create real-object graphs.</p>	<p>K.D.1 Collect, organize, and interpret categorical data.</p> <p>K.D.1.1 Collect and sort information about objects and events in the environment.</p> <p>K.D.1.2 Use categorical data to create real-object and picture graphs.</p> <p>K.D.1.3 Draw conclusions from real-object and picture graphs.</p>	<p>1.D.1 Collect, organize, and interpret categorical and numerical data.</p> <p>1.D.1.1 Collect, sort, and organize data in up to three categories using representations (e.g., tally marks, tables, Venn diagrams).</p> <p>1.D.1.2 Use data to create picture and bar-type graphs to demonstrate one-to-one correspondence.</p> <p>1.D.1.3 Draw conclusions from picture and bar-type graphs.</p>



Number & Operations (N)			
Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Quantity	<p>2.N.1 Compare and represent whole numbers up to 1,000 with an emphasis on place value and equality.</p> <p>2.N.1.1 Read, write, discuss, and represent whole numbers up to 1,000. Representations may include numerals, words, pictures, tally marks, number lines and manipulatives.</p> <p>2.N.1.2 Use knowledge of number relationships to locate the position of a given whole number on an open number line up to 100.</p> <p>2.N.1.3 Use place value to describe whole numbers between 10 and 1,000 in terms of hundreds, tens and ones. Know that 100 is 10 tens, and 1,000 is 10 hundreds.</p> <p>2.N.1.4 Find 10 more or 10 less than a given three-digit number. Find 100 more or 100 less than a given three-digit number.</p> <p>2.N.1.5 Recognize when to round numbers to the nearest 10 and 100.</p> <p>2.N.1.6 Use place value to compare and order whole numbers up to 1,000 using comparative language, numbers, and symbols (e.g., $425 > 276$, $73 < 107$, page 351 comes after page 350, 753 is between 700 and 800).</p>	<p>3.N.1 Compare and represent whole numbers up to 100,000 with an emphasis on place value and equality.</p> <p>3.N.1.1 Read, write, discuss, and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives.</p> <p>3.N.1.2 Use place value to describe whole numbers between 1,000 and 100,000 in terms of ten thousands, thousands, hundreds, tens and ones, including expanded form.</p> <p>3.N.1.3 Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.</p> <p>3.N.1.4 Use place value to compare and order whole numbers up to 100,000, using comparative language, numbers, and symbols.</p>	<p>Topic addressed at other grade levels.</p>



Number & Operations (N)			
Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Operations	<p>2.N.2 Add and subtract one- and two-digit numbers in real-world and mathematical problems.</p> <p>2.N.2.1 Use the relationship between addition and subtraction to generate basic facts up to 20.</p> <p>2.N.2.2 Demonstrate fluency with basic addition facts and related subtraction facts up to 20.</p> <p>2.N.2.3 Estimate sums and differences up to 100.</p> <p>2.N.2.4 Use strategies and algorithms based on knowledge of place value and equality to add and subtract two-digit numbers.</p> <p>2.N.2.5 Solve real-world and mathematical addition and subtraction problems involving whole numbers up to 2 digits.</p> <p>2.N.2.6 Use concrete models and structured arrangements, such as repeated addition, arrays and ten frames to develop understanding of multiplication.</p>	<p>3.N.2 Add and subtract multi-digit whole numbers; multiply with factors up to 10; represent multiplication and division in various ways; Solve real-world and mathematical problems through the representation of related operations.</p> <p>3.N.2.1 Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting.</p> <p>3.N.2.2 Demonstrate fluency of multiplication facts with factors up to 10.</p> <p>3.N.2.3 Use strategies and algorithms based on knowledge of place value and equality to fluently add and subtract multi-digit numbers.</p> <p>3.N.2.4 Recognize when to round numbers and apply understanding to round numbers to the nearest ten thousand, thousand, hundred, and ten and use compatible numbers to estimate sums and differences.</p> <p>3.N.2.5 Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.</p> <p>3.N.2.6 Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups.</p> <p>3.N.2.7 Recognize the relationship between multiplication and division to represent and solve real-world problems.</p> <p>3.N.2.8 Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two-digit number by a one-digit number.</p>	<p>4.N.1 Solve real-world and mathematical problems using multiplication and division.</p> <p>4.N.1.1 Demonstrate fluency with multiplication and division facts with factors up to 12.</p> <p>4.N.1.2 Use an understanding of place value to multiply or divide a number by 10, 100 and 1,000.</p> <p>4.N.1.3 Multiply 3-digit by 1-digit or a 2-digit by 2-digit whole numbers, using efficient and generalizable procedures and strategies, based on knowledge of place value, including but not limited to standard algorithms.</p> <p>4.N.1.4 Estimate products of 3-digit by 1-digit or 2-digit by 2-digit whole numbers using rounding, benchmarks and place value to assess the reasonableness of results. Explore larger numbers using technology to investigate patterns.</p> <p>4.N.1.5 Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of appropriate technology, and the context of the problem to assess the reasonableness of results.</p> <p>4.N.1.6 Use strategies and algorithms based on knowledge of place value, equality and properties of operations to divide 3-digit dividend by 1-digit whole number divisors. (e.g., mental strategies, standard algorithms, partial quotients, repeated subtraction, the commutative, associative, and distributive properties).</p> <p>4.N.1.7 Determine the unknown addend(s) or factor(s) in equivalent and non-equivalent expressions. (e.g., $5 + 6 = 4 + \square$, $3 \times 8 < 3 \times \square$).</p>



Number & Operations (N)

Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Fractions	<p>2.N.3 Explore the foundational ideas of fractions.</p> <p>2.N.3.1 Identify the parts of a set and area that represent fractions for halves, thirds, and fourths.</p> <p>2.N.3.2 Construct equal-sized portions through fair sharing including length, set, and area models for halves, thirds, and fourths.</p>	<p>3.N.3 Understand meanings and uses of fractions in real-world and mathematical situations.</p> <p>3.N.3.1 Read and write fractions with words and symbols.</p> <p>3.N.3.2 Construct fractions using length, set, and area models.</p> <p>3.N.3.3 Recognize unit fractions and use them to compose and decompose fractions related to the same whole. Use the numerator to describe the number of parts and the denominator to describe the number of partitions.</p> <p>3.N.3.4 Use models and number lines to order and compare fractions that are related to the same whole.</p>	<p>4.N.2 Represent and compare fractions and decimals in real-world and mathematical situations; use place value to understand how decimals represent quantities.</p> <p>4.N.2.1 Represent and rename equivalent fractions using fraction models (e.g. parts of a set, area models, fraction strips, number lines).</p> <p>4.N.2.2 Use benchmark fractions ($0, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, 1$) to locate additional fractions on a number line. Use models to order and compare whole numbers and fractions less than and greater than one using comparative language and symbols.</p> <p>4.N.2.3 Decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$).</p> <p>4.N.2.4 Use fraction models to add and subtract fractions with like denominators in real-world and mathematical situations.</p> <p>4.N.2.5 Represent tenths and hundredths with concrete models, making connections between fractions and decimals.</p> <p>4.N.2.6 Represent, read and write decimals up to at least the hundredths place in a variety of contexts including money.</p> <p>4.N.2.7 Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks.</p> <p>4.N.2.8 Compare benchmark fractions ($\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}$) and decimals (0.25, 0.50, 0.75) in real-world and mathematical situations.</p>
Money	<p>2.N.4 Determine the value of a set of coins.</p> <p>2.N.4.1 Determine the value of a collection(s) of coins up to one dollar using the cent symbol.</p> <p>2.N.4.2 Use a combination of coins to represent a given amount of money up to one dollar.</p>	<p>3.N.4 Determine the value of a set of coins or bills.</p> <p>3.N.4.1 Use addition to determine the value of a collection of coins up to one dollar using the cent symbol and a collection of bills up to twenty dollars.</p> <p>3.N.4.2 Select the fewest number of coins for a given amount of money up to one dollar.</p>	<p>4.N.3 Determine the value of coins in order to solve monetary transactions.</p> <p>4.N.3.1 Given a total cost (whole dollars up to \$20 or coins) and amount paid (whole dollars up to \$20 or coins), find the change required in a variety of ways. Limited to whole dollars up to \$20 or sets of coins.</p>



Algebraic Reasoning & Algebra (A)			
Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Patterns	<p>2.A.1 Describe the relationship found in patterns to solve real-world and mathematical problems.</p> <p>2.A.1.1 Represent, create, describe, complete, and extend growing and shrinking patterns with quantity and numbers in a variety of real-world and mathematical contexts.</p> <p>2.A.1.2 Represent and describe repeating patterns involving shapes in a variety of contexts.</p>	<p>3.A.1 Describe and create representations of numerical and geometric patterns.</p> <p>3.A.1.1 Create, describe, and extend patterns involving addition, subtraction, or multiplication to solve problems in a variety of contexts.</p> <p>3.A.1.2 Describe the rule (single operation) for a pattern from an input/output table or function machine involving addition, subtraction, or multiplication.</p> <p>3.A.1.3 Explore and develop visual representations of growing geometric patterns and construct the next steps.</p>	<p>4.A.1 Use multiple representations of patterns to solve real-world and mathematical problems.</p> <p>4.A.1.1 Create an input/output chart or table to represent or extend a numerical pattern.</p> <p>4.A.1.2 Describe the single operation rule for a pattern from an input/output table or function machine involving any operation of a whole number.</p> <p>4.A.1.3 Create growth patterns involving geometric shapes and define the single operation rule of the pattern.</p>
Number Sentences	<p>2.A.2 Use number sentences involving unknowns to represent and solve real-world and mathematical problems.</p> <p>2.A.2.1 Use objects and number lines to represent number sentences.</p> <p>2.A.2.2 Generate real-world situations to represent number sentences and vice versa.</p> <p>2.A.2.3 Apply commutative and identity properties and number sense to find values for unknowns that make number sentences involving addition and subtraction true or false.</p>	<p>3.A.2 Use number sentences involving multiplication and unknowns to represent and solve real-world and mathematical problems.</p> <p>3.A.2.1 Find unknowns represented by symbols in arithmetic problems by solving one-step open sentences (equations) and other problems involving addition, subtraction, and multiplication. Generate real-world situations to represent number sentences.</p> <p>3.A.2.2 Recognize, represent and apply the number properties (commutative, identity, and associative properties of addition and multiplication) using models and manipulatives to solve problems.</p>	<p>4.A.2 Use multiplication and division with unknowns to create number sentences representing a given problem situation.</p> <p>4.A.2.1 Use number sense, properties of multiplication and the relationship between multiplication and division to solve problems and find values for the unknowns represented by letters and symbols that make number sentences true.</p> <p>4.A.2.2 Solve for unknowns in problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, or division with whole numbers. Use real-world situations to represent number sentences and vice versa.</p>



Geometry & Measurement (GM)			
Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Geometry	<p>2.GM.1 Analyze attributes of two-dimensional figures and develop generalizations about their properties.</p> <p>2.GM.1.1 Recognize trapezoids and hexagons.</p> <p>2.GM.1.2 Describe, compare, and classify two-dimensional figures according to their geometric attributes.</p> <p>2.GM.1.3 Compose two-dimensional shapes using triangles, squares, hexagons, trapezoids, and rhombi.</p> <p>2.GM.1.4 Recognize right angles and classify angles as smaller or larger than a right angle.</p>	<p>3.GM.1 Use geometric attributes to describe and create shapes in various contexts.</p> <p>3.GM.1.1 Sort three-dimensional shapes based on attributes.</p> <p>3.GM.1.2 Build a three-dimensional figure using unit cubes when picture/shape is shown.</p> <p>3.GM.1.3 Classify angles as acute, right, obtuse, and straight.</p>	<p>4.GM.1 Name, describe, classify, and construct polygons and three-dimensional figures.</p> <p>4.GM.1.1 Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.</p> <p>4.GM.1.2 Describe, classify, and sketch quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms, and kites. Recognize quadrilaterals in various contexts.</p> <p>4.GM.1.3 Given two three-dimensional shapes, identify similarities, and differences.</p>
Measurement	<p>2.GM.2 Understand length as a measurable attribute and explore capacity.</p> <p>2.GM.2.1 Explain the relationship between the size of the unit of measurement and the number of units needed to measure the length of an object.</p> <p>2.GM.2.2 Explain the relationship between length and the numbers on a ruler by using a ruler to measure lengths to the nearest whole unit.</p> <p>2.GM.2.3 Explore how varying shapes and styles of containers can have the same capacity.</p>	<p>3.GM.2 Understand measurable attributes of real-world and mathematical objects using various tools.</p> <p>3.GM.2.1 Find perimeter of polygon, given whole number lengths of the sides, in real-world and mathematical situations.</p> <p>3.GM.2.2 Develop and use formulas to determine the area of rectangles. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.</p> <p>3.GM.2.3 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole centimeter or meter.</p> <p>3.GM.2.4 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole yard, whole foot, or half inch.</p> <p>3.GM.2.5 Using common benchmarks, estimate the lengths (customary and metric) of a variety of objects.</p> <p>3.GM.2.6 Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.</p> <p>3.GM.2.7 Count cubes systematically to identify the number of cubes needed to pack the whole or half of a three-dimensional structure.</p> <p>3.GM.2.8 Find the area of two-dimensional figures by counting total number of same size unit squares that fill the shape without gaps or overlaps.</p>	<p>4.GM.2 Understand angle, length, and area as measurable attributes of real-world and mathematical objects. Use various tools to measure angles, length, area, and volume.</p> <p>4.GM.2.1 Measure angles in geometric figures and real-world objects with a protractor or angle ruler.</p> <p>4.GM.2.2 Find the area of polygons that can be decomposed into rectangles.</p> <p>4.GM.2.3 Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with whole-number edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as cm^3.</p> <p>4.GM.2.4 Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or quarter-inch.</p> <p>4.GM.2.5 Solve problems that deal with measurements of length, when to use liquid volumes, when to use mass, temperatures above zero and money using addition, subtraction, multiplication, or division as appropriate (customary and metric).</p>



Geometry & Measurement (GM)			
Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Time	<p>2.GM.3 Tell time to the quarter hour.</p> <p>2.GM.3.1 Read and write time to the quarter-hour on an analog and digital clock. Distinguish between a.m. and p.m.</p>	<p>3.GM.3 Tell time to the nearest 5-minutes and solve problems.</p> <p>3.GM.3.1 Read and write time to the nearest 5-minute (analog and digital).</p> <p>3.GM.3.2 Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.</p>	<p>4.GM.3 Determine elapsed time and convert between units of time.</p> <p>4.GM.3.1 Determine elapsed time.</p> <p>4.GM.3.2 Solve problems involving the conversion of one measure of time to another.</p>



Data & Probability (D)

Topic	Second Grade (2)	Third Grade (3)	Fourth Grade (4)
Data Analysis	<p>2.D.1 Collect, organize, and interpret data.</p> <p>2.D.1.1 Explain that the length of a bar in a bar graph or the number of objects in a picture graph represents the number of data points for a given category.</p> <p>2.D.1.2 Organize a collection of data with up to four categories using pictographs and bar graphs with intervals of 1s, 2s, 5s or 10s.</p> <p>2.D.1.3 Write and solve one-step word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one.</p> <p>2.D.1.4 Draw conclusions and make predictions from information in a graph.</p>	<p>3.D.1 Summarize, construct, and analyze data.</p> <p>3.D.1.1 Summarize and construct a data set with multiple categories using a frequency table, line plot, pictograph, and/or bar graph with scaled intervals.</p> <p>3.D.1.2 Solve one- and two-step problems using categorical data represented with a frequency table, pictograph, or bar graph with scaled intervals.</p>	<p>4.D.1 Collect, organize, and analyze data.</p> <p>4.D.1.1 Represent data on a frequency table or line plot marked with whole numbers and fractions using appropriate titles, labels, and units.</p> <p>4.D.1.2 Use tables, bar graphs, timelines, and Venn diagrams to display data sets. The data may include benchmark fractions or decimals ($\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, 0.25, 0.50, 0.75).</p> <p>4.D.1.3 Solve one- and two-step problems using data in whole number, decimal, or fraction form in a frequency table and line plot.</p>



Number & Operations (N)

Fifth Grade (5)	Sixth Grade (6)	Seventh Grade (7)	Pre-Algebra (PA)
<p>5.N.1 Divide multi-digit numbers and solve real-world and mathematical problems using arithmetic.</p> <p>5.N.1.1 Estimate solutions to division problems in order to assess the reasonableness of results.</p> <p>5.N.1.2 Divide multi-digit numbers, by one- and two-digit divisors, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms.</p> <p>5.N.1.3 Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal and consider the context in which a problem is situated to select and interpret the most useful form of the quotient for the solution.</p> <p>5.N.1.4 Solve real-world and mathematical problems requiring addition, subtraction, multiplication, and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology, and the context of the problem to assess the reasonableness of results.</p> <p>5.N.2 Read, write, represent, and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.</p> <p>5.N.2.1 Represent decimal fractions (e.g., $\frac{1}{10}$, $\frac{1}{100}$) using a variety of models (e.g., 10 by 10 grids, rational number wheel, base-ten blocks, meter stick) and make connections between fractions and decimals.</p>	<p>6.N.1 Read, write, and represent integers and rational numbers expressed as fractions, decimals, percents, and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.</p> <p>6.N.1.1 Represent integers with counters and on a number line and rational numbers on a number line, recognizing the concepts of opposites, direction, and magnitude; use integers and rational numbers in real-world and mathematical situations, explaining the meaning of 0 in each situation.</p> <p>6.N.1.2 Compare and order positive rational numbers, represented in various forms, or integers using the symbols $<$, $>$, and $=$.</p> <p>6.N.1.3 Explain that a percent represents parts “out of 100” and ratios “to 100.”</p> <p>6.N.1.4 Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.</p> <p>6.N.1.5 Factor whole numbers and express prime and composite numbers as a product of prime factors with exponents.</p> <p>6.N.1.6 Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions, and express the sum of two-digit numbers with a common factor using the distributive property.</p> <p>6.N.2 Add and subtract integers in order to solve real-world and mathematical problems.</p> <p>6.N.2.1 Estimate solutions to addition and subtraction of integers problems in order to assess the reasonableness of results.</p>	<p>7.N.1 Read, write, represent, and compare rational numbers, expressed as integers, fractions, and decimals.</p> <p>7.N.1.1 Know that every rational number can be written as the ratio of two integers or as a terminating or repeating decimal.</p> <p>7.N.1.2 Compare and order rational numbers expressed in various forms using the symbols $<$, $>$, and $=$.</p> <p>7.N.1.3 Recognize and generate equivalent representations of rational numbers, including equivalent fractions.</p> <p>7.N.2 Calculate with integers and rational numbers, with and without positive integer exponents, to solve real-world and mathematical problems; explain the relationship between absolute value of a rational number and the distance of that number from zero.</p> <p>7.N.2.1 Estimate solutions to multiplication and division of integers in order to assess the reasonableness of results.</p> <p>7.N.2.2 Illustrate multiplication and division of integers using a variety of representations.</p> <p>7.N.2.3 Solve real-world and mathematical problems involving addition, subtraction, multiplication and division of rational; use efficient and generalizable procedures including but not limited to standard algorithms.</p> <p>7.N.2.4 Raise integers to positive integer exponents.</p> <p>7.N.2.5 Solve real-world and mathematical problems involving calculations with rational numbers and positive integer exponents.</p> <p>7.N.2.6 Explain the relationship between the absolute value of a rational number</p>	<p>PA.N.1 Read, write, compare, classify, and represent real numbers and use them to solve problems in various contexts.</p> <p>PA.N.1.1 Develop and apply the properties of integer exponents, including $a^0 = 1$ (with $a \neq 0$), to generate equivalent numerical and algebraic expressions.</p> <p>PA.N.1.2 Express and compare approximations of very large and very small numbers using scientific notation.</p> <p>PA.N.1.3 Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation.</p> <p>PA.N.1.4 Classify real numbers as rational or irrational. Explain why the rational number system is closed under addition and multiplication and why the irrational system is not. Explain why the sum of a rational number and an irrational number is irrational; and the product of a non-zero rational number and an irrational number is irrational.</p> <p>PA.N.1.5 Compare real numbers; locate real numbers on a number line. Identify the square root of a perfect square to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers.</p>



<p>5.N.2.2 Represent, read and write decimals using place value to describe decimal numbers including fractional numbers as small as thousandths and whole numbers as large as millions.</p> <p>5.N.2.3 Compare and order fractions and decimals, including mixed numbers and fractions less than one, and locate on a number line.</p> <p>5.N.2.4 Recognize and generate equivalent decimals, fractions, mixed numbers, and fractions less than one in various contexts.</p> <p>5.N.3 Add and subtract fractions with like and unlike denominators, mixed numbers and decimals to solve real-world and mathematical problems.</p> <p>5.N.3.1 Estimate sums and differences of fractions with like and unlike denominators, mixed numbers, and decimals to assess the reasonableness of the results.</p> <p>5.N.3.2 Illustrate addition and subtraction of fractions with like and unlike denominators, mixed numbers, and decimals using a variety of representations (e.g., fraction strips, area models, number lines, fraction rods).</p> <p>5.N.3.3 Add and subtract fractions with like and unlike denominators, mixed numbers, and decimals, using efficient and generalizable procedures, including but not limited to standard algorithms in order to solve real-world and mathematical problems including those involving money, measurement, geometry, and data.</p> <p>5.N.3.4 Find 0.1 more than a number and 0.1 less than a number. Find 0.01 more than a number and 0.01 less than a</p>	<p>6.N.2.2 Illustrate addition and subtraction integers using a variety of representations.</p> <p>6.N.2.3 Add and subtract integers; use efficient and generalizable procedures including but not limited to standard algorithms.</p> <p>6.N.3 Understand the concept of ratio and its relationship to fractions and percents and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems.</p> <p>6.N.3.1 Identify and use ratios to compare quantities. Recognize that multiplicative comparison and additive comparison are different.</p> <p>6.N.3.2 Determine the unit rate for ratios.</p> <p>6.N.3.3 Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixture and concentrations.</p> <p>6.N.3.4 Use multiplicative reasoning and representations to solve ratio and unit rate problems.</p> <p>6.N.4 Multiply and divide decimals, fractions, and mixed numbers; solve real-world and mathematical problems with rational numbers.</p> <p>6.N.4.1 Estimate solutions to problems with whole numbers, decimals, fractions, and mixed numbers and use the estimates to assess the reasonableness of results in the context of the problem.</p> <p>6.N.4.2 Illustrate multiplication and division of fractions and decimals to show connections to fractions, whole number multiplication, and inverse relationships.</p> <p>6.N.4.3 Multiply and divide fractions and decimals, using efficient and generalizable</p>	<p>and the distance of that number from zero on a number line. Use the symbol for absolute value.</p>	



<p>number. Find 0.001 more than a number and 0.001 less than a number.</p>	<p>procedures. 6.N.4.4 Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions and mixed numbers.</p>		
Algebraic Reasoning & Algebra (A)			
Fifth Grade (5)	Sixth Grade (6)	Seventh Grade (7)	Pre-Algebra (PA)
<p>5.A.1 Describe and graph patterns of change created through numerical patterns. 5.A.1.1 Use tables and rules of up to two operations to describe patterns of change and make predictions and generalizations about real-world and mathematical problems. 5.A.1.2 Use a rule or table to represent ordered pairs of whole numbers and graph these ordered pairs on a coordinate plane, identifying the origin and axes in relation to the coordinates.</p> <p>5.A.2 Understand and interpret expressions, equations, and inequalities involving variables and whole numbers, and use them to represent and evaluate real-world and mathematical problems. 5.A.2.1 Generate equivalent numerical expressions and solve problems involving whole numbers by applying the commutative, associative, and distributive properties and order of operations (no exponents). 5.A.2.2 Determine whether an equation or inequality involving a variable is true or false for a given value of the variable.</p>	<p>6.A.1 Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems. 6.A.1.1 Plot integer- and rational-valued (limited to halves and fourths) ordered-pairs as coordinates in all four quadrants and recognize the reflective relationships among coordinates that differ only by their signs. 6.A.1.2 Represent relationships between two varying quantities involving no more than two operations with rules, graphs, and tables; translate between any two of these representations. 6.A.1.3 Use and evaluate variables in expressions, equations, and inequalities that arise from various contexts, including determining when or if, for a given value of the variable, an equation or inequality involving a variable is true or false.</p> <p>6.A.2 Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers. 6.A.2.1 Generate equivalent expressions and evaluate expressions involving</p>	<p>7.A.1 Understand the concept of proportionality in real-world and mathematical situations, and distinguish between proportional and other relationships. 7.A.1.1 Describe that the relationship between two variables, x and y, is proportional if it can be expressed in the form $\frac{y}{x} = k$ or $y = kx$; distinguish proportional relationships from other relationships, including inversely proportional relationships ($xy = k$ or $y = \frac{k}{x}$). 7.A.1.2 Recognize that the graph of a proportional relationship is a line through the origin and the coordinate $(1, r)$, where both r and the slope are the unit rate (constant of proportionality, k).</p> <p>7.A.2 Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols, and graphs; solve problems involving proportional relationships and interpret results in the original context. 7.A.2.1 Represent proportional relationships with tables, verbal descriptions, symbols, and graphs;</p>	<p>PA.A.1 Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions. PA.A.1.1 Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable. PA.A.1.2 Use linear functions to represent and explain real-world and mathematical situations. PA.A.1.3 Identify a function as linear if it can be expressed in the form $y = mx + b$ or if its graph is a straight line.</p> <p>PA.A.2 Recognize linear functions in real-world and mathematical situations; represent linear functions and other function with tables, verbal descriptions, symbols, and graphs; solve problems involving linear functions and interpret results in the original context. PA.A.2.1 Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. PA.A.2.2 Identify, describe, and analyze linear relationships between two variables.</p>



Algebraic Reasoning & Algebra (A)			
Fifth Grade (5)	Sixth Grade (6)	Seventh Grade (7)	Pre-Algebra (PA)
<p>5.A.2.3 Evaluate expressions involving variables when values for the variables are given.</p>	<p>positive rational numbers by applying the commutative, associative, and distributive properties and order of operations to solve real-world and mathematical problems.</p> <p>6.A.3 Use equations and inequalities to represent real-world and mathematical problems and use the idea of maintaining equality to solve equations. Interpret solutions in the original context.</p> <p>6.A.3.1 Represent real-world or mathematical situations using expressions, equations and inequalities involving variables and rational numbers.</p> <p>6.A.3.2 Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form $x + p = q$ and $px = q$, where x, p, and q are nonnegative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.</p>	<p>translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope, or rate of change) given any of these representations.</p> <p>7.A.2.2 Solve multi-step problems involving proportional relationships involving distance-time, percent increase or decrease, discounts, tips, unit pricing, similar figures, and other real-world and mathematical situations.</p> <p>7.A.2.3 Use proportional reasoning to solve real-world and mathematical problems involving ratios.</p> <p>7.A.2.4 Use proportional reasoning to assess the reasonableness of solutions.</p> <p>7.A.3 Represent and solve linear equations and inequalities.</p> <p>7.A.3.1 Write and solve problems leading to linear equations with one variable in the form $px + q = r$ and $p(x+q) = r$, where p, q, and r are rational numbers.</p> <p>7.A.3.2 Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $x+p>q$ and $x+p<q$, where p, and q are nonnegative rational numbers.</p> <p>7.A.3.3 Represent real-world or mathematical situations using equations and inequalities involving variables and rational numbers.</p> <p>7.A.4 Use order of operations and properties to generate equivalent numerical and algebraic expressions containing rational numbers and grouping symbols; evaluate such expressions.</p> <p>7.A.4.1 Use properties of operations (limited to associative, commutative, and distributive) to generate equivalent</p>	<p>PA.A.2.3 Identify graphical properties of linear functions including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.</p> <p>PA.A.2.4 Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects.</p> <p>PA.A.2.5 Solve problems involving linear functions and interpret results in the original context.</p> <p>PA.A.3 Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.</p> <p>PA.A.3.1 Use substitution to simplify and evaluate algebraic expressions.</p> <p>PA.A.3.2 Justify steps in generating equivalent expressions by identifying the properties used, including the properties of operations (associative, commutative, and distributive laws) and the order of operations, including grouping symbols.</p> <p>PA.A.4 Represent real-world and mathematical problems using equations and inequalities involving linear expressions. Solve and graph equations and inequalities symbolically and graphically. Interpret solutions in the original context.</p> <p>PA.A.4.1 Illustrate, write, and solve mathematical and real-world problems using linear equations with one variable with one solution, infinitely many solutions, or no solutions. Interpret solutions in the original context.</p> <p>PA.A.4.2 Represent, write, solve, and graph problems leading to linear</p>



Geometry & Measurement (GM)			
Fifth Grade (5)	Sixth Grade (6)	Seventh Grade (7)	Pre-Algebra (PA)
<p>5.GM.1 Describe, classify, and draw representations of two- and three-dimensional figures.</p> <p>5.GM.1.1 Describe, classify and construct triangles, including equilateral, right, scalene, and isosceles triangles. Recognize triangles in various contexts.</p> <p>5.GM.1.2 Describe and classify three-dimensional figures including cubes, rectangular prisms, and pyramids by the number of edges, faces or vertices as well as the shapes of faces.</p> <p>5.GM.1.3 Recognize and draw a net for a three-dimensional figure (e.g., cubes, rectangular prisms, pyramids).</p> <p>5.GM.2 Understand how the volume of rectangular prisms and surface area of shapes with polygonal faces are determined by the dimensions of the object and that shapes with varying dimensions can have equivalent values of surface area or volume.</p> <p>5.GM.2.1 Recognize that the volume of rectangular prisms can be determined by the number of cubes (n) and by the product of the dimensions of the prism ($a \times b \times c = n$). Know that rectangular prisms of different dimensions (p, q, and r) can have the same volume if $a \times b \times c = p \times q \times r = n$.</p>	<p>6.GM.1 Calculate area of squares, parallelograms, and triangles to solve real-world and mathematical problems.</p> <p>6.GM.1.1 Develop and use formulas for the area of squares and parallelograms using a variety of methods including but not limited to the standard algorithm.</p> <p>6.GM.1.2 Develop and use formulas to determine the area of triangles.</p> <p>6.GM.1.3 Find the area of right triangles, other triangles, special quadrilaterals, and polygons that can be decomposed into triangles and other shapes to solve real-world and mathematical problems.</p> <p>6.GM.2 Understand and use relationships between angles in geometric figures.</p> <p>6.GM.2.1 Solve problems using the relationships between the angles (vertical, complementary, and supplementary) formed by intersecting lines.</p> <p>6.GM.2.2 Develop and use the fact that the sum of the interior angles of a triangle is 180° to determine missing angle measures in a triangle.</p> <p>6.GM.3 Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.</p> <p>6.GM.3.1 Estimate weights, capacities</p>	<p>7.GM.1 Develop and understand the concept of surface area and volume of rectangular prisms.</p> <p>7.GM.1.1 Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism with rational-valued edge lengths can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements such as cm^2.</p> <p>7.GM.1.2 Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with rational-valued edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as cm^3.</p> <p>7.GM.2 Determine the area of trapezoids and area and perimeter of composite figures.</p> <p>7.GM.2.1 Develop and use the formula to determine the area of a trapezoid to solve problems.</p> <p>7.GM.2.2 Find the area and perimeter of composite figures to solve real-world and mathematical problems.</p> <p>7.GM.3 Use reasoning with proportions</p>	<p>numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents.</p> <p>7.A.4.2 Apply understanding of order of operations and grouping symbols when using calculators and other technologies.</p> <p>inequalities with one variable in the form $px + q > r$ and $px + q < r$, where p, q, and r are rational numbers.</p> <p>PA.A.4.3 Represent real-world situations using equations and inequalities involving one variable.</p> <p>PA.GM.1 Solve problems involving right triangles using the Pythagorean Theorem.</p> <p>PA.GM.1.1 Informally justify the Pythagorean Theorem using measurements, diagrams or dynamic software and use the Pythagorean Theorem to solve problems in two and three dimensions involving right triangles.</p> <p>PA.GM.1.2 Use the Pythagorean Theorem to find the distance between any two points in a coordinate plane.</p> <p>PA.GM.2 Calculate surface area and volume of three-dimensional figures.</p> <p>PA.GM.2.1 Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate measurements such as cm^2.</p> <p>PA.GM.2.2 Calculate the surface area of a cylinder, in terms of n and using approximations for n, using decomposition or nets. Use appropriate measurements such as cm^2.</p> <p>PA.GM.2.3 Develop and use the formulas $V = lwh$ and $V = Bh$ to determine the volume of rectangular prisms. Justify why base area (B) and height (h) are multiplied to find the volume of a rectangular prism. Use appropriate measurements such as cm^3.</p> <p>PA.GM.2.4 Develop and use the formulas</p>



Geometry & Measurement (GM)

Fifth Grade (5)	Sixth Grade (6)	Seventh Grade (7)	Pre-Algebra (PA)
<p>5.GM.2.2 Recognize that the surface area of a three-dimensional figure with rectangular faces with whole numbered edges can be found by finding the area of each component of the net of that figure. Know that three-dimensional shapes of different dimensions can have the same surface area.</p> <p>5.GM.2.3 Find the perimeter of polygons and create arguments for reasonable values for the perimeter of shapes that include curves.</p> <p>5.GM.3 Understand angle and length as measurable attributes of real-world and mathematical objects. Use various tools to measure angles and lengths.</p> <p>5.GM.3.1 Measure and compare angles according to size.</p> <p>5.GM.3.2 Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or 1/16-inch.</p> <p>5.GM.3.3 Recognize and use the relationship between inches, feet, and yards to measure and compare objects.</p> <p>5.GM.3.4 Recognize and use the relationship between millimeters, centimeters, and meters to measure and compare objects.</p>	<p>and geometric measurements using benchmarks in customary and metric measurement systems with appropriate units.</p> <p>6.GM.3.2 Solve problems in various real-world and mathematical contexts that require the conversion of weights, capacities, geometric measurements, and time within the same measurement systems using appropriate units.</p> <p>6.GM.4 Use translations, reflections, and rotations to establish congruency and understand symmetries.</p> <p>6.GM.4.1 Predict, describe, and apply translations (slides), reflections (flips), and rotations (turns) to a two-dimensional figure.</p> <p>6.GM.4.2 Recognize that translations, reflections, and rotations preserve congruency and use them to show that two figures are congruent.</p> <p>6.GM.4.3 Use distances between two points that are either vertical or horizontal to each other (not requiring the distance formula) to solve real-world and mathematical problems about congruent two-dimensional figures.</p> <p>6.GM.4.4 Identify and describe the line(s) of symmetry in two-dimensional shapes.</p>	<p>and ratios to determine measurements, justify formulas, and solve real-world and mathematical problems involving circles and related geometric figures.</p> <p>7.GM.3.1 Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is π and can be approximated by rational numbers such as $\frac{22}{7}$ and 3.14.</p> <p>7.GM.3.2 Calculate the circumference and area of circles to solve problems in various contexts, in terms of π and using approximations for π.</p> <p>7.GM.4 Analyze the effect of dilations, translations, and reflections on the attributes of two-dimensional figures on and off the coordinate plane.</p> <p>7.GM.4.1 Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors resulting from dilations.</p> <p>7.GM.4.2 Apply proportions, ratios, and scale factors to solve problems involving scale drawings and determine side lengths and areas of similar triangles and rectangles.</p> <p>7.GM.4.3 Graph and describe translations and reflections of figures on a coordinate plane and determine the coordinates of the vertices of the figure after the transformation.</p>	<p>$V = \pi r^2 h$ and $V = Bh$ to determine the volume of right cylinders, in terms of π and using approximations for π. Justify why base area (B) and height (h) are multiplied to find the volume of a right cylinder. Use appropriate measurements such as cm^3.</p>



Data & Probability (D)

Fifth Grade (5)	Sixth Grade (6)	Seventh Grade (7)	Pre-Algebra (PA)
<p>5.D.1 Display and analyze data to find the range and measures of central tendency (mean, median, and mode).</p> <p>5.D.1.1 Find the measures of central tendency (mean, median, or mode) and range of a set of data. Understand that the mean is a “leveling out” or central balance point of the data.</p> <p>5.D.1.2 Create and analyze line and double-bar graphs with whole numbers, fractions, and decimals increments.</p>	<p>6.D.1 Display and analyze data.</p> <p>6.D.1.1 Calculate the mean, median, and mode for a set of real-world data.</p> <p>6.D.1.2 Explain and justify which measure of central tendency (mean, median, or mode) would provide the most descriptive information for a given set of data.</p> <p>6.D.1.3 Create and analyze box and whisker plots observing how each segment contains one quarter of the data.</p> <p>6.D.2 Use probability to solve real-world and mathematical problems; represent probabilities using fractions and decimals.</p> <p>6.D.2.1 Represent possible outcomes using a probability continuum from impossible to certain.</p> <p>6.D.2.2 Determine the sample space for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations.</p> <p>6.D.2.3 Demonstrate simple experiments in which the probabilities are known and compare the resulting relative frequencies with the known probabilities, recognizing that there may be differences between the two results.</p>	<p>7.D.1 Display and analyze data in a variety of ways.</p> <p>7.D.1.1 Design simple experiments, collect data and calculate measures of central tendency (mean, median, and mode) and spread (range). Use these quantities to draw conclusions about the data collected and make predictions.</p> <p>7.D.1.2 Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. Choose the appropriate data display and know how to create the display using a spreadsheet or other graphing technology.</p> <p>7.D.2 Calculate probabilities and reason about probabilities using proportions to solve real-world and mathematical problems.</p> <p>7.D.2.1 Determine the theoretical probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1.</p> <p>7.D.2.2 Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.</p> <p>7.D.2.3 Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on probabilities.</p>	<p>PA.D.1 Display and interpret data in a variety of ways, including using scatterplots and approximate lines of best fit. Use line of best fit and average rate of change to make predictions and draw conclusions about data.</p> <p>PA.D.1.1 Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet and use a calculator to examine this impact.</p> <p>PA.D.1.2 Explain how outliers affect measures of central tendency.</p> <p>PA.D.1.3 Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit, make statements about average rate of change, and make predictions about values not in the original data set. Use appropriate titles, labels and units.</p> <p>PA.D.2 Calculate experimental probabilities and reason about probabilities to solve real-world and mathematical problems.</p> <p>PA.D.2.1 Calculate experimental probabilities and represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.</p> <p>PA.D.2.2 Determine how samples are chosen (random, limited, biased) to draw and support conclusions about generalizing a sample to a population.</p> <p>PA.D.2.3 Compare and contrast dependent and independent events.</p>



Number & Operations (N)

Pre-Algebra (PA)	Algebra 1 (A1)	Algebra 2 (A2)
<p>PA.N.1 Read, write, compare, classify, and represent real numbers and use them to solve problems in various contexts.</p> <p>PA.N.1.1 Develop and apply the properties of integer exponents, including $a^0 = 1$ (with $a \neq 0$), to generate equivalent numerical and algebraic expressions.</p> <p>PA.N.1.2 Express and compare approximations of very large and very small numbers using scientific notation.</p> <p>PA.N.1.3 Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation.</p> <p>PA.N.1.4 Classify real numbers as rational or irrational. Explain why the rational number system is closed under addition and multiplication and why the irrational system is not. Explain why the sum of a rational number and an irrational number is irrational; and the product of a non-zero rational number and an irrational number is irrational.</p> <p>PA.N.1.5 Compare real numbers; locate real numbers on a number line. Identify the square root of a perfect square to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers.</p>	<p>A1.N.1 Extend the understanding of number and operations to include square roots and cube roots.</p> <p>A1.N.1.1 Write square roots and cube roots of monomial algebraic expressions in simplest radical form.</p> <p>A1.N.1.2 Add, subtract, multiply, and simplify square roots of monomial algebraic expressions and divide square roots of whole numbers, rationalizing the denominator when necessary.</p>	<p>A2.N.1 Extend the understanding of number and operations to include complex numbers, matrices, radical expressions, and expressions written with rational exponents.</p> <p>A2.N.1.1 Find the value of i^n for any whole number n.</p> <p>A2.N.1.2 Simplify, add, subtract, multiply, and divide complex numbers.</p> <p>A2.N.1.3 Use matrices to organize and represent data. Identify the order (dimension) of a matrix, add and subtract matrices of appropriate dimensions, and multiply a matrix by a scalar to create a new matrix to solve problems.</p> <p>A2.N.1.4 Understand and apply the relationship of rational exponents to integer exponents and radicals to solve problems.</p>

Algebraic Reasoning & Algebra (A)

Pre-Algebra (PA)	Algebra 1 (A1)	Algebra 2 (A2)
<p>PA.A.1 Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions.</p> <p>PA.A.1.1 Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable.</p> <p>PA.A.1.2 Use linear functions to represent and explain real-world and mathematical situations.</p> <p>PA.A.1.3 Identify a function as linear if it can be expressed in the form $y = mx + b$ or if its graph is a straight line.</p> <p>PA.A.2 Recognize linear functions in real-world and mathematical situations; represent linear functions and other function with tables, verbal descriptions, symbols, and graphs; solve problems involving linear functions and interpret results in the original context.</p>	<p>A1.A.1 Represent and solve mathematical and real-world problems using linear equations, absolute value equations, and systems of equations; interpret solutions in the original context.</p> <p>A1.A.1.1 Use knowledge of solving equations with rational values to represent and solve mathematical and real-world problems (e.g., angle measures, geometric formulas, science, or statistics) and interpret the solutions in the original context.</p> <p>A1.A.1.2 Solve absolute value equations and interpret the solutions in the original context.</p> <p>A1.A.1.3 Analyze and solve real-world and mathematical problems involving systems of linear equations with a maximum of two variables by graphing (may include graphing calculator or other appropriate technology), substitution, and elimination. Interpret the solutions in the original context.</p>	<p>A2.A.1 Represent and solve mathematical and real-world problems using nonlinear equations and systems of linear equations; interpret the solutions in the original context.</p> <p>A2.A.1.1 Represent real-world or mathematical problems using quadratic equations and solve using various methods (including graphing calculator or other appropriate technology), factoring, completing the square, and the quadratic formula. Find non-real roots when they exist.</p> <p>A2.A.1.2 Represent real-world or mathematical problems using exponential equations, such as compound interest, depreciation, and population growth, and solve these equations graphically (including graphing calculator or other appropriate technology) or algebraically.</p> <p>A2.A.1.3 Solve one-variable rational equations and check for extraneous solutions.</p> <p>A2.A.1.4 Solve polynomial equations with real roots using</p>



Algebraic Reasoning & Algebra (A)

Pre-Algebra (PA)	Algebra 1 (A1)	Algebra 2 (A2)
<p>PA.A.2.1 Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.</p> <p>PA.A.2.2 Identify, describe, and analyze linear relationships between two variables.</p> <p>PA.A.2.3 Identify graphical properties of linear functions including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.</p> <p>PA.A.2.4 Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects.</p> <p>PA.A.2.5 Solve problems involving linear functions and interpret results in the original context.</p> <p>PA.A.3 Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.</p> <p>PA.A.3.1 Use substitution to simplify and evaluate algebraic expressions.</p> <p>PA.A.3.2 Justify steps in generating equivalent expressions by identifying the properties used, including the properties of operations (associative, commutative, and distributive laws) and the order of operations, including grouping symbols.</p> <p>PA.A.4 Represent real-world and mathematical problems using equations and inequalities involving linear expressions. Solve and graph equations and inequalities symbolically and graphically. Interpret solutions in the original context.</p> <p>PA.A.4.1 Illustrate, write, and solve mathematical and real-world problems using linear equations with one variable with one solution, infinitely many solutions, or no solutions. Interpret solutions in the original context.</p> <p>PA.A.4.2 Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $px + q > r$ and $px + q < r$, where p, q, and r are rational numbers.</p> <p>PA.A.4.3 Represent real-world situations using equations and inequalities involving one variable.</p>	<p>A1.A.2 Represent and solve real-world and mathematical problems using linear inequalities, compound inequalities and systems of linear inequalities; interpret solutions in the original context.</p> <p>A1.A.2.1 Represent relationships in various contexts with linear inequalities; solve the resulting inequalities, graph on a coordinate plane, and interpret the solutions.</p> <p>A1.A.2.2 Represent relationships in various contexts with compound and absolute value inequalities and solve the resulting inequalities by graphing, and interpreting the solutions on a number line.</p> <p>A1.A.2.3 Solve systems of linear inequalities with a maximum of two variables; graph and interpret the solutions on a coordinate plane.</p> <p>A1.A.3 Generate equivalent algebraic expressions and use algebraic properties to evaluate expressions and arithmetic and geometric sequences.</p> <p>A1.A.3.1 Solve equations involving several variables for one variable in terms of the others.</p> <p>A1.A.3.2 Simplify polynomial expressions by adding, subtracting, or multiplying.</p> <p>A1.A.3.3 Factor common monomial factors from polynomial expressions and factor quadratic expressions with a leading coefficient of 1.</p> <p>A1.A.3.4 Evaluate linear, absolute value, rational, and radical expressions. Include applying a nonstandard operation such as $a \odot b = 2a + b$.</p> <p>A1.A.3.5 Recognize that arithmetic sequences are linear using equations, tables, graphs, and verbal descriptions. Using the pattern, find the next term.</p> <p>A1.A.3.6 Recognize that geometric sequences are exponential using equations, tables, graphs and verbal descriptions. Given the formula $f(x) = a(r)^x$, find the next term and define the meaning of a and r within the context of the problem.</p> <p>A1.A.4 Analyze mathematical change involving linear equations in real-world and mathematical problems.</p> <p>A1.A.4.1 Calculate and interpret slope and the x- and y-intercepts of a line using a graph, an equation, two points, or a set of data points to solve real-world and mathematical</p>	<p>various methods and tools that may include factoring, polynomial division, synthetic division, graphing calculators or other appropriate technology.</p> <p>A2.A.1.5 Solve square root equations with one variable and check for extraneous solutions.</p> <p>A2.A.1.6 Solve common and natural logarithmic equations using the properties of logarithms.</p> <p>A2.A.1.7 Solve real-world and mathematical problems that can be modeled using arithmetic or finite geometric sequences or series given the n^{th} terms and sum formulas. Graphing calculators or other appropriate technology may be used.</p> <p>A2.A.1.8 Represent real-world or mathematical problems using systems of linear equations with a maximum of three variables and solve using various methods that may include substitution, elimination, and graphing (may include graphing calculators or other appropriate technology).</p> <p>A2.A.1.9 Solve systems of equations containing one linear equation and one quadratic equation using tools that may include graphing calculators or other appropriate technology.</p> <p>A2.A.2 Represent and analyze mathematical situations and structures using algebraic symbols using various strategies to write equivalent forms of expressions.</p> <p>A2.A.2.1 Factor polynomial expressions including but not limited to trinomials, differences of squares, sum and difference of cubes, and factoring by grouping using a variety of tools and strategies.</p> <p>A2.A.2.2 Add, subtract, multiply, divide, and simplify polynomial and rational expressions.</p> <p>A2.A.2.3 Recognize that a quadratic function has different equivalent representations [$f(x) = ax^2 + bx + c$, $f(x) = a(x - h)^2 + k$, and $f(x) = (x - h)(x - k)$]. Identify and use the representation that is most appropriate to solve real-world and mathematical problems.</p> <p>A2.A.2.4 Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p>



Functions (F)		
Pre-Algebra (PA)	Algebra 1 (A1)	Algebra 2 (A2)
problems.	<p>problems.</p> <p>A1.A.4.2 Solve mathematical and real-world problems involving lines that are parallel, perpendicular, horizontal, or vertical.</p> <p>A1.A.4.3 Express linear equations in slope-intercept, point-slope, and standard forms and convert between these forms. Given sufficient information (slope and y-intercept, slope and one-point on the line, two points on the line, x- and y-intercept, or a set of data points), write the equation of a line.</p> <p>A1.A.4.4 Translate between a graph and a situation described qualitatively.</p>	
Strand addressed at other grade levels.	<p>A1.F.1 Understand functions as descriptions of covariation (how related quantities vary together) in real-world and mathematical problems.</p> <p>A1.F.1.1 Distinguish between relations and functions.</p> <p>A1.F.1.2 Identify the dependent and independent variables as well as the domain and range given a function, equation, or graph. Identify restrictions on the domain and range in real-world contexts.</p> <p>A1.F.1.3 Write linear functions, using function notation, to model real-world and mathematical situations.</p> <p>A1.F.1.4 Given a graph modeling a real-world situation, read and interpret the linear piecewise function (excluding step functions).</p> <p>A1.F.2 Recognize functions and understand that families of functions are characterized by their rate of change.</p> <p>A1.F.2.1 Distinguish between linear and nonlinear (including exponential) functions arising from real-world and mathematical situations that are represented in tables, graphs, and equations. Understand that linear functions grow by equal intervals and that exponential functions grow by equal factors over equal intervals.</p> <p>A1.F.2.2 Recognize the graph of the functions $f(x) = x$ and $f(x) = x$ and predict the effects of transformations [$f(x + c)$ and $f(x) + c$, where c is a positive or negative constant] algebraically and graphically using various</p>	<p>A2.F.1 Understand functions as descriptions of covariation (how related quantities vary together).</p> <p>A2.F.1.1 Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.</p> <p>A2.F.1.2 Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [$f(x + c)$, $f(x) + c$, $f(cx)$, and $cf(x)$, where c is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.</p> <p>A2.F.1.3 Graph a quadratic function. Identify the x- and y-intercepts, maximum or minimum value, axis of symmetry, and vertex using various methods and tools that may include a graphing calculator or appropriate technology.</p> <p>A2.F.1.4 Graph exponential and logarithmic functions. Identify asymptotes and x- and y-intercepts using various methods and tools that may include graphing calculators or other appropriate technology. Recognize exponential decay and growth graphically and algebraically.</p> <p>A2.F.1.5 Analyze the graph of a polynomial function by identifying the domain, range, intercepts, zeros, relative maxima, relative minima, and intervals of increase and</p>



	<p>methods and tools that may include graphing calculators.</p> <p>A1.F.3 Represent functions in multiple ways and use the representation to interpret real-world and mathematical problems.</p> <p>A1.F.3.1 Identify and generate equivalent representations of linear equations, graphs, tables, and real-world situations.</p> <p>A1.F.3.2 Use function notation; evaluate a function, including nonlinear, at a given point in its domain algebraically and graphically. Interpret the results in terms of real-world and mathematical problems.</p> <p>A1.F.3.3 Add, subtract, and multiply functions using function notation.</p>	<p>decrease.</p> <p>A2.F.1.6 Graph a rational function and identify the x- and y-intercepts, vertical and horizontal asymptotes, using various methods and tools that may include a graphing calculator or other appropriate technology. (Excluding slant or oblique asymptotes and holes.)</p> <p>A2.F.1.7 Graph a radical function (square root and cube root only) and identify the x- and y-intercepts using various methods and tools that may include a graphing calculator or other appropriate technology.</p> <p>A2.F.1.8 Graph piecewise functions with no more than three branches (including linear, quadratic, or exponential branches) and analyze the function by identifying the domain, range, intercepts, and intervals for which it is increasing, decreasing, and constant.</p> <p>A2.F.2 Analyze functions through algebraic combinations, compositions, and inverses, if they exist.</p> <p>A2.F.2.1 Add, subtract, multiply, and divide functions using function notation and recognize domain restrictions.</p> <p>A2.F.2.2 Combine functions by composition and recognize that $g(x) = f^{-1}(x)$, the inverse function of $f(x)$, if and only if $f(g(x)) = g(f(x)) = x$.</p> <p>A2.F.2.3 Find and graph the inverse of a function, if it exists, in real-world and mathematical situations. Know that the domain of a function f is the range of the inverse function f^{-1}, and the range of the function f is the domain of the inverse function f^{-1}.</p> <p>A2.F.2.4 Apply the inverse relationship between exponential and logarithmic functions to convert from one form to another.</p>
Data & Probability (D)		
Pre-Algebra (PA)	Algebra 1 (A1)	Algebra 2 (A2)
<p>PA.D.1 Display and interpret data in a variety of ways, including using scatterplots and approximate lines of best fit. Use line of best fit and average rate of change to make predictions and draw conclusions about data.</p> <p>PA.D.1.1 Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet and</p>	<p>A1.D.1 Display, describe, and compare data. For linear relationships, make predictions and assess the reliability of those predictions.</p> <p>A1.D.1.1 Describe a data set using data displays, describe and compare data sets using summary statistics, including measures of central tendency, location, and spread. Know how to use calculators, spreadsheets, or other appropriate</p>	<p>A2.D.1 Display, describe, and compare data. For linear and nonlinear relationships, make predictions and assess the reliability of those predictions.</p> <p>A2.D.1.1 Use the mean and standard deviation of a data set to fit it to a normal distribution (bell-shaped curve).</p> <p>A2.D.1.2 Collect data and use scatterplots to analyze patterns and describe linear, exponential or quadratic</p>



Data & Probability (D)

Pre-Algebra (PA)	Algebra 1 (A1)	Algebra 2 (A2)
<p>use a calculator to examine this impact.</p> <p>PA.D.1.2 Explain how outliers affect measures of central tendency.</p> <p>PA.D.1.3 Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit, make statements about average rate of change, and make predictions about values not in the original data set. Use appropriate titles, labels and units.</p> <p>PA.D.2 Calculate experimental probabilities and reason about probabilities to solve real-world and mathematical problems.</p> <p>PA.D.2.1 Calculate experimental probabilities and represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.</p> <p>PA.D.2.2 Determine how samples are chosen (random, limited, biased) to draw and support conclusions about generalizing a sample to a population.</p> <p>PA.D.2.3 Compare and contrast dependent and independent events.</p>	<p>technology to display data and calculate summary statistics.</p> <p>A1.D.1.2 Collect data and use scatterplots to analyze patterns and describe linear relationships between two variables. Using graphing technology, determine regression lines and correlation coefficients; use regression lines to make predictions and correlation coefficients to assess the reliability of those predictions.</p> <p>A1.D.1.3 Interpret graphs as being discrete or continuous.</p> <p>A1.D.2 Calculate probabilities and apply probability concepts.</p> <p>A1.D.2.1 Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.</p> <p>A1.D.2.2 Describe the concepts of intersections, unions, and complements using Venn diagrams to evaluate probabilities. Understand the relationships between these concepts and the words AND, OR, and NOT.</p> <p>A1.D.2.3 Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.</p> <p>A1.D.2.4 Apply probability concepts to real-world situations to make informed decisions.</p>	<p>relationships between two variables. Using graphing calculators or other appropriate technology, determine regression equation and correlation coefficients; use regression equations to make predictions and correlation coefficients to assess the reliability of those predictions.</p> <p>A2.D.1.3 Based upon a real-world context, recognize whether a discrete or continuous graphical representation is appropriate and then create the graph.</p> <p>A2.D.2 Analyze statistical thinking to draw inferences, make predictions, and justify conclusions.</p> <p>A2.D.2.1 Evaluate reports based on data published in the media by identifying the source of the data, the design of the study, and the way the data are analyzed and displayed. Given spreadsheets, tables, or graphs, recognize and analyze distortions in data displays. Show how graphs and data can be distorted to support different points of view.</p> <p>A2.D.2.2 Identify and explain misleading uses of data. Recognize when arguments based on data confuse correlation and causation.</p>



Reasoning & Logic (G.RL)		
Seventh Grade (7)	Pre-Algebra (PA)	Geometry (G)
Topic addressed at other grade levels.	Topic addressed at other grade levels.	<p>G.RL.1 Use appropriate tools and logic to evaluate mathematical arguments.</p> <p>G.RL.1.1 Understand the use of undefined terms, definitions, postulates, and theorems in logical arguments/proofs.</p> <p>G.RL.1.2 Analyze and draw conclusions based on a set of conditions using inductive and deductive reasoning. Recognize the logical relationships between a conditional statement and its inverse, converse, and contrapositive.</p> <p>G.RL.1.3 Assess the validity of a logical argument and give counterexamples to disprove a statement.</p>
Two Dimensional Shapes (G.2D)		
Seventh Grade (7)	Pre-Algebra (PA)	Geometry (G)
<p>7.GM.2 Determine the area of trapezoids and area and perimeter of composite figures.</p> <p>7.GM.2.1 Develop and use the formula to determine the area of a trapezoid to solve problems.</p> <p>7.GM.2.2 Find the area and perimeter of composite figures to solve real-world and mathematical problems.</p> <p>7.GM.4 Analyze the effect of dilations, translations, and reflections on the attributes of two-dimensional figures on and off the coordinate plane.</p> <p>7.GM.4.1 Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors resulting from dilations.</p> <p>7.GM.4.2 Apply proportions, ratios, and scale factors to solve problems involving scale drawings and determine side lengths and areas of similar triangles and rectangles.</p> <p>7.GM.4.3 Graph and describe translations and reflections of figures on a coordinate plane and determine the coordinates of the vertices of the figure after the transformation.</p>	Topic addressed at other grade levels.	<p>G.2D.1 Discover, evaluate, and analyze the relationships between lines, angles, and polygons to solve real-world and mathematical problems; express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts, or illustrations.</p> <p>G.2D.1.1 Apply the properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve real-world and mathematical problems and determine if two lines are parallel, using algebraic reasoning and proofs.</p> <p>G.2D.1.2 Apply the properties of angles, including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve real-world and mathematical problems using algebraic reasoning and proofs.</p> <p>G.2D.1.3 Apply theorems involving the interior and exterior angle sums of polygons and use them to solve real-world and mathematical problems using algebraic reasoning and proofs.</p> <p>G.2D.1.4 Apply the properties of special quadrilaterals (square, rectangle, trapezoid, isosceles trapezoid, rhombus, kite, parallelogram) and use them to solve real-world and mathematical problems involving angle measures and segment lengths using algebraic reasoning and proofs.</p> <p>G.2D.1.5 Use coordinate geometry to represent and</p>



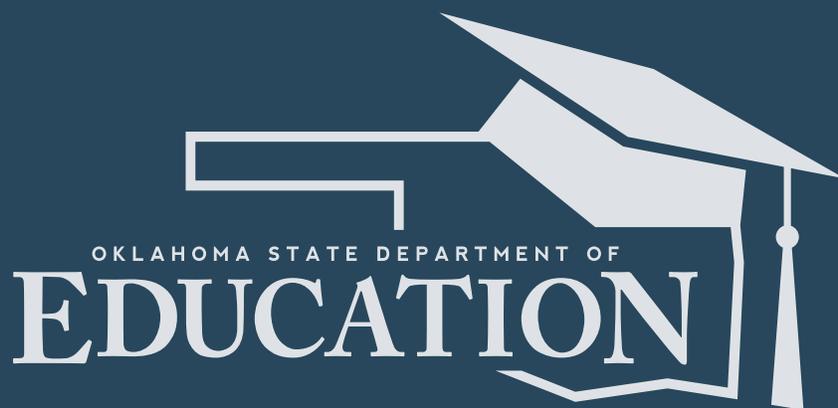
		<p>analyze line segments and polygons, including determining lengths, midpoints, and slopes of line segments.</p> <p>G.2D.1.6 Apply the properties of polygons to solve real-world and mathematical problems involving perimeter and area (e.g., triangles, special quadrilaterals, regular polygons up to 12 sides, composite figures).</p> <p>G.2D.1.7 Apply the properties of congruent or similar polygons to solve real-world and mathematical problems using algebraic and logical reasoning.</p> <p>G.2D.1.8 Construct logical arguments to prove triangle congruence (SSS, SAS, ASA, AAS and HL) and triangle similarity (AA, SSS, SAS).</p> <p>G.2D.1.9 Use numeric, graphic and algebraic representations of transformations in two dimensions, such as reflections, translations, dilations, and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate plane and identify types of symmetry.</p>
Three Dimensional Shapes (G.3D)		
Seventh Grade (7)	Pre-Algebra (PA)	Geometry (G)
<p>7.GM.1 Develop and understand the concept of surface area and volume of rectangular prisms.</p> <p>7.GM.1.1 Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism with rational-valued edge lengths can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements such as cm^2.</p> <p>7.GM.1.2 Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with rational-valued edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as cm^3.</p>	<p>PA.GM.2 Calculate surface area and volume of three-dimensional figures.</p> <p>PA.GM.2.1 Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate measurements such as cm^2.</p> <p>PA.GM.2.2 Calculate the surface area of a cylinder, in terms of π and using approximations for π, using decomposition or nets. Use appropriate measurements such as cm^2.</p> <p>PA.GM.2.3 Develop and use the formulas $V = lwh$ and $V = Bh$ to determine the volume of rectangular prisms. Justify why base area (B) and height (h) are multiplied to find the volume of a rectangular prism. Use appropriate measurements such as cm^3.</p> <p>PA.GM.2.4 Develop and use the formulas $V = \pi r^2 h$ and $V = Bh$ to determine the volume of right cylinders, in terms of π and using approximations for π. Justify why base area (B) and height (h) are multiplied to find the volume of a right cylinder. Use appropriate measurements such as cm^3.</p>	<p>G.3D.1 Solve real-world and mathematical problems involving three-dimensional figures.</p> <p>G.3D.1.1 Solve real-world and mathematical problems using the surface area and volume of prisms, cylinders, pyramids, cones, spheres, and composites of these figures. Use nets, measuring devices, or formulas as appropriate.</p> <p>G.3D.1.2 Use ratios derived from similar three-dimensional figures to make conjectures, generalize, and to solve for unknown values such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.</p>



Circles (G.C)		
Seventh Grade (7)	Pre-Algebra (PA)	Geometry (G)
<p>7.GM.3 Use reasoning with proportions and ratios to determine measurements, justify formulas, and solve real-world and mathematical problems involving circles and related geometric figures.</p> <p>7.GM.3.1 Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is n and can be approximated by rational numbers such as $\frac{22}{7}$ and 3.14.</p> <p>7.GM.3.2 Calculate the circumference and area of circles to solve problems in various contexts, in terms of π and using approximations for π.</p>	<p>Topic addressed at other grade levels.</p>	<p>G.C.1 Solve real-world and mathematical problems using the properties of circles.</p> <p>G.C.1.1 Apply the properties of circles to solve problems involving circumference and area, approximate values and in terms of π, using algebraic and logical reasoning.</p> <p>G.C.1.2 Apply the properties of circles and relationships among angles; arcs; and distances in a circle among radii, chords, secants and tangents to solve problems using algebraic and logical reasoning.</p> <p>G.C.1.3 Recognize and write the radius r, center (h, k), and standard form of the equation of a circle $(x - h)^2 + (y - k)^2 = r^2$ with and without graphs.</p> <p>G.C.1.4 Apply the distance and midpoint formula, where appropriate, to develop the equation of a circle in standard form.</p>
Right Triangle Trigonometry (G.RT)		
Seventh Grade (7)	Pre-Algebra (PA)	Geometry (G)
<p>Topic addressed at other grade levels.</p>	<p>PA.GM.1 Solve problems involving right triangles using the Pythagorean Theorem.</p> <p>PA.GM.1.1 Informally justify the Pythagorean Theorem using measurements, diagrams, or dynamic software and use the Pythagorean Theorem to solve problems in two and three dimensions involving right triangles.</p> <p>PA.GM.1.2 Use the Pythagorean Theorem to find the distance between any two points in a coordinate plane.</p>	<p>G.RT.1 Develop and verify mathematical relationships of right triangles and trigonometric ratios to solve real-world and mathematical problems.</p> <p>G.RT.1.1 Apply the distance formula and the Pythagorean Theorem and its converse to solve real-world and mathematical problems, as approximate and exact values, using algebraic and logical reasoning (include Pythagorean Triples).</p> <p>G.RT.1.2 Verify and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems using algebraic and logical reasoning.</p> <p>G.RT.1.3 Use the definition of the trigonometric functions to determine the sine, cosine, and tangent ratio of an acute angle in a right triangle. Apply the inverse trigonometric functions to find the measure of an acute angle in right triangles.</p> <p>G.RT.1.4 Apply the trigonometric functions as ratios (sine, cosine, and tangent) to find side lengths in right triangles in real-world and mathematical problems.</p>



SCIENCE



OKLAHOMA
ACADEMIC
STANDARDS

5-PS1-1 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Develop a model to describe phenomena. ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Structure and Properties of Matter:</p> <ul style="list-style-type: none"> • Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. • A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon; the effects of air on larger particles or objects. 	<p>5-PS1-1 <i>Students who demonstrate understanding can:</i></p> <p>Develop a model to describe that matter is made of particles too small to be seen.</p> <p>Clarification Statement: Examples of evidence that could be utilized in building models include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.</p> <p>Assessment Boundary: Assessment does not include atomic-scale mechanism of evaporation and condensation or defining the unseen particles.</p>

Crosscutting Concepts: Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

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5-PS1-2 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. <ul style="list-style-type: none"> • Measure and graph quantities such as weight to address scientific and engineering questions and problems. ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Structure and Properties of Matter:</p> <ul style="list-style-type: none"> • The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. <p>Chemical Reactions:</p> <ul style="list-style-type: none"> • No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) 	<p>5-PS1-2 <i>Students who demonstrate understanding can:</i></p> <p>Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.</p> <p>Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that forms new substances.</p> <p>Assessment Boundary: Assessment does not include distinguishing mass and weight.</p>

Crosscutting Concepts: Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

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5-PS1-3 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. <ul style="list-style-type: none"> • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Structure and Properties of Matter:</p> <ul style="list-style-type: none"> • Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) 	<p>5-PS1-3 <i>Students who demonstrate understanding can:</i></p> <p>Make observations and measurements to identify materials based on their properties.</p> <p>Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.</p> <p>Assessment Boundary: Assessment does not include density or distinguishing mass and weight.</p>

Crosscutting Concepts: Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

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5-PS1-4 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. <ul style="list-style-type: none"> • Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>Chemical Reactions:</p> <ul style="list-style-type: none"> • When two or more different substances are mixed, a new substance with different properties may be formed. 	<p>5-PS1-4 <i>Students who demonstrate understanding can:</i></p> <p>Conduct an investigation to determine whether the mixing of two or more substances results in new substances.</p> <p>Clarification Statement: Examples of interactions forming new substances can include mixing baking soda and vinegar. Examples of interactions not forming new substances can include mixing baking soda and water.</p>

Crosscutting Concepts: Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-PS2-1 Motion and Stability: Forces and Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ➑ Obtaining, evaluating, and communicating information 	<p>Types of Interactions:</p> <ul style="list-style-type: none"> • The gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center. 	<p>5-PS2-1 <i>Students who demonstrate understanding can:</i></p> <p>Support an argument that the gravitational force exerted by the Earth is directed down.</p> <p>Clarification Statement: “Down” is a local description of the direction that points toward the center of the spherical earth. Earth causes objects to have a force on them that point toward the center of the Earth, “down”. Support for arguments can be drawn from diagrams, evidence, and data that are provided.</p> <p>Assessment Boundary: Mathematical representation of gravitational force is not assessed.</p>

Crosscutting Concepts: Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-PS3-1 Energy

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> • Use models to describe phenomena. <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering)</p> <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Energy in Chemical Processes and Everyday Life:</p> <ul style="list-style-type: none"> • The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). <p>Organization of Matter and Energy Flow in Organisms:</p> <ul style="list-style-type: none"> • Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. 	<p>5-PS3-1 <i>Students who demonstrate understanding can:</i></p> <p>Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p> <p>Clarification Statement: Examples of models could include diagrams, and flow charts.</p> <p>Assessment Boundary: Assessment does not include cellular mechanisms of digestive absorption.</p>

Crosscutting Concepts: Energy and Matter

- Energy can be transferred in various ways and between objects.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-LS1-1 From Molecules to Organisms: Structure and Processes

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world. <ul style="list-style-type: none"> • Support an argument with evidence, data, or a model. 8 Obtaining, evaluating, and communicating information 	<p>Organization for Matter and Energy Flow in Organisms:</p> <ul style="list-style-type: none"> • Plants acquire their material for growth chiefly from air and water. 	<p>5-LS1-1 <i>Students who demonstrate understanding can:</i></p> <p>Support an argument that plants get the materials they need for growth chiefly from air and water.</p> <p>Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.</p>

Crosscutting Concepts: Energy and Matter

- Matter is transported into, out of, and within systems.

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Mathematics

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5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> • Develop a model to describe phenomena. <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering)</p> <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Interdependent Relationships in Ecosystems:</p> <ul style="list-style-type: none"> • The food of almost any kind of animal can be traced back to plants. • Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. • Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” • Decomposition eventually restores (recycles) some materials back to the soil. • Organisms can survive only in environments in which their particular needs are met. • A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. • Newly introduced species can damage the balance of an ecosystem. <p>Cycles of Matter and Energy Transfer in Ecosystems:</p> <ul style="list-style-type: none"> • Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. • Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. 	<p>5-LS2-1 <i>Students who demonstrate understanding can:</i></p> <p>Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p> <p>Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.</p> <p>Assessment Boundaries: Assessment does not include molecular explanations.</p>

Crosscutting Concepts: Systems and System Models

- A system can be described in terms of its components and their interactions.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

5-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. <ul style="list-style-type: none"> • Use models to describe phenomena. 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>Interdependent Relationships in Ecosystems:</p> <ul style="list-style-type: none"> • Organisms can survive only in environments in which their particular needs are met. • A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. • Newly introduced species can damage the balance of an ecosystem. 	<p>5-LS2-2 <i>Students who demonstrate understanding can:</i></p> <p>Use models to explain factors that upset the stability of local ecosystems.</p> <p>Clarification Statement: Factors that upset an ecosystem's stability includes: invasive species, drought, human development, and removal of predators. Models could include simulations, and representations, etc.</p> <p>Assessment Boundaries: Assessment does not include molecular explanations.</p>

Crosscutting Concepts: Systems and System Models

- A system can be described in terms of its components and their interactions.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-ESS1-1 Earth's Place in the Universe

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). <ul style="list-style-type: none"> • Support an argument with evidence, data, or a model. ➑ Obtaining, evaluating, and communicating information 	<p>The Universe and Its Stars:</p> <ul style="list-style-type: none"> • The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. 	<p>5-ESS1-1 <i>Students who demonstrate understanding can:</i></p> <p>Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.</p> <p>Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).</p>

Crosscutting Concepts: Scale, Proportion and Quantity

- Natural objects exist from the very small to the immensely large.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-ESS1-2 Earth's Place in the Universe

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. <ul style="list-style-type: none"> • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Earth and the Solar System:</p> <ul style="list-style-type: none"> • The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. 	<p>5-ESS1-2 <i>Students who demonstrate understanding can:</i></p> <p>Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.</p> <p>Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.</p> <p>Assessment Boundary: Assessment does not include causes of seasons.</p>

Crosscutting Concepts: Patterns

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-ESS2-1 Earth's Systems

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> Develop a model using an example to describe phenomena. <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering)</p> <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Earth Materials and System:</p> <ul style="list-style-type: none"> Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. 	<p>5-ESS2-1 <i>Students who demonstrate understanding can:</i></p> <p>Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.</p> <p>Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.</p> <p>Assessment Boundary: Assessment is limited to the interactions of two systems at a time.</p>

Crosscutting Concepts: System and System Models

- A system can be described in terms of its components and their interactions.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-ESS2-2 Earth's Systems

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ol style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. <ul style="list-style-type: none"> • Describe and graph quantities such as area and volume to address scientific questions. 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>The Roles of Water in Earth's Surface Processes:</p> <ul style="list-style-type: none"> • Nearly all of Earth's available water is in the ocean. • Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. 	<p>5-ESS2-2 <i>Students who demonstrate understanding can:</i></p> <p>Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.</p> <p>Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere. Only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.</p>

Crosscutting Concepts: Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight and volume.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

5-ESS3-1 Earth and Human Activity

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information Obtaining, evaluating, and communicating information in 3– 5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. <ul style="list-style-type: none"> • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. 	<p>Human Impacts on Earth Systems:</p> <ul style="list-style-type: none"> • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments. 	<p>5-ESS3-1 <i>Students who demonstrate understanding can:</i></p> <p>Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p> <p>Clarification Statement: Examples of information might include the use of natural fertilizers or biological pest control by farmers, replanting trees after cutting them by the logging industry, and the institution of recycling programs in cities.</p> <p>Assessment Boundary: N/A</p>

Crosscutting Concepts: System and System Models

- A system can be described in terms of its components and their interactions.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-PS1-3 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ol style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods. <ul style="list-style-type: none"> • Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. 	<p>Structure and Properties of Matter:</p> <ul style="list-style-type: none"> • Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. <p>Chemical Reactions:</p> <ul style="list-style-type: none"> • Substances react chemically in characteristic ways. • In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. <hr/> <p><i>* Connections to Engineering, Technology, and Application of Science</i></p> <p>Interdependence of Science, Engineering, and Technology:</p> <ul style="list-style-type: none"> • Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. <p>Interdependence of Science, Engineering, and Technology on Society and the Natural World:</p> <ul style="list-style-type: none"> • The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. 	<p>MS-PS1-3 <i>Students who demonstrate understanding can:</i></p> <p>Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.*</p> <p>Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.</p> <p>Assessment Boundary: Not assessed at state level*.</p>

Crosscutting Concepts: Structure and Function

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

MS-PS1-5 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <ul style="list-style-type: none"> • Develop a model to describe unobservable mechanisms. <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering)</p> <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Chemical Reactions:</p> <ul style="list-style-type: none"> • Substances react chemically in characteristic ways. • In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. • The total number of each type of atom is conserved, and thus the mass does not change. <hr/> <p><i>* Connections to Engineering, Technology, and Application of Science</i></p> <p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena:</p> <ul style="list-style-type: none"> • Laws are regularities or mathematical descriptions of natural phenomena. 	<p>MS-PS1-5 <i>Students who demonstrate understanding can:</i></p> <p>Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</p> <p>Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.</p> <p>Assessment Boundary: Assessment does not include the use of atomic masses or intermolecular forces.</p>

Crosscutting Concepts: Energy and Matter

- Matter is conserved because atoms are conserved in physical and chemical processes.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-PS1-6 Matter and Its Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ol style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. <ul style="list-style-type: none"> • Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>Chemical Reactions:</p> <ul style="list-style-type: none"> • Some chemical reactions release energy, others store energy. <p>Developing Possible Solutions: (secondary to MS-PS1-6)</p> <ul style="list-style-type: none"> • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. <p>Optimizing the Design Solution: (secondary to MS-PS1-6)</p> <ul style="list-style-type: none"> • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. • The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. 	<p>MS-PS1-6 <i>Students who demonstrate understanding can:</i></p> <p>Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.*</p> <p>Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.</p> <p>Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.</p>

Crosscutting Concepts: Energy and Matter

- The transfer of energy can be tracked as energy flows through a designed or natural system.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-PS2-1 Motion and Stability: Forces and Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. <ul style="list-style-type: none"> • Apply scientific ideas or principles to design an object, tool, process or system. ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Forces and Motion:</p> <ul style="list-style-type: none"> • For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton’s third law). <hr/> <p><i>* Connections to Engineering, Technology, and Application of Science</i></p> <p>Interdependence of Science, Engineering, and Technology on Society and the Natural World:</p> <ul style="list-style-type: none"> • The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. 	<p>MS-PS2-1 <i>Students who demonstrate understanding can:</i></p> <p>Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.*</p> <p>Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.</p> <p>Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.</p>

Crosscutting Concepts: Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

MS-PS2-2 Motion and Stability: Forces and Interactions

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models</p> <p>3 Planning and carrying out investigations Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.</p> <ul style="list-style-type: none"> Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering)</p> <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Forces and Motion:</p> <ul style="list-style-type: none"> The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. 	<p>MS-PS2-2 <i>Students who demonstrate understanding can:</i></p> <p>Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.</p> <p>Clarification Statement: Emphasis is on balanced (Newton’s First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton’s Second Law), frame of reference, and specification of units.</p> <p>Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.</p>

Crosscutting Concepts: Stability and Change

- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

MS-PS4-1 Waves and Their Applications in Technologies for Information Transfer

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking Mathematical and computational thinking at the 6–8 level builds on K–5 and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments. <ul style="list-style-type: none"> • Use mathematical representations to describe and/or support scientific conclusions and design solutions. 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>Waves Properties:</p> <ul style="list-style-type: none"> • A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. 	<p>MS-PS4-1 <i>Students who demonstrate understanding can:</i></p> <p>Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.</p> <p>Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.</p> <p>Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.</p>

Crosscutting Concepts: Patterns

- Graphs and charts can be used to identify patterns in data.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-PS4-2 Waves and Their Applications in Technologies for Information Transfer

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. <ul style="list-style-type: none"> • Develop and use a model to describe phenomena. ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Waves Properties:</p> <ul style="list-style-type: none"> • A sound wave needs a medium through which it is transmitted. <p>Electromagnetic Radiation:</p> <ul style="list-style-type: none"> • When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object’s material and the frequency (color) of the light. • The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. • A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. However, because light can travel through space, it cannot be a matter wave, like sound or water waves. 	<p>MS-PS4-2 <i>Students who demonstrate understanding can:</i></p> <p>Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.</p> <p>Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.</p> <p>Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.</p>

Crosscutting Concepts: Structure and Function

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

Oklahoma Academic Standards Connections

ELA/Literacy	Mathematics
<p>SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add to the discussion.</p>	<p>N/A</p>

Connection to PASS Coming Soon

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

MS-PS4-3 Waves and Their Applications in Technologies for Information Transfer

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods. <ul style="list-style-type: none"> • Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings. 	<p>Information Technologies and Instrumentation:</p> <ul style="list-style-type: none"> • Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information. 	<p>MS-PS4-3 <i>Students who demonstrate understanding can:</i></p> <p>Integrate qualitative scientific and technical information to support the claim that digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.*</p> <p>Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.</p> <p>Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.</p>

Crosscutting Concepts: Structure and Function

- Structures can be designed to serve particular functions.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-LS1-7 From Molecules to Organisms: Structure and Processes

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. <ul style="list-style-type: none"> • Develop a model to describe unobservable mechanisms. 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>Organization for Matter and Energy Flow in Organisms:</p> <ul style="list-style-type: none"> • Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. <p>Energy in Chemical Processes and Everyday Life: (secondary to MS-LS1-7)</p> <ul style="list-style-type: none"> • Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. 	<p>MS-LS1-7 <i>Students who demonstrate understanding can:</i></p> <p>Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</p> <p>Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.</p> <p>Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.</p>

Crosscutting Concepts: Energy and Matter

- Matter is conserved because atoms are conserved in physical and chemical processes.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

MS-LS4-1 Biological Unity and Diversity

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. <ul style="list-style-type: none"> • Analyze and interpret data to determine similarities and differences in findings. ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Evidence of Common Ancestry and Diversity:</p> <ul style="list-style-type: none"> • The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. 	<p>MS-LS4-1 <i>Students who demonstrate understanding can:</i></p> <p>Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.</p> <p>Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.</p> <p>Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.</p>

Crosscutting Concepts: Patterns

- Graphs, charts, and images can be used to identify patterns in data.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-LS4-2 Biological Unity and Diversity

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models</p> <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</p> <ul style="list-style-type: none"> • Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Evidence of Common Ancestry and Diversity:</p> <ul style="list-style-type: none"> • The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. 	<p>MS-LS4-2 <i>Students who demonstrate understanding can:</i></p> <p>Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer ancestral relationships.</p> <p>Clarification Statement: Emphasis is on explanations of the ancestral relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.</p> <p>Assessment Boundary: N/A</p>

Crosscutting Concepts: Patterns

- Patterns can be used to identify cause and effect relationships.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-ESS1-4 Earth's Place in the Universe

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. <ul style="list-style-type: none"> • Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>The History of Planet Earth:</p> <ul style="list-style-type: none"> • The geologic time scale interpreted from rock strata provides a way to organize Earth's history. • Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. 	<p>MS-ESS1-4 <i>Students who demonstrate understanding can:</i></p> <p>Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history.</p> <p>Clarification Statement: Emphasis is on analyses of rock formations and fossils they contain to establish relative ages of major events in Earth's history. Major events could include the formation of mountain chains and ocean basins, adaptation and extinction of particular living organisms, volcanic eruptions, periods of massive glaciation, and the development of watersheds and rivers through glaciation and water erosion. The events in Earth's history happened in the past continue today. Scientific explanations can include models.</p> <p>Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.</p>

Crosscutting Concepts: Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-ESS2-1 Earth's Systems

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <ul style="list-style-type: none"> • Develop and use a model to describe phenomena. <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering)</p> <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Earth's Materials and Systems:</p> <ul style="list-style-type: none"> • All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. 	<p>MS-ESS2-1 <i>Students who demonstrate understanding can:</i></p> <p>Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.</p> <p>Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.</p> <p>Assessment Boundary: Assessment does not include the identification and naming of minerals.</p>

Crosscutting Concepts: Stability and Change

- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.

Oklahoma Academic Standards Connections

ELA/Literacy	Mathematics
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Connection to PASS Coming Soon

MS-ESS2-2 Earth's Systems

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. <ul style="list-style-type: none"> • Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Earth's Materials and Systems:</p> <ul style="list-style-type: none"> • The planet's systems interact over scales that range from microscopic to global in size. These interactions have shaped Earth's history and will determine its future. <p>The Roles of Water in Earth's Surface Processes:</p> <ul style="list-style-type: none"> • Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. 	<p>MS-ESS2-2 <i>Students who demonstrate understanding can:</i></p> <p>Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.</p> <p>Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of a large mountain ranges) or small (such as rapid landslides on microscopic geochemical reactions), and how many geoscience processes usually behave gradually but are punctuated by catastrophic events (such as earthquakes, volcanoes, and meteor impacts). Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.</p>

Crosscutting Concepts: Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-ESS2-3 Earth's Systems

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ol style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. <ul style="list-style-type: none"> • Analyze and interpret data to provide evidence for phenomena. 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence 8 Obtaining, evaluating, and communicating information 	<p>The History of Planet Earth: (Secondary to 8-ESS2-3)</p> <ul style="list-style-type: none"> • Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. <p>Plate Tectonics and Large-Scale System Interactions:</p> <ul style="list-style-type: none"> • Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. 	<p>MS-ESS2-3 <i>Students who demonstrate understanding can:</i></p> <p>Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.</p> <p>Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).</p> <p>Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.</p>

Crosscutting Concepts: Patterns

- Patterns in rates of change and other numerical relationships can provide information about natural systems.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-ESS3-1 Earth and Human Activity

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<p>1 Asking questions (for science) and defining problems (for engineering)</p> <p>2 Developing and using models</p> <p>3 Planning and carrying out investigations</p> <p>4 Analyzing and interpreting data</p> <p>5 Using mathematics and computational thinking</p> <p>6 Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</p> <ul style="list-style-type: none"> • Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. <p>7 Engaging in argument from evidence</p> <p>8 Obtaining, evaluating, and communicating information</p>	<p>Natural Resources:</p> <ul style="list-style-type: none"> • Humans depend on Earth’s land, ocean, atmosphere, and biosphere for many different resources. • Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. • These resources are distributed unevenly around the planet as a result of past geologic processes. 	<p>MS-ESS3-1 <i>Students who demonstrate understanding can:</i></p> <p>Construct a scientific explanation based on evidence for how the uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes.</p> <p>Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).</p>

Crosscutting Concepts: Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to *PASS* Coming Soon

MS-ESS3-2 Earth and Human Activity

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> ➊ Asking questions (for science) and defining problems (for engineering) ➋ Developing and using models ➌ Planning and carrying out investigations ➍ Analyzing and interpreting data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. <ul style="list-style-type: none"> • Analyze and interpret data to provide evidence for phenomena. ➎ Using mathematics and computational thinking ➏ Constructing explanations (for science) and designing solutions (for engineering) ➐ Engaging in argument from evidence ➑ Obtaining, evaluating, and communicating information 	<p>Natural Hazards:</p> <ul style="list-style-type: none"> • Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. 	<p>MS-ESS3-2 <i>Students who demonstrate understanding can:</i></p> <p>Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p> <p>Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).</p>

Crosscutting Concepts: Patterns

- Graphs, charts, and images can be used to identify patterns in data.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

MS-ESS3-4 Earth and Human Activity

Science & Engineering Practices	Disciplinary Core Ideas	Performance Expectations
<ul style="list-style-type: none"> 1 Asking questions (for science) and defining problems (for engineering) 2 Developing and using models 3 Planning and carrying out investigations 4 Analyzing and interpreting data 5 Using mathematics and computational thinking 6 Constructing explanations (for science) and designing solutions (for engineering) 7 Engaging in argument from evidence Engaging in argument from evidence in 6-8 builds on K-5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). <ul style="list-style-type: none"> • Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or solution to a problem. 8 Obtaining, evaluating, and communicating information 	<p>Human Impacts on Earth Systems:</p> <ul style="list-style-type: none"> • Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. 	<p>MS-ESS3-4 <i>Students who demonstrate understanding can:</i></p> <p>Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.</p> <p>Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth’s systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.</p>

Crosscutting Concepts: Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Oklahoma Academic Standards Connections

ELA/Literacy

Mathematics

Connection to PASS Coming Soon

OKLAHOMA ACADEMIC STANDARDS

SOCIAL STUDIES



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —



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Introduction

The Oklahoma Academic Standards for Social Studies is the result of the contributions of hundreds of social studies educators, representatives of higher education, tribal representatives, and community members. This document reflects a balanced synthesis of the work of all members of the Oklahoma Academic Standards for Social Studies Writing and Draft Committees.

The standards specify what students should know and be able to do as learners of social studies at the end of each grade level or social studies course. The order of the standards at any grade level is not meant to imply a sequence of topics and should be considered flexible for the organization of any course.

The Oklahoma Academic Standards for Social Studies were informed by the National Council of the Social Studies (NCSS) Skills Framework, the Center for Civic Education Civics Standards, the National Council for Geographic Education (NCGE) Geography for Life Standards, the Council for Economic Education Voluntary National Content Standards in Economics, the National Council for History Education (NCHE) Habits of Mind, the National Center for History in the Schools Standards for Historical Thinking, the Oklahoma Academic Standards for English Language Arts and Social Studies, and other states' standards documents.

Standards Overview

Having a literate citizenry rests on a commitment to democratic values and the practice of them. It requires the ability to use knowledge about one's community, nation and world, apply inquiry processes, and employ skills of data collection and analysis, collaboration, decision-making; and problem-solving. Young people who are knowledgeable, skillful, and committed to democracy are necessary to sustaining and improving the democratic way of life. This will also enable our students to become participating members of a global community. A well-rounded, vigorous social studies education encourages and enables each student to acquire a core of basic knowledge, an arsenal of useful skills, and a way of thinking drawn from many academic disciplines. Thus equipped, students are prepared to become informed, contributing, and participating citizens in this democratic republic – the United States of America.

The standards are comprised of two primary components, content standards and social studies practices. The content standards designate specific learning targets at each grade level or course. These content standards are derived from the major disciplines of the social sciences: history, geography, civics and economics. The social studies practices define basic skills and disciplinary tools to prepare students for college, career, and civic life. These practices are meant to be integrated with the instruction of content standards.



Social Studies Content Strands Overview

Social Studies is a systematic and coordinated discipline designed to promote civic competence by drawing upon four content strands: history, geography, civics, and economics. These strands draw from all fields of study related to the social sciences to provide a framework used in the development of the content standards for social studies. They are to be threaded through an integrated program, from grades pre-K through 12, as appropriate at each level. While at some grades and for some courses, specific strands will be more dominant than others, all strands are represented and interrelated in the standards for each grade and course.

Strand 1: History

History focuses on the written record of human experience revealing how individuals and societies developed institutions, philosophies, ideals, and cultural values, and resolved their problems. A balanced study of history helps students understand the how and why of the challenges and successes of past societies. By studying the choices and decisions of the past, students can confront today's problems with a deeper awareness of their alternatives and likely consequences.

Strand 2: Geography

Geography has more to do with asking questions and solving problems than with rote memorization of isolated facts. It is the study of the earth's surface and the processes that shape it, the relationships between people and environments, and the connections between people and places. As a discipline, geography provides the skills to help students answer questions about where things are, how they got there, and how they interact with other things - in the past, now, and in the future.

Strand 3: Civics

Civics is defined to mean the study of the rights and duties of Oklahoma and United States citizens and of how their governments work. This strand helps students understand the essential principles and workings of their political system and that of others, as well as the relationship of American politics and government to world affairs. The goal of civics is to develop literate, informed, competent, and responsible citizens who are politically aware, active, and committed to the fundamental values and principles of American constitutional democracy.

Strand 4: Economics

Economics provides students with an understanding of how individuals, communities, states, and nations allocate both scarce and abundant resources. A clear understanding of economics enables students to comprehend the various competing economic philosophies, ideas, and forces that affect them every day, measure the effectiveness of each, and identify and evaluate the consequences of personal decisions and public policies. Students then will understand how a market economy effectively functions preparing them to be producers, consumers, and citizens.



Social Studies Practices Overview

The Social Studies Practices reflect the key skills and disciplinary tools to prepare students for college, career, and civic life. The practices are meant to be integrated with the instruction of content standards. The five practices are defined broadly below and are further delineated on pg. 6. The social studies practices are designed to support student mastery of the content through a progression of skills PK-12.

Engage in Democratic Processes

Understanding civic virtues and the role of civic institutions. Students will gain knowledge of the history, principles, and foundations of American democracy to participate in civic and democratic processes. Students will identify the institutions of American government to analyze their role as responsible citizens.

Analyze and Address Authentic Civic Issues

Understanding the importance of critical questioning to solve real world problems. Students will develop essential questions to frame independent inquiry related to the past and present. Students will identify and address public problems individually and collaboratively to improve communities and society.

Acquire, Apply, and Evaluate Evidence

Understanding and using strategies to analyze evidence in the social studies. Students will evaluate historical, geographic, and economic information. Students will draw conclusions from primary and secondary sources to formulate informed decisions.

Read Critically and Interpret Information Sources

Understanding the purpose of engaging with text. Students will evaluate factual information and points of view as presented in text. Students will read historical and contemporary texts to engage in collaborative discussion.

Engage in Evidence-Based Writing

Understanding the multiple purposes of the writing process. Students will develop written products designed for a variety of social studies related investigations. Students will use and integrate evidence to present knowledge and support opinion.



Social Studies Practices PK-12

The Social Studies Practices describe the experience all students should have as they explore and reason about social studies content PK-12. Additional guidance for what the Social Studies Practices look like across grade levels is provided in **Appendix A: Social Studies Practices PK-12 Progression**.

1. **Engage in Democratic Processes** - Students will understand the principles of government, the benefits of democratic systems, and their responsibilities as citizens.
 - 1.A. Students will demonstrate an understanding of the virtues that citizens should use when interacting with each other and the virtues that guide official government institutions.
 - 1.B. Students will demonstrate an understanding of the important institutions of their society and the principles that these institutions are intended to reflect.
 - 1.C. Students will demonstrate understanding of the processes and rules by which groups of people make decisions, govern themselves, and address public problems.
2. **Analyze and Address Authentic Civic Issues** - Students will determine the kinds of sources that will be helpful in answering essential, compelling, and supporting questions addressing authentic civic issues.
 - 2.A. Students will demonstrate the capability for developing essential, compelling, and supporting questions that address authentic civic issues.
 - 2.B. Students will demonstrate the ability to investigate problems taking into consideration multiple points of view represented in arguments, structure of an explanation, and other sources.
3. **Acquire, Apply, and Evaluate Evidence** - Students will utilize interdisciplinary tools and master the basic concepts of the social studies in order to acquire and apply content understanding in all related fields of study.
 - 3.A. Students will develop skills and practices which demonstrate an understanding that historical inquiry is based on the analysis and evaluation of evidence and its credibility.
 - 3.B. Students will demonstrate an understanding of geographic concepts and develop mastery of geographic tools and ways of thinking in order to become geographically informed.
 - 3.C. Students will analyze the principles of economic systems and develop an understanding of the benefits of a market system in local, national, and global settings.
4. **Read Critically and Interpret Informational Sources** - Students will engage in critical, active reading of grade-level appropriate primary and secondary sources related to key social studies concepts, including frequent analysis and interpretation of informational sources.
 - 4.A. Students will comprehend, evaluate, and synthesize textual sources to acquire and refine knowledge in the social studies.
 - 4.B. Students will apply critical reading and thinking skills to interpret, evaluate, and respond to a variety of complex texts from historical, ethnic, and global perspectives.
5. **Engage in Evidence-Based Writing** - Students will apply effective communication skills by developing a variety of evidence-based written products designed for multiple purposes and tasks, in order to demonstrate their understandings of social studies concepts, ideas, and content.
 - 5.A. Students will summarize and paraphrase, integrate evidence, and cite sources to create written products, research projects, and presentations for multiple purposes related to social studies content.
 - 5.B. Students will engage in authentic inquiry to acquire, refine, and share knowledge through written presentations related to social studies.



Reading the Oklahoma Academic Standards for Social Studies

Practices



Oklahoma Academic Standards for Social Studies 2nd Grade (2)



Grade or Course

Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence-Based Writing
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2nd Grade Content Standards

2.1 The student will explain the importance of the basic principles that provide the foundation of the American system of government.

Standards



2.2 The student will describe the physical and human characteristics of their environment.

2.1.1 Describe the Constitution of the United States as the structure for our national government.

2.1.2 Summarize the five key individual rights and liberties protected by the First Amendment to the Constitution of the United States.

2.1.3 Explain how active citizens participate in the government by voting to elect officials that represent them.

2.1.4 Identify the basic roles of national leaders including the President of the United States, the members of the United States Congress, and the justices of the Supreme Court.

2.1.5 Explain how all people can play an important role in their community.



Objectives

2.2.1 Construct basic maps using cardinal directions and map symbols.

2.2.2 Describe absolute and relative location using latitude, longitude, and hemispheres on basic maps and globes.

2.2.3 Use political maps to locate the state of Oklahoma and the six bordering states.

2.2.4 Identify and locate basic landforms, bodies of water, continents, and oceans on a map.

2.2.5 Describe how communities modify the environment to meet their needs.

2.2.6 Describe customs, traditions, clothing, food, housing, and music as basic elements of various cultures represented within the local community.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
Pre Kindergarten Content Standards				
<p>PK.1 The student will exhibit traits of good citizenship.</p>	<p>PK.1.1 Describe the importance of rules and personal responsibilities including working together to make decisions as a member of a family and classroom community.</p>			
	<p>PK.1.2 Explain the need to respect the uniqueness of individuals in our class and community.</p>			
	<p>PK.1.3 Describe the concept of being a citizen.</p>			
	<p>PK.1.4 Identify the United States Flag as a symbol of the country.</p>			
<p>PK.2 The student will demonstrate knowledge of basic physical and human geographic concepts.</p>	<p>PK.2.1 Explain that a map is a drawing of a place.</p>			
	<p>PK.2.2 Use basic directional terms in relation to the student’s relative location.</p>			
	<p>PK.2.3 Describe a classroom as a community.</p>			
	<p>PK.2.4 Identify family customs and traditions as basic elements of culture.</p>			
<p>PK.3 The student will understand that history relates to events and people of other times and places.</p>	<p>PK.3.1 Explain history as things that happened in the past.</p>			
	<p>PK.3.2 Describe how we honor people and events of the past.</p>			
	<p>PK.3.3 Use words and phrases, such as before and after, as they relate to chronology and time in order to explain how things change.</p>			
	<p>PK.3.4 Explain that lessons can be learned from the past.</p>			
<p>PK.4 The student will identify basic economic concepts.</p>	<p>PK.4.1 Identify basic needs all people share.</p>			
	<p>PK.4.2 Explain that people work to earn money to buy things they need and want.</p>			
	<p>PK.4.3 Explain how resources are used by people to meet their needs.</p>			
	<p>PK.4.4 Describe how various school personnel provide needed services.</p>			



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
Kindergarten Content Standards				
K.1 The student will exhibit traits of good citizenship.	K.1.1 Describe the importance of rules, personal responsibilities, and natural consequences as a member of a family, class, and school.			
	K.1.2 Identify ways to be an active member of the community.			
	K.1.3 Identify the United States Flag as a symbol of the country, explaining the stripes as symbols for the first states and the stars as symbols for the current states in our country.			
	K.1.4 Identify the purpose of the Pledge of Allegiance and explain appropriate flag etiquette.			
	K.1.5 Identify other important United States symbols including the Statue of Liberty located in New York Harbor.			
K.2 The student will demonstrate knowledge of basic physical and human geographic concepts.	K.2.1 Explain that a globe is a model of the Earth and that a map is a drawing of a place; construct basic maps.			
	K.2.2 Identify basic cardinal directions and relative location terms.			
	K.2.3 Identify the shape of the state of Oklahoma on a map.			
	K.2.4 Explain that the school is part of a larger community and one's community is within the state of Oklahoma.			
	K.2.5 Describe what makes one's community alike or different than other communities.			
	K.2.6 Describe family and community customs and traditions as basic elements of culture.			



Oklahoma Academic Standards for Social Studies Kindergarten (K)

K.3 The student will understand that history relates to events and people of other times and places.	K.3.1 Explain how events of the past may have affected our community and the way we live today.
	K.3.2 Explain how we honor people and events of the past.
	K.3.3 Use words and phrases related to chronology and time to explain how things change including before/after and yesterday/today/tomorrow.
	K.3.4 Explain that different types of sources can be used to learn about the past.
K.4 The student will identify basic economic concepts.	K.4.1 Describe the basic needs of all people: food, clothing, and shelter; differentiate between these needs and a want.
	K.4.2 Explain the relationship between work and earning money.
	K.4.3 Identify ways that people use their money, including spending and saving.
	K.4.4 Explain how various community members including police officers, firefighters, soldiers, school personnel, business professionals, and medical personnel impact the student's life.



Oklahoma Academic Standards for Social Studies 1st Grade (1)

Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
1st Grade Content Standards				
<p>1.1 The student will analyze their role as a citizen in a community.</p>	<p>1.1.1 Describe the need for written laws and the main purpose of government, including the concept of consequences for one’s actions when a law or rule is violated.</p>			
	<p>1.1.2 Describe how citizens within communities work together to accomplish common tasks and fulfill roles of authority.</p>			
	<p>1.1.3 Explain patriotic traditions including <i>The Pledge of Allegiance</i>, describe appropriate flag etiquette and proper behavior during the playing of <i>The Star-Spangled Banner</i>.</p>			
	<p>1.1.4 Identify important symbols of the United States including the Bald Eagle and the Liberty Bell, and explain their meanings.</p>			
<p>1.2 The student will demonstrate knowledge of basic geographic concepts.</p>	<p>1.2.1 Describe the difference between physical and political maps; construct basic maps of specific places.</p>			
	<p>1.2.2 Identify cardinal directions and use them to identify specific locations on a map.</p>			
	<p>1.2.3 Identify the difference between continents and oceans.</p>			
	<p>1.2.4 Compare the features of urban and rural communities.</p>			
	<p>1.2.5 Describe community customs and traditions as basic elements of culture.</p>			
<p>1.3 The student will examine important events and historical figures in the nation’s past.</p>	<p>1.3.1 Explain why people may see events from different points of view.</p>			
	<p>1.3.2 Describe the contributions of people and groups who have shaped our history and ways we commemorate important places and events of the past.</p>			
	<p>1.3.3 Read and construct basic timelines to understand the chronology of events in history.</p>			
	<p>1.3.4 Identify primary sources and how they help us to learn about the past.</p>			



Oklahoma Academic Standards for Social Studies 1st Grade (1)

1.4 The student will describe the characteristics of the American economic system.	1.4.1 Explain the costs and benefits of spending and saving in order to meet needs and wants.
	1.4.2 Describe ways people are paid for their labor and how goods and services are purchased using money and credit.
	1.4.3 Identify and explain the roles of consumers and producers in the American economy.
	1.4.4 Describe the role of banks in the community.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
2nd Grade Content Standards				
2.1 The student will explain the importance of the basic principles that provide the foundation of the American system of government.	2.1.1 Describe the Constitution of the United States as the structure for our national government.			
	2.1.2 Summarize the five key individual rights and liberties protected by the First Amendment to the Constitution of the United States.			
	2.1.3 Explain how active citizens participate in the government by voting to elect officials that represent them.			
	2.1.4 Identify the basic roles of national leaders including the President of the United States , the members of the United States Congress, and the justices of the Supreme Court.			
	2.1.5 Explain how all people can play an important role in their community.			
2.2 The student will describe the physical and human characteristics of their environment.	2.2.1 Construct basic maps using cardinal directions and map symbols.			
	2.2.2 Describe absolute and relative location using latitude, longitude, and hemispheres on basic maps and globes.			
	2.2.3 Use political maps to locate the state of Oklahoma and the six bordering states.			
	2.2.4 Identify and locate basic landforms, bodies of water, continents, and oceans on a map.			
	2.2.5 Describe how communities modify the environment to meet their needs.			
	2.2.6 Describe customs, traditions, clothing, food, housing, and music as basic elements of various cultures represented within the local community.			



2.3 The student will examine the lives of notable Americans who expanded peoples' rights and freedoms through our history.	2.3.1 Analyze the contributions of people and groups who have shaped our history and who are honored by holidays and commemorative months.
	2.3.2 Compare perspectives of people in the past to people in the present.
	2.3.3 Compare different accounts of the same historical event using primary and secondary sources.
	2.3.4 Explain possible reasons for events in the past.
2.4 The student will understand basic economic concepts in the American economy.	2.4.1 Explain the importance of supply and demand in the consumer and producer relationship.
	2.4.2 Explain how barter and trade can lead to interdependence among communities.
	2.4.3 Describe the connection between taxes and community services, including schools, sanitation and water, fire and police protection, parks and recreation, libraries, and roads.
	2.4.4 Describe how setting goals and creating a budget helps people pay for things they need and want.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
3rd Grade Content Standards				
<p>3.1 The student will analyze the traits of good citizens.</p>	<p>3.1.1 Examine and determine the main purposes of Oklahoma’s state government and identify elected leaders of the state of Oklahoma and the three branches of government.</p>			
	<p>3.1.2 Explain that tribal governments in Oklahoma have a right to self-government known as sovereignty.</p>			
	<p>3.1.3 Describe the historical significance of the symbols of Oklahoma including the Oklahoma State Seal and the Oklahoma Flag; explain how the name of Oklahoma is derived from the Choctaw language.</p>			
	<p>3.1.4 Describe relationships between people and events of the past, including those commemorated on national, state, and community holidays.</p>			
	<p>3.1.5 Define the concept of civic virtue and responsibilities of the citizen at the local, state, and tribal levels, including respect for diversity.</p>			
<p>3.2 The student will examine Oklahoma’s geography and how people of Oklahoma interact with their environment.</p>	<p>3.2.1 Examine Oklahoma’s political and physical features.</p> <ul style="list-style-type: none"> A. Identify the state of Oklahoma using relative location, absolute location (latitude and longitude), direction, scale, size, and shape using physical and political maps. B. Interpret thematic maps of Oklahoma with the essential map elements of title, legend, scale, and directional indicators. C. Identify Oklahoma’s major landforms and bodies of water on a physical map. D. Identify Oklahoma’s major metropolitan centers and cities on a political map. E. Describe the climate and various natural vegetation zones found in Oklahoma. F. Identify the six states bordering Oklahoma on a map. 			



	<p>3.2.2 Examine the interaction of the environment and the peoples of Oklahoma.</p> <ul style="list-style-type: none">A. Describe how early American Indians used Oklahoma’s natural resources, such as bison hunting, fur trading, and farming.B. Describe how pioneers to Oklahoma adapted to and modified their environment, such as sod houses, windmills, and crops.C. Summarize how the weather and the environment have impacted the economy of Oklahoma in events such as the Dust Bowl, floods, and tornadoes.D. Summarize how Oklahomans affect and change their environments such as the construction of the McClellan-Kerr Arkansas River Navigation System, creation of recreational lakes by the building of dams, irrigation of croplands, and the establishment of wildlife refuges.
	<p>3.2.3 Identify the characteristics of renewable and non-renewable resources and evaluate the role of citizens in conserving natural resources.</p>
<p>3.3 The student will analyze the significant events and historic personalities contributing to the development of the state of Oklahoma.</p>	<p>3.3.1 Understand and describe the relationship between historic events and chronology through the creation of basic timelines.</p>
	<p>3.3.2 Read and interpret primary sources related to key events in Oklahoma’s past.</p>
	<p>3.3.3 Describe American Indian pre-contact cultures that have inhabited what is now Oklahoma, such as the Spiro Mound Builders.</p>
	<p>3.3.4 Identify cultural similarities and differences of the existing sovereign tribal nations in Oklahoma, especially those near the local community.</p>
	<p>3.3.5 Describe early expeditions into Oklahoma such as those of Coronado, Washington Irving, and George Catlin.</p>
	<p>3.3.6 Describe the migrations, settlements, relocations and forced removals of American Indians.</p>
	<p>3.3.7 Describe cowboy life and cattle drives as typified by experiences along such routes as the Chisholm Trail and the impact of Mexican ranching traditions on the cattle industry and cowboy culture.</p>
	<p>3.3.8 Distinguish between the points of view of both American Indians and settlers regarding the opening of territories in Oklahoma for settlement.</p>
	<p>3.3.9 Commemorate Statehood Day, November 16, as the joining of Indian and Oklahoma Territories.</p>



Oklahoma Academic Standards for Social Studies 3rd Grade (3)

	3.3.10 Describe the contributions of Oklahoma’s military personnel, including the Buffalo Soldiers, the code talkers, and the 45 th Infantry.
	3.3.11 Explain how Oklahomans come together to help one another during difficult times, such as recovering from the bombing of the Oklahoma City Murrah Building, exhibiting what has become the “Oklahoma Standard”.
	3.3.12 Examine notable historic and present-day Oklahomans utilizing biographies and information texts such as Jim Thorpe, Sequoyah, Will Rogers, Wiley Post, Mickey Mantle, Shannon Lucid, Bill Pickett, Clara Luper, and Maria Tallchief.
3.4 The student will identify and describe basic economic activities creating prosperity in the state of Oklahoma.	3.4.1 Compare differences among human, natural, and capital resources used to produce goods and services.
	3.4.2 Summarize how the factors of scarcity and surplus and the laws of supply and demand of natural and human resources require people to make choices about producing and consuming goods and services.
	3.4.3 Examine how the development of Oklahoma’s major economic activities have contributed to the growth of the state, including, mining and energy industry, agriculture, aviation, tourism, tribal enterprises, and military installations.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
4th Grade Content Standards				
<p>4.1 The student will describe the features of self-government and the role of citizens of the United States.</p>	<p>4.1.1 Describe the concepts of democracy and representative government, including the rule of law, equality, the common good, and individual rights.</p> <ul style="list-style-type: none"> A. Explain the concept of civic responsibilities, including respect for the law, the necessity for compromise, civic participation, and public service. B. Understand the necessity of respect for diversity of the individual and diversity of groups comprising American society. 			
	<p>4.1.2 Compare powers exercised by the local, state, and national levels of governments, recognizing tribal sovereignty as a tribal nation’s inherent right to self-govern.</p>			
	<p>4.1.3 Summarize the role of citizens as responsible stewards of natural resources and the environment.</p> <ul style="list-style-type: none"> A. Describe the benefits of participation in recycling and anti-littering activities. B. Identify present-day examples to conserve natural resources and the development of alternative, sustainable energy sources. 			
<p>4.2 The student will examine the physical geography and environments of the United States.</p>	<p>4.2.1 Use maps and other geographic representations (such as globes and graphs), tools, and technologies to acquire, process, and report information from a spatial perspective.</p> <ul style="list-style-type: none"> A. Use and describe various elements of maps, including keys/legends, scale, cardinal, and intermediate directions. B. Interpret aerial photographs, satellite images and thematic maps to locate and identify physical and human features of the United States and North America. C. Use latitude and longitude to identify the location of physical and human features of the United States. 			
	<p>4.2.2 Identify major physical features in the United States and analyze how physical processes shape places.</p> <ul style="list-style-type: none"> A. Identify and describe the physical characteristics of places, including the major landforms, bodies of water, vegetation and climates in the United States. B. Describe the location and characteristics of the major ecosystems in the United States. 			



	<p>4.2.3 Explain how people create regions using common geographic characteristics.</p> <ul style="list-style-type: none">A. Identify and describe the major physical, cultural, and economic regions of the United States, comparing one’s own region to the other regions.B. Explain how and why regions change over time by comparing regions in the past with life in the same regions in the present. <p>4.2.4 Describe how physical processes of the Earth’s surface impact humans and their environment.</p> <ul style="list-style-type: none">A. Identify and describe the different climates in the United States using maps, globes, and graphs.B. Explain how climate and natural processes including floods, wind, and storms impact how we live. <p>4.2.5 Identify and locate on a political map the fifty states and the United States capital.</p>
<p>4.3 The student will analyze the human characteristics of the United States and how geography impacts historic events.</p>	<p>4.3.1 Identify and describe early settlement patterns of regions in the United States.</p> <ul style="list-style-type: none">A. Draw conclusions from maps to show how climate, vegetation, natural resources, and historic events affect the location and growth of settlements.B. Identify major American Indian groups and their ways of life in each region, including economic activities, customs, and viewpoints on land usage and ownership.C. Summarize the reasons for key expeditions of North America by Spain, France, and England and their impact on the development of each region.D. Identify push and pull factors of human migration.E. Evaluate the impact of the Columbian Exchange on American Indian groups, African slaves and European settlers, including agriculture, trade, culture, military alliances, control of territory, and the sudden and significant decline of indigenous peoples. <p>4.3.2 Examine the characteristics of culture, including the distribution and complexity of the regions of the United States.</p> <ul style="list-style-type: none">A. Identify the characteristics of culture (language, customs, beliefs, food, clothing, shelter) and compare the cultural characteristics of different regions of the United States.B. Explain how the characteristics of culture affect the ways in which people live.
<p>4.4 The student will identify basic economic activities of the United States.</p>	<p>4.4.1 Analyze how humans adapt to and modify their environments in order to survive and grow.</p> <ul style="list-style-type: none">A. Explain how humans depend upon the physical environment for food, shelter, and economic activities.B. Distinguish between renewable and nonrenewable resources.C. Explain how physical environments can provide both opportunities and limitations for human activity.



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| | <p>4.4.2 Describe the patterns and networks of economic interdependence among regions of the United States.</p> <ul style="list-style-type: none">A. Identify and locate on a map the major cities of the United States, including their relative location to natural resources and transportation routes.B. Identify the major economic activities of each region of the United States by comparing how people satisfy their basic needs through the production of goods and services.C. Describe the relative location of natural resources, such as fossil fuels, minerals and soils, and their relationship to each region’s major economic activities, including agriculture, manufacturing, transportation, energy, and services. |
| | <p>4.4.3 Explain how economic activities can threaten the physical environment.</p> <ul style="list-style-type: none">A. Identify ways in which humans can change ecosystems, such as clearing forests, draining wetlands, and diverting waterways, by examining present-day issues related to the use of resources.B. Identify examples of changes in land use in local communities and how the physical environment can be stressed by human activities. |



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
5th Grade Content Standards				
<p>5.1 The student will examine and compare the Jamestown and Plymouth settlements as the foundations of American culture and society.</p>	<p>5.1.1 Summarize reasons for European colonization of North America and the impact on the development of the American colonies.</p>			
	<p>5.1.2 Examine the economic and political motivations for English settlements at Roanoke and Jamestown .</p>			
	<p>5.1.3 Explain the economic and political motivations of immigrants and indentured servants who came to Virginia.</p>			
	<p>5.1.4 Explain the early successes and challenges of the Jamestown settlement including the leadership of John Smith, interrelationships with American Indians, challenges of the Starving Times, and the export of natural resources for profit.</p>			
	<p>5.1.5 Explain the English commitment to the permanent settlement at Jamestown as evidenced through the events of 1619 including:</p> <ul style="list-style-type: none"> A. representative government established through the House of Burgesses B. private ownership of land C. introduction of Africans as slave labor D. arrival of women and families 			
	<p>5.1.6 Analyze the religious, economic, and political motivations of immigrants and indentured servants who migrated to Plymouth.</p>			
	<p>5.1.7 Explain the early successes and challenges of the Plymouth settlement including:</p> <ul style="list-style-type: none"> A. practice of self-government established by the Mayflower Compact B. contributions of American Indians including Chief Massasoit and Squanto C. leadership of William Bradford 			
	<p>5.1.8 Explain how American Indian agricultural practices, such as the Three Sisters, contributed to the early survival of the colonists.</p>			
<p>5.2 The student will compare the developments of the New</p>	<p>5.2.1 Explain the contributions of important citizens and groups to the foundation of the colonies including the Puritans and Quakers, Roger Williams, Anne Hutchinson, William Penn, Lord Baltimore, and James Oglethorpe.</p>			



<p>England Colonies, the Middle Colonies, and the Southern Colonies.</p>	<p>5.2.2 Compare the economic development of the three colonial regions including:</p> <ul style="list-style-type: none">A. agriculture and exports as affected by climate and natural resourcesB. a labor system utilizing indentured servantsC. slave labor central to the growth of the economy <p>5.2.3 Explain the international economic and cultural interactions resulting from the triangular trade routes, including the forced migration of Africans through the Transatlantic slave trade and experiences of the Middle Passage.</p> <p>5.2.4 Analyze the forms of self-government in the three colonial regions including the role of religion in the establishment of some colonial governments, the Virginia House of Burgesses, and New England town hall meetings.</p> <p>5.2.5 Explain the evolving relationships between American Indians and the British colonists involving territorial claims.</p> <p>5.2.6 Explain that tribal sovereignty is a tribal nation’s inherent right to self-govern.</p> <p>5.2.7 Compare daily life in the colonies as experienced by different social classes, plantation owners, farmers, merchants, craftsmen, artisans, and women and children.</p> <p>5.2.8 Compare the experiences of both free and enslaved Africans in the British colonies, including resistance efforts by enslaved peoples and attempts to maintain aspects of African culture.</p>
<p>5.3 The student will examine the foundations of the American nation established during the Revolutionary Era.</p>	<p>5.3.1 Examine the causes and effects of significant events leading to armed conflict between the thirteen American colonies and Great Britain including:</p> <ul style="list-style-type: none">A. French and Indian WarB. Proclamation of 1763C. Sugar and Stamp ActsD. Townshend ActE. colonial arguments regarding taxation and rightful representation in ParliamentF. boycotts of British goods and the efforts of the Committees of CorrespondenceG. Quartering ActH. Boston MassacreI. Tea Act and The Boston Tea PartyJ. Coercive Acts (Intolerable Acts)K. British raids on Lexington and ConcordL. publication of <i>Common Sense</i>, by Thomas Paine



Oklahoma Academic Standards for Social Studies 5th Grade (5)

	<p>5.3.2 Analyze the ideals stated in the Declaration of Independence, drafted by Thomas Jefferson and adopted July 4, 1776, used to:</p> <ul style="list-style-type: none">A. identify natural, unalienable rights, such as life, liberty, and the pursuit of happinessB. declare the equality of all individualsC. define the purpose of governmentD. establish the principle of self-government and consent of the governedE. explain specific colonial grievances
	<p>5.3.3 Explain the importance of the Articles of Confederation as the first American national system of government under which the colonies waged a war in order to gain independence.</p>
	<p>5.3.4 Compare the Iroquois Confederacy’s representative government to the early attempts of the colonies to unite as one nation.</p>
	<p>5.3.5 Compare the advantages and disadvantages of the British and the American colonies at the eve and during the Revolutionary War, including political and military leadership, military strength, population, resources, foreign alliances, and motivations for fighting.</p>
	<p>5.3.6 Analyze the relationships of significant military and diplomatic events of the Revolutionary War including the leadership of General George Washington, experiences of Valley Forge, impact of the battles of Bunker Hill, Trenton, Saratoga, Yorktown, and the Treaty of Paris in 1783.</p>
	<p>5.3.7 Identify the points of view of major groups that remained loyal to Britain, joined the patriot cause, or remained neutral.</p>
	<p>5.3.8 Identify the contributions of key individuals involved in the American Revolution including Patrick Henry, Samuel Adams, John Adams, Abigail Adams, Paul Revere, Nathan Hale, John Paul Jones, Thayendanega (Joseph Brant), Nancy Ward the Beloved Woman of the Cherokee, Marquis de Lafayette, Benjamin Franklin, Mercy Otis Warren, and Phillis Wheatley.</p>
<p>5.4 The student will examine the formation of the American</p>	<p>5.4.1 Evaluate issues and events that led to the Constitutional Convention, including a weak national government and Shays’ Rebellion.</p>



Oklahoma Academic Standards for Social Studies 5th Grade (5)

system of government following the American Revolution.	5.4.2 Identify key leaders and explain the debates and compromises of the Constitutional Convention, including: A. Virginia and New Jersey Plans B. Great Compromise C. Three-fifths Compromise and its maintenance of the institution of slavery D. Father of the Constitution, James Madison E. President of the Convention, George Washington
	5.4.3 Examine the purposes and basic responsibilities of government as described in the Preamble of the Constitution of the United States, which established the supreme law of the land.
	5.4.4 Describe the relationship between the federal government and sovereign American Indian nations, as established under the Constitution of the United States.
	5.4.5 Compare the viewpoints of the Federalists, led by James Madison, and Anti-Federalists, such as George Mason, over the addition of a bill of rights.
	5.4.6 Explain how the Constitution of the United States was amended to include the Bill of Rights and summarize the liberties protected in each of the ten amendments.
5.5 The student will describe the structure and responsibilities of the American system of government and the role of the individual citizen.	5.5.1 Examine the key principles of government established in the Constitution of the United States including: A. separation of powers among three branches of government B. the system of checks and balances C. shared powers between the federal and state governments.
	5.5.2 Describe the roles of Congress, the President, and the Supreme Court in the legislative process.
	5.5.3 Describe the responsibilities of United States citizens including: A. registration and voting in public elections B. becoming informed voters C. engagement in civil discourse D. service on trial juries E. payment of taxes F. obedience to laws G. registration for military service



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
6 th Grade Content Standards				
<p>6.1 The student will analyze data from a geographic perspective using the skills and tools of geography.</p>	<p>6.1.1 Apply geographic information to support analysis from primary and secondary sources located in a variety of texts.</p>			
	<p>6.1.2 Describe how various map projections distort the surface of the earth; apply the concepts of scale, distance, direction, relative location, absolute location, and latitude and longitude.</p>			
	<p>6.1.3 Integrate visual information, draw conclusions, and make predictions from geographic data and analyze spatial distribution and patterns by interpreting that data as displayed on geographic tools.</p>			
	<p>6.1.4 Integrate visual information and develop the skill of mental mapping of the political and physical features of Earth’s surface in order to organize information about people, places, and environments.</p>			
	<p>6.1.5 Describe and analyze the role of geographic factors on current events and issues.</p>			
<p>6.2 The student will analyze the physical systems of the major regions of the Western Hemisphere.</p>	<p>6.2.1 Use visual information to identify and describe on a physical map the landforms, bodies of water, climate, and vegetation zones that are important to each region.</p>			
	<p>6.2.2 Explain how the processes and factors of latitude, elevation, Earth-Sun relationships, prevailing winds, and proximity to bodies of water influence climate.</p>			
	<p>6.2.3 Describe the predominant natural resources found in each region.</p>			
	<p>6.2.4 Describe the relationship and summarize the impact of the distribution of major renewable and nonrenewable resources on each region.</p>			



6.3 The student will identify the characteristics, distribution, and demographic patterns of human populations and systems of the Western Hemisphere.	6.3.1 Identify on a political map the major countries and population centers of each region.
	6.3.2 Identify and describe cultural traits of language, ethnic heritage, religion, and traditions practiced among peoples.
	6.3.3 Analyze the impact of geography on population distribution, growth, and change, applying geographic concepts of population density, the availability of resources.
	6.3.4 Describe how the push and pull factors of migration have affected settlement patterns and the human characteristics of places over time.
	6.3.5 Compare the systems of government, including representative governments (democracy, republic, constitutional monarchy) and authoritarian systems (dictatorship, absolute monarchy).
	6.3.6 Identify the role of the citizen in the selection of government officials and lawmaking; compare individual liberties under different forms of government.
	6.3.7 Identify and explain topics related to indigenous sovereignty.
	6.3.8 Evaluate how the three levels of economic activities (primary, secondary, tertiary) contribute to the development of a nation and region.
	6.3.9 Describe benefits and limitations of the traditional, market, and command economic systems, including how government policies affect economic activities and trade relationships.
	6.3.10 Identify the common characteristics of developed and developing countries, including the impact of education and technology; analyze data used by geographers such as literacy rate, life expectancy, per capita income, and infant mortality.



6.4 The student will analyze the interactions of humans and their environment in the Western Hemisphere.	6.4.1 Describe the commercial agriculture and industrial regions that support human development.
	6.4.2 Evaluate the effects of human modification on the natural environment through transformation caused by subsistence and commercial agriculture, industry, demand for energy, and urbanization.
	6.4.3 Analyze the impact of climate and natural disasters on human populations, including forced migration, scarcity of consumer goods, economic activities, and loss of life.
	6.4.4 Analyze environmental challenges of each region.
	6.4.5 Evaluate the role of ecotourism in creating environmental awareness of resources, climate, cultures, and wildlife.
	6.4.6 Describe the role of citizens as responsible stewards of natural resources and the environment.
6.5 The student will compare common physical and human characteristics of regions which create identity or uniqueness and influence people's perceptions of the Western Hemisphere.	6.5.1 Define the concept of region and identify the major political, physical, cultural, and economic regions.
	6.5.2 Explain how cultural diffusion, both voluntary and forced, impacts societies of a region.
	6.5.3 Describe patterns of global economic interdependence and trade, including the concepts of balance of trade and supply and demand; compare measures of economic growth including Gross Domestic Product (GDP) and Gross National Product (GNP).
	6.5.4 Analyze global interdependence which explains the outsourcing of technological and manufacturing jobs to developing regions.
	6.5.5 Analyze reasons for conflict and cooperation among and between groups, societies, nations, and regions.



Oklahoma Academic Standards for Social Studies 7th Grade (7)

Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
7th Grade Content Standards				
<p>7.1 The student will analyze data from a geographic perspective using the skills and tools of geography.</p>	<p>7.1.1 Integrate specific geographic information to support analysis from primary and secondary sources located in texts, documents, newspapers, magazines, journals, political cartoons, and online news sources.</p>			
	<p>7.1.2 Apply the concepts of scale, distance, direction, relative location, absolute location, and latitude and longitude.</p>			
	<p>7.1.3 Explain the relationship between the continents, world oceans, and major cultural regions.</p>			
	<p>7.1.4 Integrate visual information and apply the skill of mental mapping of the political and physical features of the Earth’s surface in order to organize information about people, places, and environments.</p>			
	<p>7.1.5 Integrate visual information, draw conclusions, and make predictions from geographic data; analyze spatial distribution and patterns by interpreting that data as displayed on geographic tools.</p>			
	<p>7.1.6 Describe and analyze the role of geographic factors on current events and issues.</p>			
<p>7.2 The student will analyze the physical systems of the major regions of the Eastern Hemisphere.</p>	<p>7.2.1 Identify on a physical map the major landforms and bodies of water of each region.</p>			
	<p>7.2.2 Describe the distribution of major renewable and nonrenewable resources of each region.</p>			
	<p>7.2.3 Explain how the competition for scarce resources can cause economic and political conflict and cooperation.</p>			
<p>7.3 The student will identify the characteristics, distribution and demographic patterns of human populations and systems of the Eastern Hemisphere.</p>	<p>7.3.1 Identify on a political map the major countries and population centers of each region.</p>			
	<p>7.3.2 Compare common cultural traits, including language, ethnic heritage, social systems, and traditions.</p>			
	<p>7.3.3 Evaluate the impact of a region’s major religions, including geographic hearths, major beliefs, customs, and the significance of religion in contemporary societies; explain how religion can both unify or divide people.</p>			
	<p>7.3.4 Evaluate and summarize the impact of geography on population distribution, density, growth, change, settlement patterns, the availability of resources, and migration, including push and pull factors.</p>			
	<p>7.3.5 Describe reasons for and analyze from multiple perspectives the challenges and benefits of migration on inigenous and immigrant populations.</p>			



Oklahoma Academic Standards for Social Studies 7th Grade (7)

	<p>7.3.6 Describe the distribution of resources and evaluate how the three levels of economic activities (primary, secondary, tertiary) contribute to the development of a country or region.</p>
	<p>7.3.7 Compare the structures of representative governments and authoritarian systems.</p>
	<p>7.3.8 Identify the role of the citizen in the selection of government officials and lawmaking; compare individual liberties under different forms of government.</p>
	<p>7.3.9 Identify and explain the advantages and disadvantages of traditional, market, and command economic systems.</p>
	<p>7.3.10 Explain the role of government policies in utilizing wealth from natural resources to finance development.</p>
	<p>7.3.11 Assess the influence of economic development and distribution of wealth on society.</p>
	<p>7.3.12 Distinguish between developed and developing regions using the Human Development Index; analyze data used by geographers, including literacy rate, life expectancy, infant mortality, and per capita income.</p>
<p>7.4 The student will analyze the interactions of humans and their environment in the Eastern Hemisphere.</p>	<p>7.4.1 Analyze the impact of climate events, weather patterns and natural disasters on human populations and the environment, resulting in forced migrations, scarcity of consumer goods, economic activities, and loss of life.</p>
	<p>7.4.2 Explain how climate change is affecting environments and human populations.</p>
	<p>7.4.3 Explain the differences among subsistence, cash crop and commercial agriculture, including the impact on economic development.</p>
	<p>7.4.4 Evaluate the effects of human modification of and adaptation to the natural environment through transformation caused by agriculture, the use of modern irrigation methods, industry, demand for energy, and urbanization.</p>
	<p>7.4.5 Summarize the role of ecotourism in creating environmental awareness of resources, climate, cultures and wildlife.</p>
	<p>7.4.6 Describe the role of citizens as responsible stewards of natural resources and the environment.</p>
<p>7.5 The student will compare common physical and human characteristics of regions which create identity or uniqueness and influence people's</p>	<p>7.5.1 Define the concept of region and explain how and why regions change over time through physical and human processes which operate to modify the Earth's surface.</p>
	<p>7.5.2 Describe how cultural diffusion, both voluntary and forced, impacts society.</p>
	<p>7.5.3 Explain patterns of global interdependence and world trade, including the impact of changing technology on trade routes.</p>



Oklahoma Academic Standards for Social Studies 7th Grade (7)

perceptions of the Eastern Hemisphere.	7.5.4 Explain patterns of global economic interdependence and world trade, focusing on the concepts of balance of trade, supply and demand; compare the economic measurements of productivity, Gross Domestic Product (GDP) and Gross National Product (GNP).
	7.5.5 Analyze global interdependence which explains the outsourcing of technological and manufacturing jobs to developing regions.
	7.5.6 Analyze reasons for conflict and cooperation among groups, societies, and countries, including the creation and involvement of supranational organizations.
	7.5.7 Describe how political, economic, and cultural forces challenge contemporary political arrangements leading to the devolution of states (civil wars, terrorism, genocide, and ethnic separatism).



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
8th Grade Content Standards				
8.1 The student will analyze the foundations of the United States by examining the causes, events, and ideologies which led to the American Revolution	8.1.1 Describe the political climate in the British colonies prior to the French and Indian War including the policy of salutary neglect, mercantilism through the Navigation Acts and colonial reaction through the Albany Plan of Union; compare the Iroquois Confederacy to early attempts to unite the colonies.			
	8.1.2 Summarize the political and economic consequences of the French and Indian War including imperial policies of taxation, the Proclamation of 1763, and the migration of colonists into American Indian sovereign territories.			
	8.1.3 Summarize British attempts to regulate the colonies and colonial responses including: <ul style="list-style-type: none">A. Sugar ActB. Stamp Act Congress ResolvesC. Committees of CorrespondenceD. legal principle of taxation and political representationE. Townshend Act and boycotts of British goodsF. Quartering ActG. Boston MassacreH. Tea Act and Boston Tea PartyI. Coercive Acts (Intolerable Acts)J. First Continental CongressK. British raids on Lexington and Concord			
	8.1.4 Analyze the significance of the Second Continental Congress including: <ul style="list-style-type: none">A. formation of the Continental ArmyB. establishment of currencyC. Olive Branch PetitionD. French alliance negotiated by Benjamin FranklinE. committee to draft a declaration of independence			



	<p>8.1.5 Analyze the ideological and propaganda war between Great Britain and the colonies including:</p> <ul style="list-style-type: none">A. points of views of the Patriots and the LoyalistsB. writings of Mercy Otis Warren and Phillis WheatleyC. use of Paul Revere’s engraving of the Boston MassacreD. rejection of the Olive Branch PetitionE. <i>Give Me Liberty or Give Me Death</i>, speech attributed to Patrick HenryF. <i>Common Sense</i> pamphlet by Thomas Paine <p>8.1.6 Examine the central ideas expressed in the Declaration of Independence, drafted by Thomas Jefferson and adopted July 4, 1776, and their intellectual origins including:</p> <ul style="list-style-type: none">A. John Locke’s theory on natural and unalienable rights, including life, liberty and the pursuit of happinessB. the ideals of equality for all individuals, including the impact of the First Great Awakening.C. the purpose of government as a social contract requiring the consent of the governedD. economic and political grievances against British policies.
<p>8.2 The student will examine key military and diplomatic events of the Revolutionary War that resulted in an independent nation.</p>	<p>8.2.1 Explain the purpose of the Articles of Confederation which established the first American national system of government to support and conduct a war against Britain.</p> <p>8.2.2 Evaluate the motivations and points of view of various populations to remain loyal to Britain, join the patriot cause, or choose neutrality, including:</p> <ul style="list-style-type: none">A. Patriots and Loyalists and their political, economic, and family interestsB. American Indians and the preservation of their homelands, cultures, and tradeC. women and their political statusD. free and enslaved blacks and their petitions to colonial governments for a ban on slavery. <p>8.2.3 Identify and evaluate the contributions of individuals and significant groups toward winning independence from British rule.</p> <p>8.2.4 Compare the advantages and disadvantages of the British and the American colonists including political and military leadership, military strength, population and resources, motivation, foreign alliances, financial and military support, and the British recruitment of enslaved black men in exchange for freedom.</p>



	<p>8.2.5 Summarize the impact of key military and diplomatic events of the Revolutionary War including:</p> <ul style="list-style-type: none">A. military leadership of General George WashingtonB. victories at Boston, Trenton, and SaratogaB. publication of Thomas Paine’s <i>The Crisis</i>D. Valley Forge encampmentE. French alliance, negotiated by Benjamin FranklinF. victory at YorktownG. Treaty of Paris, 1783
<p>8.3 The student will examine the formation of the American system of government following the Revolutionary War and the creation of the Constitution of the United States as the supreme law of the land.</p>	<p>8.3.1 Examine the strengths and weaknesses of the Articles of Confederation that led to the Constitutional Convention in Philadelphia in 1787, including:</p> <ul style="list-style-type: none">A. resolution of disputes over the western territories as resolved by the Northwest OrdinanceB. organization and leadership necessary to win the warC. lack of a common national currencyD. lack of a common defenseE. lack of a national judiciaryF. mismanagement of war debts due to an inability to taxG. unanimous vote required to amend the Articles of ConfederationH. civil unrest as typified in Shays’ Rebellion. <p>8.3.2 Analyze the significance of the Constitutional Convention, contributions of the Framers, major debates and compromises including the Virginia and New Jersey Plans, Great Compromise, the leadership of James Madison, Father of the Constitution, and George Washington, President of the Convention.</p> <p>8.3.3 Describe how the framers of the Constitution addressed the issue of slavery including the Three-Fifth Compromise which maintained the institution of slavery in both northern and southern states, the Fugitive Slave Clause, and the delayed ban on the slave trade.</p> <p>8.3.4 Explain the significance of the Commerce Clause in establishing a constitutional relationship between Indian tribes and the United States government.</p> <p>8.3.5 Examine the concept of self-government, the purpose, and the responsibilities of government as expressed in the Preamble to the Constitution of the United States.</p>



	<p>8.3.6 Analyze the key principles of government established by the Constitution of the United States including:</p> <ul style="list-style-type: none">A. federalism (reserved and concurrent powers)B. separation of powers among three branches of government (legislative, executive, judicial)C. a system of checks and balances among the three branchesD. popular sovereignty and consent of the governedE. judicial reviewF. rule of law
	<p>8.3.7 Examine the Federalist and Anti-Federalist arguments for and against the ratification of the Constitution as expressed in the <i>Federalist Papers</i> authored by James Madison, Alexander Hamilton, and John Jay and the writings of Anti-Federalists, such as George Mason, including concerns over a strong central government and the omission of a bill of rights.</p>
	<p>8.3.8 Explain how the Constitution of the United States was amended to include the Bill of Rights; identify and analyze the guarantees of individual rights and liberties as expressed in each of the ten amendments.</p>
	<p>8.3.9 Identify the structure and responsibilities of the elected and appointed officials of the three branches of government in relationship to the legislative process, including the role of Congress and the President, as well as the Supreme Court's power of judicial review.</p>
	<p>8.3.10 Describe the responsibilities of United States citizens such as:</p> <ul style="list-style-type: none">A. registering and voting in public electionsB. engaging in informed civil discourseC. serving on a juryD. paying taxesE. obeying lawsF. registering for military service



8.4 The student will examine the political and economic changes that occurred during the Early Federal Period.	8.4.1 Analyze the impact of the Whiskey Rebellion and enforcement of the government’s right to tax.
	8.4.2 Describe President Washington’s attempt to develop a cohesive Indian policy, which included respectful interactions with American Indian leaders, treaties to delineate tribal lands, and precedent-setting practices of assimilation.
	8.4.3 Describe the advice in <i>President Washington’s Farewell Address</i> and its impact.
	8.4.4 Evaluate the impact of the Alien and Sedition Acts on individual rights during the Adams Administration, including the responses of the Democratic-Republicans in the <i>Virginia and Kentucky Resolutions</i> .
8.5 The student will analyze the political and geographic changes that occurred during the Jeffersonian Era.	8.5.1 Explain the impact of the peaceful transfer of power from one political party to another, as exhibited by the presidential election of 1800.
	8.5.2 Analyze the impact of the Supreme Court under the leadership of Chief John Marshall and the <i>Marbury v. Madison</i> decision which confirmed the principle of judicial review.
	8.5.3 Analyze the acquisition of the Louisiana territory, the contributions of the Lewis and Clark Corps of Discovery Expedition, and the eventual establishment of the Indian Territory.
8.6 The student will examine the political, economic and social transformations during the “Era of Good Feelings”.	8.6.1 Explain how the War of 1812 confirmed American independence and fueled a spirit of nationalism, reflected in the lyrics of our national anthem, the <i>Star-Spangled Banner</i> , by Francis Scott Key.
	8.6.2 Examine the Monroe Doctrine as a policy of isolationism which was designed to protect American interests in the Western Hemisphere.
	8.6.3 Analyze the impact of <i>McCulloch v. Maryland</i> which established federal supremacy concerning taxation.
	8.6.4 Examine the increased tension between Southern sectionalist and Northern nationalist perspectives.
	8.6.5 Summarize the impact of the Missouri Compromise on the expansion of slavery into new western territories.
8.7 The student will examine the political, economic and social transformations of the Jacksonian Era.	8.7.1 Describe the factors that led to the election of Andrew Jackson including the “Corrupt Bargain” election of 1824, the expansion of voting rights, and Jackson’s political success by identifying with the “common man”.
	8.7.2 Analyze the impact of the Nullification Crisis on the development of the states’ rights debate.



	<p>8.7.3 Analyze the impact of Jackson’s policies and decisions concerning American Indian nations and their tribal sovereignty as a nation’s inherent right to self-govern, including:</p> <ul style="list-style-type: none">A. non-adherence to federal treatiesB. disregard for the <i>Worcester v. Georgia</i> decisionC. forced removals of American Indians
<p>8.8 The student will examine the political, economic, social, and geographic changes that occurred during the period of westward expansion.</p>	<p>8.8.1 Examine the concept and opposing perspectives toward Manifest Destiny as a motivation and justification for westward expansion.</p>
	<p>8.8.2 Explain the territorial growth of the United States including the annexation of Texas, Mexican Cession, and the Gadsden Purchase; describe the need to maintain a balance of “free” and “slave” states.</p>
	<p>8.8.3 Identify push and pull factors of mass migration and the settlement of western territories including the California Gold Rush, settlement of Oregon, and the Mormon migration.</p>
	<p>8.8.4 Analyze the consequences of westward expansion, including the impact on the culture of American Indians and their homelands, and the growing sectional tensions regarding the expansion of slavery.</p>
<p>8.9 The student will analyze the social and economic transformations of the early nineteenth century.</p>	<p>8.9.1 Explain the impact of the Industrial Revolution in the North including the concentration of population, manufacturing, and transportation.</p>
	<p>8.9.2 Describe the plantation system and its reliance on a slave labor system in the South, including how Eli Whitney’s invention of the cotton gin increased the profitability of the crop and led to the expansion of slavery.</p>
	<p>8.9.3 Compare perspectives and experiences of both free and enslaved blacks including the</p> <ul style="list-style-type: none">A. everyday life of free African AmericansB. everyday acts of resistance to slaveryC. efforts of Harriet Tubman and the Underground RailroadD. Nat Turner’s RebellionE. legal restrictions and Slave Codes
	<p>8.9.4 Summarize the impact of the Abolitionist Movement including the writings and work of Frederick Douglass and William Lloyd Garrison.</p>
	<p>8.9.5 Identify the ideals, significance, and key leaders of the Second Great Awakening and the Women’s Suffrage Movement, including the <i>Declaration of Sentiments</i> and the leadership of Susan B. Anthony, Elizabeth Cady Stanton, and Sojourner Truth.</p>



8.10 The student will analyze major political, economic, and social events that resulted in the Civil War.	8.10.1 Summarize the importance of slavery as the principal cause of increased sectional polarization leading to the Civil War.
	8.10.2 Evaluate the goals of the Compromise of 1850 regarding the issue of slavery.
	8.10.3 Evaluate the impact of the publication <i>Uncle Tom's Cabin</i> , by Harriet Beecher Stowe, on anti-slavery sentiments.
	8.10.4 Analyze the impact of the Kansas-Nebraska Act on the issue of popular sovereignty in new territories regarding the institution of slavery, repeal of the Missouri Compromise, and factional feuds in Bleeding Kansas.
	8.10.5 Summarize the <i>Dred Scott v. Sandford</i> case which declared slaves as property and motivated John Brown's Raid on the federal arsenal at Harpers Ferry.
8.11 The student will analyze the course and consequences of the Civil War.	8.11.1 Analyze the immediate impact of the presidential election of 1860 including A. secession of southern states who declared slavery as the central factor for seceding B. Lincoln's goal to preserve the Union C. formation of the Confederate States of America D. Confederate attack on Fort Sumter E. tensions over strategic border states.
	8.11.2 Compare the advantages and disadvantages of the Union and the Confederacy including natural resources, population, industrialization, and the military leadership of Ulysses S Grant and Robert E. Lee.
	8.11.3 Evaluate the impact and contributions of specific groups in the Civil War including free and enslaved African Americans, American Indians, women, and immigrants.
	8.11.4 Discuss the key strategies utilized during the war, such as the Anaconda Plan, Total War, and the southern defense strategy.
	8.11.5 Summarize the significance of the key battles of the war, including Antietam, Gettysburg, Vicksburg, and Lee's surrender at Appomattox.
	8.11.6 Analyze the <i>Emancipation Proclamation</i> , including its role in expanding the goals of the war and its impact on slavery; identify the significance of Juneteenth in relationship to emancipation.
	8.11.7 Explain how the <i>Gettysburg Address</i> clarified the Union's motivation for winning the war.



	<p>8.11.8 Evaluate the impact of Lincoln’s assassination, loss of his leadership, and plans for reconciliation as expressed in his <i>Second Inaugural Address</i>.</p>
<p>8.12 The student will analyze the political, social, and economic transformations during the Reconstruction Era to 1877.</p>	<p>8.12.1 Compare the major plans and policies proposed for Reconstruction.</p>
	<p>8.12.2 Analyze the impact of state and federal legislation following the Civil War including</p> <ul style="list-style-type: none">A. 13th, 14th, and 15th AmendmentsB. Black Codes and Jim Crow lawsC. establishment of the Freedmen’s Bureau
	<p>8.12.3 Compare the emerging social structure of the South including the</p> <ul style="list-style-type: none">A. influx of carpetbaggers and scalawagsB. rise of the Ku Klux Klan and its acts of intimidation and violenceC. election of blacks to government positionsD. expansion of the tenant and sharecropper systemsE. migration of former slaves.
	<p>8.12.4 Assess the impact of the presidential election of 1876 as an end to reconstruction in the South, including decline of black leadership, loss of enforcement of the 14th and 15th amendments, and the development of segregated societies.</p>
	<p>8.12.5 Evaluate the impact of federal policies including:</p> <ul style="list-style-type: none">A. Homestead Act of 1862 and the resulting movement westward to free landB. impact of continued displacement of American IndiansC. President Grant’s Peace Policy on Indian affairsD. the development of the Transcontinental Railroad.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
Economics Content Standards				
<p>E.1 The student will develop and apply economic reasoning and decision-making skills.</p>	<p>E.1.1 Define and apply basic economic concepts of money supply, scarcity, surplus, choice, opportunity cost, cost/benefit analysis, risk/reward relationship, incentive, disincentive, and trade-off to a variety of economic situations.</p>			
	<p>E.1.2 Determine appropriate courses of economic actions using a variety of economic reasoning and decision-making models.</p>			
	<p>E.1.3 Examine how the decision-making process is impacted by the scope of the decision and the size of the decision-making entity.</p>			
	<p>E.1.4 Explain that people tend to respond to fair treatment with fair treatment and to unfair treatment with retaliation, even when such reactions may not maximize their material wealth.</p>			
<p>E.2 The student will evaluate how societies answer the three basic economic questions: what goods and services to produce, how to produce them and for whom are they produced.</p>	<p>E.2.1 Compare the world’s basic economic systems of market (free enterprise), command, and mixed market economies identifying countries that have adopted each and comparing the results such economic systems have produced in those countries as measured by GDP, national prosperity, individual income, and wealth.</p>			
	<p>E.2.2 Describe the role of the factors of production, land, labor, capital, entrepreneurship, and technology as well as the place of imports and exports in economic systems.</p>			
	<p>E.2.3 Answer how the three basic economic questions affect personal income and in turn impact the economic system.</p>			
	<p>E.2.4 Explain the costs and benefits of government fiduciary policy and regulations including the impact both have on competition.</p>			
	<p>E.2.5 Describe the impact of comparative and absolute advantage upon the three basic economic questions.</p>			
<p>E.3 The student will explain how prices are set in a market economy and will determine how price provides incentives to buyers and sellers.</p>	<p>E.3.1 Analyze how price and non-price factors affect the demand and supply of goods and services available in the marketplace.</p>			
	<p>E.3.2 Explain what causes shortages and surpluses including government-imposed price floors, price ceilings, and other government regulations and the impact they have on prices and people’s decisions to buy or sell.</p>			



	E.3.3 Evaluate the role of the government within the economy as to defining, establishing, and enforcing property rights.
E.4 The student will evaluate how changes in the level of competition in different markets affect prices.	E.4.1 Explain how competition impacts the free market production and the allocation of goods and services to consumers.
	E.4.2 Explain how people’s own self-interest, incentives, and disincentives influence market decisions.
E.5 The student will describe the role of economic institutions including banks, credit unions, corporations, governments, and not-for-profits in a market economy.	E.5.1 Evaluate the impact of government ensuring the protection of private property rights and the rule of law in a market economy.
	E.5.2 Describe how banks allow people to pool their incomes and provide future income through investment in stocks.
	E.5.3 Identify how credit unions, corporations, and not-for-profits influence a market economy.
	E.5.4 Explain how successive deposits and loans made by commercial banks can cause the money supply to expand.
E.6 The student will analyze how money makes it easier to trade, borrow, save, invest, and compare the value of goods and services.	E.6.1 Explain how individuals, businesses, and the overall economy benefit from the various uses of money, such as trading, borrowing, investing, and diversifying, versus saving money.
	E.6.2 Identify the components of the money supply and the different functions of money; give examples of each.
	E.6.3 Explain how the value of money is determined by the goods and services it can buy.



Oklahoma Academic Standards for Social Studies Economics (E)

E.7 The student will evaluate how interest rates impact decisions in the market economy.	E.7.1 Define interest rates and inflation; analyze the relationship between interest rates and inflation rates to both the borrower and the lender.
	E.7.2 Determine how changes in real interest rates impact people’s decisions to borrow money and purchase goods in a market economy.
E.8 The student will analyze the role of entrepreneurs and laborers within a market economy.	E.8.1 Identify both an entrepreneur and a laborer and describe how their decisions affect job opportunities for others, such as profit-maximizing level of output, hiring the optimal number of workers, comparing marginal costs and benefits of producing more or less of a resource.
	E.8.2 Analyze the potential risks and potential gains of entrepreneurs opening new businesses or inventing a new product; determine the financial and nonfinancial incentives that motivate entrepreneurs.
	E.8.3 Evaluate the costs and benefits of incorporation including the expansion of resources and reduction of risks.
E.9 The student will evaluate the economic role of government in a free market and a mixed market economy.	E.9.1 Explain the aspects of and differences between a free market and a mixed market economy.
	E.9.2 Explain the purpose, costs, and benefits of government assistance programs and government funded services and projects.
	E.9.3 Evaluate the impact of voters’ decisions as they relate to governmental economic policy.
E.10 The student will examine current economic conditions in the United States.	E.10.1 Determine how interest rates, unemployment, Consumer Price Index (CPI), individual savings and debt, government debt, government-enforced price ceilings, labor supply, and inflation impact current economic conditions in the United States.
	E.10.2 Explain how these conditions have an impact on consumers, producers, and government policymakers.
	E.10.3 Explain how changes in supply and demand cause prices to change and in turn, cause buyers and sellers to change, including changes in price of productive resources and technologies used to make the product, profit opportunities available to producers for selling other products, number of sellers in a market, consumer incomes, consumer options, and the number of consumers in a market.
E.11 The student will identify the basic measures of a nation’s economic output and income.	E.11.1 Explain GDP and GNP and how they are used to describe economic output over time; compare the GDP of various countries representing market, command, and mixed economic systems.
	E.11.2 Describe the impact on the economy when GDP and GNP are growing or declining.



Oklahoma Academic Standards for Social Studies Economics (E)

	<p>E.11.3 Evaluate the impact of self-interest, competition, collusion, technological advancement, standard of living, the business cycle and fluctuation to the GDP.</p>
	<p>E.11.4 Examine the differences between the nominal and the real GDP.</p>
<p>E.12 The student will explain the role of inflation and unemployment in an economic system.</p>	<p>E.12.1 Define inflation and determine how it is measured, including the impact inflation has on different sectors of the United States economy.</p>
	<p>E.12.2 Define the causes of unemployment, as well as the different types of unemployment; determine how unemployment is measured and the impact it has on different sectors of the United States economy.</p>
<p>E.13 The student will identify the potential economic impact of policy changes by the Federal Reserve and the federal government.</p>	<p>E.13.1 Compare fiscal and monetary policy and the impact each has on the economy.</p>
	<p>E.13.2 Explain the role of the Federal Reserve System within government economic policy.</p>
	<p>E.13.3 Evaluate the conditions under which the federal government and the Federal Reserve implement expansionary or contractionary policies.</p>



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
Oklahoma History Content Standards				
<p>OKH.1 The student will describe the state’s geography and the historic foundations laid by American Indian, European, and American cultures.</p>	<p>OKH.1.1 Integrate visual information to identify and describe the significant physical and human features including major trails, railway lines, waterways, cities, ecological regions, natural resources, highways, and landforms.</p>			
	<p>OKH.1.2 Summarize the accomplishments of pre-contact cultures including the Spiro Mound Builders.</p>			
	<p>OKH.1.3 Compare the goals and significance of early Spanish, French, and American interactions with American Indians, including trade, the impact of disease, the arrival of the horse, and new technologies.</p>			
	<p>OKH.1.4 Compare cultural perspectives of American Indians and European Americans regarding land ownership, structure of self-government, religion, and trading practices.</p>			
<p>OKH.2 The student will evaluate the major political and economic events that transformed the land and its people from early contact through Indian Removal and its aftermath.</p>	<p>OKH.2.1 Summarize and analyze the role of river transportation to early trade and mercantile settlements including Chouteau’s Trading Post at Three Forks.</p>			
	<p>OKH.2.2 Describe the major trading and peacekeeping goals of early military posts including Fort Gibson.</p>			
	<p>OKH.2.3 Analyze the motivations for removal of American Indians and the passage of the Indian Removal Act of 1830; trace the forced removal of American Indian nations, including the impact on the tribal nations removed to present-day Oklahoma and tribal resistance to the forced relocations.</p>			
	<p>OKH.2.4 Describe the consequences of Indian Removal on intertribal relationships with western nations, such as the Osage, Comanche, Kiowa, Cheyenne and Arapaho.</p>			
<p>OKH.3 The student will evaluate the major political and economic events that transformed the land and its people from the outbreak of the Civil War through allotment and land openings.</p>	<p>OKH.3.1 Summarize the impact of the Civil War and Reconstruction Treaties on American Indian peoples, territories, and tribal sovereignty including:</p> <ul style="list-style-type: none"> A. required enrollment of the Freedmen B. Second Indian Removal C. significance of the Massacre at the Washita D. reasons for the reservation system and the controversy regarding the reservation system as opposed to tribal lands. E. establishment of the western military posts including the role of the Buffalo Soldiers F. construction of railroads through Indian Territory 			



Oklahoma Academic Standards for Social Studies Oklahoma History (OKH)

	OKH.3.2 Assess the impact of the cattle and coal mining industries on the location of railroad lines, transportation routes, and the development of communities.
	OKH.3.3 Analyze the influence of the idea of Manifest Destiny on the Boomer Movement.
	OKH.3.4 Compare multiple points of view to evaluate the impact of the Dawes Act (General Allotment Act) which resulted in the loss of tribal communal lands through a transfer to individual property and the redistribution of lands, including the Unassigned Lands and the Cherokee Outlet, by various means.
	OKH.3.5 Explain how American Indian nations lost control over tribal identity and citizenship through congressional action, including the Indian Reorganization Act.
OKH.4 The student will analyze the formation of constitutional government in Oklahoma.	OKH.4.1 Compare the governments among the American Indian nations and the movement for the state of Sequoyah.
	OKH.4.2 Describe the proposal for an all-black state advocated by Edward McCabe.
	OKH.4.3 Explain the impact of the Enabling Act on single statehood.
	OKH.4.4 Describe and summarize attempts to create a state constitution joining Indian and Oklahoma Territories including the impact of the Progressive and Labor Movements resulting in statehood on November 16,1907.
	OKH.4.5 Compare Oklahoma’s state government to the United States’ national system of government including the branches of government, their functions, and powers.
	OKH.4.6 Describe the division, function, and sharing of powers among levels of government including city, county, state and tribal.
	OKH.4.7 Identify major sources of local and state revenues and the services provided including education, health and human services, transportation, courts, corrections, and public safety.
	OKH.4.8 Describe state constitutional provisions including the direct primary, initiative petition, referendum, and recall.



Oklahoma Academic Standards for Social Studies Oklahoma History (OKH)

OKH.5 The student will examine the Oklahoma's political, social, cultural, and economic transformation during the early decades following statehood.

OKH.5.1 Examine the policies of the United States and their effects on American Indian identity, culture, economy, tribal government and sovereignty including:

- A. passage of the Indian Citizenship Act of 1924
- B. effects of the federal policy of assimilation including Indian boarding schools (1880s-1940s)
- C. authority to select tribal leaders as opposed to appointment by the federal government
- D. exploitation of American Indian resources, lands, trust accounts, head rights, and guardianship as required by the Bureau of Indian Affairs.

OKH.5.2 Examine multiple points of view regarding the evolution of race relations in Oklahoma, including:

- A. growth of all-black towns (1865-1920)
- B. passage of Senate Bill 1 establishing Jim Crow Laws
- C. rise of the Ku Klux Klan
- D. emergence of "Black Wall Street" in the Greenwood District
- E. causes of the Tulsa Race Riot and its continued social and economic impact.
- F. the role labels play in understanding historic events, for example "riot" versus "massacre".

OKH.5.3 Analyze how various segments of Oklahoma society including agriculture, mining, and state politics were influenced by the organized labor and socialist movements.

OKH.5.4 Examine how the economic cycles of boom and bust of the oil industry affected major sectors of employment, mining, and the subsequent development of communities, as well as the role of entrepreneurs, including J.J. McAlester, Frank Phillips, E.W. Marland and Robert S. Kerr, and the designation of Tulsa as the "Oil Capital of the World".

OKH.5.5 Evaluate the impact of the boom and bust cycle of Oklahoma's agricultural production due to mechanization and the needs of World War I, including its effect as a precursor of the Great Depression.

OKH.5.6 Analyze William H. "Alfalfa Bill" Murray's response to the conditions created by the Great Depression.

OKH.5.7 Describe the impact of environmental conditions and human mismanagement of resources resulting in the Dust Bowl and the migration of the "Okies", the national perceptions of Oklahomans, and the New Deal policies regarding conservation of natural resources.

OKH.5.8 Describe the contributions of Oklahomans including African-American jazz musicians, the political and social commentaries of Will Rogers and Woody Guthrie's, Wiley Post's aviation milestones, and the artwork of the Kiowa Six.

OKH.5.9 Summarize and analyze the impact of mobilization for World War II including the establishment of military bases, prisoner of war installations, and the contributions of Oklahomans to the war effort including the American Indian code talkers and the 45th Infantry Division.



Oklahoma Academic Standards for Social Studies Oklahoma History (OKH)

OKH.6 The student will investigate how post-war social, political, and economic events continued to transform the state of Oklahoma from the 1950s through the present.

OKH.6.1 Evaluate the progress of race relations and actions of civil disobedience in the state including:

- A.** judicial interpretation of the equal protection clause of the 14th Amendment which ultimately resulted in the desegregation of public facilities and public schools and universities
- B.** landmark Supreme Court cases of *Sipuel v. Board of Regents of the University of Oklahoma (1948)* and *McLaurin v. Oklahoma Board of Regents for Higher Education (1950)*
- C.** lunch counter sit-ins organized by Clara Luper and the NAACP
- D.** leadership of Governor Gary in the peaceful integration of the public common and higher education systems.

OKH.6.2 Analyze the impact of economic growth in various sectors including:

- A.** impact of rural to urban migration
- B.** development of wind, water, and timber resources
- C.** continuing role of agriculture
- D.** emergence of tourism as an industry
- E.** development of the aerospace and aviation industry including the FAA and the influence of weather research on national disaster preparedness
- F.** oil and gas boom and bust, including the discovery of new fossil fuel resources
- G.** improvement of the state's transportation infrastructures, such as the interstate highway system and the McClellan-Kerr Arkansas River Navigation System.

OKH.6.3 Describe the artistic contributions of Oklahomans in the fields of music, art, literature, theater, and dance such as Ralph Ellison and the Five Indian Ballerinas.

OKH.6.4 Summarize the impact of individual Oklahomans' leadership on state and national politics including political realignment.

OKH.6.5 Analyze the evolving relationship between state and tribal governments impacting tribal self-determination and control over American Indian lands and resources including issues of jurisdiction, taxation, and gaming.

OKH.6.6 Examine the contributions of major cultural and ethnic groups, including Asians, African Americans, American Indians, and Latinos to the state of Oklahoma and their impact on the social and economic transformation of the modern state of Oklahoma.

OKH.6.7 Analyze the causes and effects of the domestic terrorist attack on the Murrah Federal Building in Oklahoma City including the responses of Oklahomans to the act, concept of the "Oklahoma Standard" and the creation of the Oklahoma City National Memorial and Museum.



Oklahoma Academic Standards for Social Studies Oklahoma History (OKH)

OKH.6.8 Describe the changing perceptions, both internal and external, of the state and its citizens, as reflected in the *Grapes of Wrath*, the musical *Oklahoma!*, Route 66, and the professional basketball team the Oklahoma City Thunder.

OKH.6.9 Examine ongoing issues including immigration, criminal justice reform, employment, environmental issues, race relations, civic engagement, and education.



Oklahoma Academic Standards for Social Studies Psychology (PS)

Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
Psychology Content Standards				
<p>PS.1 The student will examine the foundations of psychology and its origins as a separate social science discipline.</p>	<p>PS.1.1 Analyze the definition of psychology in the context of psychology as an empirical science and the major approaches to psychology including cognitive-behavioral, psychoanalytic, cognitive, and humanistic.</p>			
	<p>PS.1.2 Evaluate the origins of psychology based on significant historic figures including Wilhelm Wundt, William James, John B. Watson, and Karen Horney.</p>			
	<p>PS.1.3 Classify the various subfields in psychology including vocational applications such as counseling, industrial, clinical, experimental, and educational psychology.</p>			
<p>PS.2 The student will examine the development of psychology as an empirical science by describing the scientific method, explaining research strategies, and identifying ethical issues.</p>	<p>PS.2.1 Describe the scientific method as the framework for research and apply the principles of research design to an appropriate experiment.</p>			
	<p>PS.2.2 Compare quantitative and qualitative research strategies including experiments, surveys, focus groups, and narratives as the foundation of research in psychology.</p>			
	<p>PS.2.3 Identify ethical standards psychologists must address regarding research with human and non-human participants.</p>			
	<p>PS.2.4 Explore the various modes of psychological testing including personality, intelligence, and projective while assessing the reliability of each.</p>			
<p>PS.3 The student will investigate the structure, biochemistry and circuitry of the brain and the nervous system to understand their roles in affecting behavior.</p>	<p>PS.3.1 Identify and describe the structure and function of the brain including the hypothalamus, prefrontal lobe, corpus callosum, hemispheres, and amygdala.</p>			
	<p>PS.3.2 Examine the structure and function of the nervous and endocrine system and how they affect behavior.</p>			
	<p>PS.3.3 Identify the parts of a neuron and explain neurotransmission including the role and impact of various neurotransmitters.</p>			
	<p>PS.3.4 Explain the processes of sensation and perception, as well as the capabilities and limitations of sensory processes including the visual, auditory, kinesthetic, olfactory, and gustatory sensory systems.</p>			



Oklahoma Academic Standards for Social Studies Psychology (PS)

	<p>PS.3.5 Describe the interaction of a person and the environment in determining perception including Gestalt principles and how one’s experiences and expectations influence perception.</p>
	<p>PS.3.6 Identify various states of consciousness including sleep and dreams, hypnosis, meditation, and psychoactive drugs.</p>
moral and cognitive development from conception through the latter stages of adulthood.	<p>PS.4.1 Explain the interaction of environmental and biological factors in human development including the role of the brain in all aspects of development.</p>
	<p>PS.4.2 Compare the theories of Jean Piaget, Sigmund Freud, Lawrence Kohlberg, Carl Jung, and Erik Erikson regarding human development.</p>
PS.5 The student will understand how organisms adapt to their environment through learning and cognition.	<p>PS.5.1 Identify and explain the major theories of learning including Ivan Pavlov’s classical conditioning, B.F. Skinner’s and Albert Bandura’s Operant conditioning, and Bandura’s observational learning.</p>
	<p>PS.5.2 Describe the process, organization, and factors that influence memory and recall.</p>
	<p>PS.5.3 Analyze strategies and impediments involved in problem solving and decision making and how this knowledge could be applied to daily life.</p>
PS.6 The student will understand the principles of motivation and emotion.	<p>PS.6.1 Compare the predominant theories of motivation and emotion including the biological, social-cognitive, humanistic, and cultural theories.</p>
	<p>PS.6.2 Analyze the biological and environmental influences on positive and negative emotion.</p>
PS.7 The student will understand how society and culture influence a person’s behavior and mental processes.	<p>PS.7.1 Evaluate the factors that lead to conformity, obedience and nonconformity as demonstrated in experiments including the Stanford Prison Experiment, Milgram Experiment, or Solomon Asch’s studies.</p>
	<p>PS.7.2 Explain how bias, discrimination and use of stereotypes influence behavior with regard to gender, race, sexual orientation and ethnicity as demonstrated in the studies of the Brown Eyed/Blue Eyed Experiment and the Clark Doll Experiment.</p>
	<p>PS.7.3 Examine influences on aggression and conflict including the factors associated with the bystander effect as demonstrated in such cases as the Kitty Genovese murder.</p>
	<p>PS.8.1 Analyze the methods of determining abnormal behavior and the tools used to diagnose and classify disorders.</p>



Oklahoma Academic Standards for Social Studies Psychology (PS)

PS.8 The student will examine how psychological disorders are diagnosed, classified, and treated.	PS.8.2 Describe symptoms and causes of major categories of psychological disorders including schizophrenia mood, anxiety, personality, somatoform, and dissociative disorders.
	PS.8.3 Compare available treatment options and how they evolved through history and among different cultures.
PS.9 The student will evaluate the many factors that promote mental health.	PS.9.1 Identify and explain potential sources of stress, effects of stress, and various coping strategies for dealing with stress.
	PS.9.2 Describe the characteristics of and factors that promote resilience and optimism.
	PS.9.3 Analyze the relationship between psychological health and physiological health.
	PS.9.4 Identify mental health disorders such as eating disorders and obsessive compulsive disorders.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
United States Government Content Standards				
<p>USG.1 The student will compare the formation of contemporary governments in terms of access, use and justification of power.</p>	<p>USG.1.1 Compare the essential characteristics of limited versus unlimited governments.</p>			
	<p>USG.1.2 Compare historic and contemporary examples of unlimited governments to examples of limited systems.</p>			
	<p>USG.1.3 Compare the advantages and disadvantages of the ways governmental power is distributed, shared and structured in unitary, federal and confederal systems in terms of effectiveness, prevention of abuse of power and responsiveness to the popular will.</p>			
	<p>USG.1.4 Compare the role of government in market and command economic systems.</p>			
<p>USG.2 The student will describe the historical and philosophical foundations of the republican system of government in the United States.</p>	<p>USG.2.1 Summarize the major documents contributing to the formation of constitutional government in the United States, including the Magna Carta, the Mayflower Compact and the English Bill of Rights.</p>			
	<p>USG.2.2 Identify the central ideas and importance of the concept of inalienable rights, including life, liberty and the pursuit of happiness, the social contract, and the grievances stated in the Declaration of Independence and reflected in the Constitution of the United States.</p>			
	<p>USG.2.3 Evaluate the necessity of a written constitution to set forth enumerated powers, to organize government, and to distribute powers among the three branches of government, the states, and the people.</p>			
	<p>USG.2.4 Compare the points of view toward the structure and powers of government as expressed in the <i>Federalist Papers</i>, authored by Madison, Hamilton and Jay, as well as the writings of the Anti-Federalists.</p>			
	<p>USG.2.5 Analyze the constitutional amendment process including the 27 amendments to the Constitution of the United States.</p>			
<p>USG.3 The student will analyze the fundamental principles of</p>	<p>USG.3.1 Examine the American system of federalism and evaluate the changes that have occurred in the relationship between the states and the national government over time.</p>			



the American system of government resulting in a republic, as established in the Constitution of the United States, the supreme law of the land.

USG.3.2 Analyze the system of federalism including the

- A. enumerated (express) powers
- B. implied powers
- C. powers denied to the national government
- D. reserved powers to the states
- E. concurrent powers.

USG.3.3 Summarize and explain the relationships and the responsibilities among national, state, tribal, and local governments.

USG.3.4 Explain that tribal sovereignty is a tribal nation’s inherent power to self-govern, such as challenges made regarding the Major Crimes Act.

USG.3.5 Analyze how the Commerce Clause established the initial constitutional relationship between the Indian tribes and the United States government.

USG.3.6 Explain how power is separated as well as shared under the American system including the

- A. system of separation of powers
- B. system of checks and balances
- C. principle of judicial review.

USG.3.7 Evaluate the importance of the rule of law on the purposes and functions of government; explain how the rule of law provides for the protection of individual liberties, including due process and equality under the law.

USG.3.8 Analyze the concept of popular sovereignty, including the government’s responsibility to legitimize majority rule while protecting minority rights.

USG.3.9 Analyze the rights and liberties guaranteed to all citizens in the Bill of Rights and how they are protected at the state level through the doctrine of incorporation using the 14th Amendment.

USG.3.10 Analyze historic and contemporary examples of landmark Supreme Court decisions which have addressed and clarified individual rights under the First Amendment, including

- A. *Gitlow v. New York* (1925)
- B. *West Virginia v. Barnette* (1943)
- C. *Engel v. Vitale* (1962)
- D. *Tinker v. Des Moines* (1969)
- E. *Texas v. Johnson* (1989)



	<p>USG.3.11 Analyze historic and contemporary examples of landmark Supreme Court cases which have specified individual rights of due process under the Constitution, including:</p> <ul style="list-style-type: none">A. <i>Mapp v. Ohio</i> (1961)B. <i>Gideon v. Wainwright</i> (1963)C. <i>Miranda v. Arizona</i> (1966)D. <i>Roe v. Wade</i> (1973)E. <i>Furman v. Georgia</i> (1972).
<p>USG.4 The student will examine the Constitution of the United States by comparing the legislative, executive, and judicial branches of government as they address the needs of the public.</p>	<p>USG.4.1 Explain the purposes of government expressed in the Preamble and how the Constitution of the United States preserves the core principles of American society.</p> <p>USG.4.2 Examine the structure, functions, and authority exercised by the executive, legislative, and judicial branches of government.</p> <ul style="list-style-type: none">A. Identify the constitutional qualifications for holding public office and the terms of office, including the composition of Congress, the Supreme Court, and the executive branch.B. Explain the steps of the legislative process, including the role of Congress and the president.C. Explain the role of the executive branch, including the function of the bureaucracy in implementing public policy.D. Identify the issues and describe the significance of landmark Supreme Court decisions including <i>Marbury v. Madison</i> (1803), <i>McCulloch v. Maryland</i> (1819), <i>United States v. Nixon</i> (1974), <i>Bush v. Gore</i> (2000), and <i>Citizens United v. F.E.C.</i> (2010)E. Examine how government exercises its authority in real world situations including current issues and events.
<p>USG.5 The student will be able to evaluate the significance of civic participation in order to ensure the preservation of our constitutional government.</p>	<p>USG.5.1 Define civic virtue and explain the individual’s duty and responsibility to participate in civic life by voting, serving on juries, volunteering within the community, running for office, serving on a political campaign, paying state and federal taxes prior to the April 15th annual deadline, and respecting legitimate authority.</p> <p>USG.5.2 Explain the naturalization process under the laws of the United States.</p> <p>USG.5.3 Analyze how our system of government provides citizens opportunities to monitor and influence the actions of the government and hold elected officials accountable.</p> <p>USG.5.4 Analyze factors affecting the political process and their role in government, including the role of political parties, interest groups, mass media, public opinion, and campaign funding.</p> <p>USG.5.5 Explain the steps of the electoral process including the components of local and national campaigns, the nominative process, and the Electoral College.</p>



Oklahoma Academic Standards for Social Studies United States Government (USG)

USG.6 The student will examine the United States public policy formation process.

USG.6.1 Examine the budget process including significant policy issues and examples of economic trade-offs that occur when addressing competing public needs.

USG.6.2 Examine how the government influences the economy using fiscal and monetary policy.

USG.6.3 Explain the role of the national government in formulating and carrying out domestic policy.

USG.6.4 Evaluate the role of the national government in formulating and carrying out foreign policy, national defense, and participation in international alliances and organizations.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
United States History Content Standards				
<p>USH.1 The student will analyze the transformation of the United States through its civil rights struggles, immigrant experiences, and settlement of the American West in the Post-Reconstruction Era, 1865 to the 1920s.</p>	<p>USH.1.1 Explain the constitutional issues that arise in the post-Civil War era including federalism, separation of powers, and the system of checks and balances.</p>			
	<p>USH.1.2 Analyze the post-Reconstruction civil rights struggles.</p> <ul style="list-style-type: none"> A. Identify the significance of Juneteenth in relation to emancipation and modern-day celebrations. B. Examine the purposes and effects of the 13th, 14th, and 15th Amendments. C. Assess the impact of the Black Codes, Jim Crow laws, and the actions of the Ku Klux Klan. 			
	<p>USH.1.3 Analyze the impact of westward expansion and immigration on migration, settlement patterns in American society, economic growth, and American Indians.</p> <ul style="list-style-type: none"> A. Summarize the reasons for immigration, shifts in settlement patterns, the immigrant experience at immigrant processing centers such as Ellis Island and Angel Island, and the impact of Nativism and Americanization. B. Analyze the creation of federal immigration policies including the Chinese Exclusion Act, the Gentlemen’s Agreement, federal court decisions, the Supreme Court’s application of the 14th Amendment and the Immigration Act of 1924. C. Examine the rationale behind federal policies toward American Indians including the establishment of reservations, attempts at assimilation, the end of the Indian Wars at Wounded Knee, and the impact of the Dawes Act on tribal sovereignty and land ownership. D. Compare viewpoints of American Indian resistance to United States Indian policies as evidenced by Red Cloud in his <i>Cooper Union</i> speech, Quanah Parker, and Chief Joseph as expressed in his <i>I Will Fight No More Forever</i> speech. 			



USH.2 The student will analyze the social, economic and political changes that occurred during the American Industrial Revolution, the Gilded Age, and significant reform movements from the 1870s to the 1920s.

USH.2.1 Evaluate the transformation of American society, economy and politics during the American Industrial Revolution.

- A.** Analyze the impact of capitalism, laissez-faire policy and the role of leading industrialists as robber barons, captains of industry and philanthropists including John D. Rockefeller and Andrew Carnegie and his *Gospel of Wealth* essay on American society.
- B.** Identify the impact of new inventions and industrial production methods including new technologies by Thomas Edison, Alexander G. Bell, Henry Ford, and the Bessemer process.
- C.** Evaluate the contributions of muckrakers, including Ida Tarbell, Jacob Riis and Upton Sinclair, in changing government policies regarding child labor, working conditions and regulation of big business.
- D.** Analyze major social reform movements including the Women’s Suffrage and Temperance Movement and the leadership of Susan B. Anthony, Alice Paul, and Jane Addams.
- E.** Evaluate the significance of the Labor Movement on the organization of workers including the impact of the Pullman strikes, the Haymarket Riot, and the leadership of Eugene V. Debs.
- F.** Assess and summarize changing race relations as exemplified in the *Plessy v. Ferguson* case.
- G.** Compare early civil rights leadership including the viewpoints of Booker T. Washington, and W.E.B. DuBois in response to rising racial tensions, the anti-lynching work of Ida B. Wells, and the use of poll taxes and literacy tests to disenfranchise blacks.

USH.2.2 Evaluate the rise and reforms of Populism and the Progressive Movement including:

- A.** direct primary, initiative petition, referendum, and recall intended to limit the corrupting influence of political machines
- B.** impact of William Jennings Bryan and his *Cross of Gold* speech on the political landscape
- C.** series of events leading to and the effects of the 16th, 17th, 18th, 19th, and 21st Amendments to the Constitution of the United States.

USH.2.3 Analyze and summarize the key personalities, actions and policies of Presidents Theodore Roosevelt, William Howard Taft, and Woodrow Wilson by:

- A.** comparing the policies of Roosevelt and Taft on environmental conservation and trust busting,
- B.** evaluating the 1912 presidential election including the role of Roosevelt's *Bull Moose Party* and Eugene V. Debs Socialist Party.
- C.** describing the policies of Wilson on the issue of women’s right to vote.



<p>USH.3 The student will analyze the expanding role of the United States in international affairs as America was transformed into a world power in the late 19th and early 20th centuries, 1890 to 1920.</p>	<p>USH.3.1 Evaluate the impact of American imperialism on international relations and explain its impact on developing nations.</p> <ul style="list-style-type: none">A. Compare the economic, religious, social, and political rationales for American imperialism including the concept of “white man’s burden,” the annexation of Hawaii, the impact of Admiral Alfred T. Mahan, and the actions of the Anti-Imperialist League.B. Assess the role of yellow journalism and jingoism in inciting the desire of Americans to go to war with Spain.C. Examine how the Spanish-American War resulted in the rise of the United States as a world power and led to new territorial acquisitions and national insurrections in Cuba and the Philippines.D. Compare the foreign policies of Presidents Roosevelt, Taft, and Wilson including Big Stick Diplomacy, Dollar Diplomacy, Missionary Diplomacy, the Roosevelt Corollary, military interventionism, and the territorial acquisition and construction of the Panama Canal. <p>USH.3.2 Evaluate the long-term impact of America’s entry into World War I on national politics, the economy, and society.</p> <ul style="list-style-type: none">A. Summarize the transformation of the United States from a position of neutrality to engagement in World War I including the Zimmermann Telegram and the threats to international trade caused by unrestricted submarine warfare.B. Analyze the impact of the war on the home front including the use of propaganda, women’s increased role in industry, the marshaling of industrial production, and the Great Migration.C. Analyze the institution of a draft and the suppression of individual liberties resulting in the First Red Scare, including the Palmer Raids and the Sacco-Vanzetti trials.D. Evaluate Wilson’s foreign policy as proposed in his Fourteen Points and the reasons for the nation’s return to isolationism highlighted by the Senate’s rejection of the League of Nations.
<p>USH.4 The student will analyze the cycles of boom and bust of the 1920s and 1930s on the transformation of American government, the economy and society.</p>	<p>USH.4.1 Examine the economic, political, and social transformations between the World Wars.</p> <ul style="list-style-type: none">A. Describe modern forms of cultural expression including the significant impact of people of African descent on American culture as exhibited by the Harlem Renaissance and the Jazz Age.B. Describe the rising racial tensions in American society including the resurgence of the Ku Klux Klan, increased lynchings, race riots as typified by the Tulsa Race Riot, the rise of Marcus Garvey and black nationalism, and the use of poll taxes and literacy tests to disenfranchise blacks.C. Assess the impact of the Indian Citizenship Act of 1924 on the American Indian nations.D. Examine growing labor unrest and industry’s reactions, including the use of sit-down strikes and court injunctions, and why socialism and communism appealed to labor.E. Describe the booming economy based upon access to easy credit through installment buying of appliances and inventions of modern conveniences including the automobile.



	<p>USH.4.2 Analyze the effects of the destabilization of the American economy.</p> <ul style="list-style-type: none">A. Identify causes contributing to an unstable economy including the overproduction of agriculture products, greater speculation and buying on margin in the Stock Market, and the government’s pro-business and laissez-faire policies.B. Examine the role of the Stock Market Crash and bank failures in weakening both the agricultural and manufacturing sectors of the economy leading to the Great Depression.C. Analyze how President Herbert Hoover’s financial policies and massive unemployment as exemplified by the Bonus Army March and Hoovervilles impacted the presidential election of 1932.D. Compare points of view regarding the economic and social impact of the Great Depression on individuals, families, and the nation.
	<p>USH.4.3 Analyze the impact of the New Deal in transforming the federal government’s role in domestic economic policies.</p> <ul style="list-style-type: none">A. Assess changing viewpoints regarding the expanding role of government as expressed in President Franklin Roosevelt’s <i>First Inaugural Address</i>.B. Examine how national policies addressed the economic crisis including John Maynard Keynes’ theory of deficit spending, Roosevelt’s court packing plan, and the new federal agencies of the Social Security Administration, Federal Deposit Insurance Corporation (FDIC), Works Progress Administration (WPA), Civilian Conservation Corps (CCC), and the Tennessee Valley Authority (TVA).C. Summarize the causes and impact of the Dust Bowl including the government’s responses.
<p>USH.5 The student will analyze the United States role in international affairs by examining the major causes, events and effects of the nation’s involvement in World War II, 1933 to 1946.</p>	<p>USH.5.1 Describe the transformations in American society and government policy as the nation mobilized for entry into World War II.</p> <ul style="list-style-type: none">A. Examine the roles of appeasement and isolationism in the United States’ reluctance to respond to Fascist military aggression in Europe and Asia including the Neutrality Acts and the Lend-Lease program.B. Evaluate the industrial mobilization for war and the psychological preparation for war as reflected in President Franklin Roosevelt’s <i>Four Freedoms</i> speech.C. Examine President Franklin Roosevelt’s <i>Day Which Will Live in Infamy</i> speech and America’s conduct of the war, including the role of women and minorities in the war effort, rationing, the internment of Americans of Japanese descent, and the treatment of Americans of German, and Italian descent, including the <i>Korematsu v. United States</i> decision. <p>USH.5.2 Analyze the series of events affecting the outcome of World War II including major battles, military turning points, and key strategic decisions in both the European and Pacific Theaters of operation including Pearl Harbor, the D-Day Invasion, development and use of the atomic bomb, the island-hopping strategy, the Allied conferences at Yalta and Potsdam, and the contributions of Generals MacArthur and Eisenhower.</p>



	<p>USH.5.3 Summarize American reactions to the events of the Holocaust resulting in United States participation in the Nuremberg Trials which held Nazi leaders accountable for war crimes.</p>
<p>USH.6 The student will analyze foreign events and policies during the Cold War, 1945-1975.</p>	<p>USH.6.1 Analyze the origins of international alliances and efforts at containment of Communism following World War II.</p> <ul style="list-style-type: none">A. Identify the origins of Cold War confrontations between the Soviet Union and the United States including the leadership of President Harry Truman, the postwar division of Berlin, the Berlin Blockade and Airlift, the Iron Curtain, and the Marshall Plan.B. Describe the roles and consequences of the spheres of influence created by the formation of the United Nations and NATO by the United States and the formation of the Warsaw Pact by the Soviet Union.C. Assess the impact and successes of the Truman Doctrine including the American military response to the invasion of South Korea.D. Evaluate the Kennedy administration’s international goals as expressed in his <i>Inaugural Address</i> in light of the subsequent building of the Berlin Wall, the Bay of Pigs Invasion, the Cuban Missile Crisis, NASA, and the establishment of the Peace Corps.
	<p>USH.6.2 Describe domestic events related to the Cold War and its aftermath.</p> <ul style="list-style-type: none">A. Summarize the reasons for the public fear of communist influence within the United States and how politicians capitalized on this fear including the leadership of President Dwight D. Eisenhower, the Army-McCarthy hearings, the Second Red Scare, the Alger Hiss controversy, and the Rosenbergs’ spy trials.B. Examine the impact of the proliferation of nuclear weapons and the resulting nuclear arms race, the concept of brinkmanship, the doctrine of mutually assured destruction (MAD), the launching of Sputnik and the space race.C. Evaluate the continuing role of radio, television and other mass media in relationship to the Nixon and Kennedy debates as part of the 1960 and subsequent elections.
	<p>USH.6.3 Analyze the series of events and long term foreign and domestic consequences of the United States’ military involvement in Vietnam including the Domino Theory, the Gulf of Tonkin Resolution, the Tet Offensive, the presidential election of 1968, university student protests led by the counterculture movement, expanded television coverage of the war, the War Powers Resolution Act, and the 26th Amendment.</p>
	<p>USH.6.4 Analyze the political and economic impact of President Nixon’s foreign policies including détente and the opening of China.</p>



USH.7 The student will analyze the cause and effects of significant domestic events and policies from 1945 to 1975.

USH.7.1 Analyze the major events, personalities, tactics and effects of the Civil Rights Movement.

A. Assess the effects of President Truman's decision to desegregate the United States armed forces and the legal attacks on segregation by the NAACP and Thurgood Marshall, the United States Supreme Court decisions in the cases of Oklahomans Ada Lois Sipuel Fisher and George McLaurin, and the differences between *de jure* and *de facto* segregation.

B. Evaluate the events arising from separate but equal, policies, such as poll taxes and literacy tests, violent responses such as the Birmingham church bombing and the assassination of Dr. Martin Luther King, Jr., and conflicts over segregation including:

1. *Brown v. Board of Education, Topeka, Kansas* decision
2. Montgomery Bus Boycott
3. desegregation of Little Rock Central High School
4. Oklahoma City lunch counter sit-ins led by Clara Luper
5. Freedom Rides
6. Marches on Washington and Selma to Montgomery
7. adoption of the 24th Amendment
8. passage of the Civil Rights Act of 1964 and the Voting Rights Act of 1965.

C. Compare the viewpoints and the contributions of civil rights leaders and organizations linking them to events of the movement, including Dr. Martin Luther King, Jr. and his *I Have a Dream* speech, the leadership of Malcolm X, the role of organizations such as the Black Panthers; describe the tactics used at different times including civil disobedience, non-violent resistance, sit-ins, boycotts, marches, and voter registration drives.



Oklahoma Academic Standards for Social Studies United States History (USH)

	<p>USH.7.2 Analyze the ongoing social and political transformations within the United States.</p> <ul style="list-style-type: none">A. Summarize and examine the United States Supreme Court’s use of the 14th Amendment incorporation doctrine in applying the Bill of Rights to the states, thereby securing and further defining individual rights and civil liberties.B. Assess the rise of liberalism in the 1960s and the lasting impact of President Lyndon Johnson’s civil rights initiatives, the war on poverty, and the Great Society.C. Describe the goals and effectiveness of the American Indian movements on tribal identity and sovereignty including the American Indian Movement (AIM) and mismanagement by the federal government causing the occupations at Wounded Knee and Alcatraz.D. Describe the goals and effectiveness of the social movement of the United Farm Workers and César Chávez.E. Compare the changing roles of women from the post-war era through the 1970s including the goals of the Women’s Liberation Movement and the National Organization of Women under the leadership of Betty Friedan, various debates on the Equal Rights Amendment, and the United States Supreme Court’s ruling in <i>Roe v. Wade</i>.F. Evaluate the impact of the Watergate Scandal on executive powers including the role of the media, the Pentagon Papers, the first use of the 25th Amendment, and President Ford’s decision to pardon former President Nixon.
<p>USH.8 The student will analyze the impact of foreign and domestic policies from 1977 to 2001.</p>	<p>USH.8.1 Evaluate President Jimmy Carter’s foreign policy in the Middle East including the Camp David Accords, the OPEC oil embargo, and the response to the 1979 Iranian hostage crisis.</p> <p>USH.8.2 Analyze the economic and political impact of the rise of conservatism and President Reagan’s domestic and foreign policies including Reaganomics, the Iran-Contra Scandal and Reagan’s <i>Tear Down This Wall</i> speech in West Berlin.</p> <p>USH.8.3 Summarize the series of events leading to the emergence of the United States as the sole superpower following the fall of the Berlin Wall and the collapse of the Soviet Empire.</p> <p>USH.8.4 Describe the goal of President George H.W. Bush’s foreign policy in forming an international coalition to counter Iraqi aggression in the Persian Gulf.</p> <p>USH.8.5 Describe and evaluate the influence of William J. Clinton’s presidency, including the</p> <ul style="list-style-type: none">A. continuing global influence of the United States including NAFTA and the NATO interventions to restore stability to the former Yugoslav republics.B. political impact of Clinton’s impeachment. <p>USH.8.6 Evaluate the rise of terrorism and its impact on the United States including the 1995 bombing of the Murrah Federal Building, the first attack on the World Trade Center Towers in 1993, the attacks on September 11, 2001, the USA PATRIOT Act, and the creation of the Department of Homeland Security.</p>



Oklahoma Academic Standards for Social Studies United States History (USH)

USH.9 The student will examine contemporary challenges and successes in meeting the needs of the American citizen and society, 2002 to the present.

USH.9.1 Assess George W. Bush’s presidency, including the causes, conduct and consequences of the United States led wars in Afghanistan and Iraq, efforts to counter and combat terrorism, and domestic issues such as the FEMA response to Hurricane Katrina and the Great Recession.

USH.9.2 Assess Barack Obama’s presidency, including the significance of his election, the wars in Afghanistan and Iraq, handling of economic conditions, establishment of DACA, and reforms to healthcare.

USH.9.3 Examine the ongoing issues to be addressed by the Donald Trump and subsequent administrations, including taxation, immigration, employment, climate change, race relations, religious discrimination and bigotry, civic engagement, and perceived biases in the media.



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
World Human Geography Content Standards				
<p>WG.1 The student will use maps and other geographic representations, tools and technologies to acquire, research, process, and solve problems from a spatial perspective.</p>	<p>WG.1.1 Analyze key concepts underlying the geographical perspectives of location, space, place, scale, pattern, regionalization, and globalization.</p>			
	<p>WG.1.2 Utilize geographic skills to understand and analyze the spatial organization of people, places, and environments on the Earth’s surface.</p>			
	<p>WG.1.3 Define regions and evaluate the regionalization process to characterize and analyze changing interconnections among places.</p>			
	<p>WG.1.4 Utilize geographic technologies of GIS, remote sensing and GPS sources of geographical data including census data, population pyramids, cartograms, and satellite imagery.</p>			
<p>WG.2 The student analyze how human population is organized geographically in order to understand the cultural, political, and economic systems of the world.</p>	<p>WG.2.1 Analyze geographic data measuring population including density, distribution, patterns of composition (age, sex, race, and ethnicity), and population trends and projections.</p>			
	<p>WG.2.2 Describe and summarize the push and pull theory of migration and its impact on human capital and demographic transitions including the research of major voluntary and involuntary migrations.</p>			
	<p>WG.2.3 Compare and contrast the impact of population policies on the patterns of fertility, mortality, and health.</p>			
<p>WG.3 The student will analyze the components and regional variations of cultural patterns and processes.</p>	<p>WG.3.1 Assess the spatial dimensions of culture as defined by language, religion, ethnicity, and gender.</p>			
	<p>WG.3.2 Analyze and summarize the role the environment plays in determining a region’s culture.</p>			
	<p>WG.3.3 Explain the processes of cultural diffusion, acculturation, assimilation, and globalization regarding their impact on defining a region.</p>			
	<p>WG.3.4 Compare the world’s major cultural landscapes to analyze cultural differences, cultural identity, social mores, and sets of beliefs which determine a sense of place.</p>			
	<p>WG.3.5 Explain how cultural characteristics, such as language, ethnicity, and religion impact different regions.</p>			



WG.4 The student will explain the political organization of space.	WG.4.1 Describe and summarize the different forces that shape the evolution of the world’s contemporary political map including the rise of nation-states.
	WG.4.2 Analyze the concept of territoriality, the nature and meaning of boundaries, and their influence on identity, interaction, and exchange.
	WG.4.3 Compare the world’s political patterns of organization including federal and unitary states.
	WG.4.4 Examine changes and challenges to political/territorial arrangements, the changing nature of sovereignty, and evolution of contemporary political patterns.
	WG.4.5 Evaluate how the forces of cooperation and conflict among people influence the division and control of territory and resources.
WG.5 The student will analyze agricultural and commercial land use.	WG.5.1 Examine the origin and diffusion of agriculture including the Agricultural Revolutions and the Green Revolution.
	WG.5.2 Describe and summarize the characteristics of modern commercial agriculture including major production regions, variations within major zones, and effects of markets.
	WG.5.3 Analyze settlement patterns associated with major agricultural regions and linkages among regions of food production and consumption.
	WG.5.4 Describe the impact of agricultural practices including irrigation, conservation, desertification, deforestation, organic farming, pesticides and herbicides, and genetic modification on the environment and the quality of life.
	WG.5.5 Examine common characteristics of rural communities including the impact of the environment on location, the political, economic and cultural functions of rural communities, the types of transportation, communication and trade linkages among rural areas, and the impact of modern migration to urban centers.
WG.6 The student will analyze the impact of industrialization on economic development.	WG.6.1 Examine the changing roles of natural resources, energy, and technology that resulted in the Industrial Revolution.
	WG.6.2 Evaluate the impact of industrialization and government policies of both market and command economic systems on the availability and use of natural resources, environmental concerns, and sustainable development.
	WG.6.3 Compare contemporary patterns of industrialization and development in selected regions of the world including the Pacific Rim, Central Asia, and the Arabian Peninsula.



	<p>WG.6.4 Analyze why some economies achieve rapid growth while other economies with similar resources struggle to reach developed status.</p>
	<p>WG.6.5 Summarize common characteristics of developed nations including variations in levels of development, modern patterns of deindustrialization, and economic restructuring, globalization, and international division of labor.</p>
<p>WG.7 The student will evaluate specific textual and visual evidence to analyze cities and urban land use.</p>	<p>WG.7.1 Examine the origin, development and character of cities including the impact of the environment on location, the political, economic, and cultural functions of cities, historical distribution of cities, and the types of transportation, communication, and trade linkages among cities.</p>
	<p>WG.7.2 Analyze contemporary patterns of rural migration on urban development including the concept of suburbanization, edge cities, megacities, and global cities.</p>
	<p>WG.7.3 Describe the factors that impact cities over time including uneven development, changing economic and demographic structures, transportation and infrastructure, housing and urban planning.</p>



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
World History Content Standards				
<p>WH.1 The student will analyze and summarize the impact of the major patterns of political, economic, and cultural change over time to 1450 CE and their long-term influences.</p>	<p>WH.1.1 Evaluate the impact of geography and trade on the development of culture in Africa, Asia, and Europe including religion, philosophy, and political belief.</p>			
	<p>WH.1.2 Describe the origins, major beliefs, spread and lasting impact of the world’s major religions and philosophies, including Judaism, Hinduism, Buddhism, Christianity, Islam, Confucianism, and Sikhism.</p>			
	<p>WH.1.3 Compare the contributions of Greek and Roman philosophers, including Plato, Aristotle and Cicero including their impact on Western society.</p>			
	<p>WH.1.4 Evaluate the economic, political, and cultural impact of interregional trade networks.</p>			
	<p>WH.1.5 Describe the institution of slavery around the world prior to the 15th century as a widespread result of warfare and economic practices.</p>			
<p>WH.2 The student will analyze patterns of social, economic, political, and cultural changes during the rise of Western civilization and the Global Age (1400-1750 CE).</p>	<p>WH.2.1 Assess the significance of the Renaissance on politics, economics, and artistic creativity, including the works of Machiavelli, Michelangelo, and daVinci.</p>			
	<p>WH.2.2 Summarize the causes of and influence of the theological movements of the Reformation and how those movements subsequently transformed society.</p>			
	<p>WH.2.3 Analyze migration, settlement patterns, cultural diffusion, and the transformations caused by the competition for resources among European nations during the Age of Exploration.</p>			
	<p>WH.2.4 Explain how slavery and the slave trade was used for the development and growth of colonial economies.</p>			
	<p>WH.2.5 Compare the various forms of government established by:</p> <ul style="list-style-type: none"> A. divine right rule, such as the Mandate of Heaven in China and absolutism in England and France B. Magna Carta in England, the English Civil War, and the Glorious Revolution C. enlightened monarchs such as Catherine the Great and Frederick the Great. 			
	<p>WH.2.6 Compare how scientific theories and technological discoveries brought about social and cultural changes, including those made by Copernicus, Galileo, and Newton; describe the impact of Islamic learning.</p>			



	<p>WH.2.7 Analyze the impact of the Enlightenment on modern government and economic institutions, including the theories of Hobbes, Locke, Voltaire, Rousseau, Montesquieu, and Adam Smith.</p>
<p>WH.3 The student will analyze the political, economic, and social transformations brought about by the events of the age of revolutions and imperialism (1750-1900 CE).</p>	<p>WH.3.1 Analyze the causes and global impact of</p> <ul style="list-style-type: none">A. England’s Glorious RevolutionB. the American RevolutionC. the French Revolution including the Napoleonic WarsD. the Congress of Vienna.
	<p>WH.3.2 Summarize the influence and global impact of emerging democratic ideals on the Latin American and Caribbean revolutions including Haiti and Mexico and the leadership of Simon Bolivar.</p>
	<p>WH.3.3 Evaluate the economic and social impact of the Industrial Revolution.</p>
	<p>WH.3.4 Analyze how the Industrial Revolution gave rise to socialism and communism, including ideas and influence of Karl Marx.</p>
	<p>WH.3.5 Explain the rationales for and consequences of imperialism on Asia, Africa, and the Americas, such as colonization and the exploitation of natural resources and peoples; summarize various efforts to resist imperialism.</p>
<p>WH.4 The student will evaluate the global transformation created by the World Wars (1900-1945 CE).</p>	<p>WH.4.1 Explain the complex and multiple causes of World War I, including militarism, nationalism, imperialism, systems of alliances, and other significant causes.</p>
	<p>WH.4.2 Describe the significant events of World War I, including key strategies, advancements in technology, the war’s significant turning points, and its lasting impact.</p>
	<p>WH.4.3 Analyze the immediate and long-term global consequences of the Treaty of Versailles.</p>
	<p>WH.4.4 Analyze socialism, communism, and the Bolshevik Revolution as responses to capitalism.</p>
	<p>WH.4.5 Describe the economic, social, and political conditions that caused WWII including</p> <ul style="list-style-type: none">A. failure of the Treaty of VersaillesB. impact of global depressionC. rise of totalitarian regimes in the Soviet Union, Germany, Italy, and Japan
	<p>WH.4.6 Examine the significant events of World War II from a global perspective, such as campaigns in Africa, Asia, and the Pacific.</p>



Oklahoma Academic Standards for Social Studies World History (WH)

	WH.4.7 Evaluate the effects of World War II including military and economic power shifts, purposes of the United Nations and NATO, and the origins and escalation of the Cold War.
	WH.4.8 Examine the causes, series of events and effects of the Holocaust through eyewitnesses such as inmates, survivors, liberators, and perpetrators.
	WH.4.9 Summarize world responses to the Holocaust, resulting in the Nuremberg Trials, the move to establish a Jewish homeland, and the creation of the Universal Declaration of Human Rights and its impact on human rights today.
WH.5 The student will evaluate post World War II regional events leading to the transformations of the modern world (1945-1990 CE).	WH.5.1 Describe the creation of the modern state of Israel and ongoing territorial disputes, including the impact of significant regional leaders.
	WH.5.2 Evaluate the ongoing regional disputes of the Middle East, including the Iranian Revolution, the Iran-Iraq conflict, and the invasion of Kuwait.
	WH.5.3 Analyze the major developments in Chinese history during the second half of the 20 th century including the <ul style="list-style-type: none">A. Chinese Civil War and the Communist Revolution in ChinaB. rise of Mao Zedong and the political, social, and economic upheavals under his leadershipC. student protests of Tiananmen SquareD. economic reforms under the leadership of Deng Xiaoping.
	WH.5.4 Examine the origins of India and Pakistan as independent nations, including the <ul style="list-style-type: none">A. struggle for independence achieved through Mohandas Gandhi's non-violent civil disobedience movementB. development of India's industrial economyC. ongoing struggles in the region.
	WH.5.5 Evaluate the people, events, and conditions leading to the end of the Cold War including the <ul style="list-style-type: none">A. effects of Poland's Solidarity MovementB. policies of the perestroika and glasnostC. fall of the Berlin WallD. breakup of the Soviet Union



	<p>WH.5.6 Assess the impact of African independence movements on human rights and the global expansion of democracy including the</p> <ul style="list-style-type: none">A. effects of Pan-Africanism on changing political boundariesB. struggle for self-government in Ghana, including the influence of Kwame NkrumahC. creation and dismantling of South Africa’s apartheid system, including the influence of Nelson Mandela and Desmond Tutu.
	<p>WH.5.7 Compare multiple perspectives to examine the religious, ethnic, and political origins, as well as the lasting impact of modern genocide and conflicts including</p> <ul style="list-style-type: none">A. actions of the Khmer Rouge in CambodiaB. Northern Ireland’s TroublesC. ethnic-cleansing in the BalkansD. Rwanda’s mass murdersE. crisis in Darfur
<p>WH.6 The student will evaluate contemporary global issues and challenges.</p>	<p>WH.6.1 Describe the ongoing impact of interdependence on the world’s economies resulting in the creation and growth of multinational organizations, international trade agreements, and the challenges faced by the global economy.</p>
	<p>WH.6.2 Examine contemporary issues that impact the new global era such as the</p> <ul style="list-style-type: none">A. changing patterns of populationB. cycle of disease and povertyC. status of womenD. environmental issues.
	<p>WH.6.3 Describe the impact of trade and interdependence on cultural diffusion.</p>
	<p>WH.6.4 Analyze responses by world governments concerning the rise and impact of international terrorism and their responses to regional disputes such as Syria.</p>



Engage in Democratic Processes	Analyze and Address Authentic Civic Issues	Acquire, Apply, and Evaluate Evidence	Read Critically and Interpret Informational Sources	Engage in Evidence Based Writing
Sociology Content Standards				
<p>S.1 The student will recognize sociology as a social science, identify methods and strategies of research, and examine the contributions of sociology to the understanding of social issues.</p>	<p>S.1.1 Describe the development of the field of sociology as a social science.</p>			
	<p>S.1.2 Identify the contributions of leading theorists within sociology including Auguste Comte, Emile Durkheim, Harriet Martineau, Herbert Spencer, Max Weber, C. Wright Mills, Karl Marx, and W.E.B. Dubois.</p>			
	<p>S.1.3 Evaluate different sociological research methods including participant observation, natural observation, library research, questionnaires, experiments, interviews, and case studies.</p>			
	<p>S.1.4 Conduct research on an issue using the scientific method of inquiry including developing a hypothesis, gathering and interpreting data, and drawing conclusions.</p>			
<p>S.2 The student will examine the influence of culture and the way cultural transmission is accomplished.</p>	<p>S.2.1 Examine how relationships, structures, patterns and processes influence culture.</p>			
	<p>S.2.2 Recognize the key components of a culture including knowledge, language and communication, customs, values, and physical artifacts.</p>			
	<p>S.2.3 Explain the differences between a culture and a society.</p>			
	<p>S.2.4 Analyze the influences of genetic inheritance and culture on human behavior including the debate over nature versus nurture.</p>			
	<p>S.2.5 Compare various subcultures including counter cultures, pop cultures, ethnic cultures, and religious cultures.</p>			
	<p>S.2.6 Describe factors that have led to cultural diversity within the United States.</p>			
<p>S.3 The student will identify how social status influences individual and group behaviors.</p>	<p>S.3.1 Describe how social status affects social order including upper class, middle class, lower class, white-collar professionals, blue-collar workers, and the unemployed.</p>			
	<p>S.3.2 Recognize how role expectations can lead to conflict including gender, age, racial groups, and ethnic groups within different societies.</p>			



S.4 The student will examine how social groups are composed of people who share common characteristics including interests, beliefs, behaviors, and feelings.	S.4.1 Examine why individuals become members of or associate with different social groups.
	S.4.2 Compare various types of norms including folkways, mores, laws, and taboos; explain why rules of behavior are considered important to society.
	S.4.3 Evaluate the characteristics of primary groups including small size intimate settings and enduring relationships and how members' behaviors are influenced by the primary group.
	S.4.4 Evaluate the characteristics of secondary groups including less permanence, less personal, and having a special purpose; explain how members' behaviors are influenced by the secondary groups.
	S.4.5 Investigate stereotypes of different groups including gangs, generational groups, immigrants, and the homeless.
S.5 The student will identify the effects of social institutions on individual and group behavior and explain how these institutions influence the development of the individual.	S.5.1 Analyze the impact of social institutions on individuals, groups and organizations within society; explain how these institutions transmit the values of society including familial, religious, educational, economic, and political.
	S.5.2 Examine rites of passage within various social institutions such as religious ceremonies, school proms, quinceañeros, graduation, marriage, and retirement.
	S.5.3 Define ethnocentrism and xenophobia; analyze how they can be beneficial or destructive to a culture.
S.6 The student will examine social change over time and the various factors that lead to these changes.	S.6.1 Examine environmental, political, economic, scientific, and technological influences upon immediate and long-term social change.
	S.6.2 Describe how collective behavior can influence and change society including sit-ins, organized demonstrations, and the use of social media.
S.7 The student will analyze social problems that affect large numbers of people or result from imbalances within a social system.	S.7.1 Distinguish between characteristics of a social problem as compared to an individual problem.
	S.7.2 Analyze patterns of behavior found within social problems and their implications for society including juvenile crime, drug addiction, and long-term unemployment.
	S.7.3 Examine individual and group response and potential resolutions to social problems as well as the consequences of such solutions.
	S.8.1 Describe the traditions, roles, and expectations necessary for a society to continue and flourish.
	S.8.2 Examine factors that can lead to the breakdown and disruption of a society.



Oklahoma Academic Standards for Social Studies Sociology (S)

S.8 The student will explore both individual and collective behavior.	S.8.3 Differentiate the impact of individual leaders of different social and political movements including Mohandas Gandhi, Dr. Martin Luther King Jr., and Susan B. Anthony.
	S.8.4 Interpret how social behavior is influenced by propaganda, the news media, and advertising.
	S.8.5 Investigate the impact of rumor, gossip, and other inaccurate communications upon group behavior.



Appendix A Social Studies Practices PK-12 Progression

1. Engage in Democratic Processes

Students will understand the principles of government, the benefits of democratic systems, and their responsibilities as citizens.

A. Students will demonstrate an understanding of the virtues that citizens should use when interacting with each other and the virtues that guide official government institutions.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
1.A.PK-1.1 Discuss democratic principles such as equality, fairness, and respect for legitimate authority.	1.A.2-3.1 Identify civic virtues and democratic principles such as equality, fairness, and respect for legitimate authority.	1.A.4-5.1 Identify democratic principles in historic documents and describe examples of civic virtues and democratic principles at work in state and national settings.	1.A.6-8.1 Compare and analyze civic virtues and democratic principles in historic and global settings, explaining how they influence various political systems.	1.A.9-12.1 Evaluate various significant documents from the United States and other countries to compare civic virtues and principles of political systems.
1.A.PK-1.2 Discuss how people can improve their communities in the present and over time.	1.A.2-3.2 Describe and offer examples of how people have improved their communities in the past and present.	1.A.4-5.2 Compare the experiences that form student's and other's points of view about civic issues.	1.A.6-8.2 Analyze the role that perspectives, civic virtues, and democratic principles play when citizens address issues or problems.	1.A.9-12.2 Evaluate the impact of perspectives, civic virtues, democratic principles, constitutional rights, and human rights on addressing issues and problems in society.



B. Students will demonstrate an understanding of the important institutions of their society and the principles that these institutions are intended to reflect.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
1.B.PK-1.1 Describe roles and responsibilities of people in authority in school and community settings.	1.B.2-3.1 Describe the basic structure of government at the local, state, and tribal levels.	1.B.4-5.1 Explain the structure, responsibilities, and powers exercised by national officials of the branches of the United States government.	1.B.6-8.1 Analyze the powers and responsibilities of the United States government and compare it to other forms of government.	1.B.9-12.1 Evaluate the impact of the structure and powers exercised by local, state, tribal, national, and international institutions on public policy.
1.B.PK-1.2 Explain how all informed citizens play important roles in the community.	1.B.2-3.2 Explain why all informed citizens should participate in their community.	1.B.4-5.2 Explain ways in which informed and responsible citizens can and should participate in state and national government.	1.B.6-8.2 Explain specific roles played by informed and responsible citizens (e.g. voters, jurors, taxpayers, military service, office holders) in all forms of government.	1.B.9-12.2 Analyze the role of informed and responsible citizens in their political systems and provide examples of changes in civic participation over time.
1.B.PK-1.3 Explain the need for and purposes of rules in various settings such as the family, classroom, and school.	1.B.2-3.3 Explain the need for and purposes of laws in the community and state.	1.B.4-5.3 Examine the purposes of government and laws, as stated in the Constitution of the United States.	1.B.6-8.3 Examine the origins, purposes and impact of constitutions, laws, treaties, and international agreements.	1.B.9-12.3 Analyze the impact of constitutions, laws, treaties, and international agreements, including the concept of sovereignty, in order to maintain national and international order.
1.B.PK-1.4 Explain how rules are made and the consequences for violating those rules.	1.B.2-3.4 Explain and provide examples of the consequences for violating laws in the community or state.	1.B.4-5.4 Explain how laws are made in a democratic society to protect individual freedoms.	1.B.6-8.4 Explain the concept of the rule of law and how limits on government authority guarantee individual liberties.	1.B.9-12.4 Analyze how various governmental powers, responsibilities, and limitations are enacted and have changed over time.



C. Students will demonstrate understanding of the processes and rules by which groups of people make decisions, govern themselves, and address public problems.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
1.C.PK-1.1 Describe how people can work together to make decisions in the classroom and school.	1.C.2-3.1 Explain how people can work together to make decisions in their community and state.	1.C.4-5.1 Explain how laws have changed society in the past and present.	1.C.6-8.1 Assess specific laws, both actual and proposed, as means of addressing historic and current national and international problems.	1.C.9-12.1 Analyze historical, contemporary, and emerging means to promote the common good and protect individual rights.
1.C.PK-1.2 Engage in democratic processes to address authentic, real-world problems in the classroom or school.	1.C.2-3.2 Use democratic processes to consider and propose actions to address authentic, real-world problems in the community and state.	1.C.4-5.2 Use a range of democratic procedures to discuss and make decisions about real-world problems in the community, region, and nation.	1.C.6-8.2 Apply a range of deliberative and democratic procedures to debate, make decisions, and propose action about authentic, real-world problems in out-of-school contexts.	1.C.9-12.2 Engage in a range of deliberative and democratic processes to develop strategies to address authentic, real-world problems in the community and out-of-school contexts.



2. Analyze and Address Authentic Civic Issues

Students will determine the kinds of sources that will be helpful in answering essential, compelling, and supporting questions addressing authentic civic issues.

A. Students will demonstrate the capability for developing essential, compelling, and supporting questions that address authentic civic issues.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
2.A.PK-1.1 Collaboratively ask and respond to enduring essential questions of common concerns to the student and the community.	2.A.2-3.1 Ask and respond to enduring essential questions of common concerns to the student, the community and the state.	2.A.4-5.1 Create and explore essential questions that are important to others, as well as enduring across the social studies disciplines.	2.A.6-8.1 Investigate and propose answers to essential questions representing enduring issues across the social studies disciplines.	2.A.9-12.1 Develop, investigate and evaluate plausible answers to essential questions that reflect enduring understandings across time and all disciplines.
2.A.PK-1.2 Recognize connections between compelling and supporting questions which help answer an essential social studies question.	2.A.2-3.2 Make connections between compelling and supporting questions which help answer an essential social studies question.	2.A.4-5.2 Identify concepts and ideas from discipline-based compelling and supporting questions that are open to different interpretations.	2.A.6-8.2 Compare points of agreement from reliable information and interpretations associated with discipline-based compelling and supporting questions.	2.A.9-12.2 Compare points of agreement and disagreement from reliable information and expert interpretations associated with discipline-based compelling and supporting questions.
2.A.PK-1.3 Practice inquiry skills by responding to various levels of open-ended questions on a regular basis.	2.A.2-3.3 Reinforce inquiry skills by asking and responding to various levels of open-ended questions on a regular basis.	2.A.4-5.3 Demonstrate depth of knowledge by developing, exploring, and answering various levels of open-ended questions frequently.	2.A.6-8.3 Develop deeper levels of understanding by questioning ideas and assumptions and identifying inconsistencies or errors in reasoning.	2.A.9-12.3 Reinforce critical thinking by evaluating and challenging ideas and assumptions; analyze and explain inconsistencies in reasoning.

B. Students will demonstrate the ability to investigate problems taking into consideration multiple points of view represented in arguments, structure of an explanation and other sources.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
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Oklahoma Academic Standards for Social Studies Appendix A

<p>2.B.PK-1.1 Discuss local problems and ways in which people are trying to address these problems.</p>	<p>2.B.2-3.1 Identify a range of local and state problems in which people are trying to address these problems.</p>	<p>2.B.4-5.1 Explain the challenges people have faced and the strategies used to address local, regional, or national historical problems.</p>	<p>2.B.6-8.1 Draw upon gathered information to analyze how a specific problem can manifest itself in local, regional, and global levels over time, evaluating options for individual and collective solutions.</p>	<p>2.B.9-12.1 Use interdisciplinary lenses to gather and evaluate information regarding complex local, regional, and global problems; assess individual and collective actions taken to address such problems.</p>
<p>2.B.PK-1.2 With guidance and support, demonstrate understanding of social studies content through completion of authentic tasks and assessments.</p>	<p>2.B.2-3.2 Demonstrate understanding of social studies content through completion of teacher-led authentic tasks and assessments.</p>	<p>2.B.4-5.2 Reinforce understanding of social studies content through teacher-led investigations and the completion of authentic tasks and assessments.</p>	<p>2.B.6-8.2 Demonstrate understanding of social studies content through the development of self-driven investigations and the completion of teacher-led authentic tasks and assessments.</p>	<p>2.B.9-12.2 Demonstrate understanding of content through the development of self-driven investigations and the completion of multi-staged, authentic tasks and assessments.</p>



3. Acquire, Apply, and Evaluate Evidence
 Students will utilize interdisciplinary tools and master the basic concepts of the social studies in order to acquire and apply content understanding in all related fields of study.

A. Students will develop skills and practices which demonstrate an understanding that historical inquiry is based on the analysis and evaluation of evidence and its credibility.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
3.A.PK-1.1 Identify a primary source of information and gather basic information from such sources.	3.A.2-3.1 Explain the difference between a primary and secondary source of information and gather basic information from such sources.	3.A.4-5.1 Gather, compare, and analyze information between primary and secondary sources about the past and present.	3.A.6-8.1 Gather, compare, and analyze evidence from primary and secondary sources on the same topic, identifying possible bias and evaluating credibility.	3.A.9-12.1 Gather, organize, and analyze various kinds of primary and secondary source evidence on related topics, evaluating the credibility of sources.
3.A.PK-1.2 Identify the author and date of a primary source using information found within the source itself with guidance and support.	3.A.2-3.2 Identify the author and date of a primary source using information found within the source itself.	3.A.4-5.2 Identify the intended audience and purpose of an historical primary source from information found within the source itself.	3.A.6-8.2 Draw conclusions regarding the plausible author, date, origin, audience, and purpose of primary sources when not easily identifiable in the source.	3.A.9-12.2 Evaluate the usefulness of primary and secondary sources for specific inquiry, based on the author, date, place of origin, intended audience, and purpose.
3.A.PK-1.3 With guidance and support, compare two primary or secondary sources about a particular event in history or contemporary events.	3.A.2-3.3 Compare two or more primary or secondary sources about a particular event in history or contemporary events.	3.A.4-5.3 Describe the similarities and differences between multiple historical or contemporary primary sources and their relationships to historical events.	3.A.6-8.3 Use multiple historical or contemporary primary sources to identify further areas of inquiry and additional relevant sources.	3.A.9-12.3 Develop questions about multiple historical and/or contemporary sources to pursue further inquiry and investigate additional sources.



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<p>3.A.PK-1.4 Make simple timelines from given information with guidance and support.</p>	<p>3.A.2-3.4 Make simple timelines and identify immediate cause and effect relationships from given information.</p>	<p>3.A.4-5.4 Create timelines to identify multiple causes and effects from given information.</p>	<p>3.A.6-8.4 Distinguish multiple causation, immediate and long-term cause-effect relationships by constructing timelines which reflect related events.</p>	<p>3.A.9-12.4 Analyze multiple causation and change over time by constructing and interpreting parallel timelines.</p>
<p>3.A.PK-1.5 Discuss possible reasons for an event or development in the past.</p>	<p>3.A.2-3.5 Generate possible reasons for an event or development in the past.</p>	<p>3.A.4-5.5 Explain multiple causes and effects of events and developments of the past or present.</p>	<p>3.A.6-8.5 Distinguish between long-term causes and triggering events on historical developments or contemporary events.</p>	<p>3.A.9-12.5 Evaluate how multiple, complex events are shaped by unique circumstances of time and place, as well as broader historical contexts.</p>
<p>3.A.PK-1.6 Discuss how individuals and groups have shaped significant historical changes.</p>	<p>3.A.2-3.6 Explain and give examples of how individuals and groups have shaped significant historical changes in the community and state.</p>	<p>3.A.4-5.6 Describe the specific contributions of individuals and groups who have shaped significant historical changes in regional and national events.</p>	<p>3.A.6-8.6 Analyze the roles of specific individuals and groups who shaped historically significant events, both nationally, regionally, and on a global scale.</p>	<p>3.A.9-12.6 Assess the significance and impact of individuals and groups throughout local, national, tribal, and world history, tracing the continuity of past events to the present.</p>
<p>3.A.PK-1.7 Identify point of view and give examples relevant to the student’s experiences.</p>	<p>3.A.2-3.7 Define point of view and give examples relevant to the student’s experiences.</p>	<p>3.A.4-5.7 Compare perspectives of individuals and groups during the same historical period.</p>	<p>3.A.6-8.7 Describe multiple factors that influence the perspectives of individuals and groups during historical eras or toward contemporary situations.</p>	<p>3.A.9-12.7 Analyze complex and interacting factors that influence multiple perspectives during different historical eras or contemporary events.</p>
<p>B. Students will demonstrate an understanding of geographic concepts and develop mastery of geographic tools and ways of thinking in order to become geographically informed.</p>				
<p>PreK-Grade 1</p>	<p>Grades 2-3</p>	<p>Grades 4-5</p>	<p>Grades 6-8</p>	<p>Grades 9-12</p>



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<p>3.B.PK-1.1 Answer geographic questions using geographic information about the student's own community.</p>	<p>3.B.2-3.1 Ask and answer geographic questions, using geographic information about the student's community and state.</p>	<p>3.B.4-5.1 Answer geographic questions by organizing geographic information about regions of the United States from historical as well as contemporary perspectives.</p>	<p>3.B.6-8.1 Answer geographic questions and conduct investigations by acquiring, organizing, and interpreting information about the modern world and historical events.</p>	<p>3.B.9-12.1 Actively engage in asking and answering geographic questions by acquiring, organizing, and analyzing multiple sources of data and information about the world's past and its present conditions.</p>
<p>3.B.PK-1.2 Create and use basic maps, graphs, and other simple models to identify the physical and human features of the community.</p>	<p>3.B.2-3.2 Create and use maps, graphs, and other simple geographic models to describe the physical and human features of the community and state.</p>	<p>3.B.4-5.2 Create and use maps, data graphs and charts, photographs, and other geographic representations to explain spatial relationships of physical and human places.</p>	<p>3.B.6-8.2 Use multiple mapping techniques and data visuals to create and analyze spatial patterns of environmental and cultural characteristics.</p>	<p>3.B.9-12.2 Compare and analyze complex maps and mapping technologies to explain relationships between the environment and events, past and present.</p>
<p>3.B.PK-1.3 Describe the community's human and physical environment through the use of simple geographic representations and photographs.</p>	<p>3.B.2-3.3 Describe the community and state's human and physical environment through the use of geographic representations, including aerial photographs.</p>	<p>3.B.4-5.3 Analyze the impact of human and physical features of the Earth by drawing conclusions from digital representations, such as aerial photographs and satellite images of our nation and its regions.</p>	<p>3.B.6-8.3 Make connections between spatial patterns of physical and human features of the Earth's surface by interpreting satellite images and using geographic technology.</p>	<p>3.B.9-12.3 Analyze spatial patterns of human and physical environments, using geographic technology, from contemporary and historical perspectives.</p>
<p>3.B.PK-1.4 Identify examples of how humans modify and adapt to their physical environment using its natural resources.</p>	<p>3.B.2-3.4 Identify and describe how humans modify and adapt to their physical environment, using its natural and human resources.</p>	<p>3.B.4-5.4 Explain how culture, political, and economic actions can influence the ways people modify and adapt to their environment.</p>	<p>3.B.6-8.4 Explain how cultural patterns, political and economic decisions can affect the physical environment, including how places and regions change over time.</p>	<p>3.B.9-12.4 Evaluate the extent to which political and economic decisions have had significant historical and global impact on human and physical environments of various places and regions.</p>



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<p>3.B.PK-1.5 Discuss how the physical environment impacts our daily lives and affects human activities.</p>	<p>3.B.2-3.5 Describe how the physical environment impacts our daily lives and affects human activities in the past and present.</p>	<p>3.B.4-5.5 Explain how environmental factors affected historical events and continue to impact contemporary human activities.</p>	<p>3.B.6-8.5 Explain the influences of multiple environmental factors on historical events and current situations, which provide both opportunities and limitations on human development.</p>	<p>3.B.9-12.5 Analyze the connections between historical events and the geographic contexts in which they have occurred, including the causes and processes of environmental changes over time.</p>
<p>3.B.PK-1.6 Discuss why and how people and goods move from place to place.</p>	<p>3.B.2-3.6 Describe how the movement of resources, people, goods, and ideas move, connecting communities.</p>	<p>3.B.4-5.6 Describe the spatial patterns of economic activities caused by interactions with other places.</p>	<p>3.B.6-8.6 Explain how changes in transportation, communication, and technology affect the diffusion of ideas.</p>	<p>3.B.9-12.6 Evaluate how globalization and the expanding use of scarce resources contribute to conflict and cooperation.</p>



C. Students will analyze the principles of economic systems and develop an understanding of the benefits of a market system in local, national, and global settings.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
3.C.PK-1.1 Collaboratively gather simple economic data from charts and tables.	3.C.2-3.1 Gather basic economic data from various types of graphs and charts.	3.C.4-5.1 Interpret and draw conclusions from economic data on charts and graphs.	3.C.6-8.1 Analyze, interpret, and compare economic data from multiple charts and graphs.	3.C.9-12.1 Evaluate economic data from charts and graphs, noting trends and making predictions.
3.C.PK-1.2 Describe freedom of choice when determining needs and wants.	3.C.2-3.2 Describe freedom of choice when determining needs and wants in a free market.	3.C.4-5.2 Explain how the concepts of supply and demand operate in a market economy, using historic and contemporary examples.	3.C.6-8.2 Compare the advantages and disadvantages of different types of economic systems.	3.C.9-12.2 Analyze the ways in which incentives and resource availability influence what is produced and distributed in different types of economic systems.
3.C.PK-1.3 Discuss the concept that personal decisions have costs and benefits.	3.C.2-3.3 Give examples of costs and benefits resulting from personal economic decisions.	3.C.4-5.3 Identify positive and negative incentives that influence economic decision making.	3.C.6-8.3 Describe alternative solutions to current economic issues in terms of benefits and costs for different groups.	3.C.9-12.3 Construct arguments using a combination of evidence for or against an approach or solution to an economic issue.
3.C.PK-1.4 Identify examples of the goods and services that school and community workers provide.	3.C.2-3.4 Describe examples of the goods and services that local and state governments provide.	3.C.4-5.4 Analyze the role of innovation and entrepreneurship in a market economy.	3.C.6-8.4 Evaluate how the advancements in technology impact economic growth and standard of living.	3.C.9-12.4 Evaluate the impact of government policies on market outcomes at national and global levels, past and present.
3.C.PK-1.5 Explain why people in the community trade goods and services with people in other communities.	3.C.2-3.5 Describe why people in one country trade goods and services with people in other countries.	3.C.4-5.5 Explain how trade influences growth and progress of nations.	3.C.6-8.5 Explain how trade impacts standard of living and leads to economic interdependence.	3.C.9-12.5 Analyze the possible consequences, both intended and unintended, of government policies on markets and international trade.



4. Read Critically and Interpret Informational Sources

Students will engage in critical, active reading of grade level appropriate primary and secondary sources related to key social studies concepts, including frequent analysis and interpretation of informational sources.

A. Students will comprehend, evaluate, and synthesize textual sources to acquire and refine knowledge in the social studies.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
4.A.PK-1.1 Locate the main idea and supporting details of a text.	4.A.2-3.1 Locate and paraphrase the main idea and supporting details of a text (e.g. primary and secondary sources.)	4.A.4-5.1 Quote accurately from a text when explaining the text explicitly and when drawing inferences from the text.	4.A.6-8.1 Paraphrase the main idea and cite evidence from primary and secondary sources; provide an accurate summary of a source distinct from prior knowledge or opinion.	4.A.9-12.1 Cite specific textual evidence to support analysis of primary and secondary sources, evaluating features such as author, date, and origin of information.
4.A.PK-1.2 Use titles and graphic features, including photographs and illustrations, to understand a text.	4.A.2-3.2 Use graphic features of a text, such as photographs, titles, headings, subheadings, charts, and graphs, to understand content.	4.A.4-5.2 Use information from multiple print or digital sources (e.g. timelines, maps, graphs, political cartoons, images) to answer a question.	4.A.6-8.2 Integrate the use of visual information (e.g. maps, charts, photographs, videos, political cartoons) with textual information from primary and secondary sources.	4.A.9-12.2 Analyze information from visual, oral, digital, and interactive texts (e.g. maps, charts, images, political cartoons, videos) in order to draw conclusions and defend arguments.
4.A.PK-1.3 Acquire new academic vocabulary and relate new words to prior knowledge.	4.A.2-3.3 Acquire new academic vocabulary; relate new words to prior knowledge, and apply vocabulary in social studies.	4.A.4-5.3 Acquire and use appropriate academic vocabulary and phrases in a social studies context.	4.A.6-8.3 Acquire, determine the meaning, and appropriately use academic vocabulary and phrases used in social studies contexts.	4.A.9-12.3 Appropriately apply and demonstrate understanding of academic vocabulary in a social studies context.



B. Students will apply critical reading and thinking skills to interpret, evaluate, and respond to a variety of complex texts from historical, ethnic, and global perspectives.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
4.B.PK-1.1 Explain and discuss the author’s purpose, with guidance and support.	4.B.2-3.1 Identify the author’s purpose, including what the author wants to answer, explain, or describe in primary and secondary informational texts.	4.B.4-5.1 Determine an author’s purpose and draw conclusions to evaluate how well the author’s purpose was achieved.	4.B.6-8.1 Analyze works written on the same topic and compare methods the authors use to achieve similar or different purposes.	4.B.9-12.1 Evaluate the extent to which historical, cultural, and/or global perspectives affect an author’s stated or implied purpose.
4.B.PK-1.2 Locate facts that are clearly stated in a text (e.g. who, what, where, when, why, and how).	4.B.2-3.2 Locate facts (e.g. who, what, where, when, why, and how) to demonstrate an understanding of key details in a text.	4.B.4-5.2 Distinguish fact from opinion in non-fiction text and investigate facts for accuracy.	4.B.6-8.2 Evaluate textual evidence to determine whether a claim is substantial or unsubstantial.	4.B.9-12.2 Evaluate authors’ points of view, potential bias, and how authors can reach different conclusions regarding the same issue.
4.B.PK-1.3 Ask and answer basic questions and engage in collaborative discussions about appropriate topics in a social studies text.	4.B.2-3.3 Ask and answer questions to clarify information and engage in collaborative discussions about appropriate topics in social studies.	4.B.4-5.3 Engage in collaborative discussions about appropriate topics and texts, expressing ideas clearly to others in diverse groups and whole class settings.	4.B.6-8.3 Engage in collaborative discussions and debates about information presented in social studies texts, expressing ideas clearly while building on the ideas of others.	4.B.9-12.3 Actively listen, evaluate, and analyze a speaker’s message, asking questions while engaged in collaborative discussions and debates about social studies topics and texts.



5. Engage in Evidence Based Writing

Students will apply effective communication skills by demonstrating a variety of evidence based written products designed for multiple purposes and tasks, in order to demonstrate their understandings of social studies concepts, ideas, and content.

A. Students will summarize and paraphrase, integrate evidence, and cite sources to create written products, research projects, and presentations for multiple purposes related to social studies content.

PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
5.A.PK-1.1 Draw, label, dictate and write a narrative with guidance and support.	5.A.2-3.1 Compose narratives which introduce a topic, use facts to develop the topic, and provide a concluding statement.	5.A.4-5.1 Compose narratives to develop and examine a topic in social studies, using information appropriately in a structured format.	5.A.6-8.1 Compose narratives incorporating point of view, the use of an appropriate structure of ideas, and application of information.	5.A.9-12.1 Compose narrative writing, when appropriate to a given purpose or task, citing evidence from informational texts.
5.A.PK-1.2 Draw, label, dictate, and write an informative product with guidance and support.	5.A.2-3.2 Compose informative written products, focusing on the facts about a topic, including a main idea with supporting details.	5.A.4-5.2 Compose informative essays and written products by introducing and developing a topic, incorporating evidence (e.g. facts, examples, details) and maintaining an organized structure.	5.A.6-8.2 Compose informative essays and other written products about social studies topics, incorporating evidence (e.g. facts, examples, details) from multiple sources, maintaining an organized, formal structure.	5.A.9-12.2 Compose informative essays and written products, developing a thesis, citing evidence from multiple sources and maintaining an organized, formal structure.
5.A.PK-1.3 With guidance and support, draw, label, dictate, and write to express an opinion, providing reasons as support.	5.A.2-3.3 Express an opinion about a topic by composing a written product and providing logical reasons as support.	5.A.4-5.3 Clearly state an opinion through written products, supported by commentary including examples, details, and reasoning.	5.A.6-8.3 Compose argumentative written products by introducing a claim, recognizing an opposing viewpoint, and organizing evidence and commentary from credible sources.	5.A.9-12.3 Compose argumentative written products, including a precise claim as distinguished from opposing claims, organizing logical reasoning, and providing credible evidence to develop a balanced argument.
5.A.PK-1.4 Express ideas independently through a	5.A.2-3.4 Write independently over extended	5.A.4-5.4 Write independently over extended	5.A.6-8.4 Write independently over extended	5.A.9-12.4 Write independently over extended



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combination of drawing and emergent writing.	periods of time (e.g. time for research and reflection) and for shorter time frames (e.g. single sitting).	periods of time and for shorter time frames to communicate with different audiences for a variety of purposes.	periods of time and for shorter time frames, varying modes of expression to suit audience, purpose, and task and/or to analyze different perspectives.	periods of time, varying modes of expression to suit audience, purpose, and task; synthesize information across multiple sources and/or articulate new perspectives.
B. Students will engage in authentic inquiry to acquire, refine, and share knowledge through written presentations related to social studies.				
PreK-Grade 1	Grades 2-3	Grades 4-5	Grades 6-8	Grades 9-12
5.B.PK-1.1 With guidance and support, generate a list of topics of interest and questions about social studies.	5.B.2-3.1 Generate a list of topics of interest and individual questions about a specific topic in social studies.	5.B.4-5.1 Formulate a viable research question related to expanding knowledge of social studies concepts.	5.B.6-8.1 Refine and formulate viable research questions related to social studies investigations, using well-developed theses or claims.	5.B.9-12.1 Develop self-generated theses or claims related to independent research and investigations using credible and relevant sources.
5.B.PK-1.2 Organize information found during group research, using graphic organizers and other aids with guidance and support.	5.B.2-3.2 Organize information found during group or individual research, using graphic organizers or other aids.	5.B.4-5.2 Organize information from research, quoting accurately from the source, avoiding plagiarism.	5.B.6-8.2 Quote, paraphrase, and summarize findings, avoiding plagiarism.	5.B.9-12.2 Integrate quotes, paraphrase, and summaries of research findings into writing while avoiding plagiarism.
5.B.PK-1.3 With guidance and support, create a simple presentation, using audio, visual, or multimedia tools to communicate ideas and thoughts.	5.B.2-3.3 Create a simple presentation, using audio, visual, and/or multimedia tools to communicate ideas and thoughts.	5.B.4-5.3 Create presentations that integrate visual displays and other multimedia to enrich the presentation.	5.B.6-8.3 Select, organize, and create presentations using multi-modal content (variety of written oral, visual, digital, or interactive texts) encompassing different points of view.	5.B.9-12.3 Construct visual and/or multimedia presentations, using a variety of media forms to enhance understanding of findings and reasoning, for diverse audiences.

APPENDIX B
GLOSSARY OF ASSESSMENT TERMS

This glossary of commonly used assessment terms can be used to help interpret and communicate test results. Note that because assessment terms evolve in terms of meaning and application, the definitions for some words may evolve beyond the sense indicated here.

Accommodation—A general term referring to changes in the setting in which a test is administered, the timing of a test, the scheduling of a test, the ways in which the test is presented, and the ways in which the student responds to the test. The term is used to refer to changes that do not alter in any significant way what the test measures or the comparability of scores.

Achievement Test—An assessment that measures a student’s acquired knowledge and skills in a content area (for example, OCCT Grade 5 Mathematics) in which the student has received instruction.

Alternate Assessment—A substitute way of gathering information on the performance and progress of students who cannot participate, even with accommodations, in the regular state or district assessment programs. Alternate assessments provide a mechanism for all students to be included in the accountability system.

Analytic Scoring—A scoring procedure in which a student’s writing is evaluated for selected traits or dimensions, with each trait receiving a separate score. The resulting values are combined for an overall score.

Bias—A systematic error in a test score. Bias occurs when factors irrelevant to the subject matter related to the assessment result in one or more specific groups of students being advantaged or disadvantaged relative to other groups.

Classical Test Theory—A psychometric theory based on the perspective that an individual’s observed score on a test is composed of the true score of the examinee and an independent component of measurement error.

College and Career Readiness Assessment (CCRA)— The CCRA testing program is a suite of assessment for grade 11. The SAT and ACT are administered for the ELA and Mathematics assessments. There are separate assessments for Science and U.S. History.

Construct—The underlying concept or the characteristic that a test is designed to measure.

Construct Irrelevance—The extent to which test scores are affected by factors that are not relevant to the construct that the test is designed to measure.

Construct Validity (Content Validity)—Construct validity indicates the extent to which the content of the test samples the subject matter or situation about which conclusions are to be drawn; also described as “evidence based on test content.”

Constructed-response Item—An assessment unit with directions, a question, or an idea that elicits a written response from a student.



Content Standard—A statement describing the knowledge and skills in a content area that is expected to be taught in classrooms and should be met at a specified point in time (e.g., at the end of the course).

Conversion Tables—Tables used to convert a student's test scores from raw-score total to scaled score.

Criterion—A standard or judgment used as a basis for quantitative and qualitative comparison; also, a variable to which a test is compared as a measure of the test's validity.

Criterion-referenced Test—An assessment that allows its users to make score interpretations of a student's performance in relation to specified performance standards or criteria, rather than in comparison to the performances of other test takers. See also performance standard/level.

Cut Score—Selected points on the score scale of a test. The points are used to determine whether a particular test score is sufficient for some purpose. For example, student performance on a test maybe classified into one of several categories, such as unsatisfactory, limited knowledge, proficient or advanced on the basis of cut scores.

Differential Item Functioning (DIF)—A situation that occurs in testing when different groups of examinees (e.g., ethnic or gender groups) with the same true achievement levels have different levels of success on a particular item. Test developers reduce DIF by analyzing item data separately for each group. Items identified with DIF are carefully reviewed by content experts and culture and sensitivity committees. Items that appear to be unfair to one or more groups are discarded.

Discrimination Parameter—In the Item Response Theory (IRT) models, it indicates the degree an item distinguishes between examinees of differing abilities on the trait being measured. Low discrimination values indicate an item does not discriminate students of low and high abilities.

Distractor—An incorrect answer choice in a selected-response or multiple-choice test item.

Frequency Distribution—An ordered tabulation of individual scores (or groups of scores) showing the number of students obtaining each score or the number of students that were within each score grouping.

Holistic Scoring—A scoring procedure yielding a single score based on overall student performance rather than on an accumulation of points. Holistic scoring uses rubrics to evaluate student performance. Note: This procedure is used to score the OMAAP English II Writing response.

Item—A statement, exercise, task, question, or problem on a test.

Item Response Theory (IRT)—A set of mathematical models that describes the relationship between performance on test items and the student's level of performance on the same scale as the ability or trait being measured. For OCCT 3–8 and EOI, the three-parameter model is used for the calibration and scaling of multiple-choice items; the two-parameter partial credit model (2PPC) is used for Writing prompts in EOI English II and English III. For the EOI OMAAP assessments, the one-parameter (Rasch) model is used for calibration and scaling of multiple-choice items; the one-parameter partial credit model (1PPC) is used for the Writing prompt in



English II. The various item parameters associated with each model (discrimination, difficulty, and guessing) are used to describe the statistical characteristics of each item. The Rasch and 1PPC only produce item difficulty estimates.

Location (Difficulty) Parameter—In Item Response Theory, this parameter is the point on the ability scale at which an item discriminates, or measures, best.

Mean—The quotient obtained by dividing the sum of a set of scores by the number of scores; also called the “average.” Mathematicians call it the “arithmetic mean.”

Median—The middle score in a set of ranked scores. Equal numbers of ranked scores lie above and below the median. It corresponds to the 50th percentile and the 5th decile.

Mode—The score or value that occurs most frequently in a distribution.

Multiple-choice Item—A question, problem, or statement called a “stem” that appears on a test followed by two or more answer choices, called alternatives or response choices. The incorrect choices, called distractors, usually reflect common errors. The student’s task is to choose the best answer to the question posed in the stem.

Normal Distribution Curve—A bell-shaped curve representing a theoretical distribution of measurements that is often approximated by a wide variety of actual data. It is often used as a basis for scaling and statistical hypothesis testing and estimation in psychology and education because it approximates the frequency distributions of sets of measurements of human characteristics.

Norm-referenced Test—A standardized assessment in which all students perform under the same conditions (e.g., carefully defined directions, time limits, materials, and scoring procedures). This type of test allows for the interpretation of the test score in relation to a specified reference group, usually others of the same grade and level.

Oklahoma Academic Standards—The Oklahoma Academic Standards are Oklahoma’s core curriculum. Each subject/grade has a different set of standards and objectives on which students are tested.

Oklahoma Core Curriculum Tests (OCCT)—The OCCT is the general testing program administered in Oklahoma public schools to students in Grades 3–8 and End-of-Instruction.

Oklahoma Modified Alternate Assessment Program (OMAAP)—The OMAAP EOI is administered for retake purposes only in order to meet a graduation requirement or to apply a Modified Proficiency Score. Students must be 2nd Time Testers with a previous OMAAP score in the same subject and be on an Individualized Education Program (IEP). The current OMAAP assessments are High School EOI for Algebra I, English II, Biology I, and U.S. History.

Oklahoma Performance Index (OPI)—The Oklahoma Performance Index (OPI) is a scaled score resulting from the mathematical transformation of the true score, which is associated with each of the raw scores. The OPI score is used to place students in one of four performance levels.



Oklahoma School Testing Program (OSTP)—The OSTP is a testing program that includes the OCCT general assessment in Grades 3–8 and EOI, the OMAAP EOI assessments, and the OAAP portfolio assessment.

Open-ended Item—See constructed-response item.

Performance Level—A level of performance on a test, established by education experts, as a goal of student attainment. It may also refer to a description of the knowledge, skills, and abilities typically held by students within a performance level.

Performance-level Score Ranges—The performance-level score range is the range of scale scores that corresponds to one of the four performance levels: Advanced, Proficient/Satisfactory, Limited Knowledge, and Unsatisfactory.

Portfolio Assessments—The Portfolio assessment is a yearlong collection of information and pieces of evidence, which represent a student’s mastery of the Oklahoma Academic Standards.

Raw Score—The number of correct answers on a test.

Reliability—The degree to which test scores obtained by a group of individuals are consistent over repeated applications. The reliability coefficient indicates the degree to which scores are free of measurement error. The conditions that the coefficient estimates may involve variations in test forms (alternate form reliability), repeated administration of the same form to the same groups after a time interval (test-retest reliability), or the statistical interrelationship of responses on separate parts of the test (internal consistency). Internal consistency fits into OCCT and EOI OMAAP test condition.

Rubric—A scoring tool, or set of criteria, used to evaluate a student’s test performance. A scoring rubric is used to evaluate a student’s response to the OCCT Grades 5 and 8 Writing, the OCCT ACE English II, and the ACE English III Writing prompt, as well as the EOI OMAAP English II Writing prompt.

Scale Scores—Scores on a single scale with intervals. The scale can be applied to all groups taking a given test, regardless of group characteristics or time of year, making it possible to compare scores from different groups of students. Scale scores are appropriate for various statistical purposes. For example, they can be added, subtracted, and averaged across test levels. Such computations permit educators to make direct comparisons among examinees or compare individual scores to groups in a way that is statistically valid. This cannot be done with percentiles or grade equivalents.

Standard—A target toward which instruction is specifically directed. In OSTP tests, standards are used to cluster key skills and/or concepts in an instructional domain. For example, skills such as Literal Understanding and Inferences and Interpretation form part of the Comprehension standard in the OCCT Grade 8 Reading test and the ACE English II test.

Standard Deviation—A statistic used to express the extent of the divergence of a set of scores from the average of all the scores in the group. In a normal distribution, approximately two thirds (68.3 percent) of the scores lie within the limits of one standard deviation above and one standard deviation below the mean. The remaining scores are equally distributed more than one standard deviation above and below the mean.



Standard Error of Measurement (SEM)—Measurement error is associated with all test scores. The standard error of measurement (SEM) is an estimate of the amount of error to be expected in a score from a particular test. This statistic provides a range within which a student’s true score is likely to fall. The smaller the standard error of measurement, the smaller the range in which the student’s true score would likely fall and the more accurate the test score.

Standardized Test—A test that is given in exactly the same way to all children taking the test. The items are the same, the instructions are the same, the timing is the same, the method of determining correctness is the same, and the scoring is the same. No variations are allowed.

Stem—The part of an item that asks a question, provides directions, or presents a statement to be completed.

Stimulus—A passage or graphic display about which questions are asked.

Test—A device or procedure designed to elicit responses that permit an inference about what a student knows or can do.

Test Item—See item.

True Score—In classical test theory, the hypothetical average score that would result if the test could be administered repeatedly without practice or fatigue effects. In Item Response Theory, the “true score” is the error-free value of the test taker’s performance.

Unscorable—Writing responses that do not meet certain criteria cannot be scored. A zero composite score is given to responses that fall into the following categories:
N – No Response/Refusal to Answer, I –Illegible/Incomprehensible, L – Language other than English, O – Off Topic.

Validity—The degree to which accumulated evidence and theory support specific interpretations of test scores proposed by users of a test.

Writing Prompt—An assessment topic, situation, or statement to which students are expected to respond in the form of an essay.



APPENDIX C
TAC MEMBERS

OKLAHOMA TECHNICAL ADVISORY COMMITTEE

The Oklahoma Technical Advisory Committee is comprised of five leading, national experts in the fields of large-scale assessment and educational research. Each member provides Oklahoma with sound input to assure validity and reliability of all technical and policy procedures throughout development and implementation of the Oklahoma School Testing Program assessments. The committee provides additional oversight of testing contractors and input to the State Board of Education on state-of-the-art technical/statistical information on assessment and accountability issues and trends.

Marianne Perie (Committee Member since January 2013)

Dr. Marianne Perie is the chair of the TAC. She is the President of an LLC, Measurement in Practice. Through her consultant role, she provides technical assistance to approximately 12 states on their assessment and accountability systems. She also works with several interim assessment companies developing a validity framework and conducting evaluations. Previously, she was the Director of the Center for Assessment and Accountability Research and Design (CAARD), formed in 2016 at the University of Kansas. This Center evaluated the use of learning maps to build formative tools for teachers, researching the comparability of various devices used in computer-based testing, and designing accountability systems under the Every Student Succeeds Act. This work was an offshoot of another Center Dr. Perie directed, the Center for Educational Testing and Evaluation (CETE). In that role she oversaw the Kansas Assessment Program, the Alaska Measures of Progress, the Career Pathways Assessment, two grants, and provided technical support on the Dynamic Learning Maps consortium. Before coming to Kansas, she was a Senior Associate with the National Center for the Improvement of Educational Assessment, providing technical assistance to over 16 states and territories on accountability and assessment issues related to Federal policy (2006–2013). Prior to joining the Center, she worked on multiple state and district assessments, the National Assessment of Educational Progress (NAEP), and international assessments as an employee of the American Institutes for Research (1995–2003) and the Educational Testing Service (2003–2006).



John M. Keene (Committee Member since March 2003)

Dr. Keene is the owner of *Assessment and Evaluation Services* which provide assessment and evaluation services and consultation to states and large school districts. His work is primarily with large scale testing programs. Dr. Keene has also served as the Vice President, Director of Measurement and Development for the *Riverside Publishing Company*, Director, Test Development for *Science Research Associates*, and Director, Psychometric and Applied Research Group with the *Psychological Corporation*. Dr. Keene received a Ph.D. in Educational Psychology from Indiana University.

Robert A. Terry (Committee Member since March 2003)

Dr. Terry is a professor of psychology at the University of Oklahoma. He has served as an active member of the American Educational Research Association review panel. Dr. Terry is currently researching measurement and methodological issues in sociometry as well as longitudinal data analysis. He has written and edited several published articles pertaining to statistics and testing, developmental psychology, and applied psychological measurement. Dr. Terry received a Ph.D. in Quantitative Psychology from the University of North Carolina at Chapel Hill.

H. Gary Cook (Committee Member since January 2013)

Dr. H. Gary Cook directs research for the WIDA Consortium and is a research scientist attached to the Wisconsin Center for Education Research. Dr. Cook received his Ph.D. in Measurement and Quantitative Methods from Michigan State University. He has a Masters in Teaching English as a Second Language and a Bachelor's in linguistics from the University of Hawai'i at Manoa. He has served in educational leadership or research positions in private industry, in an urban public-school district, in a state department of education, and at the university level. He is an experienced Federal Peer Reviewer for *NCLB* and serves on several state and national technical advisory committees. His recent research and publication interests have focused on the relationship between English language proficiency and content assessments, standards alignment, policy issues associated with Title III accountability, and applying growth modeling techniques to address key educational questions for English language learners.



Juan D’Brot (Committee Member since September 2018)

Dr. Juan D’Brot is a Senior Associate at the National Center for the Improvement in Educational Assessment, Inc., a Dover, NH non-profit consulting firm. Dr. D’Brot’s expertise includes assessment and accountability technical and policy issues, assessment and accountability design and implementation, measures of student growth, standard setting, educator accountability systems, and impact evaluation of policy and programs. Previously, he was the Senior Director of Research at Data Recognition Corporation where he provided leadership and assessment vision as the liaison between DRC Research and other departments. Prior to his position at DRC, he served as the Director of Strategic Research for CTB and served as the Executive Director of Assessment, Accountability, Research, and Evaluation for the state of West Virginia where he was responsible for the administration, development and implementation of all aspects of the statewide comprehensive assessment system, the state and federal accountability systems, and providing strategic and direct oversight of grant-based and independent research and evaluation services for the department. Additionally, Dr. D’Brot currently serves on several state technical advisory committees (TACs), coordinates the Technical Issues in Large-Scale Assessment (TILSA) State Collaborative for CCSSO, and serves as the National Council on Measurement in Education’s (NCME) representative for the Joint Committee on Standards for Educational Evaluation (JCSEE).

Suzanne Lane (Committee Member since June 2021)

Suzanne Lane is a Professor in the Research Methodology Program at the University of Pittsburgh. Her research and professional interests are in educational measurement and testing, with a focus on design, technical, validity, and equity issues pertaining to large scale testing and on the effectiveness of education and accountability programs. Her work is published in journals such as the Journal of Educational Measurement, Applied Measurement in Education, Educational Assessment, and Educational Measurement: Issues and Practice. She has served on the Editorial Boards for the Journal of Educational Measurement, Applied Measurement in Education, Educational Assessment, Educational Researcher, and Educational Measurement: Issues and Practice.

She was the President of NCME (2003-2004), Vice President of Division D of AERA (2000-2002), member of the AERA, APA, and NCME Joint Committee for the Revision of the Standards for Educational and Psychological Testing (1993-1999), and member of the Management Committee for the next revision of the Standards (2006-2015). She was appointed to the National Assessment Governing Board that sets policy for NAEP (2020-2024). She has also served on technical advisory committees for the College Board, ETS, PARCC, U.S. Department of Education’s Evaluation of NAEP, National Research Council, and NCEO as well as for state assessment and accountability programs (DE, KY, NJ, NY, PA, TN, TX, SC).



APPENDIX D
TEST BLUEPRINTS

OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT ENGLISH LANGUAGE ARTS

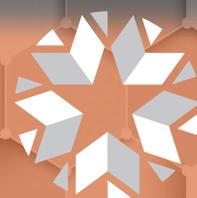
GRADE 3

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard of the Oklahoma Academic Standards (OAS).

IDEAL PERCENTAGE OF ITEMS	STANDARDS
38–42%	STANDARD 2: READING AND WRITING PROCESS** Students will use a variety of recursive reading and writing processes.
12–18%	STANDARD 3: CRITICAL READING AND WRITING Students will apply critical thinking skills to reading and writing.
22–26%	STANDARD 4: VOCABULARY** Students will expand their working vocabularies to effectively communicate and understand texts.
12–18%	STANDARD 5: LANGUAGE Students will apply knowledge of grammar and rhetorical style to reading and writing.
12–18%	STANDARD 6: RESEARCH Students will engage in inquiry to acquire, refine, and share knowledge.
100%	TOTAL: 50 ITEMS

**Reading Comprehension and Vocabulary standards applied to determine RSA Status

*Standard 8: Independent Reading and Writing is assessed throughout the test and dually aligned to each standard. Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a standard.



OKLAHOMA
Education

OKLAHOMA SCHOOL TESTING PROGRAM

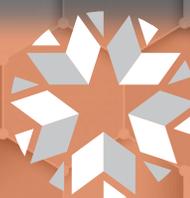
TEST BLUEPRINT ENGLISH LANGUAGE ARTS

GRADE 4

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard of the Oklahoma Academic Standards (OAS).

IDEAL PERCENTAGE OF ITEMS	STANDARDS
30–34%	STANDARD 2: READING AND WRITING PROCESS Students will use a variety of recursive reading and writing processes.
18–22%	STANDARD 3: CRITICAL READING AND WRITING Students will apply critical thinking skills to reading and writing.
22–26%	STANDARD 4: VOCABULARY Students will expand their working vocabularies to effectively communicate and understand texts.
12–18%	STANDARD 5: LANGUAGE Students will apply knowledge of grammar and rhetorical style to reading and writing.
12–18%	STANDARD 6: RESEARCH Students will engage in inquiry to acquire, refine, and share knowledge.
100%	TOTAL: 50 ITEMS

*Standard 8: Independent Reading and Writing is assessed throughout the test and dually aligned to each standard. Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a standard.



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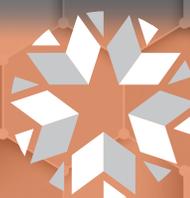
OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT ENGLISH LANGUAGE ARTS GRADE 5

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard of the Oklahoma Academic Standards (OAS).

IDEAL PERCENTAGE OF MC ITEMS	STANDARDS
30–34%	STANDARD 2: READING AND WRITING PROCESS Students will use a variety of recursive reading and writing processes.
22–26%	STANDARD 3: CRITICAL READING AND WRITING Students will apply critical thinking skills to reading and writing.
18–22%	STANDARD 4: VOCABULARY Students will expand their working vocabularies to effectively communicate and understand texts.
12–18%	STANDARD 5: LANGUAGE Students will apply knowledge of grammar and rhetorical style to reading and writing.
12–18%	STANDARD 6: RESEARCH Students will engage in inquiry to acquire, refine, and share knowledge.
90% OF OVERALL SCORE	
10% OF OVERALL SCORE	WRITING SECTION Standard 2: Reading and Writing Process Standard 3: Critical Reading and Writing Standard 4: Vocabulary Standard 5: Language Standard 6: Research Standard 8: Independent Reading and Writing
100%	TOTAL: 51 ITEMS

*Standard 8: Independent Reading and Writing is assessed throughout the test and dually aligned to each standard. Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a standard.



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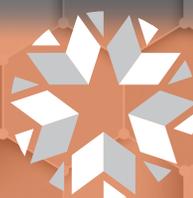
OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT ENGLISH LANGUAGE ARTS GRADE 6

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard of the Oklahoma Academic Standards (OAS).

IDEAL PERCENTAGE OF ITEMS	STANDARDS
34–38%	STANDARD 2: READING AND WRITING PROCESS Students will use a variety of recursive reading and writing processes.
18–22%	STANDARD 3: CRITICAL READING AND WRITING Students will apply critical thinking skills to reading and writing.
18–22%	STANDARD 4: VOCABULARY Students will expand their working vocabularies to effectively communicate and understand texts.
12–18%	STANDARD 5: LANGUAGE Students will apply knowledge of grammar and rhetorical style to reading and writing.
12–18%	STANDARD 6: RESEARCH Students will engage in inquiry to acquire, refine, and share knowledge.
100%	TOTAL: 50 ITEMS

*Standard 8: Independent Reading and Writing is assessed throughout the test and dually aligned to each standard. Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a standard.



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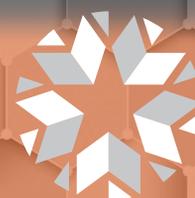
OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT ENGLISH LANGUAGE ARTS GRADE 7

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard of the Oklahoma Academic Standards (OAS).

IDEAL PERCENTAGE OF ITEMS	STANDARDS
34–38%	STANDARD 2: READING AND WRITING PROCESS Students will use a variety of recursive reading and writing processes.
18–22%	STANDARD 3: CRITICAL READING AND WRITING Students will apply critical thinking skills to reading and writing.
14–20%	STANDARD 4: VOCABULARY Students will expand their working vocabularies to effectively communicate and understand texts.
12–18%	STANDARD 5: LANGUAGE Students will apply knowledge of grammar and rhetorical style to reading and writing.
14–20%	STANDARD 6: RESEARCH Students will engage in inquiry to acquire, refine, and share knowledge.
100%	TOTAL: 50 ITEMS

*Standard 8: Independent Reading and Writing is assessed throughout the test and dually aligned to each standard. Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a standard.



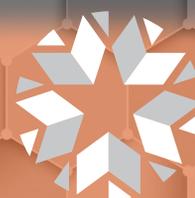
OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT ENGLISH LANGUAGE ARTS GRADE 8

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard of the Oklahoma Academic Standards (OAS).

IDEAL PERCENTAGE OF MC ITEMS	STANDARDS
24–30%	STANDARD 2: READING AND WRITING PROCESS Students will use a variety of recursive reading and writing processes.
24–30%	STANDARD 3: CRITICAL READING AND WRITING Students will apply critical thinking skills to reading and writing.
14–20%	STANDARD 4: VOCABULARY Students will expand their working vocabularies to effectively communicate and understand texts.
12–18%	STANDARD 5: LANGUAGE Students will apply knowledge of grammar and rhetorical style to reading and writing.
12–18%	STANDARD 6: RESEARCH Students will engage in inquiry to acquire, refine, and share knowledge.
88% OF OVERALL SCORE	
12% OF OVERALL SCORE	WRITING SECTION Standard 2: Reading and Writing Process Standard 3: Critical Reading and Writing Standard 4: Vocabulary Standard 5: Language Standard 6: Research Standard 8: Independent Reading and Writing
100%	TOTAL: 51 ITEMS

*Standard 8: Independent Reading and Writing is assessed throughout the test and dually aligned to each standard. Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a standard.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT MATHEMATICS

GRADE 3

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
44–48%	NUMBER AND OPERATIONS 3.N.1 Number Sense 3.N.2 Number Operations 3.N.3 Fractions 3.N.4 Money
12–18%	ALGEBRAIC REASONING AND ALGEBRA 3.A.1 Numerical and Geometric Patterns 3.A.2 Equations
26–30%	GEOMETRY AND MEASUREMENT 3.GM.1 Describe and Create Shapes 3.GM.2 Measurement 3.GM.3 Time
12–18%	DATA AND PROBABILITY 3.D.1 Data Analysis
100%	TOTAL: 50 ITEMS

(Please note this blueprint does not include items that may be field-tested.)
A minimum of 6 items is required to report a strand.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT MATHEMATICS

GRADE 4

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
42–46%	NUMBER AND OPERATIONS 4.N.1 Number Operations 4.N.2 Rational Numbers 4.N.3 Money
14–18%	ALGEBRAIC REASONING AND ALGEBRA 4.A.1 Numerical Patterns 4.A.2 Equations
26–30%	GEOMETRY AND MEASUREMENT 4.GM.1 Polygons and Polyhedra 4.GM.2 Measurement 4.GM.3 Time
12–18%	DATA AND PROBABILITY 4.D.1 Data Analysis
100%	TOTAL: 50 ITEMS

(Please note this blueprint does not include items that may be field-tested.)
A minimum of 6 items is required to report a strand.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT MATHEMATICS

GRADE 5

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
44–48%	NUMBER AND OPERATIONS 5.N.1 Division of Multi-digit Numbers 5.N.2 Fractions and Decimals 5.N.3 Add and Subtract Rational Numbers
16–20%	ALGEBRAIC REASONING AND ALGEBRA 5.A.1 Numerical Patterns and Graphs 5.A.2 Equations and Inequalities
22–26%	GEOMETRY AND MEASUREMENT 5.GM.1 Polygons and Polyhedra 5.GM.2 Volume and Surface Area 5.GM.3 Angles
12–18%	DATA AND PROBABILITY 5.D.1 Data Analysis
100%	TOTAL: 50 ITEMS

(Please note this blueprint does not include items that may be field-tested.)
A minimum of 6 items is required to report a strand.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT MATHEMATICS

GRADE 6

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
38–42%	NUMBER AND OPERATIONS 6.N.1 Number Sense of Integers and Rational Numbers 6.N.2 Addition and Subtraction of Integers 6.N.3 Ratios 6.N.4 Multiplication and Division of Rational Numbers
20–24%	ALGEBRAIC REASONING AND ALGEBRA 6.A.1 Algebraic Representations 6.A.2 Algebraic Expressions 6.A.3 Equations and Inequalities
22–26%	GEOMETRY AND MEASUREMENT 6.GM.1 Area of Parallelograms and Triangles 6.GM.2 Angle Relationships on Intersecting Lines 6.GM.3 Units of Measurement and Unit Conversions 6.GM.4 Congruency and Symmetry of Transformations
12–16%	DATA AND PROBABILITY 6.D.1 Data Analysis 6.D.2 Probability
100%	TOTAL: 50 ITEMS

(Please note this blueprint does not include items that may be field-tested.)
A minimum of 6 items is required to report a strand.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT MATHEMATICS GRADE 7

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
18–22%	NUMBER AND OPERATIONS 7.N.1 Representation and Comparison of Rational Numbers 7.N.2 Number Operations and Absolute Value
28–32%	ALGEBRAIC REASONING AND ALGEBRA 7.A.1 Proportional Relationships 7.A.2 Proportions, Rates and Ratios 7.A.3 Linear Equations and Inequalities 7.A.4 Order of Operations
28–32%	GEOMETRY AND MEASUREMENT 7.GM.1 Surface Area and Volume of Rectangular Prisms 7.GM.2 Trapezoids and Composite Figures 7.GM.3 Circles 7.GM.4 Transformations
18–22%	DATA AND PROBABILITY 7.D.1 Data Analysis 7.D.2 Probability
100%	TOTAL: 50 ITEMS

(Please note this blueprint does not include items that may be field-tested.)
A minimum of 6 items is required to report a strand.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT **MATHEMATICS** **GRADE 8**

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
16–20%	NUMBER AND OPERATIONS PA.N.1 Real Number Operations
44–48%	ALGEBRAIC REASONING AND ALGEBRA PA.A.1 Linear and Non-Linear Functions PA.A.2 Linear Function Representations and Problem Solving PA.A.3 Algebraic Expressions PA.A.4 Equations and Inequalities
18–22%	GEOMETRY AND MEASUREMENT PA.GM.1 Pythagorean Theorem PA.GM.2 Surface Area and Volume
14–18%	DATA AND PROBABILITY PA.D.1 Data Analysis and Scatter Plots PA.D.2 Probability
100%	TOTAL: 50 ITEMS

Please note this blueprint does not include items that may be field-tested. A minimum of 6 items is required to report a strand.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT

SCIENCE GRADE 5

This blueprint describes the content and structure of the operational test and defines the target number of test items by reporting category for the Grade 5 Science assessment.

REPORTING CATEGORIES¹
(OKLAHOMA ACADEMIC STANDARDS FOR SCIENCE)

PHYSICAL SCIENCES

5-PS1-1
5-PS1-2
5-PS1-3
5-PS1-4

LIFE SCIENCES

5-LS1-1
5-LS2-1
5-LS2-2
5-PS3-1^a

EARTH AND SPACE SCIENCES

5-ESS1-1
5-ESS1-2
5-ESS2-1
5-ESS2-2
5-PS2-1^a

TOTAL OPERATIONAL TEST

TARGET PERCENTAGE OF
TOTAL ITEMS / SCORE POINTS²

27–33%

27–33%

33–40%

100%
(45 TOTAL SCORE POINTS)

(Please note this blueprint does not include items that may be field-tested.)

¹ Reporting category names are taken from the three content domain names in the OAS-Science.

^a The physical science standards 5-PS3-1 and 5-PS2-1 are being reported in Life Sciences and Earth and Space Sciences, respectively. Their placement in these reporting categories reflects the way that these standards would typically be incorporated into units in classroom instruction.

² A minimum of 10 points is required to report results for a reporting category for Grade 5 Science.

Note: Standards will be assessed using a cluster-based format: a set of three multiple-choice items linked with a common stimulus. Clusters containing two multiple choice items and one technology enhanced item (TEI) will be introduced beginning in Spring 2020, and will become operational in Spring 2021. Each cluster will align to a single standard with its associated Disciplinary Core Idea(s), Science and Engineering Practice, and Cross Cutting Concept. The Grade 5 Science operational test will contain a total of 15 clusters.



OKLAHOMA
Education

OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT

SCIENCE GRADE 8

This blueprint describes the content and structure of the operational test and defines the target number of test items by reporting category for the Grade 8 Science assessment.

REPORTING CATEGORIES ¹ (OKLAHOMA ACADEMIC STANDARDS FOR SCIENCE)	TARGET NUMBER OF TE ITEMS ²	TARGET RANGE OF SCORE POINTS ³ (PERCENTAGE OF TOTAL)
PHYSICAL SCIENCES MS-PS1-5 MS-PS4-1 MS-PS1-6 MS-PS4-2 MS-PS2-1 MS-PS2-2	1	16–19 (33–40%)
LIFE SCIENCES MS-LS1-7 MS-LS4-1 MS-LS4-2	1	10–13 (21–27%)
EARTH AND SPACE SCIENCES MS-ESS1-4 MS-ESS3-1 MS-ESS2-1 MS-ESS3-2 MS-ESS2-2 MS-ESS3-4 MS-ESS2-3	1	19–22 (40–46%)
TOTAL OPERATIONAL TEST	3	100% (48 TOTAL SCORE POINTS)

(Please note this blueprint does not include items that may be field-tested.)

¹ Reporting category names are taken from the three content domain names in the OAS-Science.

² Technology-enhanced items (TE items/TEIs) may be used to more authentically address some aspects of the standards. Each TEI will have a value of two score points. At this time, it is expected that each reporting category will include one TEI. More TEIs may possibly be introduced in future operational cycles. For a paper accommodation, the TEIs will be replaced by paired MC items (two linked multiple-choice questions), also worth two score points.

³ A minimum of 10 points is required to report results for a reporting category for Grade 8 Science.

Note: Standards will be assessed using a cluster-based format: a set of three multiple-choice items linked with a common stimulus or a set of two multiple-choice items and a technology-enhanced item linked with a common stimulus. Each cluster will align to a single standard with its associated Disciplinary Core Idea(s), Science and Engineering Practice, and Cross Cutting Concept. The Grade 8 Science operational test will contain a total of 15 clusters.



OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT **CCRA: SCIENCE CONTENT**

The blueprint describes the content and structure of the operational test and defines the target number of test items by reporting category for the CCRA: Science Content.

REPORTING CATEGORIES¹ (OKLAHOMA ACADEMIC STANDARDS FOR SCIENCE)

LIFE SCIENCES

HS-LS1-1	HS-LS2-5
HS-LS1-2	HS-LS2-6
HS-LS1-3	HS-LS2-8
HS-LS1-4	HS-LS3-1
HS-LS1-5	HS-LS3-2
HS-LS1-6	HS-LS3-3
HS-LS1-7	HS-LS4-1
HS-LS2-1	HS-LS4-2
HS-LS2-2	HS-LS4-3
HS-LS2-3	HS-LS4-4
HS-LS2-4	HS-LS4-5

PHYSICAL SCIENCES

HS-PS1-1	HS-PS3-2
HS-PS1-2	HS-PS3-3
HS-PS1-5	HS-PS3-4
HS-PS1-7	HS-PS4-1
HS-PS2-5	HS-PS4-4
HS-PS3-1	

TOTAL OPERATIONAL TEST

TARGET RANGE OF SCORE POINTS² (PERCENTAGE OF TOTAL)

45–55%

45–55%

100%
(62 TOTAL SCORE POINTS)

(Please note this blueprint does not include items that may be field-tested.)

¹ Reporting category names are taken from the content domain names in the OAS-Science.

² A minimum of 12 points is required to report results for a reporting category for the CCRA: Science Content.

Note: Technology-enhanced items (TE items/TEIs) may be used to more authentically address some aspects of the performance expectations (PEs). Each TEI will have a value of two score points. At this time, it is expected that each reporting category will include one TEI. More TEIs may possibly be introduced in future operational cycles. For a paper accommodation, the TEIs will be replaced by paired MC items (two linked multiple-choice questions), also worth two score points.

Note: Standards will be assessed using a cluster-based format: a set of three multiple-choice items linked with a common stimulus or a set of two multiple-choice items and a technology-enhanced item linked with a common stimulus. Each cluster will align to a single performance expectation. **The CCRA: Science Content operational test will contain a total of 20 clusters.**



OKLAHOMA
Education

OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT **CCRA: U.S. HISTORY CONTENT**

The blueprint describes the content and structure of the operational test and defines the target number of test items by reporting category for CCRA: U.S. History Content.

REPORTING CATEGORIES¹ (OKLAHOMA ACADEMIC STANDARDS)

U.S. HISTORY

Standard 1: 1.2.A, 1.3.A, 1.3.D

Standard 2: 2.1.A, 2.1.B, 2.1.D, 2.1.E, 2.1.G, 2.2.B, 2.3.B

Standard 3: 3.1.A, 3.1.B, 3.1.C, 3.2.A, 3.2.B

Standard 4: 4.1.A, 4.1.D, 4.1.E, 4.2.A, 4.2.B, 4.2.D, 4.3.C

Standard 5: 5.1.B, 5.2, 5.3

Standard 6: 6.1.A, 6.1.B, 6.1.C, 6.1.D, 6.2.A, 6.2.B, 6.2.C, 6.4

Standard 7: 7.2.D

Standard 8: 8.1, 8.2, 8.3, 8.4, 8.5.A

CIVICS

Standard 1: 1.1, 1.2.B, 1.2.C, 1.3.B, 1.3.C

Standard 2: 2.1.C, 2.1.F, 2.2.A, 2.2.C, 2.3.A, 2.3.C

Standard 3: 3.1.D, 3.2.C, 3.2.D

Standard 4: 4.1.B, 4.1.C, 4.2.C, 4.3.A, 4.3.B

Standard 5: 5.1.A, 5.1.C

Standard 6: 6.3

Standard 7: 7.1.A, 7.1.B, 7.1.C, 7.2.A, 7.2.B, 7.2.C, 7.2.E, 7.2.F

Standard 8: 8.5.B, 8.6

TOTAL OPERATIONAL TEST

TARGET RANGE OF SCORE POINTS² (PERCENTAGE OF TOTAL)

45–55%

45–55%

100%

¹ All objectives included in each reporting category are found in OAS-U.S. History.

² A minimum of 12 points is required to report results for a reporting category for the CCRA: U.S. History Content.



APPENDIX E
PERFORMANCE LEVEL DESCRIPTORS



Oklahoma ELA

Performance Level Descriptor Tables

Oklahoma School Testing Program: Grade 3 English Language Arts Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Consistently choose the best summary of the text and identify the main idea and key details.• Compare and contrast details in literary and nonfiction/informational texts to describe genres.• Frequently identify literary elements, literary devices, and author’s purpose and frequently distinguish fact from opinion.• Consistently infer whether a text is written in first or third person point of view.• Consistently engage in a recursive writing process to create organized written works with a purpose that is clearly communicated for an appropriate audience.• Skillfully use details that support the writing task. | <ul style="list-style-type: none">• Skillfully use vocabulary knowledge and resources to analyze complex text through word parts, word relationships, and context clues.• Consistently use appropriate and meaningful vocabulary to enhance clarity and effectiveness in their writing.• Consistently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.• Generate a question on a specific topic and consistently locate and use information, including graphic features, to understand the text.• Determine the relevance and reliability of information.• Clearly summarize and present information in an organized and cohesive way. |
|---|--|

Oklahoma School Testing Program: Grade 3 English Language Arts

Performance Level Descriptors

<p>Proficient</p> <p>Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.</p> <p>Students scoring at the Proficient level typically:</p>	
<ul style="list-style-type: none"> Choose the best summary of the text and identify the main idea and key details. Compare and contrast details to classify genres. Identify literary elements, literary devices, and author’s purpose and distinguish fact from opinion. Infer whether a text is written in first or third person point of view. Engage in a recursive writing process to create organized written works. Create written works for specific purposes and audiences using details that support the writing task. 	<ul style="list-style-type: none"> Use vocabulary knowledge and resources to interpret text through word parts, word relationships, and context clues. Use appropriate vocabulary to write clearly and effectively. Frequently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication. Generate a question on a specific topic, and locate and use information, including graphic features, to understand the text. Summarize and present information in an organized way.
<p>Basic</p> <p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p> <p>Students scoring at the Basic level typically:</p>	
<ul style="list-style-type: none"> Inconsistently choose the best summary of the text and have difficulty identifying main ideas and key details. Compare and contrast but inconsistently classify genres. Inconsistently identify literary elements, literary devices, author’s purpose, or points of view or inconsistently distinguish fact from opinion. Inconsistently engage in a recursive writing process to create written works that lack organization. Write for a specific purpose but seldom consider the audience. Inconsistently support their ideas with details. 	<ul style="list-style-type: none"> Inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships, or context clues. Inconsistently use appropriate vocabulary in written works. Inconsistently identify and apply appropriate use of grammar and mechanics. Generate a question on a topic but ineffectively locate and use information, or imprecisely use graphic features, to understand the text. Provide an incomplete summary and present information with lack of clarity.
<p>Below Basic</p> <p>Students have not performed at least at the Basic level.</p>	



Oklahoma School Testing Program: Grade 4 English Language Arts Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Consistently choose the best summary of the text and explain how the details support the main idea.• Compare and contrast details in literary and nonfiction/informational texts to describe and analyze genres.• Consistently recognize the paraphrase of original text.• Consistently identify and describe literary elements, literary devices, author’s purpose, accuracy of facts, and text structure in various texts.• Consistently infer meaning from increasingly complex text, including author’s purpose and points of view.• Consistently engage in a recursive writing process to create purposeful and organized written works.• Create fully developed and engaging written works for specific purposes and audiences using details that support the writing task. | <ul style="list-style-type: none">• Efficiently use vocabulary knowledge and resources to analyze complex text through word parts, word relationships, and context clues.• Consistently use appropriate and meaningful vocabulary to enhance clarity and effectiveness in their writing.• Consistently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.• Generate a viable research question on a specific topic and consistently locate and use information, including graphic features, to interpret the text.• Organize and synthesize relevant and reliable information in order to present findings. |
|---|--|

Oklahoma School Testing Program: Grade 4 English Language Arts

Performance Level Descriptors

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Choose the best summary of the text and identify the details that support the main idea.• Compare and contrast details in literary and nonfiction/informational texts to classify genres.• Recognize the paraphrase of original text most of the time.• Identify and describe literary elements, literary devices, author’s purpose, accuracy of facts, and text structure in various texts.• Infer meaning from a text including author’s purpose and points of view.• Engage in a recursive writing process to create purposeful written works. | <ul style="list-style-type: none">• Select and apply the organizational structure that best fits the mode, purpose, and audience.• Use vocabulary knowledge and resources to interpret text through word parts, word relationships, and context clues.• Use appropriate vocabulary to write clearly and effectively.• Frequently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.• Generate a viable research question on a specific topic and adequately locate and use information, including graphic features, to interpret the text.• Organize relevant and reliable information in order to present findings. |
|--|--|



Oklahoma School Testing Program: Grade 4 English Language Arts

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Inconsistently choose the best summary of the text and have difficulty differentiating main ideas from details.• Compare and contrast details in literary and nonfiction/informational texts but inconsistently classify genres.• Seldom identify the paraphrase of original text.• Inconsistently identify and describe literary elements, literary devices, author’s purpose, points of view, or accuracy of facts.• Inconsistently engage in a recursive writing process to create written works.• Produce writing that lacks organizational structure. | <ul style="list-style-type: none">• Create underdeveloped written works for specific purposes and audiences with inconsistent use of details.• Inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships, or context clues.• Inconsistently use appropriate vocabulary in written works.• Inconsistently identify and apply appropriate use of grammar and mechanics.• Generate a research question on a topic but ineffectively locate and use information, or imprecisely use graphic features, to interpret the text. |
|---|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 5 English Language Arts

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Analyze how summaries reflect a meaningful, text-based sequence of the main idea and supporting details.• Compare and contrast details in literary and nonfiction/informational texts to describe and analyze genres.• Consistently recognize the paraphrase of original text.• Evaluate and analyze literary devices, author’s purpose, point of view, and accuracy of facts to interpret the meaning of the text as a whole.• Consistently compare and contrast texts, and ideas within and between texts, to support inferences.• Consistently engage in a recursive writing process to create purposeful and organized written works. | <ul style="list-style-type: none">• Create thoroughly organized and engaging written works by selecting and applying the organizational structure that best fits the mode, purpose, and audience.• Skillfully use vocabulary knowledge and resources to analyze complex text through word parts, word relationships, and context clues.• Consistently use appropriate and meaningful vocabulary to enhance clarity and effectiveness in their writing.• Consistently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.• Consistently locate, record, and organize relevant and reliable information on a topic in order to synthesize and clearly present findings. |
|--|---|

Oklahoma School Testing Program: Grade 5 English Language Arts

Performance Level Descriptors

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Identify objective text-based summaries that include main idea, supporting details, and a logical sequence of events.• Compare and contrast details in literary and nonfiction/informational texts to classify genres.• Recognize the paraphrase of original text most of the time.• Explain how literary elements, literary devices, author's purpose, point of view, accuracy of facts, and text structure contribute to the meaning of the text.• Compare and contrast texts and ideas within and between texts.• Engage in a recursive writing process to create purposeful written works. | <ul style="list-style-type: none">• Select and apply the organizational structure that best fits the mode, purpose, and audience.• Use vocabulary knowledge and resources to interpret text through word parts, word relationships, and context clues.• Use appropriate vocabulary to write clearly and effectively.• Frequently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.• Adequately locate, record, and organize relevant and reliable information on a topic in order to present findings. |
|---|--|

Oklahoma School Testing Program: Grade 5 English Language Arts Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Inconsistently choose the best summary of the text and have difficulty differentiating main ideas from details.• Compare and contrast details in literary and nonfiction/informational texts but inconsistently classify genres.• Seldom identify the paraphrase of original text.• Identify literary elements, literary devices, author’s purpose, point of view, or accuracy of facts.• Inconsistently compare and contrast texts and ideas within or between texts.• Inconsistently engage in a recursive writing process to create written works. | <ul style="list-style-type: none">• Create written works for various purposes and audiences but inconsistently select and apply an organizational structure that fits the writing task.• Inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships, or context clues.• Inconsistently use appropriate vocabulary in written works.• Inconsistently identify and apply appropriate use of grammar and mechanics.• Ineffectively locate, record, and organize information on a topic in order to present findings. |
|--|---|

Below Basic

Students have not performed at least at the **Basic** level.

Oklahoma School Testing Program: Grade 6 English Language Arts

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Thoroughly comprehend, interpret, evaluate, and respond to a variety of increasingly complex texts of all literary and informational genres.• Skillfully create an objective summary including main idea and supporting details.• Effectively paraphrase main ideas with supporting details in a text.• Thoroughly compare and contrast stated or implied purposes of authors' writing.• Thoroughly evaluate literary devices, points of view, and perspectives.• Explicitly analyze how authors use key literary elements to contribute to the meaning of the text.• Consistently categorize facts included in an argument.• Analyze and evaluate complex textual evidence to support inferences and understanding within and between varied texts.• Effectively engage in a recursive writing process to compose narrative, informative, and opinion responses for varied purposes and audiences.• In opinion writing, strategically state an opinion supported with facts and details. | <ul style="list-style-type: none">• Use fully developed, complex ideas, thorough organization, purposeful word choice, a variety of fluent sentences, and appropriate voice.• Skillfully use context clues, word parts, and reference tools to determine or clarify the meaning of words.• Infer complex relationships among words with multiple meanings.• Select precise vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.• Intentionally apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a strong command of Standard English grammar, mechanics, and usage.• Recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Thoroughly comprehend, evaluate, and synthesize resources.• Skillfully summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|--|--|

Oklahoma School Testing Program: Grade 6 English Language Arts

Performance Level Descriptors

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres.• Create an objective summary including main idea and supporting details.• Paraphrase main ideas with supporting details in a text.• Compare and contrast stated or implied purposes of authors' writing.• Evaluate literary devices, points of view, and perspectives.• Analyze how authors use key literary elements to contribute to the meaning of the text.• Categorize facts included in an argument.• Analyze textual evidence to support inferences and understanding within and between texts.• Engage in a recursive writing process to compose narrative, informative, and opinion responses for varied purposes and audiences.• In opinion writing, introduce a claim and organize reasons and evidence.• Use fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice. | <ul style="list-style-type: none">• Use context clues, word parts, and reference tools to determine or clarify the meaning of words.• Infer the relationships among words with multiple meanings.• Select vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.• Apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a command of Standard English grammar, mechanics, and usage.• Recognize viable research questions and well-developed thesis statements and use them to find information on a topic.• Record and organize information from various sources.• Comprehend, evaluate, and synthesize resources.• Summarize and integrate information following a citation style with guidance and support.• Summarize and present information in a report. |
|---|---|

Oklahoma School Testing Program: Grade 6 English Language Arts

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Partially comprehend, interpret, evaluate, and respond to literary and informational texts, applying limited critical thinking skills.• Create a summary including main idea and limited supporting details.• Inconsistently paraphrase main ideas with limited supporting details in a text.• Inconsistently compare and contrast stated or implied purposes of authors' writing.• Inconsistently identify literary devices, points of view, and perspectives.• Describe how authors use key literary elements.• Inconsistently categorize facts included in an argument.• Inconsistently identify limited textual evidence to support inferences between texts.• Inconsistently engage in a writing process to compose narrative, informative, and opinion responses for varied purposes and audiences.• In opinion writing, inconsistently state an opinion supported with limited facts and details. | <ul style="list-style-type: none">• Use partially developed ideas, weak organization, and ineffective word choice, sentences, and voice.• Ineffectively use context clues, word parts, and reference tools to determine the meaning of words.• Sometimes infer the relationships among words with multiple meanings.• Use a limited vocabulary to communicate ideas in writing and to create an effect according to a purpose.• Inconsistently apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a limited command of Standard English grammar, mechanics, and usage.• Sometimes recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Partially comprehend, evaluate, and synthesize resources.• Ineffectively summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|---|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 7 English Language Arts

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Thoroughly comprehend, interpret, evaluate, and respond to a variety of increasingly complex texts of all literary and informational genres.• Skillfully create an objective summary including main idea and supporting details.• Effectively paraphrase main ideas with supporting details in a text.• Thoroughly compare and contrast stated or implied purposes of authors' writing.• Thoroughly evaluate literary devices, points of view, and perspectives.• Explicitly analyze how authors use key literary elements to contribute to the meaning of the text.• Consistently distinguish factual claims from opinions.• Analyze and evaluate complex textual evidence to support inferences and understanding within and between varied texts.• Effectively engage in a recursive writing process to compose narrative, informative, and opinion responses for varied purposes and audiences.• In argumentative writing, strategically introduce a claim and organize well-developed reasons and evidence. | <ul style="list-style-type: none">• Use fully developed, complex ideas, thorough organization, purposeful word choice, a variety of fluent sentences, and appropriate voice.• Skillfully use context clues, word parts, and reference tools to determine or clarify the meaning of words.• Infer complex relationships among words with multiple meanings.• Select precise vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.• Intentionally apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a strong command of Standard English grammar, mechanics, and usage.• Recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Thoroughly comprehend, evaluate, and synthesize resources.• Skillfully summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|---|--|

Oklahoma School Testing Program: Grade 7 English Language Arts

Performance Level Descriptors

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Read and comprehend increasingly complex literary and informational texts.• Create an objective summary including main idea and supporting details.• Paraphrase main ideas with supporting details in a text.• Compare and contrast stated or implied purposes of authors' writing.• Evaluate literary devices, points of view, and perspectives.• Analyze how authors use key literary elements to contribute to the meaning of the text.• Distinguish factual claims from opinions.• Analyze and evaluate textual evidence to support inferences and draw simple, logical conclusions between and across multiple texts.• Engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences.• In argumentative writing, introduce a claim and organize reasons and evidence. | <ul style="list-style-type: none">• Use fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.• Use context clues, word parts, and reference tools to determine or clarify the meaning of words.• Infer the relationships among words with multiple meanings.• Select vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.• Apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a command of Standard English grammar, mechanics, and usage.• Recognize viable research questions and well-developed thesis statements and use them to find information on a topic.• Comprehend, evaluate, and synthesize resources.• Summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|--|--|

Oklahoma School Testing Program: Grade 7 English Language Arts Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Partially comprehend, interpret, evaluate, and respond to literary and informational texts, applying limited critical thinking skills.• Create a summary including main idea and limited supporting details.• Inconsistently paraphrase main ideas with limited supporting details in a text.• Inconsistently compare and contrast stated or implied purposes of authors' writing.• Inconsistently identify literary devices, points of view, and perspectives.• Describe how authors use key literary elements.• Inconsistently distinguish factual claims from opinions.• Inconsistently identify limited textual evidence to support inferences and draw weak conclusions between texts.• Inconsistently engage in a writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences.• In argumentative writing, introduce a claim, reasons, and evidence. | <ul style="list-style-type: none">• Use partially developed ideas, weak organization, and ineffective word choice, sentences, and voice.• Ineffectively use context clues, word parts, and reference tools to determine the meaning of words.• Sometimes infer the relationships among words with multiple meanings.• Use a limited vocabulary to communicate ideas in writing and to create an effect according to a purpose.• Inconsistently apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a limited command of Standard English grammar, mechanics, and usage.• Sometimes recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Partially comprehend, evaluate, and synthesize resources.• Ineffectively summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|---|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 8 English Language Arts Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Thoroughly comprehend, interpret, evaluate, and respond to literary and informational texts, applying critical thinking skills.• Skillfully evaluate literary devices, points of view, and perspectives.• Skillfully analyze how authors use key literary elements to contribute to the meaning of the text.• Explicitly analyze and evaluate textual evidence to support inferences and conclusions between and across multiple texts.• Effectively engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences.• In argumentative writing, introduce a claim, counterclaim, and support with logical reasons and evidence.• Synthesize fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.• Skillfully use context clues, word parts, and reference tools to determine or clarify the meaning of words. | <ul style="list-style-type: none">• Infer complex relationships among words with multiple meanings.• Select precise vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.• Intentionally apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a strong command of Standard English grammar, mechanics, and usage.• Recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Thoroughly comprehend, evaluate, and synthesize resources.• Skillfully summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|---|---|

Oklahoma School Testing Program: Grade 8 English Language Arts

Performance Level Descriptors

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Read, comprehend, interpret, evaluate, and respond to literary and informational texts, applying critical thinking skills.• Evaluate literary devices, points of view, and perspectives.• Analyze how authors use key literary elements to contribute to the meaning of the text.• Analyze and evaluate textual evidence to support inferences and conclusions between and across multiple texts.• Engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences.• In argumentative writing, introduce a claim, recognize a claim from an opposing viewpoint, and organize reasons and evidence.• Use fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice. | <ul style="list-style-type: none">• Use context clues, word parts, and reference tools to determine or clarify the meaning of words.• Infer the relationships among words with multiple meanings.• Select vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.• Apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a command of Standard English grammar, mechanics, and usage.• Recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Comprehend, evaluate, and synthesize resources.• Summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|--|---|

Oklahoma School Testing Program: Grade 8 English Language Arts Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Partially comprehend, interpret, evaluate, and respond to literary and informational texts, applying limited critical thinking skills.• Inconsistently evaluate literary devices, points of view, and perspectives.• Inconsistently analyze how authors use key literary elements to contribute to the meaning of the text.• Inconsistently analyze and evaluate textual evidence to support inferences and conclusions between or across multiple texts.• Inconsistently engage in a writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences.• In argumentative writing, introduce a claim and provide reasons and evidence.• Use partially developed ideas, weak organization, ineffective word choice, basic sentences, or inconsistent voice. | <ul style="list-style-type: none">• Ineffectively use context clues, word parts, and reference tools to determine the meaning of words.• Sometimes infer the relationships among words with multiple meanings.• Use a limited vocabulary to communicate ideas in writing and to create an effect according to a purpose.• Inconsistently apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing.• Demonstrate a limited command of Standard English grammar, mechanics, and usage.• Sometimes recognize viable research questions and well-developed thesis statements and use them to find information on a specific topic.• Partially comprehend, evaluate, and synthesize resources.• Ineffectively summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes. |
|--|--|

Below Basic

Students have not performed at least at the **Basic** level.



College- and Career-Readiness Assessment: English Language Arts Performance Level Descriptors

Advanced

Students at this level have a 94% probability of earning a C or higher and a 75% probability of earning a B or higher in credit bearing history, literature, social sciences, or writing courses at 4 year institutions. The average first year college GPA at this level is a 3.3 or above (low B or higher). Students at this level are highly likely to be on track for success in college or career.

Students demonstrate superior performance with challenging subject matter and clearly exhibit readiness for college and career.

In addition to demonstrating broad and in depth understanding and application of all skills in the **Proficient** Level, students scoring at the **Advanced** Level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Thoroughly comprehend, analyze, and synthesize information from literary and informational texts, applying a wide range of close reading skills across a range of subject areas and complexity levels.• Skillfully locate and paraphrase details, make logical inferences to support generalizations, grasp the central idea of texts, and understand complex thoughts and comparative relationships involving abstract concepts.• Use knowledge about the author’s craft and the text structure to interpret important features of the whole text, such as an author’s rhetorical purpose; also analyze character point of view in texts.• Skillfully integrate knowledge and ideas from across multiple related texts, analyzing the texts to find evidence in support of a claim.• Blend multiple modes of writing to produce complex argumentative essays on substantive topics.• Produce writing that productively and critically engages with multiple perspectives, establishes a thesis claim, and examines implications and complexities.• Develop ideas and support claims with persuasive evidence, using reasoning and illustration to enhance the central claim. | <ul style="list-style-type: none">• Purposefully engage in a recursive writing process to create a skillful organization with logical sequencing and transitions that establish and clarify relationships among ideas.• Use language to convey subtle shades of meaning with a style that enhances the writing purpose.• Use sentence structures that are consistently varied and clear.• Skillfully interpret vocabulary, including figurative language, inferring the meaning of words and phrases by using context.• Demonstrate sophisticated understanding of general academic and domain-specific vocabulary.• Maintain a consistent and appropriate tone in their writing through subtle and effective word choices.• Skillfully apply knowledge of the English language and rhetorical style to make meaning when analyzing, evaluating, producing, and revising texts.• Recognize subtle disturbances in sentence structure.• Demonstrate a thorough command of the conventions of English grammar, usage, and mechanics. |
|---|--|

College- and Career-Readiness Assessment: English Language Arts Performance Level Descriptors

Proficient

Students at this level have approximately an 80% or higher probability of earning a C or higher in credit bearing history, literature, social sciences, or writing courses at all levels of higher education. The average first year college GPA at this level is between a 2.8 and 3.3 (high C to low B). Students at this level are likely to be on track for success in college or career.

Students demonstrate mastery with subject matter and exhibit readiness for college and career.

In addition to demonstrating understanding and application of all skills in the **Basic** Level, students scoring at the **Proficient** Level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Comprehend, analyze, and synthesize information from literary and informational texts, applying various close reading skills across a range of subject areas and complexity levels.• Recognize accurate summaries, locate and paraphrase key details, make logical inferences, determine central ideas, and understand relationships between characters and important concepts.• Use knowledge about the author’s craft and the text structure to determine the main purpose of parts of the text and analyze the effect on the meaning produced by a specific detail.• Integrate knowledge and ideas from across multiple related texts, analyzing elements that are similar in two passages.• Blend multiple modes of writing to produce effective argumentative essays on substantive topics.• Produce writing that engages with multiple perspectives, establishes a thesis claim, and provides analysis that recognizes implications and complexities.• Develop ideas and support claims with relevant evidence, using reasoning and illustration to clarify the argument. | <ul style="list-style-type: none">• Engage in a recursive writing process to create a clear organization with logical grouping and transitions that establish relationships among ideas.• Use language to convey meaning with a style appropriate to the writing purpose.• Use sentence structures that are clear and show some variety.• Interpret vocabulary, including figurative language, inferring the meaning of words and phrases by using context.• Demonstrate understanding of general academic and some domain-specific vocabulary.• Maintain a consistent and appropriate tone in their writing through word choice.• Apply knowledge of the English language and rhetorical style to make meaning when analyzing, evaluating, producing, and revising texts.• Recognize disturbances in sentence structure.• Demonstrate a command of the conventions of English grammar, usage, and mechanics. |
|---|---|

College- and Career-Readiness Assessment: English Language Arts Performance Level Descriptors

Basic

Students at this level have a 60% or higher probability of earning a C or higher in credit bearing history, literature, social sciences, or writing courses across all levels of higher education. The average first year college GPA at this level is between a 2.4 and 2.7 (mid to high C). Students at this level likely require additional coursework and/or support to be on track for success in college or career.

Students demonstrate partial mastery with subject matter but may not exhibit readiness for college and career.

In addition to demonstrating understanding and application of all skills in the **Below Basic** Level, students scoring at the **Basic** Level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Comprehend, analyze, and synthesize information from literary and informational texts, applying limited close reading skills across a range of subject levels and complexity levels.• Inconsistently locate explicitly stated details, make inferences about characters and actions, and identify central ideas when they are clearly stated• Sometimes use knowledge about the author’s craft and the text structure to determine the text’s primary purpose and the function of key textual elements.• Identify knowledge and ideas from across multiple related texts, comparing details that texts have in common.• Attempt to blend multiple modes of writing to produce argumentative essays on substantive topics.• Produce writing that responds to multiple perspectives, establishes a thesis claim that shows some clarity in thought, and provides limited analysis of the issue.• Develop ideas and support claims with some relevant evidence that is often overly general, sometimes using basic reasoning and illustration that may be repetitious. | <ul style="list-style-type: none">• Attempt to use a recursive writing process and create a simple organization with some transitions that establish relationships among ideas.• Use language that is sometimes imprecise to convey meaning.• Use sentence structures that are usually clear but show little variety.• Interpret vocabulary, including basic figurative language, sometimes inferring the meaning of key words and phrases by using the context.• Demonstrate understanding of familiar and some general academic vocabulary.• Make inconsistent word choices and may use inappropriate tone in their writing.• Inconsistently apply knowledge of the English language and rhetorical style to make meaning when analyzing, evaluating, producing, and revising texts.• May recognize obvious disturbances in sentence structure.• Demonstrate an inconsistent command of the conventions of English grammar, usage, and mechanics. |
|---|---|

Below Basic

Students have not performed at least at the **Basic** level.



OKLAHOMA
Education

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Oklahoma Mathematics
Performance Level Descriptor Tables

Oklahoma School Testing Program: Grade 3 Mathematics

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Complete complex addition, subtraction, and multiplication problems and model division facts.• Order fractions using models and compose and decompose fractions related to the same whole.• Extend patterns and generate real-world situations to represent number sentences. | <ul style="list-style-type: none">• Determine volume and elapsed time.• Summarize complex data sets and analyze the data to solve problems.• Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions. |
|---|---|

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Compare and order whole numbers.• Complete addition, subtraction, and multiplication problems and recognize the relationship between multiplication and division.• Construct and compare fractions using models.• Select the fewest number of coins for a given amount of money.• Determine rules to describe basic patterns.• Determine unknowns in equations and apply number properties. | <ul style="list-style-type: none">• Classify angles.• Sort three-dimensional figures and determine the perimeter of polygons.• Determine the area of two-dimensional figures.• Read and analyze length, temperature, and time. Students summarize a data set and analyze the data to solve problems.• Solve real-world problems and employ problem-solving strategies of identifying and using appropriate information. |
|--|---|



Oklahoma School Testing Program: Grade 3 Mathematics Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Represent whole numbers.• Complete simple addition, subtraction, and multiplication problems.• Read and write fractions.• Determine the value of a set of coins or bills. | <ul style="list-style-type: none">• Determine rules to describe simple patterns. Students determine unknowns in simple equations.• Identify right angles.• Choose an appropriate instrument to measure an object.• Read and write time from a digital clock. |
|--|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 4 Mathematics

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Estimate and solve complex mathematical problems and determine the unknown in non-equivalent expressions. • Compare decimals and fractions. • Solve complex money problems. • Determine a rule and extend a complex pattern. • Determine and represent unknown values in complex problems. | <ul style="list-style-type: none"> • Determine volume. • Solve complex measurement problems. • Represent complex data sets and solve problems involving the data. • Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions. |
|--|--|

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Estimate and solve mathematical problems. • Use models to determine equivalent fractions, compare and order fractions, and add and subtract fractions. • Read and write decimals and make connections between decimals and fractions. • Determine change using coins. • Determine rules and extend patterns. • Determine unknown values in mathematical problems. | <ul style="list-style-type: none"> • Describe parts of geometrical figures and identify similarities in three-dimensional figures. • Decompose and determine the area of polygons. • Solve measurement problems. • Represent data sets and solve problems involving the data. • Solve real-world problems and employ problem-solving strategies of identifying and using appropriate information. |
|--|--|

Oklahoma School Testing Program: Grade 4 Mathematics

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Demonstrate the ability to estimate and solve simple mathematical problems.• Use models to determine simple equivalent fractions, compare and order whole numbers and simple fractions, and decompose fractions.• Read and write simple decimals and compare and order whole numbers and decimals. | <ul style="list-style-type: none">• Determine change using whole dollars.• Determine a rule and extend a simple pattern.• Determine unknown values in simple mathematical problems.• Identify quadrilaterals and determine the area of simple polygons.• Identify appropriate units and tools to measure. |
|--|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 5 Mathematics

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Interpret the remainder of division problems within the context of the problem. • Order decimals, fractions, and whole numbers. • Evaluate complex expressions, equations, and inequalities. • Construct geometric figures and identify them in various contexts. | <ul style="list-style-type: none"> • Compare the volume, perimeter, or surface area of geometric figures. • Analyze complex graphs. • Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions. |
|--|---|

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Estimate and solve division problems with the remainder represented as a fraction or decimal. • Generate equivalent decimals and fractions, represent whole numbers or decimals, and compare fractions and decimals, including mixed numbers. • Estimate, add, and subtract decimals and fractions. • Describe patterns of change and graph these patterns as ordered pairs on a coordinate plane. • Evaluate expressions, equations, and inequalities. | <ul style="list-style-type: none"> • Solve volume and perimeter problems and simple surface area problems. • Determine reasonable values for the perimeter of shapes with curves. • Compare angles. • Recognize relationships within a measurement system. • Determine the mean, median, mode, and range of a data set and analyze simple graphs. • Solve real-world problems and employ problem-solving strategies of identifying and using appropriate information. |
|---|---|



Oklahoma School Testing Program: Grade 5 Mathematics

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Estimate and solve division problems with remainders and solve addition and subtraction real-world problems.• Recognize basic equivalent decimals and fractions, represent whole numbers, and compare and order fractions or decimals.• Add and subtract decimals and fractions with like denominators.• Describe simple patterns of change and identify ordered pairs on a coordinate plane. | <ul style="list-style-type: none">• Evaluate simple equivalent numerical expressions or equations.• Describe and classify geometric figures.• Solve simple volume and perimeter problems.• Choose an appropriate instrument to measure objects and read and analyze the length of objects.• Read and analyze the measure of angles.• Read simple graphs. |
|--|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 6 Mathematics

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Estimate and solve complex problems requiring unit conversions. • Use the distance between points and transformations to solve complex problems involving congruent figures. | <ul style="list-style-type: none"> • Analyze the differences between two outcomes of simple experiments. • Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions. |
|---|---|

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Estimate, illustrate, and simplify the addition and subtraction of integers and assess the reasonableness of an answer. • Solve ratio and unit rate problems. • Estimate and illustrate the multiplication and division of non-negative rational numbers. • Evaluate the validity of the value of a variable. • Generate expressions, equations, and inequalities. • Interpret the solution of an equation and assess the reasonableness of the solution. • Determine the area of polygons and composite figures. • Use relationships between angles and the triangle sum theorem to solve problems. | <ul style="list-style-type: none"> • Estimate and solve problems requiring unit conversion. • Predict transformations, analyze lines of symmetry, and use the distance between points and transformations to solve problems involving congruent figures. • Explain and justify which measure of central tendency provides the most descriptive information for a data set. • Create and analyze box-and-whisker plots and explain and compare possible outcomes of simple experiments. • Solve real-world problems and employ problem-solving strategies of identifying and using appropriate information. |
|---|---|

Oklahoma School Testing Program: Grade 6 Mathematics

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Read, order, represent, and explain rational numbers expressed as fractions, decimals, percents, and ratios.• Write positive integers as products of factors.• Illustrate or simplify the addition and subtraction of integers.• Identify and compare quantities, determine unit rates, and find equivalent fractions and percents.• Multiply and divide non-negative rational numbers. Students graph ordered pairs in all quadrants.• Represent reflective relationships between varying quantities. | <ul style="list-style-type: none">• Evaluate the value of a variable in expressions, equations, and inequalities.• Use number sense and properties of operations to solve equations and graph the solution.• Determine the area of parallelograms and triangles.• Identify angle relationships by name.• Identify and display the effect of transformations.• Identify lines of symmetry.• Calculate measures of central tendency, determine the sample space of simple experiments, and identify possible outcomes. |
|---|--|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 7 Mathematics

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Interpret equations and inequalities involving variables and rational numbers. • Make connections between circumference and area to solve problems involving circles. • Analyze, apply, and display the effect of dilations and multiple transformations. | <ul style="list-style-type: none"> • Use central tendencies and range, predict data and select an appropriate data display, and predict theoretical probability. • Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions. |
|---|---|

Proficient

Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Estimate solutions of problems involving rational numbers and assess the reasonableness of the solutions. • Differentiate between proportional and inversely proportional relationships and identify the constant of proportionality. • Represent proportional relationships in a variety of ways. • Use representations to identify and compare unit rates. • Solve problems involving proportional relationships and assess the reasonableness of solutions. | <ul style="list-style-type: none"> • Represent, solve, and write equations. • Solve simple inequalities. • Generate and evaluate equivalent expressions with justification of steps. • Interpret theoretical probability and draw conclusions. Students apply the effect of dilations and transformations. • Solve real-world problems and employ problem-solving strategies of identifying and using appropriate information. |
|--|---|

Oklahoma School Testing Program: Grade 7 Mathematics

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Recognize, compare, and order rational numbers.• Create equivalent representations of rational numbers.• Calculate and model mathematical problems involving rational numbers and exponents.• Calculate the absolute value of a rational number.• Describe and identify a proportional relationship.• Identify and solve problems involving ratios and unit rates.• Represent, solve, and write simple equations.• Represent, write, and graph simple inequalities. | <ul style="list-style-type: none">• Evaluate expressions using the order of operations.• Determine the surface area and volume of rectangular prisms and calculate the area and perimeter of trapezoids.• Calculate the circumference and area of circles.• Describe the effect of dilations and transformations.• Calculate the measures of central tendencies and range and determine appropriate data displays.• Calculate theoretical probability. |
|--|---|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 8 Mathematics

Performance Level Descriptors

<p>Advanced</p> <p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:</p>	
<ul style="list-style-type: none"> • Generate, simplify, and evaluate complex equivalent expressions. • Make connections between volume and surface area to solve problems involving solids. • Compare the volume and surface area of different solids. 	<ul style="list-style-type: none"> • Describe the impact on central tendencies of a data set with multiple outliers and when inserting or deleting multiple data points. • Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions.
<p>Proficient</p> <p>Students demonstrate mastery over appropriate grade level subject matter and readiness for the next grade level. Students scoring at the Proficient level typically:</p>	
<ul style="list-style-type: none"> • Solve complex and non-routine real-world problems, draw logical conclusions and justify solutions. • Generate, simplify, and evaluate equivalent expressions. • Classify and explain operational closure of rational and irrational numbers. • Distinguish between a linear and nonlinear function. • Identify independent and dependent variables. • Describe, analyze, and represent linear functions with two variables and translate between representations. 	<ul style="list-style-type: none"> • Use and apply the Pythagorean Theorem. • Describe the impact on central tendencies of a data set with an outlier and when inserting or deleting a data point. • Interpret a scatterplot, determine the rate of change, and use a line of best fit to make predictions. • Calculate, interpret, and predict experimental probability and generalize samples to populations. • Solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Oklahoma School Testing Program: Grade 8 Mathematics

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.

Students scoring at the **Basic** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Simplify and generate simple equivalent expressions, including expressions in scientific notation.• Translate between standard form and scientific notation.• Identify and compare real numbers.• Recognize if a graph represents a linear function.• Identify intercepts and slope from the graph of a line.• Identify the effect on the graph of a linear function when characteristics are changed.• Solve and graph equations and inequalities. | <ul style="list-style-type: none">• Use the Pythagorean Theorem to identify right triangles and to find the length of the hypotenuse.• Calculate the surface area and volume of solids.• Identify the outliers of a data set.• Identify the line of best fit from a given scatterplot and determine if the rate of change is positive or negative.• Calculate the experimental probability of single events, identify sample spaces, and classify events as independent or dependent. |
|---|---|

Below Basic

Students have not performed at least at the **Basic** level.



College- and Career-Readiness Assessment: Mathematics Performance Level Descriptors

Advanced

Students at the Advanced level have a 90% probability of earning a C or higher and a 66% probability of earning a B or higher in credit bearing math courses at 4 year institutions. Their average first year college GPA at this level is a 3.3 or above (low B or higher). Students at this level are highly likely to be on track to be successful at the next level.

Students demonstrate superior performance with challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating broad and in depth understanding and application of all skills in the Proficient Level, students scoring at the Advanced Level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Rewrite rational, radical, and exponential expressions.• Find the value of i^n for any whole number n.• Perform operations on complex numbers.• Add, subtract, and perform scalar multiplication on matrices.• Interpret a term in a linear function of a challenging context.• Make connections between different representations of, linear functions, systems of two linear equations, and systems of two linear inequalities in two variables.• Determine the conditions under which a system of two linear equations in two has no solution, one solution, or infinitely many solutions.• Create and use a linear equation in two variables that represents a challenging context.• Create and solve a 3-variable linear system.• Create and use an inequality in one or two variables that represents a challenging context.• Make connections between the graph and solution to a quadratic and linear system of equations.• Given a graph of a quadratic or exponential function representing a context, interpret a value, variable, point, or input-output pair in terms of the context. | <ul style="list-style-type: none">• Solve absolute value, logarithmic, polynomial, rational, radical, and exponential equations in real-world and mathematical problems.• Solve quadratic equations with complex solutions.• Analyze graphs relationships between two quantities, including relationships that are not represented by a linear, quadratic, or exponential equation.• Identify characteristics of graphs of functions.• Identify the effect of multiple transformations of functions.• Find inverse functions.• Divide polynomials.• Solve challenging radical and rational equations.• Solve problems involving arithmetic and geometric sequences and series.• Identify an appropriate inference or conclusion based on information from a graph, table, or scatterplot.• Identify the equation of a line or curve that best fits the data in a scatterplot.• Identify the appropriate conclusion to draw from a description of a study's design and the study results.• Compare measures of center and spread of two data distributions represented visually. |
|---|---|

College- and Career-Readiness Assessment: Mathematics Performance Level Descriptors

Advanced (cont.)

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|--|---|
| <ul style="list-style-type: none">• Find the probability of a compound event.• Recognize the effect of standard deviation.• Count using the Fundamental Counting Principle, combinations, and permutations, including when cases overlap.• Identify the most appropriate sample or sampling method to best answer the question of interest.• Identify the population to which the results of a survey can be generalized.• Understand sampling variability when the population proportion is estimated using sample data.• Use similarity as well as theorems related to lines, angles, and triangles to solve problems.• Find the diameter, radius, center, or points on a circle in coordinate plane. | <ul style="list-style-type: none">• Solve problems using properties of special right triangles, the Pythagorean Theorem or its converse, and trigonometric ratios.• Solve problems using properties and theorems relating to circles and parts of circles, such as radii, diameters, tangents, angles, arcs, arc length, and sector area.• Apply the triangle inequality theorem.• Recognize congruencies that appear through the use of auxiliary lines.• Determine an expression for the area of a regular polygon in terms of side length or apothem/altitude.• Find area and volume of composite shapes.• Convert area and volume to different units. |
|--|---|



College- and Career-Readiness Assessment: Mathematics Performance Level Descriptors

Proficient

Students at the Proficient level have approximately a 75% or higher probability of earning a C or higher in credit bearing math courses at all levels of higher education. Their average first year college GPA at this level is between a 2.9 and 3.3 (high C to low B). Students at this level are likely to be on track to be successful at the next level.

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic Level, students scoring at the Proficient Level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Rationalize numeric expressions.• Convert numbers with rational exponents to radical form.• Simplify cube roots.• Use properties of radicals and exponents to rewrite expressions.• Evaluate slope in given contexts.• Interpret terms in linear functions and make connections between different representations.• Determine the number of solutions linear systems of two equations have.• Create and solve linear equations within context.• Create and use inequalities within context.• Graph compound linear inequalities.• Interpret the constant, variable, term, solution, or input-output pair in quadratic or exponential functions in context.• Add, subtract, and multiply polynomials.• Solve multistep quadratic equations.• Solve radical equations.• Solve rational equations.• Solve systems of equations with one linear and one quadratic equation.• Solve literal equations for a given variable.• Use Venn diagrams to make conclusions. | <ul style="list-style-type: none">• Make connections between the various representations of quadratic or exponential functions.• Factor polynomial expressions.• Determine the number of solutions quadratic equations have.• Create and/or use quadratic or exponential functions to represent real-world contexts.• Graph polynomial functions.• Evaluate the effects of single function transformations.• Evaluate logarithmic, polynomial, rational, radical, and exponential functions, including where they are undefined.• Find near terms in geometric sequences.• Compose 2 functions.• Evaluate conclusions of population proportions based on sample data and margins of error.• Identify bias in sampling methods.• Interpret scatterplots and use lines of best fit to make predictions.• Calculate, compare, and interpret measures of central tendency in context.• Determine probabilities of compound events.• Find probabilities where the sample space must be determined from the context.• Solve problems using properties of right triangles. |
|---|--|

College- and Career-Readiness Assessment: Mathematics Performance Level Descriptors

Proficient (cont.)

- | | |
|---|---|
| <ul style="list-style-type: none">• Make connections between the equation of a circle in a coordinate plane and the center and radius of the circle.• Solve simple problems using properties and theorems relating to circles and parts of circles.• Solve problems using properties of similar triangles.• Find the measure of interior angles of polygons.• Solve problems using the midpoint formula.• Solve problems using multiple theorems related to lines, angles, or triangles. | <ul style="list-style-type: none">• Solve problems involving circumference, area, surface area, perimeter and volume.• Solve problems involving translations, rotations, and reflections.• Solve problems using the Pythagorean Theorem.• Solve problems using the distance formula.• Solve problems involving right triangles using trigonometric functions. |
|---|---|

College- and Career-Readiness Assessment: Mathematics Performance Level Descriptors

Basic

Students at this level have a 50% or higher probability of earning a C or higher in credit bearing math courses across all levels of higher education. Their average first year college GPA at this level is between a 2.4 to 2.8 (mid to high C student). Students at this level likely require additional coursework and/or support to be on track for college and/or career success.

Students demonstrate partial mastery with subject matter but may not exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Below Basic Level, students scoring at the Basic Level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Add complex numbers and add matrices.• Simplify square roots.• Rewrite monomials with integer exponents to have positive exponents.• Create linear expressions, equations or inequalities to model contexts.• Create systems of two linear equations to model contexts.• Solve systems of two linear equations with integer coefficients.• Make connections between different representations of linear relationships between two variables.• Create and use linear relationships to solve a problem.• Multiply polynomials by monomials.• Multiply binomials.• Factor monomials from polynomial expressions.• Factor trinomials.• Add and subtract polynomials.• Solve quadratic equations in the form $ax^2 = b$.• Solve simple radical equations.• Use function notation to represent functions.• Evaluate absolute value functions. | <ul style="list-style-type: none">• Evaluate simple algebraic expressions.• Identify the shape of graphs from some of their points.• Identify graphs of nonlinear relationships between two variables based on descriptions of characteristics.• Read and interpret information presented in graphs, scatterplots, or tables.• Find the median or mean of data sets.• Find probabilities of simple events.• Estimate expected population counts or proportions from sample counts or proportions.• Find probabilities of simple compound events.• Calculate simple conditional probabilities.• Solve simple problems about geometric figures using the vertical angle theorem, the triangle angle sum theorem, or theorems about a transversal crossing parallel lines.• Solve real-world problems using the Pythagorean Theorem.• Solve simple problems involving perimeter, area and volume.• Identify corresponding parts of congruent triangles.• Translate points horizontally and vertically on a coordinate plane. |
|--|--|

Below Basic

Students have not performed at least at the **Basic** level.





**Oklahoma Grade 5 Science
Performance Level Descriptor Tables**

<p>5PS1-1 5PS3-1 5LS2-1 5LS2-2 5ESS2-1</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Develop and Use Models DCI</p> <ul style="list-style-type: none"> • PS1.A Structure and Properties of Matter • PS3.D Energy in Chemical Processes • LS1.C Organization of Matter and Energy Flow in Organisms • LS2.A Interdependent Relationships in Ecosystems • LS2.B Cycles of Matter and Energy Transfer in Ecosystems • ESS2.A: Earth Materials and Systems <p>CCC</p> <ul style="list-style-type: none"> • Scale, Proportion and Quantity • Energy and Matter • Systems and System Models 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will Identify basic models to represent common features of matter and/or energy, ecosystems and/or Earth's systems.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will describe, use and/or develop basic models at various scales to explain the movement of matter and energy between organisms, ecosystems and Earth's systems and the outcomes of these interactions.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically predict, modify, and extend complex models at various scales to analyze the movement of matter and energy between organisms, ecosystems and Earth's systems and the outcomes of these interactions.</p>

<p>PS1-2 ESS 1-2 ESS2-2</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Using Mathematics and Computational Thinking, Analyzing and Interpreting Data</p> <p>DCI</p> <ul style="list-style-type: none"> • PS1.A Structure and Properties of Matter • PS1.B Chemical Reactions • ESS1.B Earth and the Solar System • ESS2.C The Roles of Water in Earth’s Surface Processes <p>CCC</p> <ul style="list-style-type: none"> • Scale, Proportion, and Quantity • Patterns 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will recognize scale, proportion, quantity or patterns when performing basic computations with data as it pertains to distribution of water on Earth, conservation of matter, and/or Earth’s relationship with the sun, moon and stars.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will apply scale, proportion, quantity and/or patterns when performing computational thinking to data as it pertains to distribution of water on Earth, conservation of matter, and Earth’s relationship with the sun, moon and stars.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically analyze scale, proportion, quantity and patterns when performing computational thinking to complex data as it pertains to distribution of water on Earth, conservation of matter, and Earth’s relationship with the sun, moon and stars.</p>

<p>PS2-1 LS 1-1 ESS 1-1</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Engaging in Argument from Evidence</p> <p>DCI</p> <ul style="list-style-type: none"> PS2.B: Types of Interactions LS1.C Organization for Matter and Energy Flow in Organisms ESS1.A: The Universe and Its Stars <p>CCC</p> <ul style="list-style-type: none"> Cause and Effect Energy and Matter Scale, Proportion, and Quantity 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will identify evidence, data or models to distinguish relationships between an object and Earth’s gravity, or how basic scale and proportion affect the brightness of the sun and other stars, or how plants use air and water.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will use evidence, data and/or models to engage in argument to explain the cause and effect relationships between an object and Earth’s gravity, or how scale and proportion affect the apparent brightness of the sun and other stars, or how plants use matter (chiefly air and water) to grow.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically analyze and compare evidence, data and models to engage in argument to explain the cause and effect relationships between an object and Earth’s gravity; how scale and proportion affect the apparent brightness of the sun and other stars; and/or how plants use matter (chiefly air and water) to grow.</p>

<p>PS1-3 PS1-4</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Planning and Carrying Out Investigations</p> <p>DCI</p> <ul style="list-style-type: none"> PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions <p>CCC</p> <ul style="list-style-type: none"> Patterns Cause and Effect 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will observe or measure phenomenon to recognize patterns of materials. Identify basic relationships when mixing substances within an investigation framework.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will observe and measure phenomenon to identify patterns that classify materials based on properties. Describe cause and effect relationships when mixing substances within an investigation framework.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically observe and measure phenomenon to interpret and evaluate patterns that classify materials based on properties. Describe complex cause and effect relationships when mixing substances within an investigation framework.</p>



**Oklahoma Grade 8 Science
Performance Level Descriptor Tables**

PS1-5 PS4-1 PS4-2 LS1-7 ESS2-1	Unsatisfactory: Students have not performed at least at the Limited Knowledge level.	Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.	Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.	Advanced: Students demonstrate superior performance on challenging subject matter.
<p>Develop and Use Models, Using Mathematics and Computational Thinking</p> <p>DCI</p> <ul style="list-style-type: none"> • PS1.B Chemical Reactions • PS4.A Wave Properties • PS4.B Electromagnetic Radiation • LS1.C Organization for Matter and Energy Flow in Organisms • PS3.D Energy in Chemical Processes and Everyday Life • ESS2.A Earth's Materials and Systems <p>CCC</p> <ul style="list-style-type: none"> • Energy and matter • Patterns • Structure function • Stability and change 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will identify or describe basic components or concept(s) of a model involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will make predictions about, describe, develop, or use a given model involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically evaluate, revise, or develop a model from evidence, or apply models to complex concepts involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems.</p>

<p>LS4-1 ESS2-3 ESS3-2 PS2-2</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Planning and Carrying Out Investigations, Analyzing and Interpreting Data</p> <p>DCI</p> <ul style="list-style-type: none"> • LS4.A Evidence of Common Ancestry and Diversity • ESS1.C The History of Planet Earth • ESS2.B Plate tectonics and Large Scale System Interactions • ESS3.B Natural Hazards • PS2.A Forces and Motion <p>CCC</p> <ul style="list-style-type: none"> • Patterns • Stability and change 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will identify or describe basic steps or processes within investigations about stability and change of forces and motion, or identify and define patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will identify, describe, or explain how to plan or perform investigations about stability and change of forces and motion, or identify and apply patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically design, evaluate, or modify investigations about stability and change of forces and motion, or analyze and draw conclusions from patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards.</p>

<p>PS1-6 PS2-1</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Designing Solutions DCI</p> <ul style="list-style-type: none"> • PS1.B Chemical Reactions • PS2.A Forces and Motion <p>CCC</p> <ul style="list-style-type: none"> • Energy and matter • System and system models 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will identify components of a design solution or describe simple relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will use, describe, or explain a design solution, or identify evidence of relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically modify, synthesize, or apply a design solution, or evaluate evidence of relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions.</p>

<p>LS4-2 ESS1-4 ESS2-2 ESS3-1 ESS3-4</p>	<p>Unsatisfactory: Students have not performed at least at the Limited Knowledge level.</p>	<p>Limited Knowledge: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.</p>	<p>Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Engaging in Argument from Evidence, Constructing Explanations</p> <p>DCI</p> <ul style="list-style-type: none"> • LS4.A Evidence of Common Ancestry and Diversity • ESS1.C The History of Planet Earth • ESS2.A Earth’s Materials and Systems • ESS2.C The Roles of Water in Earth’s Surface Processes • ESS3.A Natural Resources • ESS3.C Human Impacts on Earth Systems <p>CCC</p> <ul style="list-style-type: none"> • Structure-function • Scale, proportion and quantity • Cause and effect 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level will identify or describe basic relationships shown in evidence of anatomy and common ancestry of organisms, or aspects of Earth systems, including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion.</p>	<p>Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will construct explanations by identifying, describing, or comparing evidence of anatomy and common ancestry of organisms, or aspects of Earth systems including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion.</p>	<p>Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically will analyze, infer, relate, or identify complex relationships within a system to construct or evaluate explanations for evidence of anatomy and common ancestry of organisms, or aspects of Earth systems including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion.</p>



Oklahoma Grade 11 Physical Science Performance Level Descriptor Tables

Name: _____

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:

- **evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**
- **use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy, and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**
- **evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts.**
- **construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions, taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology.**

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic Level, students scoring at the Proficient Level typically:

- **use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**
- **use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**
- **evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published sources.**
- **construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.**

Basic

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career. Students scoring at the Basic level typically:

- use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.
- identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

Below Basic

Students scoring **Below Basic** have not demonstrated they can perform at the Basic level. Students scoring at the Basic Level:

- use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.
- identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

PS1-1 PS3-2	Below Basic: Students have not performed at least at the Basic level.	Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).	Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).	Advanced: Students demonstrate superior performance on challenging subject matter.
Develop and Use Models DCI <ul style="list-style-type: none"> PS1.A Structure and Properties of Matter PS3.A Definitions of Energy CCC <ul style="list-style-type: none"> Patterns Energy and Matter 		Students scoring at the Basic level typically use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.	Students scoring at the Proficient level typically use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.	Students scoring at the Advanced level typically evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.

<p>PS1-7 PS2-5 PS3-1 PS3-4 PS4-1</p>	<p>Below Basic: Students have not performed at least at the Basic level.</p>	<p>Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Planning and Carrying Out Investigations, Using Mathematics and Computational Thinking</p> <p>DCI</p> <ul style="list-style-type: none"> • PS1.B Chemical Reactions • PS2.B Types of Interactions • PS3.A Definitions of Energy • PS3.B Conservation of Energy and Energy Transfer • PS4.A Wave Properties <p>CCC</p> <ul style="list-style-type: none"> • Energy and Matter • Cause and Effect • Systems and System Models 		<p>Students scoring at the Basic level typically use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.</p>	<p>Students scoring at the Proficient level typically use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.</p>	<p>Students scoring at the Advanced level typically use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.</p>

<p>PS4-4</p>	<p>Below Basic: Students have not performed at least at the Basic level.</p>	<p>Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Obtaining, Evaluating, and Communicating Information</p> <p>DCI</p> <ul style="list-style-type: none"> PS4.B Electromagnetic Radiation <p>CCC</p> <ul style="list-style-type: none"> Cause and Effect 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to college and career readiness. Students scoring at the Basic level typically evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.</p>	<p>Students demonstrate mastery with subject matter and exhibit readiness for college and career. Students scoring at the Proficient level typically evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published sources.</p>	<p>Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts.</p>

PS1-2 PS1-5 PS3-3	Below Basic: Students have not performed at least at the Basic level.	Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).	Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).	Advanced: Students demonstrate superior performance on challenging subject matter.
Constructing Explanations and Designing Solutions DCI <ul style="list-style-type: none"> • PS1.A Structure and Properties of Matter • PS1.B: Chemical Reactions • PS3.A Definitions of Energy • ETS1.A Defining and Delimiting Engineering Problems • ETS2.B Interdependence of Science, Engineering, and Technology CCC <ul style="list-style-type: none"> • Patterns • Energy and Matter 		Students scoring at the Basic level typically identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.	Students scoring at the Proficient level typically construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.	Students scoring at the Advanced level typically construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

Oklahoma School Testing Program: Grade 5 Science

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in-depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Analyze scale, proportion, quantity and patterns when performing computational thinking to complex data as it pertains to distribution of water on Earth, conservation of matter, and Earth’s relationship with the sun, moon and stars.• Predict, modify, and extend complex models at various scales to analyze the movement of matter and energy between organisms, ecosystems, and Earth’s systems, and analyze the outcomes of these interactions.• Describe complex cause and effect relationships when mixing substances within an investigation framework. | <ul style="list-style-type: none">• Analyze and compare evidence, data, and models to engage in argument to explain the cause and effect relationships between an object and Earth’s gravity, how scale and proportion affect the apparent brightness of the sun and other stars, and/or how plants use matter (chiefly air and water) to grow.• Observe and measure phenomenon to interpret and evaluate patterns that classify materials based on properties. |
|--|--|

Proficient

Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Describe, use and/or develop basic models at various scales to explain the movement of matter and energy between organisms, ecosystems, and Earth’s systems and explain the outcomes of these interactions.• Apply scale, proportion, quantity, and/or patterns when performing computational thinking to data as it pertains to distribution of water on Earth, conservation of matter, and Earth’s relationship with the sun, moon, and stars. | <ul style="list-style-type: none">• Use evidence, data, and/or models to engage in argument to explain the cause and effect relationships between an object and Earth’s gravity, how scale and proportion affect the apparent brightness of the sun and other stars, or how plants use matter (chiefly air and water) to grow.• Observe and measure phenomenon to identify patterns that classify materials based on properties.• Describe cause and effect relationships when mixing substances within an investigation framework. |
|---|---|



Oklahoma School Testing Program: Grade 5 Science

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Identify basic models to represent common features of matter and/or energy, ecosystems, and/or Earth's systems.• Recognize scale, proportion, quantity, or patterns when performing basic computations with data as it pertains to distribution of water on Earth, conservation of matter, and/or Earth's relationship with the sun, moon, and stars. | <ul style="list-style-type: none">• Identify evidence, data, or models to distinguish relationships between an object and Earth's gravity, how basic scale and proportion affect the brightness of the sun and other stars, or how plants use air and water.• Observe or measure phenomenon to recognize patterns of materials. Students can identify basic relationships when mixing substances within an investigation framework. |
|--|--|

Below Basic

Students have not performed at least at the **Basic** level.



Oklahoma School Testing Program: Grade 8 Science

Performance Level Descriptors

Advanced

Students demonstrate superior performance on challenging subject matter.

In addition to demonstrating a broad and in-depth understanding and application of all skills at the **Proficient** level, students scoring at the **Advanced** level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Evaluate, revise, or develop a model from evidence, or apply models to complex concepts involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems.• Design, evaluate, or modify investigations about stability and change of forces and motion, or analyze and draw conclusions from patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards. | <ul style="list-style-type: none">• Modify, synthesize, or apply a design solution, or evaluate evidence of relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions.• Analyze, infer, relate, or identify complex relationships within a system to construct or evaluate explanations for evidence of anatomy and common ancestry of organisms, or aspects of Earth systems including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion. |
|---|--|

Proficient

Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level.

Students scoring at the **Proficient** level typically:

- | | |
|--|---|
| <ul style="list-style-type: none">• Make predictions about, describe, develop, or use a given model involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems.• Identify, describe, or explain how to plan or perform investigations about stability and change of forces and motion, or identify and apply patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards. | <ul style="list-style-type: none">• Use, describe, or explain a design solution, or identify evidence of relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions.• Construct explanations by identifying, describing, or comparing evidence of anatomy and common ancestry of organisms, or aspects of Earth systems including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion. |
|--|---|



Oklahoma School Testing Program: Grade 8 Science

Performance Level Descriptors

Basic

Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level.
Students scoring at the **Basic** level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Identify or describe basic components or concept(s) of a model involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems.• Identify or describe basic steps or processes within investigations about stability and change of forces and motion, or identify and define patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards. | <ul style="list-style-type: none">• Identify components of a design solution or describe simple relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions.• Identify or describe basic relationships shown in evidence of anatomy and common ancestry of organisms, or aspects of Earth systems, including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion. |
|---|---|

Below Basic

Students have not performed at least at the **Basic** level.



College- and Career-Readiness Assessment (CCRA): High School Science Performance Level Descriptors

The CCRA High School Science Performance Level Descriptors (PLDs) represent the knowledge, skills, and abilities that students scoring within a given range possess and can perform. The PLD ranges are Below Basic, Basic, Proficient, and Advanced, with the last level representing students with the highest probability of success after high school. The College- and Career-Readiness Assessment (CCRA): Science Content PLDs are divided into two areas of study, Life Science and Physical Science, as the CCRA Science is comprised of 50% Life Science and 50% Physical Science content. The knowledge, skills, and abilities represented across the range of the PLDs are important attributes for students to possess in order to be on track for success in college and careers in the major industries in Oklahoma, such as Aerospace & Defense, Agriculture & Bioscience, and Energy.

Physical Science

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.• Use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy, and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.• Evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts. | <ul style="list-style-type: none">• Construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions, taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology. |
|---|---|

Physical Science

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic Level, students scoring at the Proficient Level typically:

- | | |
|---|---|
| <ul style="list-style-type: none">• Use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.• Use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.• Evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published sources. | <ul style="list-style-type: none">• Construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology. |
|---|---|

Physical Science

Basic

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career.

Students scoring at the Basic level typically:

- | | |
|--|--|
| <ul style="list-style-type: none">• Use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.• Use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties. | <ul style="list-style-type: none">• Evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.• Identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology. |
|--|--|

Below Basic

Student has not performed at least at the Basic Level.

Life Science

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:

- Develop and use models to interpret and evaluate components and relationships among components within and between complex systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems and/or energy in chemistry processes.
- Plan and conduct investigations to produce reliable data considering the types, amounts, and accuracy of data needed; analyze and interpret complex data sets to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.
- Ask questions to analyze relationships about the effect of structure and function on inheritance of traits; or support and/or evaluate the merits of arguments to synthesize and communicate understanding and defend them based on empirical evidence about stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- Construct, evaluate, make inferences and revise an explanation based on valid and reliable evidence from a variety of sources regarding the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or evaluate or refine explanations derived from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

Life Science

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic Level, students scoring at the Proficient Level typically:

- Develop and use models to describe components and relationships among the components of a system, related to structure and function, growth and development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, and energy in chemistry processes, including hierarchical structures and inputs and outputs of a system. Use the models to represent basic aspects of phenomena that result from changes in energy and matter.
- Plan and conduct investigations to produce reliable data; analyze and interpret provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.
- Ask questions to clarify relationships about the effect of structure and function on inheritance of traits; or evaluate arguments based on evidence as students synthesize and communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- Construct an explanation based on valid and reliable evidence from sources of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or construct and revise explanations derived from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

Life Science

Basic:

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career.

Students scoring at the Basic level typically:

- | | |
|---|--|
| <ul style="list-style-type: none">• Identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.• Conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation. | <ul style="list-style-type: none">• Ask questions to identify relationships about the effect of structure and function on inheritance of traits; or describe arguments based on evidence as students communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.• Identify and describe basic relationships based on evidence of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem. |
|---|--|

Below Basic

Student has not performed at least at the Basic Level

APPENDIX F
CBT DEVICE AND ACCOMMODATION
TOOL ANALYSIS

Device and Accommodation Tool Comparability

Differential item functioning (DIF) between subgroups using different approved CBT device-types and accommodation tools was analyzed in the 2018-19 test administrations to provide validity evidence of comparability between those groups. These analyses included:

- Chrome OS versus Windows OS
- Chrome OS versus Mac OS
- Chrome OS versus iOS
- Aspect wide (16:9) versus aspect full (4:3)
- Resolution high versus resolution low
- Guide tool versus no guide tool
- Sketch tool versus no sketch tool
- Answer masking versus no answer masking
- Reference tool versus no reference tool
- Calculator tool versus no calculator tool

In these analyses, the standardization DIF procedure (Dorans & Kulick, 1986) was employed to evaluate subgroup differences. The standardization DIF procedure is designed to identify items for which subgroups of interest perform differently, beyond the impact of differences in overall achievement. The DIF procedure calculates the difference in item performance for two groups of students (at a time) matched for achievement on the total test. Specifically, average item performance is calculated for students at every total score. Then an overall average is calculated, weighting the total score distribution so that it is the same for the two groups.

When differential performance between two groups occurs on an item (i.e., a DIF index in the “low” or “high” categories, explained below), it may or may not be indicative of item bias. Course-taking patterns or differences in school curricula can lead to DIF, but for construct-relevant reasons. On the other hand, if subgroup differences in performance could be traced to differential experience (such as geographical living conditions or access to technology), the inclusion of such items should be reconsidered.

Computed DIF indices have a theoretical range from -1.0 to 1.0 for multiple-choice items. Dorans and Holland (1993) suggested that index values between -0.05 and 0.05 should be considered negligible. Dorans and Holland further stated that items with values between -0.10 and -0.05 or between 0.05 and 0.10 (i.e., “low” DIF) should be inspected to ensure that no possible effect is overlooked and that items with values outside the $[-0.10, 0.10]$ range (i.e., “high” DIF) are more unusual and should be examined very carefully. DIF procedures were limited to the subgroups listed above, which have sufficiently large sample sizes, in order to avoid inflation of type I error rates.

Results

Study results are summarized in the tables below. No items were flagged for high device type or accommodation type DIF for most tests. High DIF was only found in grade 5 mathematics in one multiple choice item favoring Chrome users over iOS and Mac users. Careful analysis of the item by content experts revealed no apparent reason for the differences; given the very small number of flagged items in all grades and subjects, it is likely that this difference is simply a result of chance. The small number of flagged items provides strong evidence that the test taking experiences of students using different CBT device types and using (or not using) different CBT accommodation tools are comparable, even when considered at the item level.



Table F-1. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—ELA: MC Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring Reference	Focal	Total	Favoring Reference	Focal
4	No Answermask	Answermask	MC	50	0	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	50	0	0	0	0	0	0
	No Guide	Guide	MC	50	0	0	0	0	0	0
	Chrome	iOS	MC	50	0	0	0	0	0	0
		Mac	MC	50	1	1	0	0	0	0
		Windows	MC	50	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	50	0	0	0	0	0	0
	No Sketch	Sketch	MC	50	0	0	0	0	0	0
5	No Answermask	Answermask	MC	50	0	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	50	0	0	0	0	0	0
	No Guide	Guide	MC	50	0	0	0	0	0	0
	Chrome	iOS	MC	50	0	0	0	0	0	0
		Mac	MC	50	1	1	0	0	0	0
		Windows	MC	50	0	0	0	0	0	0
	No References	References	MC	50	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	50	0	0	0	0	0	0
No Sketch	Sketch	MC	50	0	0	0	0	0	0	
6	No Answermask	Answermask	MC	57	0	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	57	0	0	0	0	0	0
	No Guide	Guide	MC	57	0	0	0	0	0	0
	Chrome	iOS	MC	57	1	0	1	0	0	0
		Mac	MC	57	0	0	0	0	0	0
		Windows	MC	57	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	57	0	0	0	0	0	0
	No Sketch	Sketch	MC	57	0	0	0	0	0	0
7	No Answermask	Answermask	MC	57	0	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	57	0	0	0	0	0	0
	No Guide	Guide	MC	57	0	0	0	0	0	0
	Chrome	iOS	MC	57	2	0	2	0	0	0
		Mac	MC	57	1	0	1	0	0	0
		Windows	MC	57	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	57	0	0	0	0	0	0
	No Sketch	Sketch	MC	57	0	0	0	0	0	0

continued



Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring Reference	Focal	Total	Favoring Reference	Focal
8	No Answermask	Answermask	MC	58	0	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	58	0	0	0	0	0	0
	No Guide	Guide	MC	58	0	0	0	0	0	0
	Chrome	iOS	MC	58	3	2	1	0	0	0
		Mac	MC	58	1	0	1	0	0	0
		Windows	MC	58	0	0	0	0	0	0
	No References	References	MC	58	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	58	0	0	0	0	0	0
	No Sketch	Sketch	MC	58	0	0	0	0	0	0

**Table F-2. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—
Mathematics: MC Items**

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring Reference	Focal	Total	Favoring Reference	Focal
4	No Answermask	Answermask	MC	50	0	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	50	0	0	0	0	0	0
	No Guide	Guide	MC	50	0	0	0	0	0	0
	Chrome	iOS	MC	50	1	0	1	0	0	0
		Mac	MC	50	1	0	1	0	0	0
		Windows	MC	50	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	50	0	0	0	0	0	0
	No Sketch	Sketch	MC	50	0	0	0	0	0	0
	5	No Answermask	Answermask	MC	50	0	0	0	0	0
Full Aspect		Wide Aspect	MC	50	1	1	0	0	0	0
No Guide		Guide	MC	50	0	0	0	0	0	0
Chrome		iOS	MC	50	2	0	2	1	1	0
		Mac	MC	50	1	1	0	1	1	0
		Windows	MC	50	1	0	1	0	0	0
Low Resolution		High Resolution	MC	50	1	0	1	0	0	0
No Sketch		Sketch	MC	50	0	0	0	0	0	0
6		No Answermask	Answermask	MC	47	0	0	0	0	0
	Full Aspect	Wide Aspect	MC	47	0	0	0	0	0	0
	No Calculator	Calculator	MC	47	0	0	0	0	0	0
	No Guide	Guide	MC	47	0	0	0	0	0	0

continued



Grade	Group Reference	Focal	Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”			
					Total	Favoring Reference	Focal	Total	Favoring Reference	Focal	
6	Chrome	iOS	MC	47	3	1	2	0	0	0	
		Mac	MC	47	3	3	0	0	0	0	
		Windows	MC	47	0	0	0	0	0	0	
	No References	References	MC	47	0	0	0	0	0	0	
		Low Resolution	High Resolution	MC	47	0	0	0	0	0	0
		No Sketch	Sketch	MC	47	0	0	0	0	0	0
7	No Answermask	Answermask	MC	47	0	0	0	0	0	0	
		Full Aspect	Wide Aspect	MC	47	0	0	0	0	0	0
		No Calculator	Calculator	MC	47	0	0	0	0	0	0
	No Guide	Guide	MC	47	0	0	0	0	0	0	
		Chrome	iOS	MC	47	3	0	3	0	0	0
			Mac	MC	47	1	1	0	0	0	0
	Windows		MC	47	0	0	0	0	0	0	
	No References	References	MC	47	0	0	0	0	0	0	
		Low Resolution	High Resolution	MC	47	0	0	0	0	0	0
		No Sketch	Sketch	MC	47	0	0	0	0	0	0
	8	No Answermask	Answermask	MC	47	0	0	0	0	0	0
			Full Aspect	Wide Aspect	MC	47	0	0	0	0	0
No Calculator			Calculator	MC	47	0	0	0	0	0	0
No Guide		Guide	MC	47	1	1	0	0	0	0	
		Chrome	iOS	MC	47	3	0	3	0	0	0
			Mac	MC	47	6	3	3	0	0	0
Windows			MC	47	0	0	0	0	0	0	
No References		References	MC	47	0	0	0	0	0	0	
		Low Resolution	High Resolution	MC	47	0	0	0	0	0	0
		No Sketch	Sketch	MC	47	0	0	0	0	0	0



Table F-3. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—Mathematics: TEI Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”			
	Reference	Focal			Total	Favoring		Total	Favoring		
						Reference	Focal		Reference	Focal	
6	No Answermask	Answermask	TE	3	0	0	0	0	0	0	
	Full Aspect	Wide Aspect	TE	3	0	0	0	0	0	0	
	No Calculator	Calculator	TE	3	0	0	0	0	0	0	
	No Guide	Guide	TE	3	0	0	0	0	0	0	
	Chrome	iOS	TE	3	0	0	0	0	0	0	0
		Mac	TE	3	0	0	0	0	0	0	0
		Windows	TE	3	0	0	0	0	0	0	0
	No References	References	TE	3	0	0	0	0	0	0	0
	Low Resolution	High Resolution	TE	3	0	0	0	0	0	0	0
No Sketch	Sketch	TE	3	0	0	0	0	0	0	0	
7	No Answermask	Answermask	TE	3	0	0	0	0	0	0	
	Full Aspect	Wide Aspect	TE	3	0	0	0	0	0	0	
	No Calculator	Calculator	TE	3	0	0	0	0	0	0	
	No Guide	Guide	TE	3	0	0	0	0	0	0	
	Chrome	iOS	TE	3	0	0	0	0	0	0	0
		Mac	TE	3	0	0	0	0	0	0	0
		Windows	TE	3	0	0	0	0	0	0	0
	No References	References	TE	3	0	0	0	0	0	0	0
	Low Resolution	High Resolution	TE	3	0	0	0	0	0	0	0
No Sketch	Sketch	TE	3	0	0	0	0	0	0	0	
8	No Answermask	Answermask	TE	3	0	0	0	0	0	0	
	Full Aspect	Wide Aspect	TE	3	0	0	0	0	0	0	
	No Calculator	Calculator	TE	3	0	0	0	0	0	0	
	No Guide	Guide	TE	3	0	0	0	0	0	0	
	Chrome	iOS	TE	3	0	0	0	0	0	0	0
		Mac	TE	3	0	0	0	0	0	0	0
		Windows	TE	3	0	0	0	0	0	0	0
	No References	References	TE	3	0	0	0	0	0	0	0
	Low Resolution	High Resolution	TE	3	0	0	0	0	0	0	0
No Sketch	Sketch	TE	3	0	0	0	0	0	0	0	



Table F-4. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—Science: MC Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”			
	Reference	Focal			Total	Favoring		Total	Favoring		
						Reference	Focal		Reference	Focal	
5	No Answermask	Answermask	MC	45	0	0	0	0	0	0	
	Full Aspect	Wide Aspect	MC	45	0	0	0	0	0	0	
	No Guide	Guide	MC	45	0	0	0	0	0	0	
	Chrome	iOS	MC	45	0	0	0	0	0	0	0
		Mac	MC	45	1	1	0	0	0	0	0
		Windows	MC	45	0	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	45	0	0	0	0	0	0	0
	No Sketch	Sketch	MC	45	0	0	0	0	0	0	0
8	No Answermask	Answermask	MC	42	0	0	0	0	0	0	
	Full Aspect	Wide Aspect	MC	42	0	0	0	0	0	0	
	No Calculator	Calculator	MC	42	0	0	0	0	0	0	
	No Guide	Guide	MC	42	0	0	0	0	0	0	
	Chrome	iOS	MC	42	3	2	1	0	0	0	0
		Mac	MC	42	1	0	1	0	0	0	0
		Windows	MC	42	0	0	0	0	0	0	0
	Low Resolution	High Resolution	MC	42	0	0	0	0	0	0	0
No Sketch	Sketch	MC	42	0	0	0	0	0	0	0	
11	No Answermask	Answermask	MC	58	0	0	0	0	0	0	
	Full Aspect	Wide Aspect	MC	58	0	0	0	0	0	0	
	No Calculator	Calculator	MC	58	0	0	0	0	0	0	
	No Guide	Guide	MC	58	6	1	5	0	0	0	
	Chrome	iOS	MC	58	4	2	2	0	0	0	0
		Mac	MC	58	0	0	0	0	0	0	0
		Windows	MC	58	0	0	0	0	0	0	0
	No References	References	MC	58	1	0	1	0	0	0	
	Low Resolution	High Resolution	MC	58	0	0	0	0	0	0	0
No Sketch	Sketch	MC	58	0	0	0	0	0	0	0	



Table F-5. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—Science: TEI Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
8	No Answermask	Answermask	TE	3	0	0	0	0	0	0
	Full Aspect	Wide Aspect	TE	3	0	0	0	0	0	0
	No Calculator	Calculator	TE	3	0	0	0	0	0	0
	No Guide	Guide	TE	3	0	0	0	0	0	0
		iOS	TE	3	0	0	0	0	0	0
	Chrome	Mac	TE	3	0	0	0	0	0	0
		Windows	TE	3	0	0	0	0	0	0
	Low Resolution	High Resolution	TE	3	0	0	0	0	0	0
	No Sketch	Sketch	TE	3	0	0	0	0	0	0
11	No Answermask	Answermask	TE	2	0	0	0	0	0	0
	Full Aspect	Wide Aspect	TE	2	0	0	0	0	0	0
	No Calculator	Calculator	TE	2	0	0	0	0	0	0
	No Guide	Guide	TE	2	0	0	0	0	0	0
		iOS	TE	2	0	0	0	0	0	0
	Chrome	Mac	TE	2	0	0	0	0	0	0
		Windows	TE	2	0	0	0	0	0	0
	Low Resolution	High Resolution	TE	2	0	0	0	0	0	0
	No Sketch	Sketch	TE	2	0	0	0	0	0	0



APPENDIX G
TEST ACCOMMODATIONS



OKLAHOMA SCHOOL TESTING PROGRAM (OSTP)

ACCOMMODATIONS *for* STUDENTS
with an INDIVIDUALIZED EDUCATION
PROGRAM (IEP) *or* SECTION 504 PLAN



OKLAHOMA
Education

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Definition & Purpose of Oklahoma School Testing Program (OSTP)

Accommodations

A test accommodation is a change in the way a test is administered or in the way a student responds to test questions. Similar to instructional accommodations, test accommodations are intended to offset the effects of a student's disability and to provide him/her with the opportunity to demonstrate knowledge and skills on statewide assessments.

Eligibility for Accommodations

OSTP Grades 3-8 & Grade 11 CCRA: Science & U.S. History Content Accommodations

The right of a student with a disability to receive allowable accommodations on statewide assessments is protected by both federal and state laws. The student's current Individualized Education Program/Section 504 Plan must specify precisely which test accommodation(s) they will receive. In cases where an IEP/504 Plan is under development, the school personnel responsible for writing the plan must have already met and agreed upon the necessary accommodation(s) before a student may be provided the accommodation(s).

A student who does not have a documented disability or is not served by a current IEP/504 Plan is not eligible to receive accommodations on statewide assessments, **except** for Emergency Accommodation situations. Scribes may be provided for any student (with or without an IEP or Section 504 Plan) who has a short-term medical condition that affects his/her physical dexterity which impedes his/her ability to respond to the assessment format.

OSTP Accommodations for Students with an IEP or 504 Plan

Snapshot of Accommodation Class/Activity Category for Math listed in the Statewide IEP system EDPlan	
<input type="checkbox"/> P3. Use of assistive technology (AT) devices or supports.	<input type="checkbox"/> Provide study carrel for independent work.
<input type="checkbox"/> P4a. Text-to-Speech built into online testing client (Math, Science, U.S. History, Grade 5 & 8 ELA writing sections only).	<input type="checkbox"/> Provide Calculator.
<input type="checkbox"/> P4b. Human Reader (Math, Science, U.S. History, Grade 5 & 8 ELA writing sections only).	<input type="checkbox"/> Provide frequent feedback.
<input type="checkbox"/> P4c. Sign Language Interpretation (Math, Science, U.S. History, Grade 5 & 8 ELA writing sections only).	<input type="checkbox"/> Provide immediate feedback.
<input type="checkbox"/> P5. Use of Secure Braille Note-taker.	<input type="checkbox"/> Allow minimal auditory distractions.
<input type="checkbox"/> P6. Simplification/repetition/signage of directions.	<input type="checkbox"/> Encourage classroom participation.
<input type="checkbox"/> P7. Turn off Universal Tools/Accessibility Features.	<input type="checkbox"/> Provide peer tutoring/paired-working arrangement.
<input type="checkbox"/> P8. Use of an Abacus.	<input type="checkbox"/> Allow student to dictate themes, information, answers on tape or to ot
<input type="checkbox"/> P9. Use a calculator on Grades 3-5 Mathematics.	<input type="checkbox"/> Allow time to verbalize and/or respond to class objectives.
<input type="checkbox"/> R1. Student marks answers in test book and not on an answer document, for later transfer by a Test Administrator to an answer document.	<input type="checkbox"/> Explain directions in detail as needed.

Protocol for Emergency Accommodations on State Assessments

If, prior to or during testing, the school principal (or designee) determines that a student requires an emergency accommodation (e.g., broken hand), [Form EA](#) must be completed and submitted to the District Test Coordinator (DTC) for approval. A copy of this form must be filed in the testing archives, and a copy must be retained by the DTC at the central office.

SAT/ACT Accommodations

All students enrolled in the 11th grade will participate in the College- and Career-Readiness Assessment (CCRA), which includes either the SAT or ACT plus writing, **except** students participating in the Oklahoma Alternate Assessment Program (OAAP).

Both SAT and ACT determine their own allowable accommodations and require an approval process. SAT and ACT consider accommodation requests on an individual basis based upon a documented need. Accommodation needs and requests must be based off documented student characteristics, classroom/instructional supports, and accessibility needs. Accommodation needs should be addressed during the development of the student's IEP/504 Plan or through an amendment process as necessary.

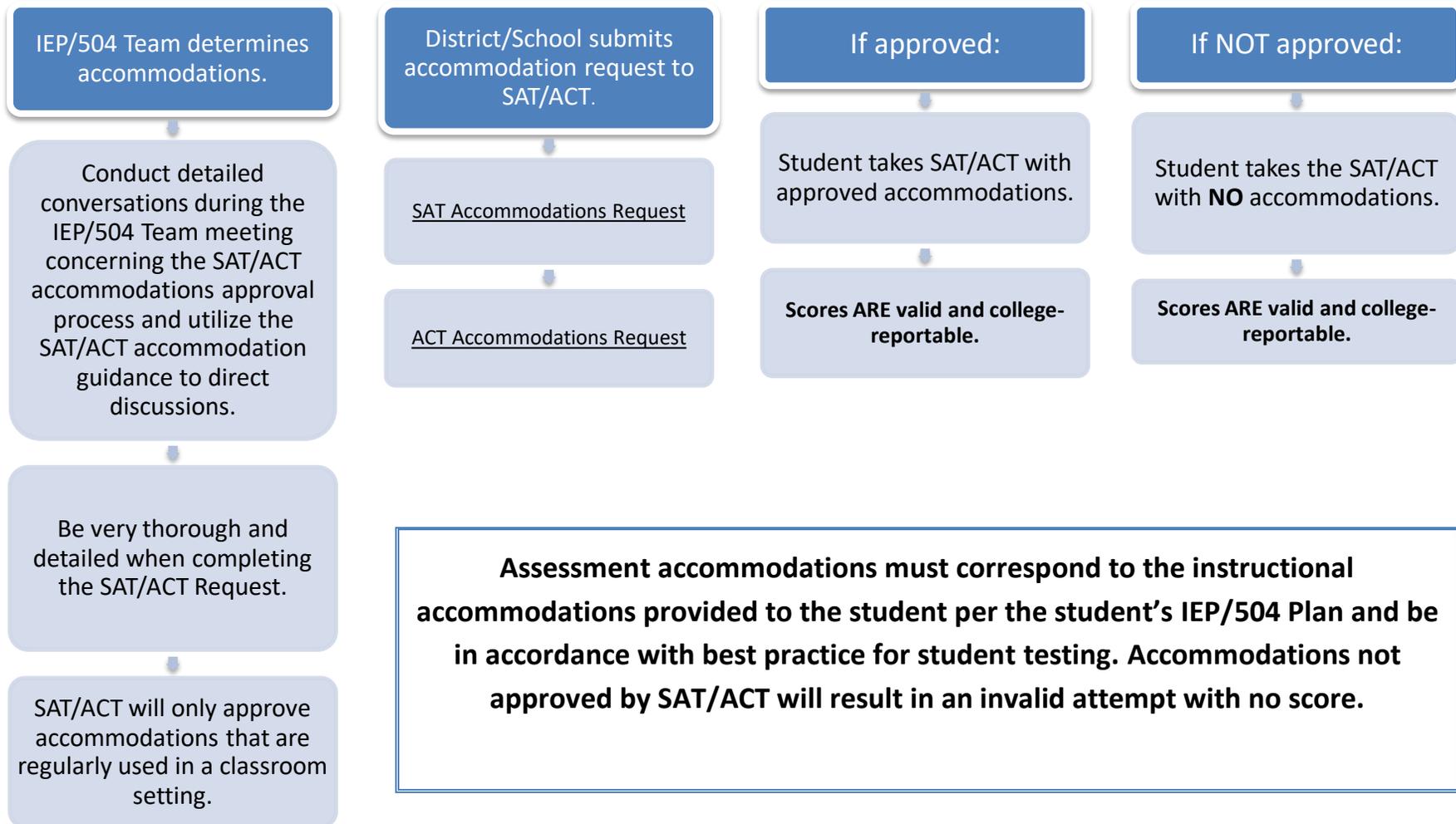
Accommodation requests must be submitted to SAT or ACT during the designated window and approved before a student can be provided their SAT or ACT specific accommodations. Assessment accommodations requested on behalf of the student must be regularly used in classroom instruction and documented in the student's IEP/504 Plan. Accommodations not approved by SAT/ACT will result in an invalid attempt with no score.

For more information visit:

- [SAT Accommodations](#)
- [ACT Accommodations](#)
- [OSTP Accommodations, Section IV](#)
- The District Test Coordinator at your local school district

Assessment accommodations must correspond to the instructional accommodations described and provided to the student per the student's IEP/504 Plan and be in accordance with best practices for student testing.

SAT/ACT Accommodation(s) Request Process



Definition of Standard and Nonstandard OSTP Accommodations

For the purposes of the OSTP, a **standard accommodation** is defined as a change in the routine conditions under which students take OSTP tests that does not alter what the test is intended to measure. Standard accommodations are grouped into the following four categories:

- Setting: for example, administering the test in a small group or a separate setting
- Timing or scheduling of the test: for example, administering the test in short intervals or at a specific time of day
- Presentation: for example, using a large-print or Braille edition of the test
- Response: for example, dictating responses to a scribe

For the purposes of the OSTP, a **nonstandard accommodation** is defined as an accommodation that is needed for the student to access the assessment but not included on the allowable list of accommodations and requires OSDE approval for use on OSTP assessments.

General Requirements for the Use of Standard and Nonstandard Accommodations

All accommodations require adherence to test security protocols, including the presence of both a Test Administrator and a Test Proctor during periods requiring access to secure testing materials (e.g., human read-aloud). IEP/504 teams determine annually which accommodations will be needed and update the IEP/504 Plan accordingly. If the IEP/504 team believes that an OSTP accommodation listed in the student's IEP/504 Plan should be removed because it is no longer necessary or appropriate for the student, the team must amend the IEP/504 Plan accordingly prior to testing.

If a **nonstandard accommodation** will be provided, the student must meet all of the eligibility criteria for that accommodation, and a Nonstandard Accommodation Application must have been:

- 1) submitted by the DTC through the Nonstandard Accommodation Application on the [Single Sign-On](#) website,
- 2) approved by the OSDE before the accommodation may be used.

The use of accommodations is based on the individual needs of a student with a disability and may only be provided when **ALL** of the following conditions have been met:

- 1) The student's IEP/504 Plan accurately reflects accessibility needs related to the student's medical or health diagnosis/diagnoses or, in the case of an IEP, areas of need in specific academic content area(s).
- 2) The student uses the **accommodation routinely** (with rare exceptions) during classroom instruction and assessment in the subject, both before and after the OSTP assessment is administered.

However, use of a **nonstandard accommodation** during instruction does not necessarily qualify a student to receive the same nonstandard accommodation during OSTP testing; the student must meet additional eligibility requirements to receive a nonstandard accommodation on an OSTP assessment.

- 3) The accommodation is documented on both the State/District Accommodation and Class/Activity Accommodation sections of the student's current IEP/504 Plan.
- 4) The student requires the accommodation in order to participate in OSTP testing.
- 5) The accommodation is listed as a current accommodation in this appendix (or, prior to testing, the district or school has consulted with the OSDE and received permission to use a unique accommodation not included in this appendix).

Accommodations **may not:**

- 1) Alter, explain, simplify, paraphrase, or eliminate any test question, reading passage, writing prompt, or multiple-choice answer option;
- 2) Provide verbal or other clues or suggestions that hint at or give away the correct response to the student;
- 3) Contradict test administration requirements or result in the violation of test security; for example,
 - Test questions may not be modified, reordered, or reformatted in any way for any student;
 - Tests may not be photocopied, enlarged, altered, or duplicated;
 - English-language dictionaries are not allowed for any student on any test.

If the above five conditions have been met and the IEP/504 team determines an accommodation is necessary, then it must be provided to the student during OSTP testing. If an accommodation is provided that does not meet the conditions stated above, the student’s test score may be invalidated. If a student refuses an accommodation listed in his/her plan, the accommodation must be offered and remain available to the student during testing. The school may want to document in writing that the student refused the accommodation and keep this documentation on file at the school. Students should never be asked to sign an agreement waiving their right to receive an accommodation. Accommodations used by the student must be indicated on the student’s answer booklet and/or personal information profile (online)

Test Formatting Options	Paper 	Online 
Grade 3 8, OSTP ELA & Math Grades 5 & 8, OSTP Science Grade 11, CCRA: Science & U.S. History Content	X*	X
Braille Tests	X*	
Large Print tests may be provided in paper format for Online tests.	X*	

*These test formats are **only** available for students with an accommodation that has been appropriately documented in their IEP/504 Plan.

Paper & Pencil Test Formats

IEP/504 teams are encouraged to provide students with disabilities the same test formats provided to their non-disabled peers based on the test formatting options listed above. IEP/504 teams should base their decision upon individualized, objective evidence to determine whether or not a student is able to access a computer-based (online) test. Students unable to access an OSTP computer-based test must also be unable to receive computer-based classroom assessments, benchmark assessments, and districtwide assessments.

Consequently, a student on an IEP/504 Plan does not automatically receive paper & pencil test formats. Blanket policies predetermining specific accommodations for students with disabilities are not in accordance with the Individuals with Disabilities Education Act (IDEA) and Section 504 of the Rehabilitation Act of 1973. The SDE has developed a [Paper Testing Checklist](#) to assist IEP/504 teams in determining if paper & pencil testing is appropriate for students.

OSTP Accommodations for Students with an IEP or 504 Plan

OSTP Accommodations (See Section IV for SAT/ACT ELA & Math)

I. Setting/Timing/Schedule	Procedures & Guidance
S1. Individual testing	
S2. Small group testing (8-10 maximum)	<p>This accommodation is intended to reduce student distractions and may be required for certain accommodations. Students must be actively monitored and may use a testing carrel or test in a special education resource room or other location that maintains test security.</p> <p>Students should be tested with their non-disabled peers to the greatest extent possible.</p>
S3. Preferential seating	
S4. Separate location (No limit on number of students)	<p>This accommodation is intended to reduce student distractions. Students may use a testing carrel, or test in a special education resource room or other location that maintains test security.</p>
S5. Provide special lighting	Specify type (e.g., 75-Watt incandescent, light box, etc.)
S6. Provide adaptive or special furniture	Students may need accommodations to provide better access (e.g., slant board, stander, etc.)
T1. Flexible schedule same day Student test book(s) must be secured between sessions.	<p>Students are scheduled to allow for the best conditions/timing for their performance, and/or may be allowed to take the test during more than one sitting during a single day. Students are not allowed to study for or discuss tests between sessions. This is not intended for lunch or recess breaks.</p> <p>(S4) must be selected for this accommodation.</p>
T2. Administer test over several sessions or “chunking” (except writing tasks/sections) Student test book(s) must be secured between sessions.	<p>The test may be separated into smaller sections and administered over several days within the state testing window. Student may only work in one separated section at a time and may not go to previous sections or work ahead.</p> <p>(S4) must be selected for this accommodation.</p>

**OSTP Accommodations for
Students with an IEP or 504 Plan**

<p>T3. Allow frequent breaks during one test session (maximum 10-15 minute duration)</p> <p>Student test book(s) must be secured during the breaks.</p>	<p>Students must be monitored during breaks and may not study for or discuss the test during these breaks or view/change previously answered questions after a break.</p> <p>This accommodation is not intended for lunch or recess breaks—students must complete a Section before being dismissed.</p>
<p>II. Presentation</p>	<p>Procedures & Guidance</p>
<p>P1. Alternate Formats</p> <ul style="list-style-type: none"> a. Large-Print Version (Instructions provided within kit.) b. Contracted Braille Version (Instructions provided within kits) c. Large-print through Online Testing Client (Vector-based Magnification) 	<p>The Test Administrator must transcribe student answers verbatim into the standard answer document/test book that was provided in the large-print (paper/pencil) or Braille kit.</p> <p>Braille test formats will be provided on paper using contracted Braille and Nemeth code for numbers and formulas.</p> <p>Large print formats may be configured in the online testing client for certain assessments.</p>
<p>P2. Reverse Color Contrast</p>	<p>Students who have a visual impairment may require this to access the computer screen. This accommodation option must be selected in the online testing client student profile.</p>
<p>P3. Use of assistive technology (AT) devices or supports (e.g., color overlays, magnifier, pencil grips, auditory amplification devices, noise buffers, wedge for positioning, and multiplication table/chart)</p>	<p>The specific device or support should be specified in the IEP/504 Plan, be routinely used by the student, and not alter the construct being measured.</p> <p>(S1, S2, or S4) may be appropriate for this accommodation as some AT devices may be distracting to other students.</p>
<p>P4. Text-to-Speech, Human Reader, or Sign Language Interpretation</p> <p>*P4 applies to all Math, Science, and U.S. History test sections and Grades 5 & 8 ELA writing/extended constructed response sections only</p> <ul style="list-style-type: none"> a. Text-to-Speech is built into the online testing client, requires the use of earphones, and may be administered in individual, small group, or regular setting. (All Math, Science, U.S. History tests, and Grades 5 & 8 ELA Section 3 only.) b. Human Reader reads test directions, test items, and answer choices. This is limited to small group or individualized testing. 	<p><u>Online tests</u> have built in Text-to-Speech functionality. Earphones are required. Students may test with nondisabled peers. Please note: The Text-to-Speech functionality must be checked in the online platform before a student logs into the system and starts a test.</p> <p>For online tests, if a Human Reader is required for a student, then the test must be read from the computer screen verbatim. (S1 or S2) is required when utilizing a Human Reader for Online tests.</p> <p><u>For paper tests, tests (test forms must be the same) are read by a Human Reader.</u> Test Administrator uses separate test booklet or reads over a student’s shoulder. Small group testing (S1 or S2: 8-10 maximum) is required and test forms must be the same.</p>

OSTP Accommodations for Students with an IEP or 504 Plan

<p>c. Sign Language Interpretation may be accomplished by using a separate test booklet in a separate location.</p> <p><u>For additional information, please refer to the Protocol for Human Readers.</u></p>	<p>Students may request items be read more than once.</p>
<p>P5. Use of Secure Braille Note-taker (students with a visual impairment)</p>	<p>An electronic note-taker, which may have a Braille or QWERTY-type keyboard, is an adaptive device similar to a PDA. This device may have built-in speech output and/or a refreshable Braille display.</p> <p>(S1 or S2) must be selected for this accommodation.</p>
<p>P6. Simplification/repetition/signage of directions</p>	<p>Student may ask for clarification, simplification, signage of directions. This does not include test questions or answer choices. Students may have directions reread for each page of questions.</p>
<p>P7. Turn off Universal Tools/Accessibility Features</p>	<p>Disable any tools that may be distracting to a student, tools a student does not need to use, or tools a student may be unable to use.</p>
<p>P8. Use of an abacus</p>	<p>Students who have a visual impairment/blindness or access mathematical calculations tactilely may use an abacus.</p>
<p>P9. Use of a calculator on Grades 3–5 Mathematics</p> <p><u>For additional information, please refer to the OSTP Calculator Policy.</u></p>	<p>Only basic four-function calculators with square root and percent are allowed.</p> <p>Calculators must be provided to students and are not integrated within the online testing interface.</p>
<p>P10. Provide cues (arrows, stop signs) on answer form</p>	<p>This applies to Paper Only tests. Cues may not clue a student to a correct or incorrect answer.</p>
<p>P11. Use masking or templates to reduce the amount of visible print</p>	<p>Masking involves blocking off content that is distracting to the student. Students are able to focus their attention on a specific part of a test item by masking. This feature is built into the online testing client.</p>
<p>P12. Secure paper to work area with tape or magnets</p>	<p>This applies to Paper Only tests. Please be cautious when adhering tape to the test booklet or answer document by avoiding the tracking marks (black bars) for the scoring process.</p>
<p>P13. Student may read the test aloud or sign the test to himself or herself.</p>	<p>This requires individual testing (even if student is reading aloud quietly).</p> <p>(S1) must be selected for this accommodation.</p>
<p>P14. Placeholders, templates, or markers to maintain place</p>	<p>This applies to Paper Only tests.</p>
<p>P15. Audio Calculator</p>	<p>This requires earphones for group testing. A non-embedded calculator for students needing a special</p>

	calculator, such as a Braille calculator or a talking
<p>P16. Paper & Pencil Test</p> <p><u>For additional information, please refer to the Paper & Test Formats section of this manual.</u></p>	<p>Students unable to access an OSTP computer-based test must also receive classroom assessments, benchmark assessments, and districtwide assessments in this manner.</p> <p>A student on an IEP/504 Plan does not automatically receive a paper & pencil test format.</p>
<p>III. Response</p>	<p>Procedures & Guidance</p>
<p> </p>	
<p>R2. Human Scribe ELA, Mathematics, Science, U.S. History:</p> <ol style="list-style-type: none"> a. Student dictates response to a scribe who records responses on an answer document or through the Online Testing Client by Test Administrator or Proctor. b. Student signs response to a scribe who records responses on an answer document or through the Online Testing Client by Test Administrator or Proctor. c. Student tapes or records response for a writing portion of the test for verbatim transcription by Test Administrator or Proctor. <p><u>For additional information, please refer to the Procedures for Scribing Student Responses section of this manual.</u></p>	<p>A scribe is a Test Administrator or Proctor who writes down what a student dictates by speech, or through an assistive technology communication device.</p> <p>Students who have documented significant motor or processing difficulties that make it difficult to produce responses may need to dictate their responses to a human, who then records the students' responses verbatim. The use of this support may result in the student needing additional overall time to complete the assessment.</p> <p>The guiding principle in scribing is to assist the student in accessing the test and responding to it. (S1) must be selected for this accommodation.</p>
<p> </p> <hr/> <hr/> <hr/>	

	The electronic responses or recordings must be destroyed or erased by District Test Coordinator. (S1 or S2) must be selected for this accommodation.
R4. Test Administrator monitors placement of student responses on the answer document or the online testing client.	Test Administrator may redirect students. Students may not be directed to correct or incorrect answers in any way.
R5. Braille/Secure, Braille Note-taker/Abacus (students with a visual impairment)	The Test Administrator must transcribe answers verbatim into the standard answer document/test book that was provided in the large-print (paper/pencil) or Braille kit. (S1, S2, or S4) must be selected for this accommodation.

IV. SAT/ACT ELA & Math

The SAT/ACT accommodations provided below represent typical or common accommodation(s) requests that are appropriate to produce valid, college-reportable scores. Please utilize this list as a starting point as both College Board and ACT consider requests for utilization of accommodations on a case-by-case basis.

For more information, please see the following links: [SAT Accommodations](#) | [ACT Accommodations](#)

SAT (ELA/Math)	ACT (ELA/Math)
Timing/Setting	
<ul style="list-style-type: none"> • Extended time • Extra Breaks • Late Start • Limited timed testing • Home/Hospital Setting • Other Modified Setting • Use of concentration aids • Preferential Sating • Small Group • One-to-One • Alternate location 	<ul style="list-style-type: none"> • Extra time • Breaks • Multiple Days • Food or Medication • Special Seating/Grouping • Location for Movement • Individual Administration • Administration at Optimum Time of Day • Administration from Home or Care Facility • Audio Amplification • Special Lighting • Adaptive Equipment or Furniture • Wheelchair Accessible Room • Personalized Auditory/Visual Notification of Remaining Time
Presentation	
<ul style="list-style-type: none"> • Text-to-Speech (screen reader, text-to-speech on Reading assessment, etc.) • Read Aloud • Auditory amplification devices • Braille • Large Print • Magnification/Color Contrast • Braille writer • Use of four-function calculator • Audio test forms • Abacus 	<ul style="list-style-type: none"> • Text-to-Speech (screen reader, text-to-speech on Reading assessment, etc.) • Read Aloud • Unified English Braille (UEB) • Large Print • Browser Zoom Magnification or Magnification • Line Reader • Talking Calculator • Color Contrast (Online or Overlay) • Abacus
Response	
<ul style="list-style-type: none"> • Assistive technology (e.g., switches, alternative keyboard, eye-gaze motion sensors, voice recognition, head or mouth pointer, specialized trackballs or mice) • Dictate Responses • Scribe • Speech-to-text 	<ul style="list-style-type: none"> • Respond in Test Booklet or on Separate Paper • Large Block Answer Sheet • Dictate Responses • Computer for Writing Essays and Constructed Responses • Speech-to-Text

OSTP Accommodations for Students with an IEP or 504 Plan

Requirements for the Use of Nonstandard Accommodations

IEP and 504 teams may request the use of one or more of the following OSTP nonstandard accommodations (ELA Read-Aloud or Unique Accommodation) only when all of the criteria are met, as described within [OSTP Nonstandard Accommodations table](#). For a **nonstandard accommodation** to be provided, the student must meet all of the eligibility criteria for that accommodation, and a Nonstandard Accommodation Application must have been:

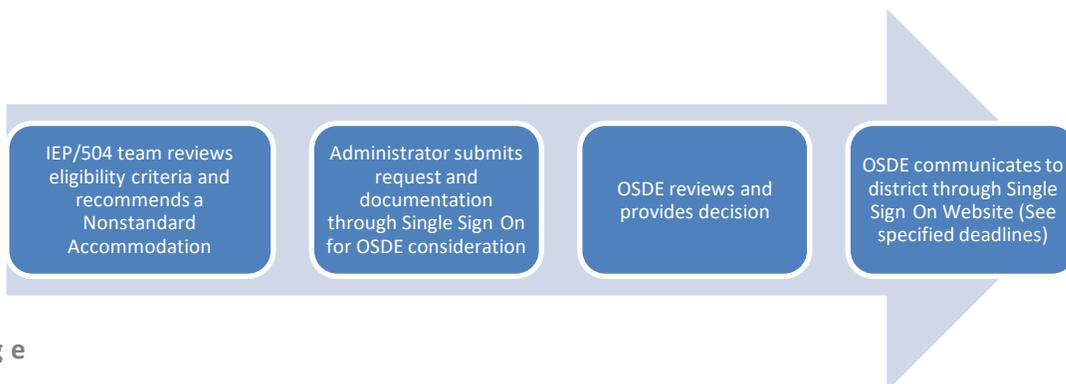
- 1) submitted by the DTC through the Nonstandard Accommodation Application on the [Single Sign-On](#) website,
- 2) approved by the OSDE before the accommodation may be used.

The decision to use a nonstandard accommodation is recommended by the IEP/504 team based on the nonstandard accommodation eligibility criteria. Nonstandard accommodations for use on OSTP assessments must be approved annually by the OSDE. The nonstandard accommodation can only be provided to a student with a disability on an OSTP assessments when it is documented in student's IEP/504 Plan under both the State/District Accommodations and Class/Activity Accommodation sections. The use of a nonstandard accommodation during instruction does not necessarily qualify a student to receive the same nonstandard accommodation on an OSTP assessment.

The **ELA Test Read-Aloud accommodation (NS1)** request for grades 3-8 may only be submitted when all three prongs of the eligibility requirements are met as described on within the [OSTP Nonstandard Accommodations table](#). The [OSTP ELA Test Read-Aloud Protocol](#) will be used by the IEP/504 team to document all three prongs, including submission of any documents or evaluations to the OSDE. The protocol must be submitted through the Nonstandard Accommodation Application on the [Single Sign-On](#) website for consideration by the OSDE.

A **Unique Accommodation (NS2)** is an accommodation that requires changes or alterations to the test materials/booklet or media presentation. The unique accommodation must be one that is regularly used by the student for classroom instruction, must be on the student's IEP/504 Plan, and must not alter the underlying content of the assessment. The unique accommodation request must be submitted through the Nonstandard Accommodation Application on the [Single Sign-On](#) website for consideration by the OSDE. Please refer to [NS2 section](#) of the OSTP Nonstandard Accommodations table, [Form U](#), and the [Overview: Non-Standard Accommodations](#) webpage for specific requirements.

IEP and 504 teams are encouraged to make consistent, defensible, and appropriate decisions for each student, and to amend the IEPs and 504 Plans of students who do not meet the nonstandard accommodation eligibility criteria. The OSDE will continue to review the number of students with disabilities who receive nonstandard accommodations in each district. Nonstandard accommodation requests must be approved by the OSDE before a student may use the accommodation on a state assessment. The use of a nonstandard accommodation on the OSTP without OSDE approval may result in a testing invalidation. Please do not submit a request if the student does not meet the specific eligibility criteria listed within the [OSTP Nonstandard Accommodations table](#).



OSTP Accommodations for Students with an IEP or 504 Plan

OSTP Nonstandard Accommodations

Nonstandard Accommodation	Eligibility Requirements
<p>NS1. ELA Read-Aloud (Grades 3-8)</p> <p>Text-to-Speech, Human Reader, or Sign Language Interpretation Accommodation for the OSTP English Language Arts Assessments.</p> <ol style="list-style-type: none"> Text-to-Speech is built into the online testing client, requires the use of earphones, and may be administered in individual, small group, or regular setting for Grades 3, 4, 6, & 7. Text-to-Speech is available on the Writing Section only of ELA Grades 5 & 8. Students requiring the Read-Aloud Accommodation for all sections of ELA Grades 5 & 8 must have a Human Reader for Sections 1 & 2. A Human Reader reads test directions, test items, and answer choices. This is limited to small group or individualized testing Sign Language Interpretation may be accomplished by using a separate test booklet. <p>Test directions, test items, and answer choices must be read verbatim. Students may request items be read more than once.</p> <p><u>Due Date for Requests:</u></p> <p>Requests must be submitted to the OSDE through the Nonstandard Accommodation Application on the Single Sign-On website by February 1st for the Spring testing window and responses will be provided on a case-by-case basis no later than March 15th.</p>	<p>This accommodation must be determined by the following 3-pronged approach:</p> <ol style="list-style-type: none"> The student has a specific disability that severely limits or prevents him/her from decoding printed text at any level of difficulty, even after varied and repeated attempts to teach the student to do so (i.e., the student is a non-reader, not simply reading below grade level); and The student can only access printed materials through a screen reader (assistive technology) or Human Reader, and/or is provided with spoken text on audiotape, CD, video, or other electronic format during routine instruction (includes Sign Language Interpretation), except while the student is actually being taught to decode; and The IEP/504 team will utilize and provide the required documentation from the OSTP ELA Test Read-Aloud Protocol, which includes the use of the Protocol for Accommodations in Reading (PAR) or the AEM Navigator for deaf or blind students. This documentation must be uploaded into the Nonstandard Accommodation Application in the Single Sign-On website for consideration by the OSDE. <p><u>Paper tests</u> are read by a Human Reader. (S1 or S2) is required, and test forms must be the same.</p> <p><u>Online tests:</u> If a Human Reader is utilized, they must read the assessment verbatim from the computer screen. (S1, S2, or S4) is required.</p> <p>The request will be submitted annually through the Nonstandard Accommodation Application in the Single Sign-On website.</p>

OSTP Accommodations for Students with an IEP or 504 Plan

<p>NS2. Unique Accommodations (Grades 3-8 ELA/Math/Science and Grade 11 Science & US History)</p> <p>Students with disabilities who have IEPs/504 plans are eligible for consideration for unique accommodations on state assessments (e.g., allow projection of test for students receiving the Sign Language Interpretation accommodation in small groups, manipulatives, special devices, etc.).</p> <p>A unique accommodation is an accommodation that requires changes or alterations to the test materials/ booklet or media presentation.</p> <p>The unique accommodation must be one that is regularly used by the student for classroom instruction, must be on the student’s IEP, and must not alter the underlying content of the assessment.</p>	<p>A request may be made (pursuant to the IEP/504 team’s determination) for a unique accommodation utilizing Form U for a student with a disability on any specified subject area(s) of the OSTP.</p> <p>The Form U must be submitted:</p> <ul style="list-style-type: none"> • Due to the student’s need for an accommodation that would enable the student to access the state assessment. • Through the Nonstandard Accommodation Application in the Single Sign-on Website. • With completed student information and any other requested information. <p>The requested accommodation must not impact the reliability or validity of the test, and the request may not exempt a student from taking any portion of the OSTP test(s).</p>
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Calculator Policy

The items on the Grades 6-8 Math, Grade 8 Science, and Grade 11 CCRA: Science Content assessments are designed so that all tasks can be solved without the use of a calculator. However, certain tasks are more difficult if a calculator is not available. More information regarding calculator use can be found in the [OSTP Calculator Policy](#). For SAT/ACT calculator requirements, please see [SAT Calculator Policy](#) or [ACT Calculator Policy](#).

Before the first day of the test, students using a calculator for any Math and Science assessment should be familiar with the use of the specific calculator that can be utilized. Students should be consistently instructed throughout the school year in the use of calculators; otherwise, it may hinder students’ performance on the assessment.

Protocol for Human Readers

A Test Administrator (Human Reader) who provides the verbatim reading accommodation to a student must comply with the following procedures when working with a student in a testing situation:

- Human Reader: A state-certified educator who reads orally to a student.
- All Human Readers must receive Test Administrator training by the local district, and the district must retain documentation, which may be requested by the OSDE at any time.
- **A test proctor who is employed by the school district is required.** Small group (8-10 maximum) or individual testing required.
- Human Readers must sign the Test Administrator Test Security Form.
- Human Readers must read from the computer screen for online test formats or from a separate test booklet or over the student’s shoulder for paper/pencil formats (log test booklet serial number on NDA)
- Only students receiving the Human Reader accommodation and taking the same grade-level subject area test may be tested together in the same location.
- If students are taking a paper test, the students grouped together must have the **same paper test form.**

Verbatim Read-Aloud Procedures for Human Reader Accommodators

To ensure uniformity in presentation of standardized tests in Oklahoma, **built-in Text-to-Speech software on the secure online testing client** should be used whenever possible.

Human Readers must follow the procedures outlined below:

1. Human Readers must read, verbatim (word-for-word), only the words in the test book or on the computer screen, without changing or adding words, or otherwise assisting the test-taker in any way to influence the test taker’s selection of a response.
2. Human Readers must speak in a clear and consistent voice throughout the test administration, using correct pronunciation.
3. Human Readers may not clarify, elaborate, or provide assistance to students.
4. Human Readers must give special emphasis only to words printed in **boldface**, *italics*, or CAPITALS and tell the test-taker that the words are printed in that way. No other emphasis or special vocal inflection is permissible. Readers should use even inflection so that the student does not receive any cues by the way the information is read.
5. Human Readers must be patient and understand that the test-taker may need to have test items repeated several times.
6. Human Readers must not attempt to solve problems or determine the correct answer to an item while reading as this may result in an unconscious pause or change in inflection which could be misleading to the test-taker.
7. Human Readers must maintain a neutral facial expression and must not smile or frown which may be interpreted by the test-taker as approval or disapproval of the student’s answers.

8. Human Readers must recognize that test-takers who are blind or who have low vision may also have additional special tools or equipment (e.g., abacus, braille, slate, stylus) that have been approved for use during the test.
9. Human Readers must be familiar with the student's IEP/504 Plan and know in advance the exact type of verbatim reading accommodation required by the student. The test-taker may require all or portions of the test to be read aloud, depending on his or her particular set of accommodations.
10. If a Human Reader finds an unfamiliar word or one that he or she is not sure how to pronounce, advise the test-taker of the uncertainty about the word and spell the word.
11. When reading a word that is pronounced like another word with a different spelling, if there is any doubt about which word is intended, readers must spell the word after pronouncing it.
12. Human Readers must spell any words requested by the test-taker.
13. When reading passages, readers must be alert to all punctuation marks. Human Readers may read the passage through once so that the test-taker can grasp the content of the passage. Some test-takers may ask for the passage to be read through a second time with punctuation marks indicated. When required or asked to read with punctuation, read the specific lines within a passage and indicate all punctuation found within those lines.
14. When test items refer to particular lines of a passage, reread the lines before reading the question and answer choices. For example, a Human Reader might say, "Question X refers to the following lines..." Reading the lines referred to would then be followed by reading question X and its response options.
15. When reading selected response items, readers must be particularly careful to give equal stress to each response option and to read all of them before waiting for a response. The test-taker will record the answer or provide the answer to the test scribe, who will record it for the test-taker.
16. If a Human Reader is also serving as a scribe, and if the test-taker designates a response choice by letter only ("D," for example), the Human Reader must ask the test-taker if he/she would like the complete response be reread before the answer is recorded.
17. If the test-taker chooses an answer before the reader has read all the answer choices, the Human Reader must ask if the test-taker wants the other response options to be read.
18. After a Human Reader finishes reading a test item, the Human Reader must allow the test-taker to pause before responding. However, if the test-taker pauses for a considerable time following the reading of the answer choices, say: "Do you want me to read the question again . . . or any part of it?" In rereading questions, readers must be careful to avoid any special emphasis on words not emphasized in the printed copy by italics or capital letters.

NOTE: For SAT/ACT, please refer to the [SAT/ACT Accommodations section on page 2](#).

Special Guidelines for Reading, Mathematics, and Science Content

Mathematical expressions and science vocabulary must be read precisely and carefully to avoid misrepresentation. For mathematics items involving algebraic expressions or other mathematical notation, it may be preferable for the reader to silently read the entire question before reading it aloud to the test-taker. Use technically correct yet simple terms and be consistent in the treatment of similar expressions.

Sign Language Interpreters

Test-takers who are deaf or hard of hearing may require the services of an interpreter. The interpreter typically provides support to the student in understanding test instructions that would otherwise be read aloud to all students.

- Discussions with the interpreter on testing procedures should be conducted with the test-taker present before (and not during) the test session.
- Before the session, the interpreter must become familiar with the test instructions and the terminology used in the test that he or she will be interpreting.
- An interpreter always lags a few words or phrases behind the person who is speaking. Allow short pauses for the test-taker to respond or to ask questions.
- As the test administrator, remember to speak directly to the test-taker even when an interpreter is present.
- Courtesy requires that test examiners not say things to the interpreter that they do not want repeated to the test taker. (For example, do not ask the interpreter's opinion about the test taker or the situation.)
- An interpreter may also provide a verbatim read-aloud accommodation for students who require this accommodation, as listed in the student's IEP/504 Plan.

NOTE: For SAT/ACT, please refer to the [SAT/ACT Accommodations section on page 2](#).

Procedures for Scribing Student Responses

Overview

A scribe is a Test Administrator or Proctor who writes down what a student dictates by speech, or through an assistive technology communication device. The guiding principle in scribing is to assist the student in accessing the test and responding to it. **Alterations or changes to OSTP tests are not allowed and will result in test invalidation.** Any variation in the assessment environment or process that fundamentally alters what the test measures or affects the comparability of scores is considered a modification. For SAT/ACT, please refer to the [SAT/ACT Accommodations section on page 2](#).

A scribe must be a currently employed educator/paraprofessional, must be familiar with scribing, must have been trained as a Test Administrator or Proctor, and must have on file a signed Test Administrator/Proctor Security Form (See Test Preparation Manual). Individuals who serve as scribes need to be carefully prepared to ensure that they know the vocabulary involved and understand the boundaries of the assistance to be provided.

Scribes must be impartial and experienced in transcription. It is preferable for the scribe to be a familiar person, such as the teacher who is typically responsible for scribing during regular instruction. Scribes will review the test security procedures and will sign all statements required of Test Administrators/Proctors.

Scribes must fulfill the following duties:

- Sign a test security form acknowledging that they will ensure that the content of the written responses directly represents the independent work of the student.
- Sign a Test Administrator/Test Proctor Test Security Form.
- List the names and enrollment grades of the students whose responses were transcribed and send the form to the BTC upon completion.

- Demonstrate proficiency in signing (ASL and/or signed English) if serving as both the interpreter and scribe.
- Test in a location where examinees are not able to hear or see other students' responses.
- Remain silent while students are dictating or signing.
- When needed, ask students to repeat a word or phrase for understanding.
- Indicate when they are unable to understand the student's oral or signed response.
- Record the interpreter's response.

Produce legible text so that the written portion of the test can be scored.

- When transcribing from a handwritten or word-processed response, record punctuation, capitalization, and spelling as provided by the student

Refrain from:

- Communicating verbally or nonverbally whether the response is correct or incorrect.
- Prompting the student in any way that would result in a better response or essay.
- Influencing the student's response in any way.
- Editing student work or completing a student's incomplete essay.
- Discussing the student's essay with the student or any other person.

Scribing Multiple-Choice Questions

The scribe should confirm the student's response before recording the student's answer on the answer document or entering the student's response into the secure online testing platform. If the scribe cannot understand a student's pattern of speech, or it is barely audible, large cards, each indicating one of the response options (e.g., A-D), can be used. The student can then choose the card that indicates the student's desired response to the multiple-choice question. For SAT/ACT, please refer to the [SAT/ACT Accommodations section on page 2](#).

Scribing Constructed/Extended-Response Questions (Writing Tasks)

The scribe should determine the preferred mode of recording the student's response **before** the date of the test. At testing time, the student may then dictate the constructed/extended response directly to a scribe. A student with disabilities must be given the same opportunity as other students to plan, draft, and revise the constructed/extended response. The scribe's responsibility is to be both accurate and fair, neither diminishing the fluency of the student's response nor helping to improve or alter what the student asks to be recorded. This means that the scribe may write an outline or other plan as directed by the student. For online/computer based tests, transcribing involves the transfer of a student's written response into the secure testing platform. For SAT/ACT, please refer to the [SAT/ACT Accommodations section on page 2](#).

The student does not have to specify repeatedly spelling and language conventions once the student has demonstrated knowledge and skills in the use of these spelling and language conventions. The scribe may apply these conventions automatically. Examples include the following:

- Once a student has demonstrated the knowledge of indicating the beginning of sentences with a capital letter, the student does not need to specify this throughout the remainder of the constructed/extended response. That is, scribes can automatically capitalize the first letter in the beginning of a sentence if the student has indicated punctuation ending the previous sentence. If the student has not indicated

punctuation ending the previous sentence and says, “The dog ran. The dog jumped,” the scribe would write “the dog ran the dog jumped”.

- Homonyms and often-confused words should be spelled by the student each time they are used. For example:
 - "to," "two," and "too,"
 - "there," "their," and "they're"
 - “than” and “then”

Scribing Procedures

To maintain the student’s fluency of thought and to allow the student to demonstrate the requisite knowledge and skill in English Language Arts conventions, the scribe should adhere to the following process:

1. The student dictates the response without interruption directly to the scribe or electronic recording device.
 - a. Students may punctuate as they dictate. For example, when stating the sentence “The cat ran.”, the student may say, “The cat ran period.”
 - b. Students may dictate more than one sentence at a time and add punctuation after the fact, when given the scribed sentences to proofread.
 - c. The scribe transcribes a draft of the student’s response exactly as dictated without including any conventions other than spelling. Probing or clarifying questions are not allowed except in the case of classifiers for students using American Sign Language (ASL). Scribes may not question or correct student choices. Scribes may draw a diagram or a picture described by the student if the student is unable to draw the diagram or picture. The student may not yet view this written transcription.
2. The scribe reads the draft to the student without vocal inflection that would indicate punctuation or alert the student to possible mistakes.
3. The student then provides letter-by-letter spelling for each word in the response that the scribe has determined must be spelled by the student. The scribe edits the draft of the constructed/extended response as spelled by the student.
4. The student views the draft and/or listens to the scribe as the scribe reads the draft of the constructed/extended response (i.e., written transcription). Students MUST be given the opportunity to review their responses in the way that the student prefers:
 - a. Scribes may read back the dictation for proofreading to the student; or
 - b. Students may review the written or typed response on paper or on the computer screen after having indicated word-for-word spelling according to these guidelines.
5. The student indicates additional edits to the scribe, including but not limited to paragraph structure, capitalization (for proper nouns, acronyms, and so forth), wording, spelling, and punctuation. The scribe will make those changes exactly as dictated by student, even if incorrect.
6. The scribe records the final written response. Scribes may handwrite (there is no penalty for cross-outs and insertions), type, or use a laptop to record the student’s work. If the scribe types and prints out the student’s responses, the responses need to be transcribed into the response booklet for paper-based

tests or typed directly into the secure testing client for online tests. The transcriber must copy the student's marks or responses exactly as he/she has written—including all errors in grammar, mechanics, spelling, etc.

If necessary, proofread the student essay with another scribe before word processing the student response.

- ✓ If the student is using a tape recorder or videotape for later transcription by a scribe, it is required to have two people listen or view as a reliability check for accuracy.
- ✓ For an accuracy check, scribes may record the session on audio or videotape for playback.
- ✓ Corrections of exclusively Braille errors will be at the discretion of the scribe. Braille errors are those errors that occur specifically to that population due to recording medium. An example could be the result of the physical typing on a Braille machine, such as typing an 'f' as opposed to the intended 'd' due to finger misplacement. The transcriber has the option to verify student response with another examiner trained in Braille.
- ✓ To increase accuracy, it is advisable to have one person reading the student's responses as another transcribes them into the test booklet. The persons then switch roles to check the transcription. Transcriptions must take place in a secure environment and, whenever possible, under the direction of the BTC. Please note that all test material—including the test booklet the student originally used—must be returned to the testing vendor.
- ✓ Collect scratch paper, rough drafts, and login information immediately at the end of the testing session. These items are considered secure material and must be collected and shredded by the BTC at the end of the testing session.

NOTE: For SAT/ACT, please refer to the [SAT/ACT Accommodations section on page 2](#).

Oklahoma Alternate Assessment Program (OAAP)

The OAAP is a component of the OSTP and is designed for students with the most significant cognitive disabilities and adaptive behavior deficits. The OAAP mirrors the general assessment system in regard to grade levels and subjects assessed and utilizes the Dynamic Learning Maps (DLM) Alternate Assessment System. The academic achievement of students participating in the OAAP is based on alternate academic achievement standards, which differ in complexity from the Oklahoma Academic Standards (OAS) of the general state assessments.

In order to participate in the OAAP, students must require alternate achievement standards in all content areas and must have an IEP containing rigorous, measurable goals that include short-term benchmarks/objectives. In addition, students must meet the criteria identified in *The Criteria Checklist for Assessing Students with Disabilities on Alternate Assessments*, and the IEP team must determine an alternate assessment is appropriate for the student. The Every Student Succeeds Act (ESSA) mandates that no more than 1% of all tested students may participate in an alternate assessment. IEP teams should discuss the accommodations needed for students to participate in the general assessment prior to considering eligibility in the alternate assessment. For additional information on the OAAP, visit <https://sde.ok.gov/assessment> or contact the Special Education Office at (405) 521-3351.

Supporting Documents

[ACT Accommodations Request Form](#)

[SAT Accommodations Request Form](#)

[Form EA \(Emergency Accommodation\)](#)

[Form U \(Unique Accommodation\)](#)

[OSTP Calculator Policy](#)

[OSTP ELA/Reading Test Read-Aloud Protocol](#)

[Paper Testing Checklist](#)

**OSTP Accommodations for
Students with an IEP or 504 Plan**

APPENDIX H
PARTICIPATION RATES

Table H-1. Summary of Participation by Demographic Category—ELA

Description	Tested	
	Number	Percent
All Students	280,064	100.00%
Female	137,063	48.94%
Male	142,936	51.04%
Hispanic or Latino	54,712	19.54%
American Indian/Alaskan Native	34,320	12.25%
Asian	5,984	2.14%
Black/African American	21,858	7.80%
Pacific Islander	1,185	0.42%
White/Caucasian	129,344	46.18%
Two or More Races	32,496	11.60%
Economically Disadvantaged	127,788	45.63%
Individual Education Program (IEP)	45,939	16.40%
Plan 504	7,274	2.60%
English Language Learners (ELL)	30,046	10.73%

Table H-2. Summary of Participation by Demographic Category—Mathematics

Description	Tested	
	Number	Percent
All Students	279,548	100.00%
Female	136,787	48.93%
Male	142,699	51.05%
Hispanic or Latino	54,550	19.51%
American Indian/Alaskan Native	34,277	12.26%
Asian	5,968	2.13%
Black/African American	21,742	7.78%
Pacific Islander	1,188	0.42%
White/Caucasian	129,230	46.23%
Two or More Races	32,428	11.60%
Economically Disadvantaged	127,370	45.56%
Individual Education Program (IEP)	45,893	16.42%
Plan 504	7,260	2.60%
English Language Learners (ELL)	29,933	10.71%

Table H-3. Summary of Participation by Demographic Category—Science OSTP

Description	Tested	
	Number	Percent
All Students	93,184	100.00%
Female	45,711	49.05%
Male	47,447	50.92%
Hispanic or Latino	18,084	19.41%
American Indian/Alaskan Native	11,404	12.24%
Asian	1,969	2.11%
Black/African American	7,301	7.84%
Pacific Islander	352	0.38%
White/Caucasian	43,337	46.51%
Two or More Races	10,599	11.37%
Economically Disadvantaged	42,071	45.15%
Individual Education Program (IEP)	14,649	15.72%
Plan 504	2,628	2.82%
English Language Learners (ELL)	8,596	9.22%

Table H-4. Summary of Participation by Demographic Category—Science CCRA

Description	Tested	
	Number	Percent
All Students	42,696	100.00%
Female	21,091	49.40%
Male	21,549	50.47%
Hispanic or Latino	7,560	17.71%
American Indian/Alaskan Native	5,297	12.41%
Asian	1,054	2.47%
Black/African American	3,230	7.57%
Pacific Islander	138	0.32%
White/Caucasian	21,103	49.43%
Two or More Races	4,258	9.97%
Economically Disadvantaged	16,612	38.91%
Individual Education Program (IEP)	5,452	12.77%
Plan 504	1,316	3.08%
English Language Learners (ELL)	2,138	5.01%

APPENDIX I
ONLINE TESTING ACCOMMODATION FREQUENCIES
AND STATE-APPROVED ACCOMMODATIONS

Table I-1. Numbers of Students Tested With Accommodations by Accommodation Type and Grade—ELA

Accommodation Code	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
AccomBraille	1	1	18	1	2	16
AccomColorContrast	104	114	99	146	143	125
AccomGeneralMasking	129	108	106	110	82	97
AccomMagnification	115	104	105	143	124	132
AccomReadAloudELA	78	88	4,878	230	138	3,899
AccomTurnoffUniversal	18	24	46	39	14	2
TestELL	2,659	2,280	1,789	1,066	1,140	1,063
TestIEP	4,482	5,178	5,481	5,091	4,864	4,840
TestPlan504	430	659	740	740	735	722

Table I-2. Numbers of Students Tested With Accommodations by Accommodation Type and Grade—Mathematics

Accommodation Code	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
AccomBraille	0	1	2	1	1	0
AccomColorContrast	104	116	99	148	144	125
AccomGeneralMasking	129	110	106	113	83	97
AccomMagnification	114	105	105	145	125	132
AccomReadAloudMAT	6,477	6,965	6,761	5,936	5,669	5,427
AccomTurnoffUniversal	18	24	46	39	14	2
TestELL	2,931	2,463	1,810	1,090	1,169	1,081
TestIEP	4,566	5,305	5,578	5,384	5,137	4,923
TestPlan504	427	662	740	748	746	710

Table I-3. Numbers of Students Tested With Accommodations by Accommodation Type and Grade—Science

Accommodation Code	Grade 5	Grade 8	Grade 11
AccomBraille	2	0	0
AccomColorContrast	98	127	115
AccomGeneralMasking	105	100	99
AccomMagnification	104	134	134
AccomReadAloudSCI	6,339	5,014	1,648
AccomTurnoffUniversal	47	2	3
TestELL	1,636	1,001	395
TestIEP	4,860	4,326	2,659
TestPlan504	673	612	356

Table I-4. State-Approved Standard Accommodations

I. Setting/Timing/Schedule	Procedures & Guidance
S1. Individual testing	This accommodation is required for many presentations or response accommodations. This accommodation is intended to reduce student distractions. Students must be actively monitored and may use a testing carrel or test in a special education resource room or other location that maintains test security.
S2. Small group testing (8–10 maximum)	This accommodation is intended to reduce student distractions and may be required for certain accommodations. Students must be actively monitored and may use a testing carrel or test in a special education resource room or other location that maintains test security. Students should be tested with their non-disabled peers to the greatest extent possible.
S3. Preferential seating	Students may need to sit close to the front of the room so they can see or hear more easily, increase physical access, or have access to special equipment.
S4. Separate location (No limit on number of students)	This accommodation is intended to reduce student distractions. Students may use a testing carrel, or test in a special education resource room or other location that maintains test security.
S5. Provide special lighting	Specify type (e.g., 75 Watt incandescent, light box, etc.)
S6. Provide adaptive or special furniture	Students may need accommodations to provide better access (e.g., slant board, stander, etc.)
T1. Flexible schedule same day Student test book(s) must be secured between sessions.	Students are scheduled to allow for the best conditions/timing for their performance, and/or may be allowed to take the test during more than one sitting during a single day. Students are not allowed to study for or discuss tests between sessions. This is not intended for lunch or recess breaks. (S4) must be selected for this accommodation.
T2. Administer test over several sessions or “chunking” (except writing tasks/sections). Student test book(s) must be secured between sessions.	The test may be separated into smaller sections and administered over several days within the state testing window. Student may only work in one separated section at a time and may not go to previous sections or work ahead. (S4) must be selected for this accommodation.
T3. Allow frequent breaks during one test session (maximum 10–15 minute duration) Student test book(s) must be secured during the break(s).	Students must be monitored during breaks and may not study for or discuss the test during these breaks or view/change previously answered questions after a break. This accommodation is not intended for lunch or recess breaks—students must complete a Section before being dismissed.

continued



II. Presentation	Procedures & Guidance
<p>P1. Alternate Formats</p> <p>a. Large-Print Version (Instructions provided within kits.)</p> <p>b. Contracted Braille Version (Instructions provided within kits.)</p> <p>c. Large-print through Online Testing Client (Vector-based Magnification)</p>	<p>The Test Administrator must transcribe student answers verbatim into the standard answer document/test book that was provided in the large-print (paper/pencil) or Braille kit. Braille test formats will be provided on paper using contracted Braille and Nemeth code for numbers and formulas. Large print formats may be configured in the online testing client for certain assessments.</p>
<p>P2. Reverse Color Contrast</p>	<p>Students who have a visual impairment may require this to access the computer screen. This accommodation option must be selected in the online testing client student profile.</p>
<p>P3. Use of assistive technology (AT) devices or supports: e.g., color overlays, magnifier, pencil grips, auditory amplification devices, noise buffers, wedge for positioning, and multiplication table/chart.</p>	<p>The specific device or support should be specified in the IEP/504 Plan, be routinely used by the student, and not alter the construct being measured. (S1, S2, or S4) may be appropriate for this accommodation as some AT devices may be distracting to other students.</p>
<p>P4. Text-to-Speech, Human Reader, or Sign Language Interpretation</p> <p>a. Text-to-Speech is built into the online testing client, requires the use of earphones, and may be administered in individual, small group, or regular setting.</p> <p>b. Human Reader reads test directions, test items, and answer choices and must log the test booklet serial number on the Nondisclosure Agreement (NDA). This is limited to small group or individualized testing.</p> <p>c. Sign Language Interpretation may be accomplished by using a separate test booklet in a separate location.</p> <p>Please refer to the Human Reader directions on pages 12–14.</p>	<p>P4 applies to Math, Science, U.S. History, and Grades 5 & 8 ELA writing/constructed response sections only.</p> <p>Online tests have built-in Text-to-Speech functionality (must be selected in online testing client before student starts the test). Earphones are required. Students may test with nondisabled peers. However, if a Human Reader is required for the student, then the test must be read from the computer screen verbatim. (S1 or S2) is required when utilizing a Human Reader for Online Only tests.</p> <p>Paper tests (test forms must be the same) are read by a Human Reader. Test Administrator uses separate test booklet or reads over a student’s shoulder and must log the test booklet serial number on the Nondisclosure Agreement (NDA). Small group testing (S1 or S2: 8–10 maximum) is required and test forms must be the same. Students may request items be read more than once.</p>
<p>P5. Use of Secure Braille Note-taker (students with a visual impairment)</p>	<p>An electronic note-taker, which may have a Braille or QWERTY-type keyboard, is an adaptive device similar to a PDA. This device may have built-in speech output and/or a refreshable Braille display. (S1 or S2) must be selected for this accommodation.</p>
<p>P6. Simplification/repetition/signage of directions</p>	<p>Student may ask for clarification, simplification, signage of directions. This does not include test questions or answer choices. Students may have directions reread for each page of questions.</p>

continued



II. Presentation	Procedures & Guidance
P7. Turn off Universal Tools/Accessibility Features	Disable any tools that may be distracting to a student, tools a student does not need to use, or tools a student may be unable to use.
P8. Use of an abacus.	Students who have a visual impairment/blindness or access mathematical calculations tactilely may use an abacus.
P9. Use of a calculator on Grades 3–5 Mathematics. See Calculator Requirements on page 12.	A basic calculator may be used. Calculators with Computer Algebra Systems are prohibited.
P10. Provide cues (arrows, stop signs) on answer form	This applies to Paper Only tests. Cues may not clue a student to a correct or incorrect answer.
P11. Use masking or templates to reduce the amount of visible print.	Masking involves blocking off content that is distracting to the student. Students are able to focus their attention on a specific part of a test item by masking. This feature is built into the online testing client.
P12. Secure paper to work area with tape or magnets.	This applies to Paper Only tests. Please be cautious when adhering tape to the test booklet or answer document by avoiding the tracking marks (black bars) for the scoring process.
P13. Student may read the test aloud or sign the test to himself or herself.	This requires individual testing (even if student is reading aloud quietly) and non-disclosure forms signed by Test Administrator/Test Proctor. (S1) must be selected for this accommodation.
P14. Placeholders, templates, or markers to maintain place	This applies to Paper Only tests.
P15. Audio Calculator	This requires earphones for group testing. A non-embedded calculator for students needing a special calculator, such as a Braille calculator or a talking calculator, is currently unavailable within the online assessment platform. (S1, S2, or S4) may be appropriate for this accommodation.
P16. Paper & Pencil Test Please see Paper & Pencil Test Format guidelines on page 4.	Students unable to access an OSTP computer-based test must also receive classroom assessments, benchmark assessments, and districtwide assessments in this manner. Consequently, a student on an IEP/504 Plan does not automatically receive a paper & pencil test format.

continued



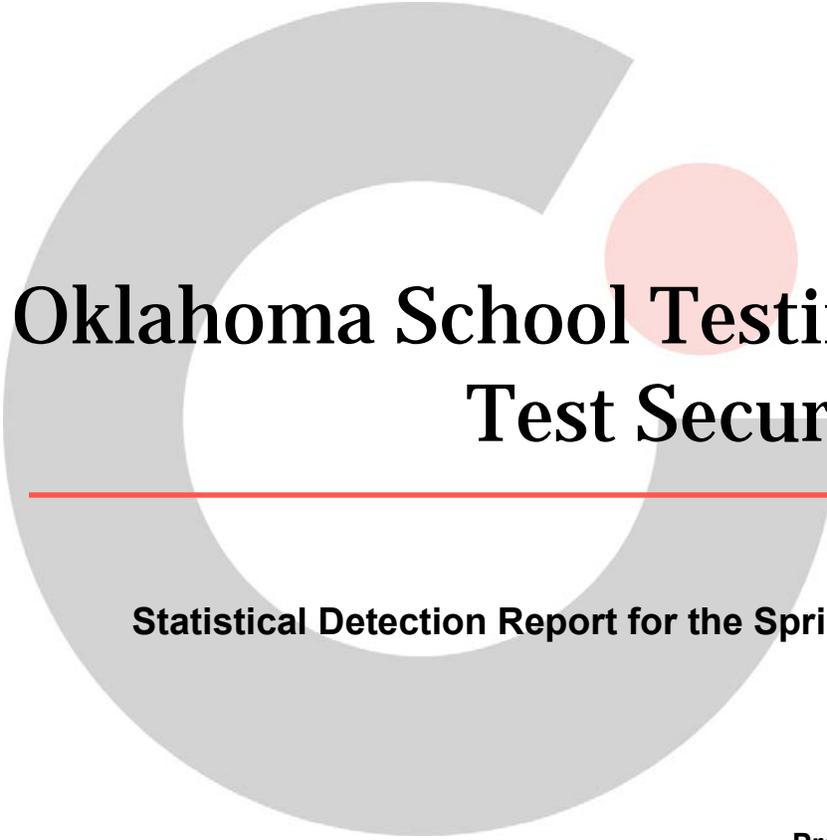
III. Response	Procedures & Guidance
<p>R1. Student marks answers in test book and not on an answer document, for later transfer by a Test Administrator to an answer document.</p>	<p>The Test Administrator with the Test Proctor present must transcribe answers verbatim into the standard answer document. Does not apply to Grade 3 tests. This accommodation applies to Paper Only tests.</p>
<p>R2. Human Scribe ELA, Mathematics, Science, Social Studies:</p> <p>a. Student dictates response to a scribe who records responses on an answer document or through the Online Testing Client by Test Administrator or Proctor.</p> <p>b. Student signs response to a scribe who records responses on an answer document or through the Online Testing Client by Test Administrator or Proctor.</p> <p>c. Student tapes or records response for a writing portion of the test for verbatim transcription by Test Administrator or Proctor.</p> <p>Please see Scribe Instructions and Guidelines on pages 15–18.</p>	<p>A scribe is a Test Administrator or Proctor who writes down what a student dictates by speech, or through an assistive technology communication device. Signed Nondisclosure Agreements (NDAs) are required for both Test Administrator and Proctor. Students who have documented significant motor or processing difficulties that make it difficult to produce responses may need to dictate their responses to a human, who then records the students' responses verbatim. The use of this support may result in the student needing additional overall time to complete the assessment.</p> <p>The guiding principle in scribing is to assist the student in accessing the test and responding to it. (S1) must be selected for this accommodation.</p>
<p>R3. Use computer or other assistive technology device to respond.</p> <p>a. Student utilizes an electronic input device without the “help” features, such as spell check, an electronic dictionary, a thesaurus, or access to the Internet.</p> <p>Please see Scribe Instructions and Guidelines on pages 15–18.</p>	<p>Students may use a computer, typewriter, or other assistive technology device to respond. This may include software dictation or dictation devices the student uses during routine instruction. Extended written responses must be printed off for transcription. Return the original typed student response for secure materials submission. The Test Administrator must transcribe words verbatim into an answer document/test book or Online Testing Client. The electronic responses or recordings must be destroyed or erased by District Test Coordinator. (S1 or S2) must be selected for this accommodation.</p>
<p>R4. Test Administrator monitors placement of student responses on the answer document or the online testing client.</p>	<p>Test Administrator may redirect students. Students may not be directed to correct or incorrect answers in any way.</p>
<p>R5. Braille/Secure, Braille Note-taker/Abacus (students with a visual impairment)</p>	<p>The Test Administrator must transcribe answers verbatim into the standard answer document/test book that was provided in the large-print (paper/pencil) or Braille kit. (S1, S2, or S4) must be selected for</p>



Table I-5. 2017–18 OSTP: State-Approved Nonstandard Accommodations

IV. ELA Read-Aloud (Grades 3–8)	Eligibility Requirements
<p>NS1. Human Reader or Sign Language Interpretation Accommodations for the English Language Arts Assessments.</p> <p>a. Human Reader reads test directions, test items, and answer choices from separate test booklet and must log the test booklet serial number on the Nondisclosure agreement (NDA). This is limited to small group or individualized testing</p> <p>b. Sign Language Interpretation may be accomplished by using a separate test booklet.</p> <p>Test directions, test items, and answer choices may be read verbatim. Refer to test formatting options. Students may request items be read more than once.</p> <p>Due Date for Requests: Requests must be submitted to the OSDE through the Nonstandard Accommodations on the SDE Single Sign-on by February 1st for the Spring testing window and responses will be provided on a case-by-case basis no later than March 15th.</p>	<p>This accommodation must be determined by the following 3-pronged approach:</p> <ol style="list-style-type: none"> 1. The student has a specific disability that severely limits or prevents him/her from decoding printed text at any level of difficulty, even after varied and repeated attempts to teach the student to do so (i.e., the student is a non-reader, not simply reading below grade level); and 2. The student can only access printed materials through a screen reader (assistive technology) or human reader, and/or is provided with spoken text on audiotape, CD, video, or other electronic format during routine instruction (includes Sign Language Interpretation), except while the student is actually being taught to decode; and 3. The IEP/504 team will utilize and provide the required documentation from the OSTP ELA Test Read-Aloud Protocol, which includes the use of the Protocol for Accommodations in Reading (PAR) or the AEM Navigator for deaf or blind students. This documentation must be uploaded into the Nonstandard Accommodation Tool in the Single <p>Sign-on application for consideration by the OSDE. Paper tests are read by a Human Reader. (S1 or S2) is required and test forms must be the same. Online tests A human reader reads verbatim from the computer screen. (S1, S2, or S4) is required.</p> <p>The request will be submitted annually through the Nonstandard Accommodation Tool in the Single Sign-on application.</p>
<p>NS2. Unique Accommodations</p> <p>Students with disabilities who have IEPs/504 plans are eligible for consideration for unique accommodations on state assessments (e.g., allow projection of test for students receiving the Sign Language Interpretation accommodation in small groups, manipulatives, etc.).</p> <p>A unique accommodation is an accommodation that requires changes or alterations to the test materials/ booklet or media presentation.</p> <p>The unique accommodation must be one that is regularly used by the student for classroom instruction, must be on the student’s IEP, and must not alter the underlying content of the assessment.</p>	<p>A request may be made (pursuant to the IEP/504 team’s determination) for a unique accommodation utilizing Form U for a student with a disability on any specified subject area(s) of the OSTP. The Form U must be submitted:</p> <ul style="list-style-type: none"> • Due to the student’s need for an accommodation that would enable the student to access the state assessment. • Through the Nonstandard Accommodation Tool in the Single Sign-on application. • With completed student information and any other requested information. <p>The requested accommodation must not impact the reliability or validity of the test, and the request may not exempt a student from taking any portion of the OSTP test(s).</p>

APPENDIX J
STATISTICAL DETECTION REPORT
FOR THE SPRING 2021 ADMINISTRATION



Oklahoma School Testing Program Test Security Analysis

Statistical Detection Report for the Spring 2021 Administration

Prepared by Dr. Frank Padellaro
September 2021



OKLAHOMA

STATE DEPARTMENT *of* EDUCATION

———— JOY HOFMEISTER ————

STATE SUPERINTENDENT *of* PUBLIC INSTRUCTION



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Introduction

Cognia’s test security policies and practices are designed to protect examinee data privacy, test data security, and the security of test content. We organize our planning and execution of test security measures around a framework for comprehensive test security systems: *Prevention, Detection, Investigation, and Resolution* (PDIR; Ferrara, 2017). We rely on collaboration with our clients to protect test security and data integrity, working together with them to encourage and support rigorous, professional investigations if security issues should arise and to resolve any issues to the degree possible following such investigations.

In this report, we provide statistical detection findings from two techniques for detecting possible test security violations: inordinate response similarity analyses and inordinate score gain analyses. **Statistical detection findings** provide initial indication of whether additional follow-up may be required to determine if a test security violation may have occurred. **Inordinate response similarity analyses** enable us to detect evidence, in the form of inordinately similar item response patterns, of possible security threats from prior exposure of test items to educators and examinees, educators supplying answers to test items to examinees during administration, educators changing examinee answers after test administration, or examinees copying answers to test items from one another. **Response change analyses** enable us to detect evidence of inordinate numbers of response changes in an examinee group’s test performance.

The highest probability threats to the security of OSTP and CCRA are the exposure of test items and stimulus material (e.g., reading passages) before test administration, helping students respond to test items during test administration, and changing student responses after test administration.

We use the statistical results to flag possible evidence of a test security violation or other testing irregularity that may require follow-up. Statistical evidence by itself does not indicate that a test security violation has occurred; however, it signals the need for additional consideration to determine if a violation is likely and whether or not additional investigation is necessary. When one of the two statistical flags indicate the need for additional follow-up, this process could include examining results from the other statistical analysis, examining reports of test administration irregularities, and conducting informal conversations with people who may have firsthand knowledge of a situation. When initial evidence indicates the need for more formal follow-up investigations, these may include professional investigative interviews, requests for relevant documents, the examination of examinee online log files, and scannable answer documents. Cognia can provide advice and other support of investigations after delivery of the statistical detection report.



Statistical Detection Methods

Data Sources

The inordinate response similarity analysis required the examinee's response option selections (i.e., a, b, c, or d not 0 or 1), along with the correct answer key for each item. Those response options were accompanied with the examinee's school ID to identify all possible pairs of examinees in a grade and content area, and also to assign examinees to examinee groups for group-level analysis after the individual-level analysis. Similarly, inordinate response change analysis required the response option selections for examinees accompanied with the examinee's school ID to identify school and district assignment for group-level analysis. We planned all the data handling in advance with clear specifications and dealt with small data issues when they arose.

Procedures

Both the inordinate response similarity analysis that produced the ω -index and the inordinate response change analysis using independent two-samples t-test were done on the corresponding individual level data first. It's important to note that by the nature of the analysis and the structure of the data, the analysis units of the inordinate response similarity on the individual level are all possible pairs of examinees in an examinee group (i.e., grade and content area in a school), while the analysis units of the inordinate response change analysis on the individual level are all the individual examinees in an examinee group. The output result of the first analysis is the list of flagged pairs of examinees or the list of examinees. Those flagged individuals were used to calculate the proportions of flagged pairs or examinees in a grade and content area within a school in the group-level analysis. In the case of inordinate response change, students were grouped by school and then all individuals in each group were used to compare to the entire state (excluding the group in question). The result of the group-level analysis illustrates the list of all examined schools with details on whether such groups with inordinately high proportions of flagged examinee pairs or groups were marked for further investigation.

While the lead psychometrician monitored the analysis process and examined the results, another psychometrician independently designed and coded the analysis programs and managed running them to ensure the exactness of the processes and reasonableness of the results.

Inordinate Response Similarity Analysis: Examinee Pairs

Inordinate response similarity analysis focuses on the agreement between two examinees' response patterns by taking their ability into account. Inordinately high response similarity suggests a violation of independent test-taking behavior. Non-independent test-taking could be caused by many factors, such as the prior exposure of test items, examinees copying answers from each other, test administrators supplying answers during test administration, or test administrators changing answers after test administration.

Inordinate response similarity analysis is implemented by calculating the ω -index (Wollack, 1997) for every pair of examinees within an examinee group on their responses to multiple-choice items. The ω -index is a commonly used statistic in the literature of inordinate response similarity detection. Previous research (Wollack, 1997, 2003; Wollack & Cohen, 1998; Sotaridona, & Meijer, 2002) suggests that it performs just as well as or better than other statistics and the statistical properties of ω are not much affected by examinee sample size or error in item parameter estimates. The ω -index is based on the total number of matched responses, M_{CS} , between a pair of examinees, C (potential copier) and S (potential source). To determine whether or not M_{CS} is large enough to be considered suspicious, the expected value of M_{CS} is calculated under the null hypothesis that examinees C and S worked independently. With examinee S's responses treated as fixed, the expected value of M_{CS} is equal to

$$E(M_{CS}|\theta_C, U_S) = \sum_i P(U_{iC} = u_{iS}|\theta_C, U_S)$$

where θ_C is the latent ability of examinee C , U_S is the response pattern of examinee S , i is the index for item i , U_{iC} and u_{iS} are the response on items i by examinee C and S respectively. $P(U_{iC} = u_{iS}|\theta_C, U_S)$ represents the probability that examinee C chooses the same response as examinee S , given C 's ability. The variance of M_{CS} is equal to

$$Var(M_{CS}|\theta_C, U_S) = \sum_i P(U_{iC} = u_{iS}|\theta_C, U_S)(1 - P(U_{iC} = u_{iS}|\theta_C, U_S))$$

The ω -index is calculated by taking the standardized form of M_{CS} :

$$\omega = \frac{M_{CS} - E(M_{CS}|\theta_C, U_S)}{\sqrt{Var(M_{CS}|\theta_C, U_S)}}$$

The ω -index follows a standard, normal distribution as the number of items becomes infinitely large (Wollack, 1997), and large positive values lead to the rejection of independent test-taking behavior.

Calculation of the ω -index requires estimating the probability that C chooses a particular response option. This probability is usually estimated by fitting a nominal response model to the data. However, based on our experience, the estimation of the nominal response model is sometimes unstable; the estimation either does not reach a converged solution after a large number of iterations or gives unreasonably large parameter estimates for low-discriminating items. Even if stable estimation is obtained, the fit of a nominal response model to some datasets may be unsatisfactory. To overcome these problems, we used nonparametric item response models to calculate the response probabilities. Nonparametric estimation provides a more flexible modeling tool, as it does not assume a parametric form for the item characteristic curves (ICC). Douglas (1997) has demonstrated that, under mild assumptions, the curved smoothed "ICC estimates and ordinal ability estimates simultaneously converge to their true values" (p. 19). Specifically, kernel smoothing is used as the nonparametric estimation technique, due to its computational simplicity and wide use in nonparametric regression, and examinee ability θ is estimated using the same procedure as described in Douglas (1997).

The ω -index was initially developed to identify potential copiers given a known source. However, the source is unknown in our analysis, as in most situations, and the calculation typically yields different results depending on which examinee in a pair is treated as a source. In our analysis, the examinee with a higher raw score is treated as the source in each examinee pair, so that there is only one value of ω for each pair of examinees.

A pair of examinees is flagged if the right tailed p -value of the ω statistic is smaller than the nominal level for these analyses, 0.01. The nominal level is the p -value threshold for rejecting the null hypothesis. The use of 0.01 in a right-tailed test ensures that we flag only largely positive and statistically significant ω values, which is part of our effort to minimize false positive flagging errors.

Inordinate response change analysis is only conducted at the group and state levels.

Group Level (School) Response Similarity and Response Change Analyses

The focus of these statistical detection analyses is to identify grade-level examinee groups within a school with inordinately high numbers of examinees with inordinately (a) similar response patterns, and (b)



inordinately great numbers of WTR response changes.¹ To evaluate whether or not a grade-level examinee group within a school should be flagged for additional consideration, the response similarity individual pair-level results are aggregated to the school level. As hypothesis testing is conducted for each examinee pair or each examinee, the Type I error at the school level may be inflated due to the multiple comparisons in a school. To control for the inflated Type I error rate (or false positive error rate) at the school level in the response similarity analysis, a three-step procedure is used for school-level detection:

- a. Calculate each statistic for all pairs of examinees or all individual examinees in each school and flag a pair or an examinee if the statistic falls into the rejection region, which is done in the individual level analyses.
- b. Calculate the total number of flagged pairs or examinees (n_F) in each grade within a school.
- c. Compare n_F to the Binomial distribution, $Binom(N, \alpha)$, where N is total number of pairs or examinees in a grade within a school and α is the nominal level used in step.
- d. If the right tailed p -value associated with the n_F under the Binomial distribution is smaller than 0.01, a school is flagged.

Inordinate response change analysis focuses on the number of items where a respondent erased or deleted an incorrect response and replaced that response with one which was scored as correct. The proportion of wrong-to-right answer changes [WTR] is calculated at the school level and then each school is compared to the entire state (excluding the school in question) using independent two-sample hypothesis testing. This approach is commonly used in erasure and response change analysis (e.g., Wollack & Fremer, 2013), testing the null hypothesis that the population means related to two independent, random samples from an approximately normal distribution are equal.

The formula for pooled variance s^2 and statistic t for detecting inordinate response change are calculated as:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$s^2 = \frac{\sum_{i=1}^{n_1} (x_i - \bar{x}_1)^2 + \sum_{j=1}^{n_2} (x_j - \bar{x}_2)^2}{n_1 + n_2 - 2}$$

where \bar{x}_1 and \bar{x}_2 are the sample means, s^2 is the pooled sample variance, n_1 and n_2 are the sample sizes.

Schools are considered for flagging if the right tailed p -value of the t statistic is smaller than the nominal level for these analyses, 0.01. The nominal level is the p -value threshold for rejecting the null hypothesis. Any schools meeting those criteria would be ranked using Cohen's d as an indicator of effect size, and those schools with $d \geq .3$ flagged for potential further investigation.

¹ The preferred level of analysis is testing group rather than all students within a grade level with a school. Testing group assignment is not available in these data.

Results

In this section of the report, we summarize the numbers of schools flagged in the inordinate response similarity and response change analyses. The summary tables list numbers and percentages of schools flagged in each analysis and count flagged schools according to numbers of examinees in different-size grade level examinee groups.

Full results from pair and individual analyses and school analyses are provided in a separate excel file. Descriptions of the tables provided in the excel file are appended at the end of this report.

Inordinate Response Similarity

Table 1 lists the numbers of schools within grade levels that are flagged for inordinately similar responses to the 2021 OSTP and CCRA test items and the percentage of the total number of schools within a grade level.

TABLE 1. INORDINATE RESPONSE SIMILARITY ANALYSIS RESULTS FOR 2021: NUMBERS OF FLAGGED SCHOOLS BY EXAMINEE GROUP SIZE

Grade	No. of Schools Flagged (% of Total Schools)	No. of Examinees in the School				
		1–5	6–10	11–20	21–30	Greater Than 30
English Language Arts						
3	32(3.8)	0	2	0	3	27
4	19(2.3)	0	0	1	0	18
5	14(1.8)	0	0	1	1	12
6	23(3.6)	0	2	3	1	17
7	30(5.1)	0	2	1	1	26
8	9(1.5)	0	0	0	1	8
Mathematics						
3	68(8)	0	3	2	4	59
4	84(10.1)	0	1	9	9	65
5	132(16.5)	0	1	6	11	114
6	65(10.2)	0	3	3	6	53
7	318(53.9)	1	7	25	36	249
8	166(28.2)	0	2	13	13	138
Science						
5	41(5.1)	0	2	3	1	35
8	22(3.7)	0	0	5	3	14
11	109(23.4)	0	1	14	6	88

As Table 1 indicates, in the inordinate response similarity analyses:

- Higher percentages of schools are flagged in Mathematics than in ELA or Science.
- In ELA, as few as 1.5% of schools (grade 8) and as many as 5.1% of schools (grade 7) were flagged. These data represent an increase in flagging percentages when compared to the previous year. The confounding impacts of changes in instruction and learning due to COVID-19 on group detection is unknown, and while these increases in flagging percentages can't necessarily be attributed to those changes, it does represent a substantial difference in the way the two populations interacted with the assessment. In Mathematics, there were similar increases in group flagging percentages., The range of percentages is 8% (grade 3) to 53.9%

(grade 7), and in Science the range is 3.7% (grade 8) to 23.4% (grade 11). The findings within Science are not notably different than the previous administration. This is the second year inordinate response similarity data have been analyzed for CCRA (grade 11) Science.

- Higher numbers of schools are flagged in testing groups with more than 30 examinees.
- Few schools are flagged for smaller examinee group sizes.

Inordinate Response Change

Table 2 lists the numbers and percentages of schools within grade levels that are flagged for inordinately high response changes in 2021 and the percentage of the total number of schools within a grade level.

TABLE 2. INORDINATE RESPONSE CHANGE ANALYSIS RESULTS FOR 2021: NUMBERS OF FLAGGED SCHOOLS BY EXAMINEE GROUP SIZE

Grade	No. of Schools Flagged (% of Total Schools)	No. of Examinees in the School				
		12-20 *	21-30	31-40	41-50	Greater Than 50
English Language Arts						
3	22(2.6)	2	5	3	5	7
4	28(3.4)	10	6	3	3	6
5	19(2.4)	3	1	2	5	8
6	15(2.4)	4	2	3	4	2
7	11(1.9)	5	1	2	1	2
8	11(1.9)	5	2	1	1	2
Mathematics						
3	13(1.5)	1	2	1	7	2
4	18(2.2)	2	2	3	4	7
5	8(1)	1	0	3	1	3
6	6(0.9)	3	2	1	0	0
7	10(1.7)	2	5	1	0	2
8	13(2.2)	4	2	3	1	3
Science						
5	17(2.1)	3	5	3	1	5
8	13(2.2)	4	2	2	3	2
11	14(3)	2	5	2	3	2

* Schools with examinees <12 are not subject to flagging for inordinate response change

As Table 2 indicates, in the inordinate response change analyses:

- Slightly greater percentages of schools are flagged in ELA and Science than in Mathematics.
- Most flagged schools are in testing groups with fewer than 51 examinees.
- Slightly more schools are flagged among those with smaller examinee group sizes.
- In ELA the flagging percentages range from 1.9% in grades 7 and 8 to a maximum of 3.4% in grade 4. In Mathematics, the flagging percentages range from 0.9% in grade 6 to 2.2% in grades 4 and 8. In Science, the flagging percentages range from 2.1% in grade 5 to 3% in grade 11.



Discussion and Recommendations

In this report, we have summarized statistical detection findings from analyses of inordinate response similarities and inordinate answer changes. We selected these analyses from a range of other statistical detection techniques because they focus on the highest probability threats to the security of OSTP and CCRA: exposure of test items and stimulus material (e.g., reading passages) before test administration, helping students respond to test items during test administration, and changing student responses after test administration.

We use the statistical results to flag possible evidence of a test security violation or other testing irregularity that may require follow-up. We emphasize that statistical evidence by itself does not indicate that a test security violation has occurred. It signals the need for additional consideration to determine if a violation is likely and whether additional investigation is necessary.

When one of the two statistical flags indicate the potential need for further analyses, initial follow-up investigations could include examining results from another statistical analysis, examining reports of test administration irregularities, and conducting informal conversations with people who may have firsthand knowledge of the administration. When initial evidence indicates the need for more formal follow-up investigations, these may include professional investigative interviews, requests for relevant documents, and examination of examinee online log files and scannable answer documents. Cognia can provide advice and other support of investigations after delivery of the statistical detection report.

The results show notable increases in all grades of Math and ELA for group flagging percentages due to inordinate response similarity. Cognia would urge caution in interpretation of these increases as the confounding effects of changes to instruction and learning between the previous administration (2019) and current administration were unprecedented. In grades where flagging percentages are exceptionally high (Math 07, nearly 60%), the actual proportion of flagged to unflagged pairs was still quite low. In Math 07 the average proportion of flagged to unflagged pairs was less than 3%, for example. Cognia recommends, in cases where other evidence suggests violations of test security, that investigators do not solely rely on group (school) detection flagging for additional evidence. In these cases, examining clusters of flagged examinee pairs where an overlap of respondents is indicated, within a school, may be a more powerful indicator of testing issues. These raw data details are provided along with this report. Additionally, Cognia would be able to provide more granular analysis if particular clusters or groups require additional investigation.

The 2021 administration represents only the second time inordinate response change has been analyzed. Because of the gap in testing between 2019 and 2021, the above mentioned confounding effects of changes to instruction and learning, the differences in 2019 test mode for some grades (paper vs. computer), and the relative lack of longitudinal data, year over year comparison of this analysis may not be appropriate or interpretable.



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Appendix A—Description of the Tables in the Output Files

A-1. Inordinate Response Similarity Analysis Output

Response Similarity – Student

- All possible pairs were constructed within the school unit for the purpose of the analysis.
- Only the flagged pairs of examinees are listed in the output.

Subject.Grade

- Specific subject and grade combination associated with the current examine pair (e.g., ELA03)

ID.District

- Identification number of the district where the school and the pair of examinees belong

ID.School

- Identification number of the school where the pair of examinees belongs

DistrictName

- Name of the district where the school and the pair of examinees belong

SchoolName

- Name of the school where the pair of examinees belongs

ID.Examinee.1

- Identification number of the first examinee

ID.Examinee.2

- Identification number of the second examinee

Score.Examinee.1

- Raw score of the first examinee

Score.Examinee.2

- Raw score of the second examinee

Observed.Matching

- Number of matching response options between two examinees (missing responses were not included in the analysis.)

Omega

- Answer similarity index

p.value

- Probability of getting the omega index at or above the observed value under the null hypothesis

Flag.at.0.01

- Whether a pair is flagged at the nominal level of 0.01: 1 indicates flagged, and 0 indicates not flagged.

School.Flag.at.0.01

- Whether the school where the pair of examinees belongs is flagged at the nominal level of 0.01: 1 indicates flagged, and 0 indicates not flagged.

Response Similarity – School

- All available districts and schools are listed.

Subject.Grade

- Specific subject and grade combination associated with the current examinees pair (e.g., ELA03)

ID.District

- Identification number of the district where the school belongs

ID.School

- Identification number of the school

DistrictName

- Name of the district where the school belongs

SchoolName

- Name of the school

Number.Examinees

- Number of examinees in the school

Proportion.Flag.at.0.01

- Proportion of examinees flagged in the school at the nominal level of 0.01

p.value.0.01

- Probability of getting the proportion at or above the observed value under the null hypothesis

Flag.at.0.01

- Whether the school is flagged at the nominal level of 0.01: 1 indicates flagged, and 0 indicates not flagged.

A-2. Inordinate Response Change Analysis Output

Response Change – Glossary of Terms

Wrong-to-Right [WTR], Right-to-Wrong [RTW] and Wrong-to-Wrong [WTW]

- There is an indication that the examinee changed their response from an incorrect answer to the correct answer [WTR], from the correct answer to an incorrect answer [RTW] or from an incorrect answer to a different incorrect answer [WTW]

Response Change – Student

- Examinees are not flagged for inordinate response changes at the student level. All analyzed examinees are listed for each flagged school, and descriptive information provided regarding examinee response changes. For computer-based administrations, process data has been collected indicating an answer was changed prior to the final recorded entry.

Subject.Grade

- Grade and subject for the listed examinee analysis.

ID.District

- Identification number of the district where the examinee belongs

ID.School

- Identification number of the school where the examinee belongs

DistrictName

- Name of the district where the school is located.

SchoolName

- Name of the school identified by ID. School.

Booklet.Number

- Identification number of the booklet taken by the examinee

ID.Examinee

- Identification number of the examinee

N.Answered

- Number of multiple-choice item where the examinee indicated a scored response.

N.Erasure

- Number of answered items indicating a response change has been made.

Avg. Erasures

- The ratio (in decimal form) of erasures made to items answered.

SD. Erasures

- The standard deviation of N. Erasure.



N. Erasure Type (WTR, RTW, WTW)

- Number of answered items indicating a response change of the type detailed above.

Avg. Erasure Type (WTR, RTW, WTW)

- The ratio (in decimal form) of the indicated erasure type to items answered.

Erasure Type Ratio

- The ratio (in decimal form) of the indicated erasure type to response changes.

Response Change – School

- All available districts and schools are listed. Schools with analyzed examinees < 12 are not examined for aberrative response change using statistical methods, however all other descriptive statistics are still shown.

Subject.Grade

- Specific subject and grade combination associated with the listed analysis (e.g., ELA03)

ID.School

- Identification number of the school

DistrictName

- Name of the district where the listed school is located.

SchoolName

- Name of the school analyzed.

N

- Number of current year examinees analyzed for the listed school.

Descriptive Statistics

- Averages of examinee-level statistics aggregated at school-level (Answered, Erasures, WTR, RTW, WTW)

Cohen's D

- A measure of effect size. Significant comparisons between WTW response changes at the school and state level are flagged based on effect size.

p.value

- Probability of getting the proportion at or above the observed value under the null hypothesis

Flag

- Whether the school is flagged for inordinate response change behavior: 1 indicates flagged and 0 indicates not flagged.



APPENDIX K
SCORE REPORTS

Table K-1. Double Blind Report—Grade 3 Reading CRs

Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
16597	1,263	551	43.6	455	82.6	95	17.2	1	0.2
21056	5,184	2,696	52	2,283	84.7	412	15.3	1	0
21569	2,989	1,539	51.5	1,340	87.1	196	12.7	3	0.2
21572	2,476	1,333	53.8	1,163	87.2	169	12.7	1	0.1
21591	2,806	1,437	51.2	1,249	86.9	187	13	1	0.1
21566	1,327	785	59.2	626	79.7	159	20.3	0	0
17112	2,151	1,022	47.5	847	82.9	175	17.1	0	0
21546	1,344	804	59.8	660	82.1	142	17.7	2	0.2
17030	4,057	1,776	43.8	1,501	84.5	274	15.4	1	0.1
21563	885	455	51.4	356	78.2	96	21.1	3	0.7
20320	3,325	1,720	51.7	1,486	86.4	234	13.6	0	0
21597	5,578	2,725	48.9	2,249	82.5	474	17.4	2	0.1
21559	931	505	54.2	423	83.8	82	16.2	0	0
21577	4,394	2,232	50.8	1,947	87.2	283	12.7	2	0.1
9362	4,488	2,373	52.9	1,944	81.9	428	18	1	0
21634	1,590	911	57.3	722	79.3	189	20.7	0	0
18508	93	83	89.2	65	78.3	18	21.7	0	0
17139	6,865	2,993	43.6	2,452	81.9	541	18.1	0	0
67451	119	109	91.6	89	81.7	20	18.3	0	0
20933	3,130	1,580	50.5	1,388	87.8	192	12.2	0	0
20913	3,688	1,655	44.9	1,390	84	265	16	0	0
20261	5,221	2,318	44.4	1,886	81.4	430	18.6	2	0.1
21568	2,185	1,156	52.9	973	84.2	183	15.8	0	0
20001	4,027	1,810	44.9	1,515	83.7	295	16.3	0	0
21589	7,417	3,358	45.3	2,926	87.1	430	12.8	2	0.1
55220	3,654	1,851	50.7	1,644	88.8	207	11.2	0	0
21627	775	280	36.1	230	82.1	50	17.9	0	0
21305	1,673	722	43.2	585	81	136	18.8	1	0.1
21575	7,014	3,450	49.2	2,977	86.3	468	13.6	5	0.1
21581	7,685	3,933	51.2	3,449	87.7	481	12.2	3	0.1
16439	2,222	967	43.5	800	82.7	167	17.3	0	0
21629	3,596	1,991	55.4	1,649	82.8	341	17.1	1	0.1
21007	4,745	2,600	54.8	2,193	84.3	407	15.7	0	0
9709	3,742	1,919	51.3	1,645	85.7	274	14.3	0	0
15262	3,451	1,723	49.9	1,446	83.9	277	16.1	0	0
21631	186	128	68.8	110	85.9	18	14.1	0	0
21564	363	193	53.2	142	73.6	51	26.4	0	0
64236	164	143	87.2	119	83.2	24	16.8	0	0
21632	1,791	1,041	58.1	881	84.6	158	15.2	2	0.2
17761	1,442	673	46.7	573	85.1	100	14.9	0	0
16742	1,738	824	47.4	692	84	132	16	0	0
19599	329	81	24.6	78	96.3	3	3.7	0	0
19556	2,166	1,174	54.2	999	85.1	175	14.9	0	0
19314	4,118	1,940	47.1	1,574	81.1	364	18.8	2	0.1
21521	3,371	1,526	45.3	1,307	85.6	217	14.2	2	0.1
16274	2,031	931	45.8	792	85.1	139	14.9	0	0
21477	4,174	1,994	47.8	1,604	80.4	390	19.6	0	0
21579	268	138	51.5	116	84.1	20	14.5	2	1.4
19614	476	211	44.3	174	82.5	37	17.5	0	0
21590	3,898	1,780	45.7	1,541	86.6	237	13.3	2	0.1
80631	3,015	1,376	45.6	1,205	87.6	170	12.4	1	0.1
21596	949	468	49.3	384	82.1	83	17.7	1	0.2
21570	3,883	1,892	48.7	1,603	84.7	288	15.2	1	0.1
18670	2,328	1,085	46.6	893	82.3	192	17.7	0	0

continued



Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
60113	2,762	1,280	46.3	1,079	84.3	197	15.4	4	0.3
15935	134	68	50.7	67	98.5	1	1.5	0	0
21586	1,374	673	49	572	85	98	14.6	3	0.4
21583	1,192	539	45.2	427	79.2	112	20.8	0	0
21580	2,036	866	42.5	705	81.4	159	18.4	2	0.2
19419	1,615	767	47.5	665	86.7	102	13.3	0	0
21167	1,603	896	55.9	760	84.8	136	15.2	0	0
21578	3,719	1,696	45.6	1,466	86.4	230	13.6	0	0
21587	3,619	1,707	47.2	1,465	85.8	241	14.1	1	0.1
15836	3,829	2,012	52.5	1,707	84.8	305	15.2	0	0
21567	245	122	49.8	92	75.4	30	24.6	0	0
21576	2,751	1,309	47.6	1,128	86.2	180	13.8	1	0.1
19772	186	172	92.5	150	87.2	22	12.8	0	0
21630	621	350	56.4	278	79.4	72	20.6	0	0
21558	3,465	1,579	45.6	1,358	86	219	13.9	2	0.1
21628	881	386	43.8	324	83.9	62	16.1	0	0
Total	182,812	89,382	48.9	75,583	84.6	13,741	15.4	58	99.9

Table K-2. Read Behind Report—Grade 3 Reading CRs

Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
16597	1,263	149	11.8	132	88.6	17	11.4	0	0
21056	5,184	542	10.5	479	88.4	62	11.4	1	0.2
21569	2,989	312	10.4	281	90.1	31	9.9	0	0
21572	2,476	250	10.1	217	86.8	33	13.2	0	0
21591	2,806	303	10.8	267	88.1	36	11.9	0	0
21566	1,327	257	19.4	207	80.5	50	19.5	0	0
17112	2,151	421	19.6	346	82.2	73	17.3	2	0.5
21546	1,344	144	10.7	128	88.9	16	11.1	0	0
17030	4,057	483	11.9	420	87	62	12.8	1	0.2
21563	885	102	11.5	88	86.3	14	13.7	0	0
20320	3,325	422	12.7	359	85.1	63	14.9	0	0
21597	5,578	546	9.8	458	83.9	85	15.6	3	0.5
21559	931	90	9.7	77	85.6	13	14.4	0	0
21577	4,394	445	10.1	395	88.8	50	11.2	0	0
9362	4,488	574	12.8	493	85.9	80	13.9	1	0.2
21634	1,982	270	17	216	80	54	20	0	0
17139	6,865	757	11	647	85.5	110	14.5	0	0
20933	3,130	342	10.9	311	90.9	31	9.1	0	0
20913	3,688	499	13.5	436	87.4	62	12.4	1	0.2
20261	5,221	499	9.6	423	84.8	74	14.8	2	0.4
21568	2,185	310	14.2	268	86.5	41	13.2	1	0.3
20001	4,027	443	11	386	87.1	57	12.9	0	0
21589	7,417	765	10.3	683	89.3	80	10.5	2	0.3
55220	3,654	378	10.3	341	90.2	37	9.8	0	0
21627	901	83	10.7	73	88	10	12	0	0
21305	1,673	291	17.4	248	85.2	43	14.8	0	0
21575	7,014	710	10.1	624	87.9	85	12	1	0.1
21581	7,685	756	9.8	647	85.6	107	14.2	2	0.3
16439	2,222	310	14	259	83.5	51	16.5	0	0
21629	3,596	409	11.4	343	83.9	65	15.9	1	0.2
21007	4,745	489	10.3	432	88.3	56	11.5	1	0.2
9709	3,742	373	10	313	83.9	60	16.1	0	0
15262	3,451	419	12.1	366	87.4	53	12.6	0	0

continued



Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
21631	186	24	12.9	23	95.8	1	4.2	0	0
21564	555	31	8.5	25	80.6	6	19.4	0	0
21632	1,791	175	9.8	153	87.4	22	12.6	0	0
17761	1,442	164	11.4	152	92.7	12	7.3	0	0
16742	1,738	349	20.1	325	93.1	24	6.9	0	0
19556	2,166	234	10.8	199	85	35	15	0	0
19314	4,118	417	10.1	345	82.7	71	17	1	0.2
21521	3,371	346	10.3	308	89	38	11	0	0
16274	2,031	286	14.1	253	88.5	32	11.2	1	0.3
21477	4,174	422	10.1	342	81	79	18.7	1	0.2
21579	1,267	46	17.2	40	87	6	13	0	0
19614	476	41	8.6	33	80.5	8	19.5	0	0
21590	3,898	450	11.5	407	90.4	43	9.6	0	0
80631	3,015	307	10.2	281	91.5	26	8.5	0	0
21596	1,367	133	14	110	82.7	23	17.3	0	0
21570	3,883	391	10.1	326	83.4	62	15.9	3	0.8
18670	2,328	368	15.8	307	83.4	61	16.6	0	0
60113	2,762	335	12.1	280	83.6	54	16.1	1	0.3
21586	1,374	140	10.2	127	90.7	13	9.3	0	0
21583	1,192	126	10.6	104	82.5	21	16.7	1	0.8
21580	2,036	219	10.8	184	84	34	15.5	1	0.5
19419	1,615	188	11.6	172	91.5	15	8	1	0.5
21167	1,603	318	19.8	278	87.4	40	12.6	0	0
21578	3,719	397	10.7	342	86.1	55	13.9	0	0
21587	3,619	375	10.4	330	88	44	11.7	1	0.3
15836	3,829	444	11.6	386	86.9	58	13.1	0	0
21567	583	39	15.9	34	87.2	4	10.3	1	2.6
21576	2,751	286	10.4	264	92.3	22	7.7	0	0
21630	621	155	25	127	81.9	28	18.1	0	0
21558	3,465	401	11.6	350	87.3	51	12.7	0	0
21628	881	84	9.5	73	86.9	11	13.1	0	0
Total	184,252	20,834	11.5	18043	86.6	2,760	13.2	31	0.1



Table K-3. Double Blind Report—Grade 4 Reading CRs

Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
21569	6,048	856	14.2	817	95.4	39	4.6	0	0
21572	6,487	806	12.4	771	95.7	35	4.3	0	0
21591	6,630	743	11.2	709	95.4	33	4.4	1	0.1
21563	2,445	235	9.6	213	90.6	22	9.4	0	0
21597	11,141	1,388	12.5	1,314	94.7	74	5.3	0	0
21559	2,524	302	12	286	94.7	16	5.3	0	0
21577	9,342	906	9.7	874	96.5	32	3.5	0	0
20933	4,947	659	13.3	632	95.9	27	4.1	0	0
21568	9,146	1,587	17.4	1,513	95.3	74	4.7	0	0
21589	13,508	1,836	13.6	1,725	94	111	6	0	0
55220	4,335	506	11.7	491	97	15	3	0	0
21575	11,143	1,064	9.5	1,022	96.1	42	3.9	0	0
21581	13,512	1,515	11.2	1,425	94.1	90	5.9	0	0
15262	97	14	14.4	13	92.9	1	7.1	0	0
19614	157	131	83.4	128	97.7	3	2.3	0	0
15904	50	49	98	35	71.4	14	28.6	0	0
Total	101,512	12,597	12.4	11,968	95	628	5	1	0

Table K-4. Read Behind Report—Grade 4 Reading CRs

Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
21569	6,048	714	11.8	664	93	49	6.9	1	0.1
21572	6,487	684	10.5	613	89.6	69	10.1	2	0.3
21591	6,630	830	12.5	739	89	88	10.6	3	0.4
21566	281	26	9.3	24	92.3	1	3.8	1	3.8
21584	1,378	103	9.2	87	84.5	16	15.5	0	0
21563	2,445	268	11	231	86.2	36	13.4	1	0.4
21597	11,141	1,156	10.4	1,014	87.7	136	11.8	6	0.5
21559	2,524	275	10.9	239	86.9	36	13.1	0	0
21577	9,342	1,011	10.8	934	92.4	73	7.2	4	0.4
20933	4,947	624	12.6	570	91.3	52	8.3	2	0.3
21568	9,146	1,062	11.6	962	90.6	100	9.4	0	0
21589	13,508	1,287	9.5	1,105	85.9	179	13.9	3	0.2
55220	4,335	485	11.2	432	89.1	51	10.5	2	0.4
21575	11,143	1,090	9.8	974	89.4	113	10.4	3	0.3
21581	13,512	1,293	9.6	1,131	87.5	158	12.2	4	0.3
Total	102,867	10,908	10.6	9,719	89.1	1,157	10.6	32	0.3



Table K-5. Double Blind Report—Grade 5 Writing ERs

Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
59897	6,257	1,432	22.9	1,071	74.8	357	24.9	4	0.3
21281	102	17	16.7	13	76.5	3	17.6	1	5.9
17112	3,622	967	26.7	735	76	229	23.7	3	0.3
59380	3,293	927	28.2	728	78.5	185	20	14	1.5
20320	626	401	64.1	315	78.6	86	21.4	0	0
21597	754	176	23.3	149	84.7	26	14.8	1	0.6
21585	3,206	915	28.5	726	79.3	182	19.9	7	0.8
9362	6,637	1,585	23.9	1,302	82.1	268	16.9	15	0.9
20913	2,940	682	23.2	557	81.7	118	17.3	7	1
20573	3,759	973	25.9	809	83.1	158	16.2	6	0.6
19464	3,911	903	23.1	788	87.3	111	12.3	4	0.4
22028	93	82	88.2	61	74.4	21	25.6	0	0
55220	1,763	515	29.2	353	68.5	150	29.1	12	2.3
21766	4,959	1,185	23.9	899	75.9	282	23.8	4	0.3
21751	462	134	29	96	71.6	38	28.4	0	0
20627	2,574	655	25.4	551	84.1	100	15.3	4	0.6
21631	655	153	23.4	126	82.4	25	16.3	2	1.3
21635	604	129	21.4	106	82.2	20	15.5	3	2.3
55182	2,022	489	24.2	358	73.2	123	25.2	8	1.6
20520	463	132	28.5	109	82.6	22	16.7	1	0.8
32096	1,894	510	26.9	397	77.8	108	21.2	5	1
32025	2,723	537	19.7	415	77.3	118	22	4	0.7
21573	424	106	25	79	74.5	25	23.6	2	1.9
55225	263	63	24	45	71.4	16	25.4	2	3.2
21636	130	37	28.5	30	81.1	6	16.2	1	2.7
32030	30	4	13.3	4	100	0	0	0	0
21586	1,043	261	25	200	76.6	54	20.7	7	2.7
21757	3,529	889	25.2	675	75.9	209	23.5	5	0.6
21167	379	132	34.8	96	72.7	36	27.3	0	0
21578	1,603	247	15.4	196	79.4	51	20.6	0	0
20851	1,499	404	27	265	65.6	137	33.9	2	0.5
Total	62,219	15,642	25.1	12,254	78.3	3,264	20.9	124	0.8



Table K-6. Read Behind Report—Grade 5 Writing ERs

Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
59897	6,257	779	12.5	593	76.1	184	23.6	2	0.3
21281	102	14	13.7	10	71.4	3	21.4	1	7.1
17112	3,622	428	11.8	336	78.5	90	21	2	0.5
59380	3,293	428	13	327	76.4	99	23.1	2	0.5
20320	626	30	4.8	23	76.7	7	23.3	0	0
21597	754	77	10.2	66	85.7	11	14.3	0	0
21585	3,206	451	14.1	352	78	97	21.5	2	0.4
9362	6,637	748	11.3	624	83.4	113	15.1	11	1.5
20913	2,940	346	11.8	289	83.5	57	16.5	0	0
20573	3,759	444	11.8	395	89	48	10.8	1	0.2
19464	3,911	486	12.4	424	87.2	60	12.3	2	0.4
55220	1,763	251	14.2	193	76.9	51	20.3	7	2.8
21766	4,959	665	13.4	507	76.2	156	23.5	2	0.3
21751	462	63	13.6	47	74.6	16	25.4	0	0
20627	2,574	322	12.5	258	80.1	62	19.3	2	0.6
21631	655	73	11.1	63	86.3	8	11	2	2.7
21635	604	100	16.6	81	81	18	18	1	1
55182	2,022	279	13.8	208	74.6	65	23.3	6	2.2
20520	463	63	13.6	53	84.1	9	14.3	1	1.6
32096	1,894	270	14.3	209	77.4	57	21.1	4	1.5
32025	2,723	336	12.3	263	78.3	71	21.1	2	0.6
21573	424	47	11.1	38	80.9	9	19.1	0	0
55225	263	44	16.7	30	68.2	11	25	3	6.8
21636	130	16	12.3	13	81.3	3	18.8	0	0
32030	30	5	16.7	4	80	1	20	0	0
21586	1,043	142	13.6	109	76.8	31	21.8	2	1.4
21757	3,529	457	12.9	362	79.2	95	20.8	0	0
21167	379	62	16.4	47	75.8	15	24.2	0	0
21578	1,603	178	11.1	149	83.7	28	15.7	1	0.6
20851	1,499	215	14.3	156	72.6	58	27	1	0.5
Total	62,126	7,819	12.6	6,229	79.7	1,533	19.6	57	0.7

Table K-7. Double Blind Report—Grade 6 Reading CRs

Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
20320	78	55	70.5	47	85.5	8	14.5	0	0
21305	1	1	100	1	100	0	0	0	0
21560	8,931	1,216	13.6	1,202	98.8	14	1.2	0	0
21565	2,458	190	7.7	190	100	0	0	0	0
21592	5,192	592	11.4	580	98	12	2	0	0
63425	10,210	1,130	11.1	1,093	96.7	37	3.3	0	0
21598	4,079	878	21.5	870	99.1	8	0.9	0	0
15262	108	11	10.2	10	90.9	1	9.1	0	0
21555	11,021	1,301	11.8	1,288	99	13	1	0	0
21594	9,514	1,472	15.5	1,463	99.4	9	0.6	0	0
21571	1,282	110	8.6	110	100	0	0	0	0
21562	14,006	2,026	14.5	2,007	99.1	19	0.9	0	0
21561	8,490	845	10	836	98.9	9	1.1	0	0
16742	60	40	66.7	40	100	0	0	0	0
32025	3,517	439	12.5	431	98.2	8	1.8	0	0
21573	7,382	866	11.7	856	98.8	10	1.2	0	0
16274	151	94	62.3	90	95.7	4	4.3	0	0
21588	9,715	1,008	10.4	995	98.7	13	1.3	0	0
21582	11,172	933	8.4	920	98.6	13	1.4	0	0
Total	107,367	13,207	12.3	13,029	98.7	178	1.3	0	0



Table K-8. Read Behind Report—Grade 6 Reading CRs

Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
21560	8,931	1,016	11.4	892	87.8	122	12	2	0.2
21565	2,458	302	12.3	265	87.7	36	11.9	1	0.3
21592	5,192	590	11.4	509	86.3	79	13.4	2	0.3
63425	10,210	1,142	11.2	976	85.5	163	14.3	3	0.3
21598	4,140	473	11.6	411	86.9	59	12.5	3	0.6
21555	11,021	1,223	11.1	1,046	85.5	175	14.3	2	0.2
21594	9,514	1,091	11.5	963	88.3	128	11.7	0	0
21571	1,282	166	12.9	147	88.6	19	11.4	0	0
21562	14,006	1,618	11.6	1,419	87.7	195	12.1	4	0.2
21561	8,490	965	11.4	843	87.4	122	12.6	0	0
32025	3,517	397	11.3	328	82.6	66	16.6	3	0.8
21573	7,382	833	11.3	719	86.3	110	13.2	4	0.5
21588	9,715	1,131	11.6	1,010	89.3	120	10.6	1	0.1
21582	11,172	1,466	13.1	1,225	83.6	236	16.1	5	0.3
Total	107,030	12,413	11.6	10,753	86.6	1,630	13.1	30	0.2

Table K-9. Double Blind Report—Grade 7 Reading CRs

Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
20320	125	51	40.8	49	96.1	2	3.9	0	0
16814	153	51	33.3	48	94.1	3	5.9	0	0
21579	1,540	120	7.8	117	97.5	3	2.5	0	0
21590	12,564	824	6.6	789	95.8	35	4.2	0	0
80631	7,047	414	5.9	384	92.8	30	7.2	0	0
21596	4,890	160	3.3	156	97.5	4	2.5	0	0
21570	6,358	375	5.9	349	93.1	26	6.9	0	0
60113	4,579	130	2.8	120	92.3	10	7.7	0	0
21586	11,669	609	5.2	575	94.4	34	5.6	0	0
21583	5,087	326	6.4	311	95.4	15	4.6	0	0
21580	4,098	267	6.5	251	94	16	6	0	0
19419	4,311	220	5.1	212	96.4	8	3.6	0	0
21578	11,334	816	7.2	769	94.2	47	5.8	0	0
21556	766	19	2.5	17	89.5	2	10.5	0	0
21587	9,884	714	7.2	680	95.2	34	4.8	0	0
21567	2,547	164	6.4	153	93.3	11	6.7	0	0
21576	6,292	296	4.7	286	96.6	10	3.4	0	0
21558	8,578	446	5.2	419	93.9	26	5.8	1	0.2
Total	101,822	6,002	5.9	5,685	94.7	316	5.3	1	0

Table K-10. Read Behind Report—Grade 7 Reading CRs

Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
21579	1,559	201	13.1	170	84.6	30	14.9	1	0.5
21590	12,564	1,294	10.3	1,102	85.2	183	14.1	9	0.7
80631	7,047	769	10.9	668	86.9	95	12.4	6	0.8
21596	4,890	606	12.4	506	83.5	97	16	3	0.5
21570	6,358	717	11.3	582	81.2	128	17.9	7	1
60113	4,579	608	13.3	508	83.6	98	16.1	2	0.3
21586	11,669	1,176	10.1	1,019	86.6	150	12.8	7	0.6
21583	5,087	588	11.6	485	82.5	94	16	9	1.5

continued



Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
21580	4,098	610	14.9	517	84.8	85	13.9	8	1.3
19419	4,311	562	13	484	86.1	74	13.2	4	0.7
21578	11,334	1,155	10.2	1,001	86.7	144	12.5	10	0.9
21556	766	88	11.5	73	83	14	15.9	1	1.1
21587	9,884	1,060	10.7	893	84.2	156	14.7	11	1
21567	2,547	353	13.9	291	82.4	56	15.9	6	1.7
21576	6,292	742	11.8	636	85.7	97	13.1	9	1.2
21558	8,801	941	11	798	84.8	133	14.1	10	1.1
Total	101,786	11,470	11.3	9,733	84.9	1,634	14.2	103	0.9

Table K-11. Double Blind Report—Grade 8 Writing ERs

Scorer ID	Total Scored	Total # of DB	% DB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
59897	590	162	27.5	106	65.4	55	34	1	0.6
17112	422	111	26.3	79	71.2	32	28.8	0	0
17030	1,480	362	24.5	259	71.5	101	27.9	2	0.6
20320	157	40	25.5	30	75	10	25	0	0
21597	1,169	373	31.9	235	63	136	36.5	2	0.5
32131	568	75	13.2	41	54.7	34	45.3	0	0
21749	2,616	765	29.2	512	66.9	242	31.6	11	1.4
21602	1,590	409	25.7	266	65	138	33.7	5	1.2
21585	278	67	24.1	55	82.1	12	17.9	0	0
21750	3,994	1,079	27	695	64.4	366	33.9	18	1.7
21589	3,111	745	23.9	499	67	235	31.5	11	1.5
55220	373	117	31.4	72	61.5	43	36.8	2	1.7
21766	460	117	25.4	85	72.6	30	25.6	2	1.7
21751	4,234	830	19.6	490	59	329	39.6	11	1.3
21752	3,090	945	30.6	640	67.7	293	31	12	1.3
15262	1,431	235	16.4	161	68.5	71	30.2	3	1.3
21631	53	40	75.5	24	60	15	37.5	1	2.5
21456	666	224	33.6	133	59.4	85	37.9	6	2.7
21555	31	3	9.7	1	33.3	1	33.3	1	33.3
21635	2,736	741	27.1	486	65.6	246	33.2	9	1.2
21614	4,105	1,085	26.4	698	64.3	369	34	18	1.7
21682	3,415	856	25.1	442	51.6	383	44.7	31	3.6
21613	6,458	1,549	24	956	61.7	551	35.6	42	2.7
55182	804	252	31.3	164	65.1	86	34.1	2	0.8
20520	1,502	444	29.6	276	62.2	161	36.3	7	1.6
19599	612	165	27	124	75.2	41	24.8	0	0
32025	992	285	28.7	197	69.1	85	29.8	3	1.1
21573	1,239	355	28.7	221	62.3	123	34.6	11	3.1
21588	2,685	728	27.1	484	66.5	236	32.4	8	1.1
55225	1,436	421	29.3	238	56.5	170	40.4	13	3.1
21755	1,213	495	40.8	281	56.8	200	40.4	14	2.8
15904	1,201	159	13.2	110	69.2	45	28.3	4	2.5
21590	280	108	38.6	74	68.5	32	29.6	2	1.9
21596	2,109	689	32.7	415	60.2	244	35.4	30	4.4
21636	1,949	560	28.7	359	64.1	183	32.7	18	3.2
21167	1,044	260	24.9	170	65.4	87	33.5	3	1.2
21556	2,344	555	23.7	386	69.5	156	28.1	13	2.3
20851	1,557	448	28.8	281	62.7	158	35.3	9	2
Total	63,994	16,854	26.3	10,745	63.8	5,784	34.3	325	1.9



Table K-12. Read Behind Report—Grade 8 Writing ERs

Scorer ID	Total Scored	Total # of RB	% RB	# Exact	% Exact	# Adjacent	% Adjacent	# Discrepant	% Discrepant
59897	590	153	25.9	107	69.9	45	29.4	1	0.7
17112	422	51	12.1	44	86.3	7	13.7	0	0
17030	1,480	150	10.1	146	97.3	4	2.7	0	0
20320	157	22	14	18	81.8	4	18.2	0	0
21597	1,169	117	10	86	73.5	31	26.5	0	0
32131	568	85	15	76	89.4	9	10.6	0	0
21749	2,616	337	12.9	249	73.9	87	25.8	1	0.3
21602	1,590	167	10.5	135	80.8	32	19.2	0	0
21585	278	42	15.1	33	78.6	9	21.4	0	0
21750	3,994	423	10.6	364	86.1	59	13.9	0	0
21589	3,111	355	11.4	277	78	76	21.4	2	0.6
55220	373	47	12.6	37	78.7	10	21.3	0	0
21766	460	67	14.6	52	77.6	15	22.4	0	0
21751	4,234	413	9.8	328	79.4	85	20.6	0	0
21752	3,090	387	12.5	300	77.5	85	22	2	0.5
15262	1,431	158	11	149	94.3	9	5.7	0	0
21631	53	14	26.4	11	78.6	3	21.4	0	0
21456	666	97	14.6	74	76.3	22	22.7	1	1
21555	31	8	25.8	7	87.5	1	12.5	0	0
21635	2,736	362	13.2	281	77.6	81	22.4	0	0
21614	4,105	519	12.6	424	81.7	95	18.3	0	0
21682	3,415	419	12.3	317	75.7	98	23.4	4	1
21613	6,458	745	11.5	587	78.8	147	19.7	11	1.5
55182	804	154	19.2	117	76	37	24	0	0
20520	1,502	217	14.4	159	73.3	57	26.3	1	0.5
19599	612	55	9	48	87.3	7	12.7	0	0
32025	992	132	13.3	99	75	33	25	0	0
21573	1,239	193	15.6	154	79.8	39	20.2	0	0
21588	2,685	413	15.4	340	82.3	71	17.2	2	0.5
55225	1,436	238	16.6	209	87.8	27	11.3	2	0.8
21755	1,213	236	19.5	193	81.8	41	17.4	2	0.8
15904	1,201	132	11	132	100	0	0	0	0
21590	280	35	12.5	31	88.6	3	8.6	1	2.9
21596	2,109	293	13.9	214	73	77	26.3	2	0.7
21636	1,949	266	13.6	212	79.7	53	19.9	1	0.4
21167	1,044	202	19.3	163	80.7	38	18.8	1	0.5
21556	2,344	497	21.2	389	78.3	106	21.3	2	0.4
20851	1,557	236	15.2	188	79.7	44	18.6	4	1.7
Total	63,994	8,437	13.2	6,750	80	1,647	19.5	40	0.5

APPENDIX L
ITEM-LEVEL CLASSICAL STATISTICS

Table L-1. Item-Level Classical Test Theory Statistics—ELA Grade 3

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
146971A	MC	0.57	0.45	0.16	156336A	MC	0.75	0.56	0.21
146994A	MC	0.64	0.51	0.10	156355A	MC	0.65	0.35	0.16
147007A	MC	0.60	0.46	0.07	156356A	MC	0.60	0.50	0.16
147008A	MC	0.57	0.34	0.12	156362A	MC	0.51	0.28	0.16
147012A	MC	0.64	0.44	0.06	184195A	MC	0.55	0.34	0.20
147341A	MC	0.75	0.44	0.11	184197A	MC	0.62	0.40	0.20
147348A	MC	0.56	0.43	0.13	481996	MC	0.50	0.25	0.13
147351A	MC	0.73	0.52	0.13	482322	MC	0.33	0.33	0.05
147358A	MC	0.71	0.33	0.14	484543	MC	0.24	0.25	0.12
147359A	MC	0.59	0.46	0.14	484565	MC	0.39	0.39	0.15
147433A	MC	0.49	0.37	0.14	484567	MC	0.24	0.29	0.18
147456A	MC	0.44	0.46	0.14	484569	MC	0.59	0.42	0.09
155253A	MC	0.58	0.43	0.07	484575	MC	0.57	0.40	0.09
155255A	MC	0.45	0.39	0.06	484577	MC	0.45	0.40	0.08
155274A	MC	0.71	0.51	0.10	484579	MC	0.48	0.47	0.09
155279A	MC	0.61	0.48	0.10	484581	MC	0.37	0.22	0.08
155282A	MC	0.57	0.34	0.12	628643	MC	0.39	0.25	0.14
155283A	MC	0.67	0.41	0.09	628734	MC	0.57	0.42	0.14
156120A	MC	0.67	0.55	0.08	628923	MC	0.29	0.39	0.17
156121A	MC	0.61	0.49	0.06	628961	MC	0.50	0.48	0.19
156123A	MC	0.47	0.43	0.09	630590	MC	0.43	0.44	0.05
156124A	MC	0.74	0.43	0.06	630598	MC	0.45	0.31	0.16
156125A	MC	0.39	0.27	0.09	630600	MC	0.49	0.41	0.13
156126A	MC	0.44	0.46	0.09	630602	MC	0.37	0.34	0.13



Table L-2. Item-Level Classical Test Theory Statistics—ELA Grade 4

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
146887A	MC	0.57	0.45	0.09	185806A	MC	0.42	0.33	0.09
148686A	MC	0.53	0.33	0.12	186016A	MC	0.66	0.29	0.10
148719A	MC	0.45	0.15	0.12	186018A	MC	0.27	0.20	0.11
148938A	MC	0.81	0.53	0.06	186065A	MC	0.40	0.38	0.10
149114A	MC	0.76	0.50	0.09	483086	MC	0.56	0.36	0.12
149115A	MC	0.41	0.36	0.06	483092	MC	0.19	0.00	0.13
149116A	MC	0.71	0.53	0.09	483113	MC	0.31	0.23	0.19
149136A	MC	0.44	0.49	0.12	484626	MC	0.67	0.43	0.09
155490A	MC	0.51	0.46	0.07	484628	MC	0.73	0.52	0.07
155569A	MC	0.61	0.44	0.13	484632	MC	0.61	0.52	0.07
155571A	MC	0.73	0.48	0.14	484636	MC	0.56	0.25	0.07
155572A	MC	0.75	0.45	0.12	484638	MC	0.63	0.54	0.05
155580A	MC	0.69	0.56	0.13	484646	MC	0.57	0.47	0.05
158587A	MC	0.57	0.52	0.07	484648	MC	0.64	0.47	0.05
158589A	MC	0.69	0.58	0.11	484652	MC	0.39	0.33	0.11
158602A	MC	0.51	0.35	0.06	484654	MC	0.48	0.40	0.10
158603A	MC	0.30	0.11	0.03	484658	MC	0.61	0.51	0.11
158604A	MC	0.71	0.37	0.03	632843	MC	0.33	0.31	0.14
158611A	MC	0.66	0.39	0.04	632853	MC	0.71	0.53	0.13
158691A	MC	0.83	0.47	0.04	632863	MC	0.46	0.39	0.12
158692A	MC	0.46	0.37	0.04	632877	MC	0.62	0.35	0.13
184822A	MC	0.39	0.23	0.10	635510	MC	0.81	0.33	0.02
184824A	MC	0.82	0.50	0.10	635527	MC	0.65	0.37	0.02
184827A	MC	0.29	0.31	0.11	635530	MC	0.62	0.36	0.03



Table L-3. Item-Level Classical Test Theory Statistics—ELA Grade 5

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
147920A	MC	0.80	0.45	0.04	186115A	MC	0.42	0.38	0.11
147921A	MC	0.63	0.51	0.03	186121A	MC	0.61	0.50	0.11
147923A	MC	0.62	0.47	0.04	186131A	MC	0.49	0.28	0.11
147924A	MC	0.65	0.43	0.03	186469A	MC	0.38	0.45	0.17
147926A	MC	0.54	0.39	0.05	186471A	MC	0.84	0.50	0.17
147969A	MC	0.77	0.52	0.03	186474A	MC	0.52	0.36	0.16
148003A	MC	0.57	0.35	0.07	186476A	MC	0.54	0.45	0.15
148007A	MC	0.60	0.30	0.08	186488A	MC	0.32	0.18	0.20
148008A	MC	0.46	0.25	0.07	186777A	MC	0.78	0.51	0.11
148961A	MC	0.65	0.49	0.10	483126	MC	0.68	0.44	0.03
148963A	MC	0.75	0.52	0.11	483134	MC	0.59	0.37	0.14
148967A	MC	0.72	0.62	0.10	483146	MC	0.47	0.40	0.14
149152A	MC	0.83	0.49	0.09	483172	MC	0.71	0.49	0.03
149158A	MC	0.49	0.36	0.09	630617	MC	0.42	0.39	0.13
149196A	MC	0.65	0.42	0.13	630655	MC	0.76	0.51	0.03
149321A	MC	0.64	0.37	0.10	630737	MC	0.67	0.50	0.12
149334A	MC	0.54	0.45	0.15	631575	MC	0.50	0.40	0.12
149338A	MC	0.59	0.54	0.13	631601	MC	0.58	0.47	0.12
149339A	MC	0.56	0.35	0.14	631918	MC	0.48	0.43	0.11
158749A	MC	0.51	0.45	0.10	631955	MC	0.77	0.52	0.04
159592A	MC	0.62	0.44	0.04	631981	MC	0.53	0.52	0.05
159600A	MC	0.83	0.49	0.03	632003	MC	0.67	0.47	0.05
160718A	MC	0.80	0.51	0.08	632256	MC	0.65	0.41	0.04
186097A	MC	0.37	0.41	0.11	632269	MC	0.47	0.37	0.05
186107A	MC	0.73	0.53	0.12	632323	MC	0.52	0.45	0.05



Table L-4. Item-Level Classical Test Theory Statistics—ELA Grade 6

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
147283A	MC	0.71	0.49	0.06	159281A	MC	0.80	0.42	0.05
147289A	MC	0.67	0.31	0.06	159297A	MC	0.60	0.46	0.06
147290A	MC	0.68	0.45	0.05	159451A	MC	0.75	0.40	0.16
149400A	MC	0.71	0.48	0.05	159453A	MC	0.69	0.36	0.17
149414A	MC	0.52	0.41	0.06	159454A	MC	0.39	0.34	0.16
149570A	MC	0.61	0.45	0.20	159457A	MC	0.75	0.39	0.17
149571A	MC	0.62	0.60	0.21	159458A	MC	0.66	0.38	0.17
149737A	MC	0.61	0.39	0.07	485443	MC	0.40	0.39	0.18
158702A	MC	0.49	0.58	0.19	485688	MC	0.73	0.51	0.27
158705A	MC	0.83	0.57	0.19	485700	MC	0.17	0.14	0.23
158723A	MC	0.81	0.50	0.17	485702	MC	0.78	0.50	0.11
158739A	MC	0.77	0.49	0.08	486350	MC	0.50	0.32	0.07
158740A	MC	0.64	0.34	0.18	486369	MC	0.65	0.52	0.08
158747A	MC	0.69	0.45	0.22	486371	MC	0.65	0.44	0.07
158756A	MC	0.37	0.17	0.18	486376	MC	0.68	0.51	0.09
158774A	MC	0.70	0.54	0.08	629854	MC	0.27	0.24	0.07
158786A	MC	0.75	0.53	0.21	629856	MC	0.62	0.47	0.09
158886A	MC	0.83	0.47	0.17	629863	MC	0.60	0.42	0.04
158897A	MC	0.63	0.44	0.21	629867	MC	0.74	0.52	0.03
158935A	MC	0.60	0.41	0.04	629869	MC	0.53	0.39	0.05
158943A	MC	0.41	0.26	0.07	629875	MC	0.43	0.42	0.03
158947A	MC	0.60	0.41	0.07	629885	MC	0.53	0.39	0.20
158954A	MC	0.73	0.54	0.20	629889	MC	0.32	0.24	0.20
158978A	MC	0.42	0.33	0.22	629895	MC	0.61	0.40	0.19



Table L-5. Item-Level Classical Test Theory Statistics—ELA Grade 7

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
148104A	MC	0.63	0.50	0.20	160457A	MC	0.48	0.31	0.02
148117A	MC	0.55	0.42	0.21	160508A	MC	0.58	0.43	0.03
148759A	MC	0.57	0.43	0.21	160511A	MC	0.58	0.36	0.02
148760A	MC	0.64	0.50	0.22	160937A	MC	0.72	0.53	0.05
148762A	MC	0.72	0.38	0.26	160940A	MC	0.81	0.50	0.08
148823A	MC	0.65	0.44	0.02	182584A	MC	0.47	0.37	0.04
148850A	MC	0.74	0.41	0.19	182596A	MC	0.70	0.53	0.04
148859A	MC	0.82	0.44	0.19	182597A	MC	0.62	0.37	0.06
154639A	MC	0.40	0.31	0.19	485447	MC	0.72	0.41	0.02
158719A	MC	0.47	0.41	0.19	485451	MC	0.41	0.38	0.23
158724A	MC	0.60	0.47	0.19	485453	MC	0.53	0.47	0.05
158765A	MC	0.60	0.44	0.16	485467	MC	0.40	0.18	0.01
158766A	MC	0.64	0.41	0.16	486286	MC	0.31	0.19	0.04
158769A	MC	0.57	0.18	0.17	486294	MC	0.35	0.31	0.05
158810A	MC	0.55	0.36	0.03	486317	MC	0.52	0.24	0.06
158847A	MC	0.83	0.27	0.02	486331	MC	0.17	0.00	0.05
158849A	MC	0.60	0.25	0.02	486333	MC	0.64	0.50	0.04
158871A	MC	0.74	0.47	0.01	633929	MC	0.23	0.26	0.06
159120A	MC	0.65	0.54	0.21	634354	MC	0.43	0.23	0.18
159122A	MC	0.48	0.37	0.21	634364	MC	0.52	0.37	0.18
159133A	MC	0.47	0.32	0.21	634366	MC	0.53	0.28	0.18
159137A	MC	0.37	0.28	0.21	634374	MC	0.42	0.28	0.20
159394A	MC	0.56	0.30	0.06	634379	MC	0.55	0.48	0.20
159646A	MC	0.50	0.45	0.05	634389	MC	0.56	0.37	0.18



Table L-6. Item-Level Classical Test Theory Statistics—ELA Grade 8

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
148177A	MC	0.70	0.49	0.15	160787A	MC	0.67	0.43	0.04
148187A	MC	0.72	0.36	0.13	160788A	MC	0.56	0.29	0.05
148189A	MC	0.52	0.34	0.13	160789A	MC	0.42	0.36	0.04
148191A	MC	0.60	0.42	0.13	160790A	MC	0.73	0.28	0.04
149373A	MC	0.87	0.54	0.13	160946A	MC	0.55	0.53	0.14
149374A	MC	0.81	0.51	0.13	160947A	MC	0.71	0.26	0.13
149507A	MC	0.60	0.38	0.13	160956A	MC	0.57	0.30	0.14
149580A	MC	0.19	0.27	0.03	160989A	MC	0.51	0.26	0.07
149583A	MC	0.33	0.26	0.02	485473	MC	0.66	0.43	0.13
149591A	MC	0.43	0.52	0.04	485493	MC	0.61	0.27	0.13
149597A	MC	0.74	0.40	0.02	485510	MC	0.51	0.33	0.03
149600A	MC	0.57	0.24	0.02	486738	MC	0.47	0.24	0.05
149603A	MC	0.84	0.46	0.03	486744	MC	0.52	0.34	0.05
149619A	MC	0.52	0.41	0.15	486757	MC	0.38	0.27	0.05
149623A	MC	0.67	0.46	0.14	486763	MC	0.81	0.27	0.05
160000A	MC	0.58	0.42	0.13	487006	MC	0.79	0.44	0.06
160467A	MC	0.70	0.34	0.13	626597	MC	0.55	0.24	0.06
160472A	MC	0.70	0.41	0.14	626602	MC	0.53	0.42	0.05
160477A	MC	0.31	0.23	0.16	626606	MC	0.35	0.20	0.08
160742A	MC	0.68	0.48	0.07	626623	MC	0.60	0.21	0.06
160745A	MC	0.79	0.43	0.07	626626	MC	0.41	0.46	0.14
160747A	MC	0.67	0.40	0.08	626777	MC	0.41	0.32	0.14
160780A	MC	0.29	0.33	0.13	626785	MC	0.71	0.56	0.14
160782A	MC	0.67	0.41	0.14	626800	MC	0.41	0.34	0.19
160784A	MC	0.91	0.46	0.04	627061	MC	0.80	0.52	0.14



Table L-7. Item-Level Classical Test Theory Statistics—Mathematics Grade 3

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
146917	MC	0.76	0.51	0.04	154758	MC	0.58	0.61	0.05
146955	MC	0.65	0.47	0.12	154760	MC	0.58	0.60	0.13
147044	MC	0.63	0.47	0.11	155162	MC	0.26	0.42	0.12
147064	MC	0.88	0.41	0.02	155260	MC	0.77	0.60	0.11
147330	MC	0.78	0.58	0.11	155268	MC	0.51	0.49	0.04
147503	MC	0.63	0.66	0.06	155455	MC	0.32	0.31	0.09
147542	MC	0.69	0.49	0.04	155478	MC	0.54	0.55	0.06
147712	MC	0.74	0.56	0.10	155501	MC	0.36	0.40	0.14
147718	MC	0.67	0.52	0.14	155594	MC	0.56	0.46	0.13
147741	MC	0.79	0.50	0.06	155999	MC	0.53	0.38	0.03
147966	MC	0.41	0.17	0.10	161166	MC	0.65	0.54	0.07
150663	MC	0.67	0.47	0.05	184059	MC	0.49	0.39	0.15
151560	MC	0.71	0.49	0.11	479107	MC	0.79	0.47	0.08
152255	MC	0.50	0.36	0.06	479111	MC	0.64	0.55	0.12
152325	MC	0.66	0.47	0.10	479113	MC	0.84	0.50	0.04
152546	MC	0.73	0.48	0.04	479117	MC	0.62	0.40	0.06
152598	MC	0.41	0.48	0.15	479125	MC	0.93	0.37	0.14
152739	MC	0.76	0.46	0.07	479138	MC	0.44	0.49	0.15
152842	MC	0.28	0.41	0.08	479140	MC	0.58	0.49	0.11
152864	MC	0.54	0.39	0.14	488998	MC	0.46	0.28	0.14
153154	MC	0.68	0.47	0.18	636402	MC	0.61	0.44	0.13
153168	MC	0.62	0.64	0.13	636410	MC	0.82	0.44	0.08
154329	MC	0.79	0.48	0.19	636412	MC	0.45	0.32	0.12
154484	MC	0.71	0.56	0.08	636429	MC	0.68	0.33	0.09
154533	MC	0.58	0.53	0.16	636443	MC	0.52	0.30	0.11



Table L-8. Item-Level Classical Test Theory Statistics—Mathematics Grade 4

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
147318	MC	0.90	0.40	0.08	152874	MC	0.33	0.40	0.05
147319	MC	0.79	0.41	0.04	152988	MC	0.59	0.52	0.08
147525	MC	0.64	0.53	0.02	153171	MC	0.50	0.48	0.08
147975	MC	0.46	0.27	0.09	153185	MC	0.46	0.45	0.09
148069	MC	0.76	0.44	0.08	153189	MC	0.46	0.54	0.08
148301	MC	0.36	0.37	0.08	153206	MC	0.61	0.52	0.05
148500	MC	0.49	0.52	0.06	153325	MC	0.39	0.40	0.11
148654	MC	0.33	0.47	0.09	153346	MC	0.90	0.34	0.03
148675	MC	0.33	0.27	0.10	154024	MC	0.48	0.55	0.06
149723	MC	0.47	0.47	0.07	154479	MC	0.34	0.31	0.11
150227	MC	0.42	0.24	0.09	155121	MC	0.29	0.33	0.09
150664	MC	0.59	0.53	0.02	155167	MC	0.89	0.37	0.04
150722	MC	0.36	0.22	0.06	155192	MC	0.51	0.32	0.09
151506	MC	0.44	0.46	0.08	155220	MC	0.69	0.37	0.10
151519	MC	0.82	0.51	0.09	156019	MC	0.51	0.50	0.09
151549	MC	0.68	0.40	0.12	161617	MC	0.23	0.29	0.05
151554	MC	0.74	0.45	0.05	184099	MC	0.49	0.40	0.08
151556	MC	0.63	0.55	0.10	184241	MC	0.68	0.47	0.04
151997	MC	0.47	0.50	0.15	479500	MC	0.83	0.39	0.08
152343	MC	0.41	0.53	0.03	479507	MC	0.78	0.27	0.04
152353	MC	0.62	0.51	0.09	479932	MC	0.37	0.26	0.08
152355	MC	0.77	0.45	0.09	636619	MC	0.71	0.50	0.09
152518	MC	0.71	0.50	0.08	636627	MC	0.34	0.41	0.14
152776	MC	0.67	0.30	0.08	636666	MC	0.67	0.56	0.08
152789	MC	0.39	0.44	0.04	636668	MC	0.59	0.49	0.10



Table L-9. Item-Level Classical Test Theory Statistics—Mathematics Grade 5

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
146915A	MC	0.64	0.55	0.02	153162A	MC	0.84	0.34	0.07
146959A	MC	0.42	0.41	0.07	153165A	MC	0.46	0.47	0.07
147968A	MC	0.81	0.40	0.03	153972A	MC	0.60	0.44	0.09
147990A	MC	0.39	0.52	0.04	154046A	MC	0.43	0.57	0.05
148011A	MC	0.62	0.54	0.03	155145A	MC	0.63	0.47	0.05
148659A	MC	0.52	0.57	0.08	155234A	MC	0.17	0.37	0.09
148852A	MC	0.39	0.45	0.08	155426A	MC	0.83	0.40	0.06
149230A	MC	0.51	0.54	0.04	155434A	MC	0.48	0.42	0.08
149246A	MC	0.56	0.48	0.03	155474A	MC	0.61	0.54	0.10
149261A	MC	0.36	0.49	0.11	155479A	MC	0.29	0.35	0.16
149289A	MC	0.46	0.31	0.03	155489A	MC	0.42	0.43	0.06
149384A	MC	0.62	0.51	0.11	155523A	MC	0.79	0.42	0.10
149640A	MC	0.30	0.25	0.10	161469A	MC	0.66	0.49	0.09
150267A	MC	0.46	0.38	0.04	181426A	MC	0.50	0.29	0.04
150631A	MC	0.63	0.57	0.05	184261A	MC	0.56	0.38	0.10
150689A	MC	0.50	0.39	0.05	184263A	MC	0.70	0.28	0.09
150703A	MC	0.25	0.26	0.08	187144A	MC	0.47	0.37	0.04
150711A	MC	0.41	0.42	0.03	187147A	MC	0.55	0.48	0.12
152807A	MC	0.40	0.46	0.11	484706	MC	0.59	0.41	0.02
152859A	MC	0.56	0.41	0.02	484714	MC	0.29	0.18	0.08
152933A	MC	0.51	0.29	0.10	489954	MC	0.85	0.38	0.02
152946A	MC	0.62	0.53	0.09	636681	MC	0.29	0.51	0.10
152972A	MC	0.61	0.41	0.07	636693	MC	0.83	0.38	0.08
153075A	MC	0.43	0.57	0.04	636726	MC	0.50	0.53	0.11
153107A	MC	0.55	0.45	0.10	636735	MC	0.72	0.38	0.05



Table L-10. Item-Level Classical Test Theory Statistics—Mathematics Grade 6

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
147412A	MC	0.61	0.49	0.03	153601A	MC	0.65	0.45	0.19
147578A	MC	0.31	0.37	0.04	153952A	MC	0.74	0.41	0.03
148159A	MC	0.66	0.30	0.19	155177A	MC	0.84	0.45	0.17
148231A	MC	0.67	0.46	0.18	155184A	MC	0.57	0.41	0.08
148926A	MC	0.73	0.41	0.20	155298A	MC	0.59	0.52	0.26
149062A	MC	0.75	0.40	0.21	181240A	MC	0.64	0.46	0.04
149140A	MC	0.57	0.43	0.19	181455A	MC	0.43	0.45	0.24
149231A	MC	0.55	0.54	0.08	479039	MC	0.43	0.31	0.07
149234A	MC	0.69	0.53	0.17	479041	MC	0.73	0.43	0.04
149511A	MC	0.51	0.39	0.22	479043	MC	0.28	0.26	0.04
149730A	MC	0.60	0.45	0.02	479047	MC	0.39	0.27	0.12
150604A	MC	0.51	0.40	0.03	479049	MC	0.34	0.20	0.11
150723A	MC	0.68	0.51	0.21	479057	MC	0.69	0.40	0.21
150972A	MC	0.35	0.44	0.04	479067	MC	0.37	0.21	0.21
151145A	MC	0.61	0.38	0.28	479069	MC	0.78	0.42	0.06
151316A	MC	0.66	0.50	0.03	479077	MC	0.35	0.31	0.07
151782A	MC	0.23	0.17	0.04	479083	MC	0.59	0.39	0.09
151835A	MC	0.33	0.19	0.22	479087	MC	0.43	0.27	0.04
152379A	MC	0.49	0.60	0.07	636459	MC	0.61	0.47	0.10
152754A	MC	0.33	0.35	0.20	636463	MC	0.41	0.36	0.19
153103A	MC	0.50	0.40	0.18	636465	MC	0.60	0.52	0.18
153315A	MC	0.43	0.53	0.19	636479	MC	0.48	0.39	0.06
153382A	MC	0.43	0.30	0.22	636499	MC	0.63	0.40	0.04
153512A	MC	0.53	0.46	0.21					

Table L-11. Item-Level Classical Test Theory Statistics—Mathematics Grade 7

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
147541A	MC	0.69	0.42	0.22	153291A	MC	0.43	0.43	0.20
148154A	MC	0.71	0.41	0.21	153299A	MC	0.28	0.43	0.15
148171A	MC	0.41	0.48	0.10	153485A	MC	0.49	0.34	0.06
148193A	MC	0.28	0.32	0.08	153504A	MC	0.34	0.51	0.10
148330A	MC	0.31	0.53	0.21	155126A	MC	0.21	0.34	0.13
148478A	MC	0.27	0.32	0.26	155443A	MC	0.40	0.47	0.07
148527A	MC	0.59	0.45	0.22	182026A	MC	0.62	0.21	0.05
148530A	MC	0.47	0.34	0.24	182027A	MC	0.44	0.31	0.06
148711A	MC	0.44	0.52	0.22	480259	MC	0.37	0.30	0.14
148739A	MC	0.64	0.48	0.22	480287	MC	0.41	0.39	0.12
148912A	MC	0.50	0.39	0.19	480295	MC	0.33	0.32	0.29
149102A	MC	0.35	0.28	0.07	480307	MC	0.26	0.15	0.13
149204A	MC	0.44	0.44	0.07	480339	MC	0.23	0.47	0.20
149705A	MC	0.63	0.34	0.08	489119	MC	0.25	0.35	0.26
149759A	MC	0.56	0.43	0.25	489176	MC	0.45	0.40	0.15
150199A	MC	0.45	0.54	0.21	490454	MC	0.29	0.20	0.29
150232A	MC	0.20	0.43	0.12	636508	MC	0.49	0.43	0.18
150891A	MC	0.32	0.27	0.09	636512	MC	0.28	0.42	0.23
152009A	MC	0.35	0.40	0.19	CB23120	MC	0.22	0.30	0.05
152051A	MC	0.26	0.42	0.12	CB23921	MC	0.19	0.00	0.15
152195A	MC	0.54	0.42	0.06	CB52883	MC	0.14	0.22	0.06
152288A	MC	0.29	0.40	0.19	CB56794	MC	0.26	0.02	0.23
152901A	MC	0.52	0.35	0.28	CB57198	MC	0.25	0.15	0.22
152915A	MC	0.51	0.34	0.21					

Table L-12. Item-Level Classical Test Theory Statistics—Mathematics Grade 8

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
148061A	MC	0.32	0.49	0.05	484821	MC	0.54	0.47	0.10
148303A	MC	0.39	0.47	0.06	484823	MC	0.69	0.42	0.04
148327A	MC	0.39	0.54	0.24	484828	MC	0.60	0.39	0.25
148379A	MC	0.58	0.48	0.04	484841	MC	0.20	0.18	0.27
148689A	MC	0.33	0.49	0.25	484853	MC	0.45	0.54	0.30
149067A	MC	0.60	0.48	0.05	484860	MC	0.32	0.22	0.12
150198A	MC	0.34	0.54	0.25	484866	MC	0.28	0.40	0.04
150202A	MC	0.47	0.41	0.24	484873	MC	0.31	0.28	0.24
150215A	MC	0.47	0.32	0.24	484877	MC	0.66	0.38	0.24
150218A	MC	0.45	0.44	0.26	484881	MC	0.63	0.30	0.23
150223A	MC	0.51	0.53	0.29	484977	MC	0.40	0.30	0.04
151253A	MC	0.40	0.46	0.28	490067	MC	0.38	0.54	0.25
151283A	MC	0.46	0.47	0.05	490116	MC	0.51	0.32	0.25
153423A	MC	0.72	0.36	0.05	490151	MC	0.47	0.30	0.11
154159A	MC	0.54	0.42	0.03	636559	MC	0.41	0.35	0.11
154160A	MC	0.45	0.37	0.25	636567	MC	0.43	0.29	0.17
154320A	MC	0.52	0.34	0.07	636602	MC	0.19	0.22	0.26
161462A	MC	0.42	0.56	0.08	636610	MC	0.69	0.37	0.05
183763A	MC	0.29	0.27	0.24	CB23158	MC	0.20	0.29	0.02
183764A	MC	0.38	0.26	0.24	CB30135	MC	0.26	0.33	0.05
183795A	MC	0.35	0.41	0.23	CB48551	MC	0.31	0.39	0.09
183885A	MC	0.56	0.34	0.08	CB52933	MC	0.17	0.16	0.07
484772	MC	0.49	0.37	0.08	CB6713	MC	0.11	0.10	0.26
484815	MC	0.32	0.28	0.03	148061A	MC	0.32	0.49	0.05



Table L-13. Item-Level Classical Test Theory Statistics—Science Grade 5

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
184387A	MC	0.52	0.48	0.05	188720A	MC	0.75	0.48	0.19
184423A	MC	0.44	0.30	0.05	189235A	MC	0.71	0.42	0.03
185413A	MC	0.31	0.30	0.04	189237A	MC	0.51	0.48	0.02
186483A	MC	0.51	0.19	0.02	189238A	MC	0.45	0.28	0.03
186489A	MC	0.51	0.41	0.03	189340A	MC	0.58	0.57	0.15
186490A	MC	0.43	0.29	0.03	189341A	MC	0.58	0.43	0.17
186754A	MC	0.71	0.48	0.13	189345A	MC	0.36	0.29	0.16
186756A	MC	0.75	0.40	0.13	189356A	MC	0.39	0.39	0.14
186759A	MC	0.75	0.51	0.14	189358A	MC	0.46	0.32	0.15
187487A	MC	0.50	0.31	0.02	189361A	MC	0.72	0.51	0.13
187491A	MC	0.36	0.24	0.02	437226	MC	0.61	0.52	0.12
187497A	MC	0.35	0.42	0.02	437231	MC	0.55	0.45	0.12
187503A	MC	0.46	0.29	0.01	437235	MC	0.60	0.36	0.12
187505A	MC	0.77	0.40	0.02	437241	MC	0.46	0.44	0.07
187510A	MC	0.86	0.42	0.01	437243	MC	0.38	0.34	0.06
188334A	MC	0.43	0.33	0.07	437245	MC	0.37	0.37	0.08
188338A	MC	0.56	0.42	0.06	638751	MC	0.38	0.23	0.03
188340A	MC	0.49	0.46	0.06	638753	MC	0.44	0.32	0.02
188698A	MC	0.29	0.43	0.15	638755	MC	0.46	0.28	0.02
188699A	MC	0.46	0.34	0.13	638783	MC	0.48	0.39	0.15
188700A	MC	0.36	0.41	0.14	638785	MC	0.50	0.37	0.15
188717A	MC	0.68	0.53	0.18	638787	MC	0.36	0.31	0.14
188718A	MC	0.81	0.51	0.18					



Table L-14. Item-Level Classical Test Theory Statistics—Science Grade 8

Item		Difficulty	Discrimination	Percent Omitted	Item		Difficulty	Discrimination	Percent Omitted
Number	Type				Number	Type			
185899A	MC	0.59	0.49	0.18	188849A	MC	0.48	0.37	0.16
185901A	MC	0.27	0.20	0.18	189061A	MC	0.40	0.42	0.03
185916A	MC	0.58	0.44	0.17	189076A	MC	0.56	0.39	0.03
186154A	MC	0.30	0.34	0.14	189080A	MC	0.53	0.34	0.03
186293A	MC	0.47	0.27	0.13	189438A	MC	0.54	0.31	0.17
186309A	MC	0.45	0.36	0.14	189440A	MC	0.62	0.31	0.16
186321A	MC	0.54	0.40	0.02	189442A	MC	0.70	0.49	0.15
186325A	MC	0.74	0.36	0.02	300093A	MC	0.61	0.50	0.03
186364A	MC	0.46	0.41	0.02	300095A	MC	0.42	0.37	0.02
187032A	MC	0.57	0.45	0.05	300097A	MC	0.63	0.52	0.04
187038A	MC	0.47	0.39	0.04	437757	MC	0.45	0.42	0.02
187047A	MC	0.40	0.29	0.04	437771	MC	0.45	0.34	0.02
188149A	MC	0.49	0.27	0.04	437788	MC	0.35	0.24	0.02
188150A	MC	0.48	0.41	0.02	437995	MC	0.42	0.38	0.05
188153A	MC	0.25	0.23	0.02	437999	MC	0.60	0.49	0.06
188312A	MC	0.33	0.26	0.18	638857	MC	0.54	0.25	0.02
188317A	MC	0.70	0.44	0.17	638862	MC	0.47	0.37	0.03
188328A	MC	0.52	0.57	0.19	638866	MC	0.44	0.33	0.02
188332A	MC	0.55	0.47	0.18	638873	MC	0.23	0.28	0.15
188846A	MC	0.49	0.32	0.18	638875	MC	0.44	0.21	0.15
188847A	MC	0.53	0.47	0.16	638883	MC	0.62	0.44	0.15



Table L-15. Item-Level Classical Test Theory Statistics—Science Grade 11

Item					Item				
Number	Type	Difficulty	Discrimination	Percent Omitted	Number	Type	Difficulty	Discrimination	Percent Omitted
186972	MC	0.38	0.34	0.18	586631	MC	0.21	0.38	0.16
186989	MC	0.54	0.45	0.18	586636	MC	0.61	0.36	0.16
186992	MC	0.65	0.43	0.18	586640	MC	0.24	0.24	0.17
187933	MC	0.74	0.44	0.04	586649	MC	0.43	0.42	0.09
187935	MC	0.58	0.43	0.03	586655	MC	0.39	0.33	0.11
187938	MC	0.66	0.35	0.03	586691	MC	0.43	0.22	0.18
188657	MC	0.49	0.25	0.03	586693	MC	0.41	0.39	0.17
188658	MC	0.39	0.20	0.05	586701	MC	0.45	0.39	0.21
188659	MC	0.44	0.30	0.04	586709	MC	0.34	0.50	0.24
188833	MC	0.33	0.25	0.17	586711	MC	0.36	0.31	0.21
188834	MC	0.41	0.35	0.17	591949	MC	0.37	0.33	0.18
188835	MC	0.45	0.46	0.16	592069	MC	0.56	0.53	0.02
188947	MC	0.33	0.30	0.03	592071	MC	0.70	0.45	0.03
188949	MC	0.28	0.26	0.03	592073	MC	0.29	0.33	0.03
188952	MC	0.44	0.35	0.04	593424	MC	0.44	0.36	0.04
439192	MC	0.37	0.39	0.03	593426	MC	0.53	0.49	0.04
439200	MC	0.41	0.35	0.03	594373	MC	0.32	0.33	0.20
439206	MC	0.37	0.35	0.03	594375	MC	0.45	0.33	0.19
439223	MC	0.31	0.40	0.22	594379	MC	0.25	0.24	0.20
439239	MC	0.32	0.32	0.21	603684	MC	0.44	0.39	0.18
457186	MC	0.45	0.57	0.04	638964	MC	0.33	0.10	0.21
457197	MC	0.39	0.39	0.04	638968	MC	0.33	0.41	0.21
457199	MC	0.35	0.37	0.04	638970	MC	0.30	0.19	0.22
586027	MC	0.36	0.39	0.04	639009	MC	0.31	0.27	0.04
586029	MC	0.44	0.46	0.04	639014	MC	0.37	0.43	0.05
586031	MC	0.53	0.46	0.03	639018	MC	0.27	0.23	0.04
586051	MC	0.46	0.34	0.16	656455	MC	0.31	0.22	0.18
586069	MC	0.41	0.26	0.17	656457	MC	0.46	0.33	0.16
586218	MC	0.59	0.50	0.04	656465	MC	0.35	0.38	0.16

Table L-16. Item-Level Non-MC Items—Across Grades & Content Areas

Content Area	Grade	PvMax	Item	Type	P0	P1	P2	P3	P4	P5	P6	P7	
ELA	3	2	627921	CR	43.37	55.53	1.10	NULL	NULL	NULL	NULL	NULL	
		2	628835	CR	42.72	53.70	3.58	NULL	NULL	NULL	NULL	NULL	
	4	2	629160	CR	35.50	53.70	10.80	NULL	NULL	NULL	NULL	NULL	
		2	629614	CR	58.80	38.56	2.64	NULL	NULL	NULL	NULL	NULL	
		5	760803	WP	1.78	75.75	NULL	16.14	5.81	0.52	NULL	NULL	
	5	5	760986	WP	2.33	67.71	NULL	23.13	6.37	0.45	NULL	NULL	
		5	761338	WP	0.83	54.34	NULL	35.14	9.23	0.47	NULL	NULL	
		5	761740	WP	0.89	54.08	NULL	38.32	6.42	0.30	NULL	NULL	
		5	761786	WP	0.85	68.17	NULL	25.75	5.03	0.21	NULL	NULL	
		5	761899	WP	1.36	51.93	NULL	39.61	6.76	0.35	NULL	NULL	
		5	762003	WP	1.72	83.56	NULL	12.76	1.89	0.07	NULL	NULL	
		5	763352	WP	1.44	82.21	NULL	12.90	3.27	0.17	NULL	NULL	
	6	2	630339	CR	75.89	22.10	2.02	NULL	NULL	NULL	NULL	NULL	
		2	630430	CR	67.66	30.04	2.30	NULL	NULL	NULL	NULL	NULL	
	7	2	630545	CR	50.45	46.18	3.37	NULL	NULL	NULL	NULL	NULL	
		2	630649	CR	39.68	51.61	8.71	NULL	NULL	NULL	NULL	NULL	
		7	761992	WP	1.07	NULL	30.37	NULL	43.95	21.98	NULL	2.62	
	8	7	762043	WP	1.00	NULL	38.54	NULL	46.14	12.80	NULL	1.52	
		7	762085	WP	1.18	NULL	39.08	NULL	39.07	18.67	NULL	2.00	
		7	762218	WP	1.07	NULL	29.66	NULL	46.77	21.24	NULL	1.25	
		7	762233	WP	0.85	NULL	26.24	NULL	51.08	20.88	NULL	0.95	
		7	762511	WP	1.10	NULL	42.73	NULL	47.60	8.15	NULL	0.41	
		7	762991	WP	0.81	NULL	39.09	NULL	44.74	14.62	NULL	0.74	
		7	762993	WP	0.72	NULL	33.26	NULL	53.63	11.72	NULL	0.67	
	Mathematics	6	1	479095	TE	86.39	13.61	NULL	NULL	NULL	NULL	NULL	NULL
			1	479097	TE	71.31	28.69	NULL	NULL	NULL	NULL	NULL	NULL
			1	479148	TE	81.65	18.35	NULL	NULL	NULL	NULL	NULL	NULL
		7	1	480360	TE	86.55	13.45	NULL	NULL	NULL	NULL	NULL	NULL
1			480373	TE	83.02	16.98	NULL	NULL	NULL	NULL	NULL	NULL	
1			480380	TE	88.64	11.36	NULL	NULL	NULL	NULL	NULL	NULL	
8		1	484739	TE	93.75	6.25	NULL	NULL	NULL	NULL	NULL	NULL	
		1	484750	TE	78.11	21.89	NULL	NULL	NULL	NULL	NULL	NULL	
		1	484766	TE	45.01	54.99	NULL	NULL	NULL	NULL	NULL	NULL	
Science	8	2	438018	TE	42.04	31.56	26.40	NULL	NULL	NULL	NULL	NULL	
		2	494074	TE	20.42	13.67	65.91	NULL	NULL	NULL	NULL	NULL	
		2	494991	TE	17.68	25.51	56.81	NULL	NULL	NULL	NULL	NULL	
	11	2	439259	TE	15.19	63.16	21.65	NULL	NULL	NULL	NULL	NULL	
		2	586659	TE	21.55	41.86	36.59	NULL	NULL	NULL	NULL	NULL	



APPENDIX M
DIFFERENTIAL ITEM FUNCTIONING RESULTS

Table M-1. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall & by Grade & Group Favored—ELA: MC Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
3	Male	Female	MC	48	1	1	0	0	0	0
		Black/African American	MC	48	0	0	0	0	0	0
		Hispanic or Latino	MC	48	1	1	0	0	0	0
	White/Caucasian	American Indian/Alaskan Native	MC	48	0	0	0	0	0	0
		Asian	MC	48	7	6	1	0	0	0
		Pacific Islander	MC	48	11	4	7	3	2	1
		Two or More Races	MC	48	0	0	0	0	0	0
	Non-IEP	IEP	MC	48	0	0	0	0	0	0
	Non-EconDis	EconDis	MC	48	0	0	0	0	0	0
Non-ELL	ELL	MC	48	1	1	0	0	0	0	
4	Male	Female	MC	48	3	2	1	0	0	0
		Black/African American	MC	48	1	0	1	0	0	0
		Hispanic or Latino	MC	48	0	0	0	0	0	0
	White/Caucasian	American Indian/Alaskan Native	MC	48	0	0	0	0	0	0
		Asian	MC	48	4	3	1	0	0	0
		Pacific Islander	MC	48	18	9	9	0	0	0
		Two or More Races	MC	48	0	0	0	0	0	0
	Non-IEP	IEP	MC	48	1	1	0	0	0	0
	Non-EconDis	EconDis	MC	48	0	0	0	0	0	0
Non-ELL	ELL	MC	48	1	1	0	0	0	0	
5	Male	Female	MC	50	4	2	2	1	1	0
		Black/African American	MC	50	3	3	0	0	0	0
		Hispanic or Latino	MC	50	3	2	1	1	1	0
	White/Caucasian	American Indian/Alaskan Native	MC	50	0	0	0	0	0	0
		Asian	MC	50	2	1	1	3	3	0
		Pacific Islander	MC	50	16	7	9	5	4	1
		Two or More Races	MC	50	0	0	0	0	0	0
	Non-IEP	IEP	MC	50	1	1	0	0	0	0
	Non-EconDis	EconDis	MC	50	0	0	0	0	0	0
Non-ELL	ELL	MC	50	3	2	1	1	1	0	
6	Male	Female	MC	48	7	6	1	0	0	0
	White/Caucasian	Black/African American	MC	48	0	0	0	0	0	0
		Hispanic or Latino	MC	48	0	0	0	0	0	0

continued



Grade	Reference	Group		Item Type	Number of Items	Number “Low Resolution” Favoring			Number “High Resolution” Favoring		
		Focal				Total	Reference	Focal	Total	Reference	Focal
6	White/Caucasian	American Indian/Alaskan Native	MC	48	0	0	0	0	0	0	0
		Asian	MC	48	4	2	2	0	0	0	0
		Pacific Islander	MC	48	12	4	8	1	1	0	0
		Two or More Races	MC	48	0	0	0	0	0	0	0
	Non-IEP	IEP	MC	48	1	1	0	0	0	0	0
	Non-EconDis	EconDis	MC	48	0	0	0	0	0	0	0
	Non-ELL	ELL	MC	48	2	2	0	0	0	0	0
7	Male	Female	MC	48	9	6	3	1	1	0	0
	White/Caucasian	Black/African American	MC	48	5	4	1	0	0	0	0
		Hispanic or Latino	MC	48	3	3	0	0	0	0	0
		American Indian/Alaskan Native	MC	48	1	1	0	0	0	0	0
		Asian	MC	48	5	3	2	1	1	0	0
		Pacific Islander	MC	48	15	7	8	5	4	1	1
	Two or More Races	MC	48	0	0	0	0	0	0	0	
	Non-IEP	IEP	MC	48	1	1	0	0	0	0	0
	Non-EconDis	EconDis	MC	48	0	0	0	0	0	0	0
	Non-ELL	ELL	MC	48	3	3	0	0	0	0	0
	8	Male	Female	MC	50	4	2	2	0	0	0
White/Caucasian		Black/African American	MC	50	7	3	4	0	0	0	0
		Hispanic or Latino	MC	50	6	4	2	0	0	0	0
		American Indian/Alaskan Native	MC	50	0	0	0	0	0	0	0
		Asian	MC	50	16	7	9	1	1	0	0
		Pacific Islander	MC	50	11	6	5	4	3	1	1
Two or More Races		MC	50	0	0	0	0	0	0	0	
Non-IEP		IEP	MC	50	3	3	0	0	0	0	0
Non-EconDis		EconDis	MC	50	0	0	0	0	0	0	0
Non-ELL		ELL	MC	50	8	4	4	0	0	0	0



Table M-2. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—ELA: CR Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
3	Male	Female	CR	2	0	0	0	0	0	0
		Black/African American	CR	2	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino	CR	2	0	0	0	0	0	0
		American Indian/Alaskan Native	CR	2	0	0	0	0	0	0
		Asian	CR	2	0	0	0	0	0	0
		Pacific Islander	CR	2	1	0	1	0	0	0
		Two or More Races	CR	2	0	0	0	0	0	0
	Non-IEP	IEP	CR	2	0	0	0	0	0	0
	Non-EconDis	EconDis	CR	2	0	0	0	0	0	0
Non-ELL	ELL	CR	2	0	0	0	0	0	0	
4	Male	Female	CR	2	0	0	0	0	0	0
		Black/African American	CR	2	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino	CR	2	0	0	0	0	0	0
		American Indian/Alaskan Native	CR	2	0	0	0	0	0	0
		Asian	CR	2	0	0	0	0	0	0
		Pacific Islander	CR	2	1	0	1	0	0	0
		Two or More Races	CR	2	0	0	0	0	0	0
	Non-IEP	IEP	CR	2	0	0	0	0	0	0
	Non-EconDis	EconDis	CR	2	0	0	0	0	0	0
Non-ELL	ELL	CR	2	0	0	0	0	0	0	
6	Male	Female	CR	2	2	0	2	0	0	0
		Black/African American	CR	2	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino	CR	2	0	0	0	0	0	0
		American Indian/Alaskan Native	CR	2	0	0	0	0	0	0
		Asian	CR	2	0	0	0	0	0	0
		Pacific Islander	CR	2	0	0	0	0	0	0
		Two or More Races	CR	2	0	0	0	0	0	0

continued

Grade	Group		Item Type	Number of Items	Number "Low Resolution"			Number "High Resolution"		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
6	Non-IEP	IEP	CR	2	0	0	0	0	0	0
	Non-EconDis	EconDis	CR	2	0	0	0	0	0	0
	Non-ELL	ELL	CR	2	0	0	0	0	0	0
7	Male	Female	CR	2	1	0	1	0	0	0
		Black/African American	CR	2	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino	CR	2	0	0	0	0	0	0
		American Indian/Alaskan Native	CR	2	0	0	0	0	0	0
		Asian	CR	2	1	0	1	0	0	0
		Pacific Islander	CR	2	1	0	1	0	0	0
		Two or More Races	CR	2	0	0	0	0	0	0
		Non-IEP	IEP	CR	2	0	0	0	0	0
	Non-EconDis	EconDis	CR	2	0	0	0	0	0	0
	Non-ELL	ELL	CR	2	0	0	0	0	0	0



Table M-3. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—ELA: WP Items

Grade	Reference	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
		Focal				Total	Favoring		Total	Favoring	
							Reference	Focal		Reference	Focal
5	Male	Female		WP	8	0	0	0	0	0	0
		Black/African American		WP	8	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino		WP	8	0	0	0	0	0	0
		American Indian/Alaskan Native		WP	8	0	0	0	0	0	0
		Asian		WP	8	0	0	0	0	0	0
		Pacific Islander		WP	8	0	0	0	0	0	0
		Two or More Races		WP	8	0	0	0	0	0	0
	Non-IEP	IEP		WP	8	0	0	0	0	0	0
	Non-EconDis	EconDis		WP	8	0	0	0	0	0	0
Non-ELL	ELL		WP	8	0	0	0	0	0	0	
8	Male	Female		WP	8	0	0	0	0	0	0
		Black/African American		WP	8	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino		WP	8	0	0	0	0	0	0
		American Indian/Alaskan Native		WP	8	0	0	0	0	0	0
		Asian		WP	8	0	0	0	0	0	0
		Pacific Islander		WP	8	0	0	0	0	0	0
		Two or More Races		WP	8	0	0	0	0	0	0
	Non-IEP	IEP		WP	8	0	0	0	0	0	0
	Non-EconDis	EconDis		WP	8	0	0	0	0	0	0
Non-ELL	ELL		WP	8	0	0	0	0	0	0	



Table M-4. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall & by Grade & Group Favored—Mathematics: MC Items

Grade	Reference	Group		Item Type	Number of Items	Number “Low Resolution” Favoring			Number “High Resolution” Favoring		
		Focal				Total	Reference	Focal	Total	Reference	Focal
3	Male	Female		MC	50	4	1	3	0	0	0
		Black/African American		MC	50	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino		MC	50	0	0	0	0	0	0
		American Indian/Alaskan Native		MC	50	0	0	0	0	0	0
		Asian		MC	50	5	2	3	0	0	0
		Pacific Islander		MC	50	13	6	7	1	0	1
		Two or More Races		MC	50	0	0	0	0	0	0
		Non-IEP	IEP		MC	50	2	1	1	0	0
	Non-EconDis	EconDis		MC	50	0	0	0	0	0	0
	Non-ELL	ELL		MC	50	0	0	0	0	0	0
4	Male	Female		MC	50	8	5	3	0	0	0
		Black/African American		MC	50	1	1	0	0	0	0
	White/Caucasian	Hispanic or Latino		MC	50	0	0	0	0	0	0
		American Indian/Alaskan Native		MC	50	0	0	0	0	0	0
		Asian		MC	50	6	2	4	0	0	0
		Pacific Islander		MC	50	17	9	8	2	1	1
		Two or More Races		MC	50	0	0	0	0	0	0
		Non-IEP	IEP		MC	50	8	6	2	3	0
	Non-EconDis	EconDis		MC	50	0	0	0	0	0	0
	Non-ELL	ELL		MC	50	0	0	0	0	0	0
5	Male	Female		MC	50	7	4	3	0	0	0
		Black/African American		MC	50	2	2	0	0	0	0
	White/Caucasian	Hispanic or Latino		MC	50	0	0	0	0	0	0
		American Indian/Alaskan Native		MC	50	0	0	0	0	0	0
		Asian		MC	50	4	2	2	0	0	0
		Pacific Islander		MC	50	15	5	10	2	2	0
		Two or More Races		MC	50	0	0	0	0	0	0
		Non-IEP	IEP		MC	50	9	7	2	1	0
	Non-EconDis	EconDis		MC	50	0	0	0	0	0	0
	Non-ELL	ELL		MC	50	0	0	0	0	0	0
6	Male	Female		MC	47	5	2	3	0	0	0
		Black/African American		MC	47	4	2	2	0	0	0
	White/Caucasian	Hispanic or Latino		MC	47	0	0	0	0	0	0
		American Indian/Alaskan Native		MC	47	0	0	0	0	0	0
		Asian		MC	47	7	3	4	0	0	0

continued



Grade	Reference	Group		Item Type	Number of Items	Number “Low Resolution” Favoring			Number “High Resolution” Favoring			
		Focal				Total	Reference	Focal	Total	Reference	Focal	
7	White/Caucasian	Pacific Islander		MC	47	13	7	6	3	2	1	
		Two or More Races		MC	47	0	0	0	0	0	0	
	Non-IEP	IEP		MC	47	2	2	0	0	0	0	
	Non-EconDis	EconDis		MC	47	0	0	0	0	0	0	
	Non-ELL	ELL		MC	47	0	0	0	0	0	0	
	Male	Female		MC	47	8	3	5	1	1	0	
	White/Caucasian	Black/African American		MC	47	3	3	0	0	0	0	
		Hispanic or Latino		MC	47	0	0	0	0	0	0	
	White/Caucasian	American Indian/Alaskan Native		MC	47	0	0	0	0	0	0	
		Asian		MC	47	7	4	3	0	0	0	
	Non-IEP	Pacific Islander		MC	47	8	4	4	3	2	1	
		Two or More Races		MC	47	0	0	0	0	0	0	
	Non-IEP	IEP		MC	47	8	6	2	1	0	1	
	Non-EconDis	EconDis		MC	47	0	0	0	0	0	0	
	Non-ELL	ELL		MC	47	3	3	0	0	0	0	
	8	Male	Female		MC	47	3	2	1	0	0	0
		White/Caucasian	Black/African American		MC	47	3	2	1	0	0	0
Hispanic or Latino				MC	47	2	2	0	0	0	0	
American Indian/Alaskan Native				MC	47	0	0	0	0	0	0	
White/Caucasian		Asian		MC	47	6	3	3	0	0	0	
		Pacific Islander		MC	47	11	4	7	4	3	1	
Non-IEP		Two or More Races		MC	47	0	0	0	0	0	0	
		IEP		MC	47	6	4	2	1	1	0	
Non-EconDis		EconDis		MC	47	1	1	0	0	0	0	
Non-ELL		ELL		MC	47	6	5	1	0	0	0	



**Table M-5. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—
Mathematics: TEI Items**

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
6	Male	Female	TE	3	0	0	0	0	0	0
		Black/African American	TE	3	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino	TE	3	0	0	0	0	0	0
		American Indian/Alaskan Native	TE	3	0	0	0	0	0	0
		Asian	TE	3	1	0	1	0	0	0
		Pacific Islander	TE	3	0	0	0	0	0	0
		Two or More Races	TE	3	0	0	0	0	0	0
		Non-IEP	IEP	TE	3	0	0	0	0	0
	Non-EconDis	EconDis	TE	3	0	0	0	0	0	0
	Non-ELL	ELL	TE	3	0	0	0	0	0	0
7	Male	Female	TE	3	0	0	0	0	0	0
		Black/African American	TE	3	0	0	0	0	0	0
	White/Caucasian	Hispanic or Latino	TE	3	0	0	0	0	0	0
		American Indian/Alaskan Native	TE	3	0	0	0	0	0	0
		Asian	TE	3	1	0	1	0	0	0
		Pacific Islander	TE	3	0	0	0	0	0	0
		Two or More Races	TE	3	0	0	0	0	0	0
		Non-IEP	IEP	TE	3	0	0	0	0	0
	Non-EconDis	EconDis	TE	3	0	0	0	0	0	0
	Non-ELL	ELL	TE	3	0	0	0	0	0	0
8	Male	Female	TE	3	0	0	0	0	0	0
		Black/African American	TE	3	1	1	0	0	0	0
	White/Caucasian	Hispanic or Latino	TE	3	1	1	0	0	0	0
		American Indian/Alaskan Native	TE	3	0	0	0	0	0	0
		Asian	TE	3	1	1	0	0	0	0
		Pacific Islander	TE	3	0	0	0	0	0	0
		Two or More Races	TE	3	0	0	0	0	0	0
		Non-IEP	IEP	TE	3	0	0	0	0	0
	Non-EconDis	EconDis	TE	3	0	0	0	0	0	0
	Non-ELL	ELL	TE	3	0	0	0	0	0	0



Table M-6. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall & by Grade & Group Favored—Science: MC Items

Grade	Group		Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
5	Male	Female	MC	45	7	2	5	0	0	0
		Black/African American	MC	45	2	2	0	0	0	0
	White/Caucasian	Hispanic or Latino	MC	45	0	0	0	0	0	0
		American Indian/Alaskan Native	MC	45	0	0	0	0	0	0
		Asian	MC	45	4	1	3	0	0	0
		Pacific Islander	MC	45	8	4	4	1	1	0
		Two or More Races	MC	45	0	0	0	0	0	0
	Non-IEP	IEP	MC	45	3	1	2	0	0	0
	Non-EconDis	EconDis	MC	45	0	0	0	0	0	0
	Non-ELL	ELL	MC	45	1	1	0	0	0	0
8	Male	Female	MC	42	5	3	2	0	0	0
		Black/African American	MC	42	2	2	0	0	0	0
	White/Caucasian	Hispanic or Latino	MC	42	2	2	0	0	0	0
		American Indian/Alaskan Native	MC	42	0	0	0	0	0	0
		Asian	MC	42	3	3	0	0	0	0
		Pacific Islander	MC	42	8	4	4	1	0	1
		Two or More Races	MC	42	0	0	0	0	0	0
	Non-IEP	IEP	MC	42	1	1	0	0	0	0
	Non-EconDis	EconDis	MC	42	0	0	0	0	0	0
	Non-ELL	ELL	MC	42	1	1	0	1	1	0
11	Male	Female	MC	58	4	2	2	0	0	0
		Black/African American	MC	58	2	2	0	0	0	0
	White/Caucasian	Hispanic or Latino	MC	58	0	0	0	0	0	0
		American Indian/Alaskan Native	MC	58	0	0	0	0	0	0
		Asian	MC	58	1	0	1	0	0	0
		Pacific Islander	MC	58	0	0	0	0	0	0
		Two or More Races	MC	58	0	0	0	0	0	0
	Non-IEP	IEP	MC	58	1	1	0	1	1	0
	Non-EconDis	EconDis	MC	58	0	0	0	0	0	0
	Non-ELL	ELL	MC	58	2	2	0	0	0	0



Table M-7. Number of Items Classified as “Low Resolution” or “High Resolution” DIF Overall and by Grade and Group Favored—Science: TEI Items

Grade	Reference	Group Focal	Item Type	Number of Items	Number “Low Resolution”			Number “High Resolution”		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
8	Male	Female	TE	3	1	0	1	0	0	0
		Black/African American	TE	3	0	0	0	0	0	0
		Hispanic or Latino	TE	3	0	0	0	0	0	0
	White/Caucasian	American Indian/Alaskan Native	TE	3	0	0	0	0	0	0
		Asian	TE	3	0	0	0	0	0	0
		Pacific Islander	TE	3	2	1	1	0	0	0
		Two or More Races	TE	3	0	0	0	0	0	0
	Non-IEP	IEP	TE	3	1	1	0	0	0	0
	Non-EconDis	EconDis	TE	3	0	0	0	0	0	0
Non-ELL	ELL	TE	3	0	0	0	0	0	0	
11	Male	Female	TE	2	0	0	0	0	0	0
		Black/African American	TE	2	0	0	0	0	0	0
		Hispanic or Latino	TE	2	0	0	0	0	0	0
	White/Caucasian	American Indian/Alaskan Native	TE	2	0	0	0	0	0	0
		Asian	TE	2	0	0	0	0	0	0
		Pacific Islander	TE	2	0	0	0	0	0	0
		Two or More Races	TE	2	0	0	0	0	0	0
	Non-IEP	IEP	TE	2	0	0	0	0	0	0
	Non-EconDis	EconDis	TE	2	0	0	0	0	0	0
Non-ELL	ELL	TE	2	0	0	0	0	0	0	

APPENDIX N
2020–21 EQUATING REPORT



Oklahoma School Testing Program

2020–2021 EQUATING REPORT

2020-2021 Oklahoma School Testing Program

Equating Report

The purpose of this document is to summarize the equating results obtained from Measured Progress for OSTP. Presented in this report are various program summary statistics and specific results related to the equating study.

The results of this report are organized as follows:

1. Aggregate Results
 1. Percentage of Students by Performance Level Categories
 2. Calibration Report
 3. Equating Item Summary Statistics
2. Grade Subject Results
 1. A/A, B/B, and Delta Plots
 2. Lookup Tables
 3. Cumulative Scale Score Distribution Tables
 4. Tabled Delta Analysis Results
 5. Tabled B/B Analysis Results
 6. Final Item Parameters
 7. Decision Accuracy and Consistency (DAC)

The final results of this equating will be included as part of the 2020 - 2021 OSTP Technical Manual.



Section 1.1

Percentage of Students by Performance Level Categories

Table 1.1.1
 Percentage of Students by Performance Level Categories
 English Language Arts

Grade	Year	Count	BB	B	P	A	P/A	Delta	Ave. SS
3	2021	46090	44	32	21	4	25	-14.1	278.9
	2019	50832	31	30	29	10	39	5.7	289.2
	2018	52382	34	33	27	6	33	-5.6	286.6
	2017	52060	30	32	31	8	39		290.7
4	2021	45579	45	33	20	2	22	-8.0	276.1
	2019	51321	36	33	24	6	30	-5.5	284.0
	2018	50985	30	34	28	7	36	-1.3	287.9
	2017	50512	29	34	30	7	37		289.3
5	2021	46431	32	39	23	6	29	-6.3	281.6
	2019	51488	25	40	27	8	35	0.3	287.7
	2018	33277	23	42	22	13	35	-5.0	290.3
	2017	48449	21	39	28	12	40		291.4
6	2021	47197	31	44	21	4	26	-10.5	281.6
	2019	51337	22	42	28	8	36	-1.7	289.7
	2018	49226	22	40	29	9	38	-2.4	290.3
	2017	46499	18	41	31	9	40		292.7
7	2021	47139	46	34	15	4	19	-9.7	273.0
	2019	49406	35	36	21	8	29	1.7	283.2
	2018	46675	32	41	20	8	27	0.9	284.7
	2017	48035	34	40	20	6	26		282.1
8	2021	47293	34	43	17	7	23	-9.6	278.8
	2019	46983	25	43	24	9	33	0.2	285.1
	2018	48052	24	43	24	9	33	-2.0	286.3
	2017	47914	23	42	23	11	35		287.6

Table 1.1.2
 Percentage of Students by Performance Level Categories
 Mathematics

Grade	Year	Count	BB	B	P	A	P/A	Delta	Ave. SS
3	2021	46033	35	35	20	9	29	-13.6	283.2
	2019	50739	24	33	26	17	43	1.4	294.4
	2018	51842	24	35	26	15	42	-2.6	292.9
	2017	52518	21	35	27	17	44		295.3
4	2021	45530	37	35	18	10	28	-10.1	281.1
	2019	51224	26	36	26	12	38	1.6	289.1
	2018	50856	27	37	25	11	37	-4.1	289.4
	2017	50677	23	36	27	14	41		292.8
5	2021	46348	37	41	15	8	22	-8.7	276.0
	2019	51478	24	45	19	11	31	1.0	285.4
	2018	33251	25	46	20	10	30	-5.4	285.1
	2017	48460	22	43	23	12	35		287.9
6	2021	47153	37	42	16	5	21	-9.2	275.2
	2019	51213	27	43	25	6	30	2.4	284.5
	2018	49140	29	43	23	5	28	-7.5	282.3
	2017	46542	22	42	29	6	35		287.4
7	2021	47077	55	25	17	3	20	-13.1	274.7
	2019	49215	38	29	26	7	33	-1.1	285.9
	2018	46445	34	32	26	8	34	0.4	286.9
	2017	48149	35	31	27	7	34		286.6
8	2021	46900	65	21	9	5	14	-7.0	262.8
	2019	46819	50	30	11	10	21	0.7	276.1
	2018	47903	52	28	10	10	20	-3.2	274.9
	2017	47768	49	28	12	11	23		276.3

Table 1.1.3
 Percentage of Students by Performance Level Categories
 Science

Grade	Year	Count	BB	B	P	A	P/A	Delta	Ave. SS
5	2021	46250	28	40	27	5	32	-6.4	285.9
	2019	51476	22	40	30	8	39	-2.2	291.4
	2018	33201	20	39	32	9	41	-2.2	293.7
	2017	48450	22	35	34	9	43		295.0
8	2021	46787	45	22	26	6	33	-7.2	285.4
	2019	46755	39	21	31	9	40	0.6	291.4
	2018	47754	40	21	29	10	39	-1.3	290.7
	2017	47904	38	21	30	11	41		291.8
11	2021	42566	52	24	17	6	24	-0.2	271.5
	2019	43638	57	20	17	7	24		271.2

Section 1.2

Calibration Report



Calibration Report—Executive Summary

PARSCALE 4.1 was used for all analyses. All command files were set up in a way that all general settings were identical to last year. For example, the calibration statement reads:

```
CAL GRADED,LOGISTIC,CYCLE=(150,1,1,1,1),TPRIOR,SPRIOR,GPRIOR;
```

Thus, a 3PLM was used for all MC items, and a Graded Response Model was specified for the polytomous items. The logistic version of the IRT models was used, and default priors were used for all parameter estimates. Each item occupied its own unique block in the command file, and for most items initial guessing parameters were set to 0.22.

The resulting parameters demonstrated excellent model fit. In particular, the largest change in parameter values (from one iteration to the next) was monotonically decreasing and tended to flatten out towards the end of the calibration process. The number of Newton cycles to conversion for each grade/content for the initial calibrations are listed in the following table:

Table 1.2.1
Number of Cycles to Convergence

Subject	Grade	Initial Cycles	Equating Cycles
English Language Arts	Grade 3	50	1
English Language Arts	Grade 4	85	1
English Language Arts	Grade 5	42	1
English Language Arts	Grade 6	43	1
English Language Arts	Grade 7	38	1
English Language Arts	Grade 8	37	1
Mathematics	Grade 3	48	1
Mathematics	Grade 4	51	1
Mathematics	Grade 5	57	1
Mathematics	Grade 6	54	1
Mathematics	Grade 7	55	22
Mathematics	Grade 8	69	60
Science	Grade 5	43	1
Science	Grade 8	40	1
Science	Grade 11	63	17



For some items the guessing parameter was poorly estimated. This is not at all unusual as difficulty in estimating the c-parameter has been well documented in the psychometric literature. This often happens when item discrimination is low (e.g., less than 0.50). After carefully studying these items we found that fixing the lower asymptote (for example to a value of 0.00) resulted in stable and reasonable estimates for both the a and b parameters (relative to CTT statistics). This technique also produced item parameters that resulted in excellent model fit (comparing theoretical ICCs to observed ICCs).

Three methods of evaluating the suitability of the equating items were used: the delta analysis, the b/b analysis and the rescore analysis. As a result of all three analyses very few items were removed from the equating analysis. Results such as this are very common particularly, given the number of grade/content combinations, and the number and types of items in the program. Results from these analyses are included in Section II of this report.

Items flagged by the delta, b/b, or rescore analyses, or any item that required intervention during the calibration process, were compiled and placed in our item watch list, which includes the final actions taken on these items. The final watch list is presented in the following table:



Table 1.2.2
Final Items Watch List

Subject	Grade	ItemID	Reason	Action	Source
English Language Arts	3	146971A	delta analysis	retained for equating	
English Language Arts	3	147433A	b/b analysis	retained for equating	
English Language Arts	3	147433A	delta analysis	retained for equating	
English Language Arts	3	156124A	c-parameter	set c = 0	Initial
English Language Arts	3	156355A	c-parameter	set c = 0	Initial
English Language Arts	3	156362A	c-parameter	set c = 0	Initial
English Language Arts	4	483086	delta analysis	retained for equating	
English Language Arts	4	483092	b/b analysis	retained for equating	
English Language Arts	5	148007A	c-parameter	set c = 0	Initial
English Language Arts	5	149321A	c-parameter	set c = 0	Initial
English Language Arts	5	483172	delta analysis	retained for equating	
English Language Arts	6	158740A	c-parameter	set c = 0	Initial
English Language Arts	6	158756A	b/b analysis	retained for equating	
English Language Arts	6	159281A	c-parameter	set c = 0	Initial
English Language Arts	6	630430	delta analysis	retained for equating	
English Language Arts	7	158847A	delta analysis	retained for equating	
English Language Arts	7	486331	manual	removed from equating	
English Language Arts	7	486333	c-parameter	set c = 0	Initial
English Language Arts	7	630545	c-parameter	set c = 0	Initial
English Language Arts	7	630649	c-parameter	set c = 0	Initial
English Language Arts	7	633929	c-parameter	set c = 0	Initial
English Language Arts	7	634354	c-parameter	set c = 0	Initial
English Language Arts	7	634364	c-parameter	set c = 0	Initial
English Language Arts	7	634366	c-parameter	set c = 0	Initial
English Language Arts	7	634374	c-parameter	set c = 0	Initial
English Language Arts	7	634379	c-parameter	set c = 0	Initial
English Language Arts	7	634389	c-parameter	set c = 0	Initial
English Language Arts	8	149600A	c-parameter	set c = 0	Initial
English Language Arts	8	160467A	c-parameter	set c = 0	Initial
English Language Arts	8	160745A	c-parameter	set c = 0	Initial
English Language Arts	8	160790A	c-parameter	set c = 0	Initial
English Language Arts	8	160947A	c-parameter	set c = 0	Initial
English Language Arts	8	160989A	c-parameter	set c = 0	Initial
English Language Arts	8	485493	b/b analysis	retained for equating	
English Language Arts	8	486738	b/b analysis	retained for equating	
English Language Arts	8	626602	c-parameter	set c = 0	Initial
Mathematics	3	152325A	delta analysis	retained for equating	
Mathematics	3	636410	b/b analysis	retained for equating	
Mathematics	3	636410	delta analysis	retained for equating	
Mathematics	4	152776A	c-parameter	set c = 0	Initial
Mathematics	4	154024A	delta analysis	retained for equating	



Table 1.2.2 (continued)
Final Items Watch List

Subject	Grade	ItemID	Reason	Action	Source
Mathematics	4	479500	b/b analysis	retained for equating	
Mathematics	5	146959A	b/b analysis	retained for equating	
Mathematics	5	146959A	delta analysis	retained for equating	
Mathematics	5	152933A	b/b analysis	retained for equating	
Mathematics	5	636735	c-parameter	set c = 0	Initial
Mathematics	6	148159A	c-parameter	set c = 0	Initial
Mathematics	6	149511A	b/b analysis	retained for equating	
Mathematics	6	181455A	delta analysis	retained for equating	
Mathematics	6	479043	delta analysis	retained for equating	
Mathematics	7	148711A	delta analysis	retained for equating	
Mathematics	7	152901A	b/b analysis	retained for equating	
Mathematics	7	CB23921	a-parameter	a set to initial	Final
Mathematics	7	CB23921	c-parameter	set c = 0	Final
Mathematics	7	CB56794	a-parameter	a set to initial	Final
Mathematics	7	CB56794	c-parameter	set c = 0	Final
Mathematics	8	484855	delta analysis	retained for equating	
Mathematics	8	484881	c-parameter	set c = 0	Initial
Mathematics	8	CB6713	c-parameter	set c = 0	Initial
Science	5	186483A	b/b analysis	retained for equating	
Science	5	188698A	delta analysis	retained for equating	
Science	5	188700A	delta analysis	retained for equating	
Science	5	638751	c-parameter	set c = 0	Initial
Science	8	188153A	b/b analysis	retained for equating	
Science	8	188153A	delta analysis	retained for equating	
Science	8	189440A	c-parameter	set c = 0	Initial
Science	8	638883	c-parameter	set c = 0	Initial
Science	8	638883	delta analysis	retained for equating	
Science	11	187938A	c-parameter	set c = 0	Initial
Science	11	439206	b/b analysis	retained for equating	
Science	11	603684	c-parameter	set c = 0	Initial
Science	11	638970	b/b analysis	retained for equating	

Section 1.3

Equating Item Summary Statistics



Table 1.3.1
Equating Item Summary Statistics

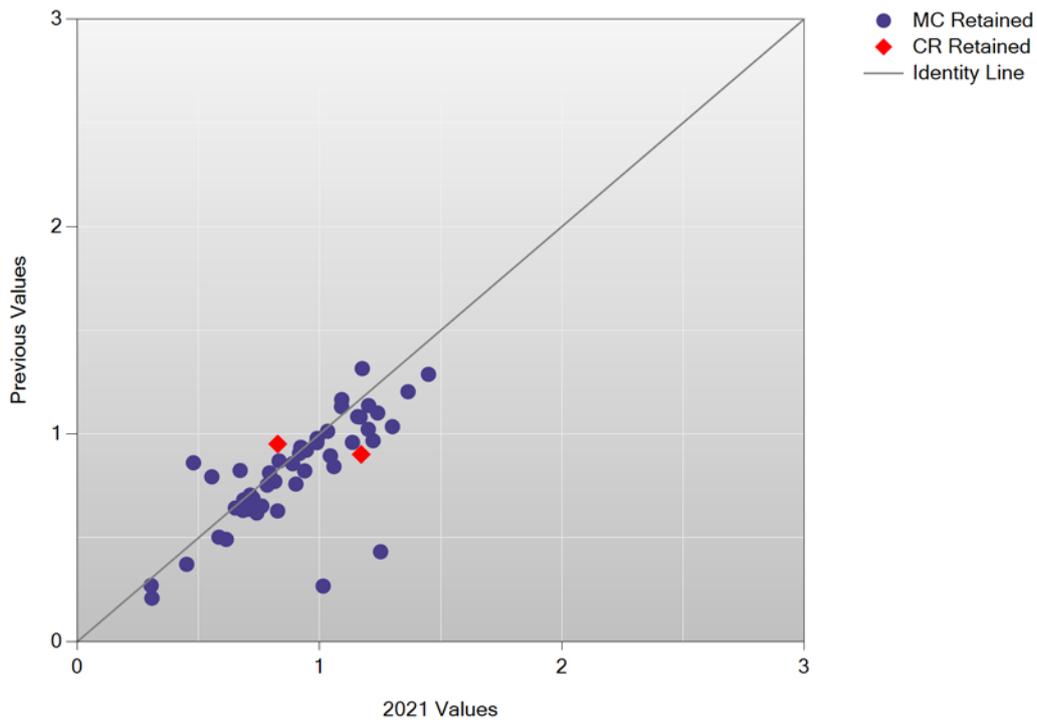
Subject	Grade	Year	P-Value		Point Biserial		a		b	
			Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
English Language Arts	03	2021	0.52	0.14	0.41	0.09	0.90	0.27	0.40	0.78
		Previous	0.56	0.14	0.47	0.11	0.82	0.26	-0.03	0.93
English Language Arts	04	2021	0.55	0.17	0.40	0.12	0.87	0.35	0.15	0.98
		Previous	0.56	0.17	0.43	0.12	0.78	0.31	-0.20	1.38
English Language Arts	05	2021	0.61	0.13	0.44	0.08	0.88	0.32	-0.13	0.65
		Previous	0.62	0.12	0.45	0.09	0.91	0.28	-0.43	0.69
English Language Arts	06	2021	0.59	0.17	0.42	0.10	0.87	0.31	0.08	1.03
		Previous	0.61	0.16	0.44	0.10	0.83	0.29	-0.33	0.99
English Language Arts	07	2021	0.55	0.14	0.38	0.10	0.64	0.30	0.11	1.00
		Previous	0.58	0.14	0.41	0.10	0.72	0.26	-0.24	0.97
English Language Arts	08	2021	0.59	0.16	0.37	0.10	0.73	0.34	-0.17	1.02
		Previous	0.60	0.16	0.41	0.10	0.74	0.36	-0.47	1.04
Mathematics	03	2021	0.62	0.15	0.46	0.10	1.04	0.28	-0.12	0.80
		Previous	0.67	0.15	0.53	0.10	0.92	0.24	-0.61	0.89
Mathematics	04	2021	0.56	0.18	0.42	0.09	1.05	0.33	0.24	0.93
		Previous	0.57	0.18	0.47	0.09	0.96	0.30	-0.19	1.15
Mathematics	05	2021	0.53	0.16	0.43	0.09	1.06	0.34	0.27	0.82
		Previous	0.57	0.17	0.47	0.08	0.98	0.25	-0.12	0.92
Mathematics	06	2021	0.52	0.17	0.40	0.10	0.99	0.32	0.43	0.90
		Previous	0.55	0.18	0.42	0.18	0.94	0.28	0.02	1.09
Mathematics	07	2021	0.39	0.15	0.39	0.09	1.14	0.37	0.98	0.63
		Previous	0.44	0.16	0.43	0.08	1.15	0.47	0.66	0.65
Mathematics	08	2021	0.44	0.14	0.38	0.10	1.06	0.39	0.80	0.81
		Previous	0.48	0.14	0.43	0.10	1.07	0.38	0.51	0.81
Science	05	2021	0.52	0.15	0.39	0.09	0.94	0.33	0.52	0.83
		Previous	0.53	0.14	0.42	0.11	0.86	0.25	0.20	0.82
Science	08	2021	0.50	0.12	0.38	0.10	0.82	0.28	0.58	0.82
		Previous	0.52	0.11	0.40	0.11	0.84	0.28	0.35	0.76
Science	11	2021	0.00	0.00	0.00	0.00	1.02	0.36	0.93	0.83
		Previous	0.00	0.00	0.00	0.00	1.07	0.39	0.97	0.77

Section 2.1

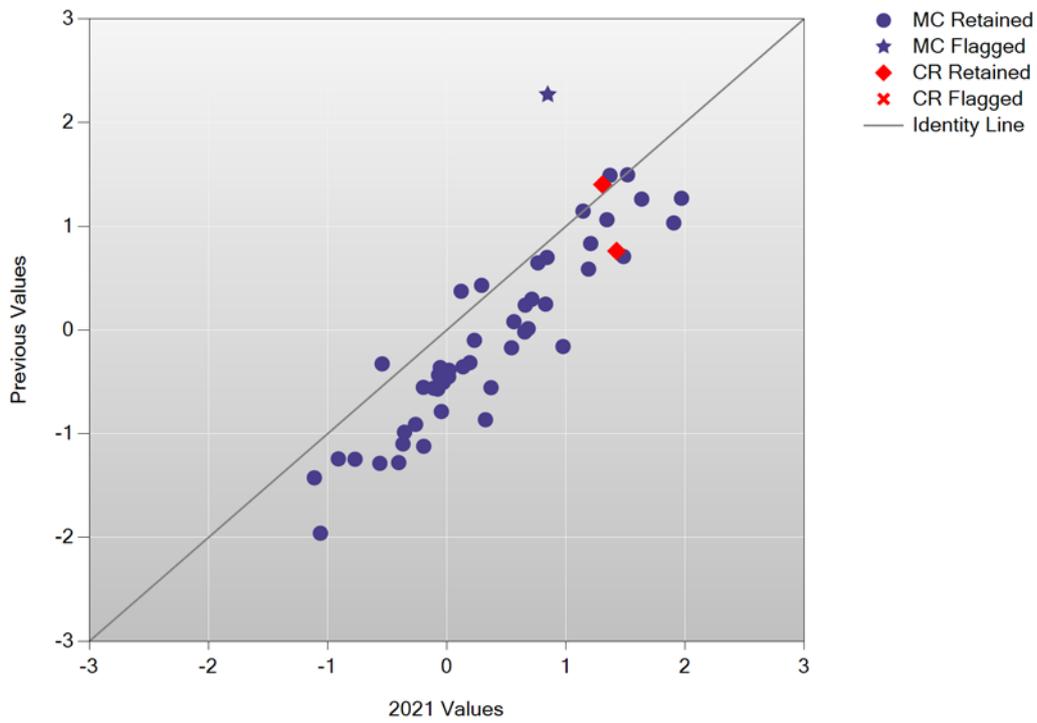
A/A, B/B, and Delta Plots



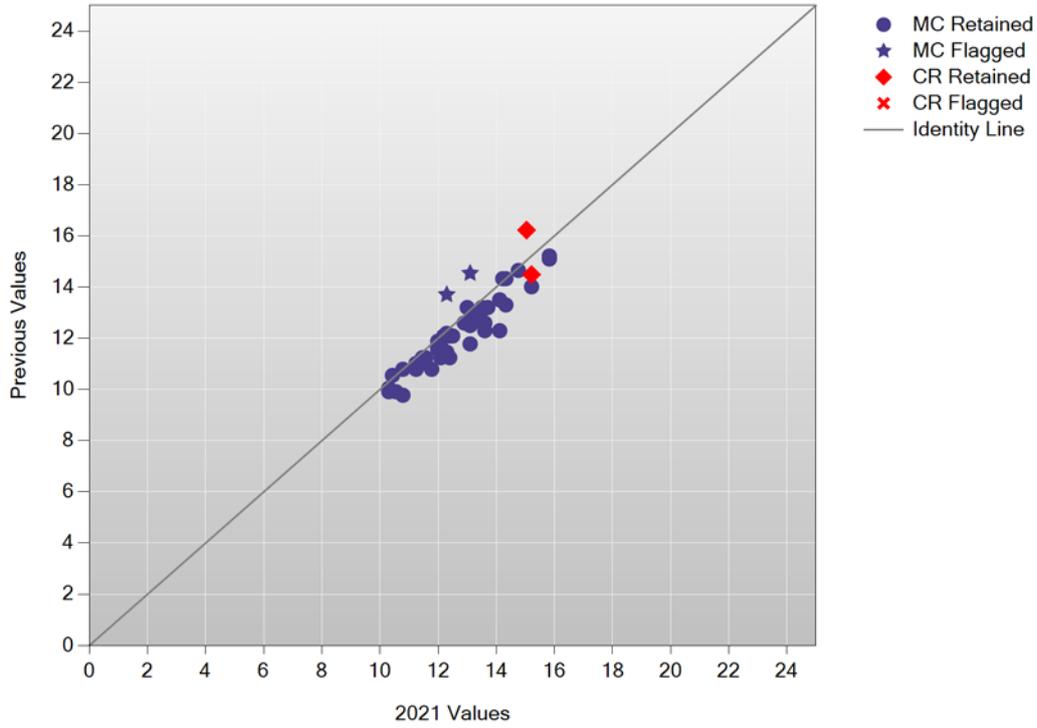
A/A Plot: English Language Arts Grade 3



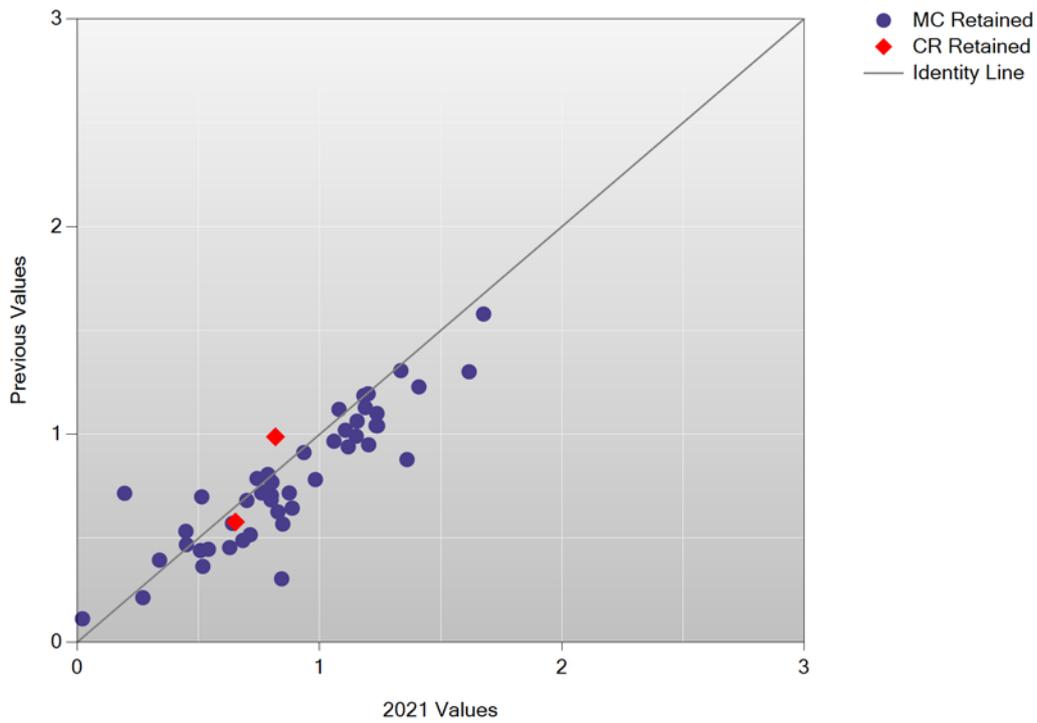
B/B Plot: English Language Arts Grade 3



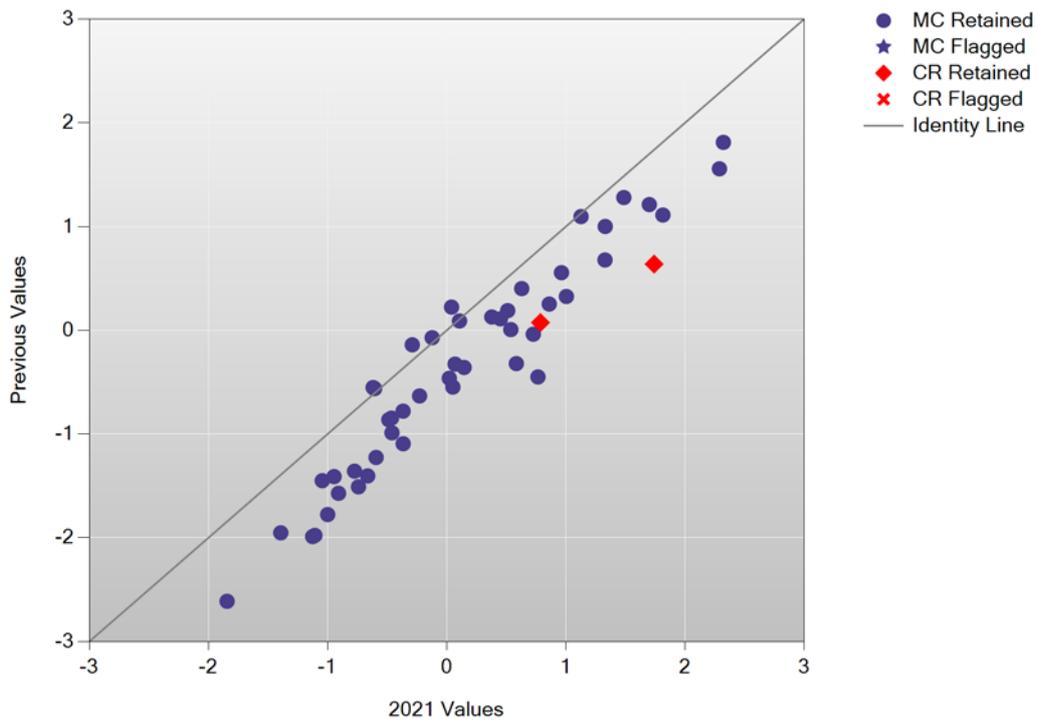
Delta Plot: English Language Arts Grade 3



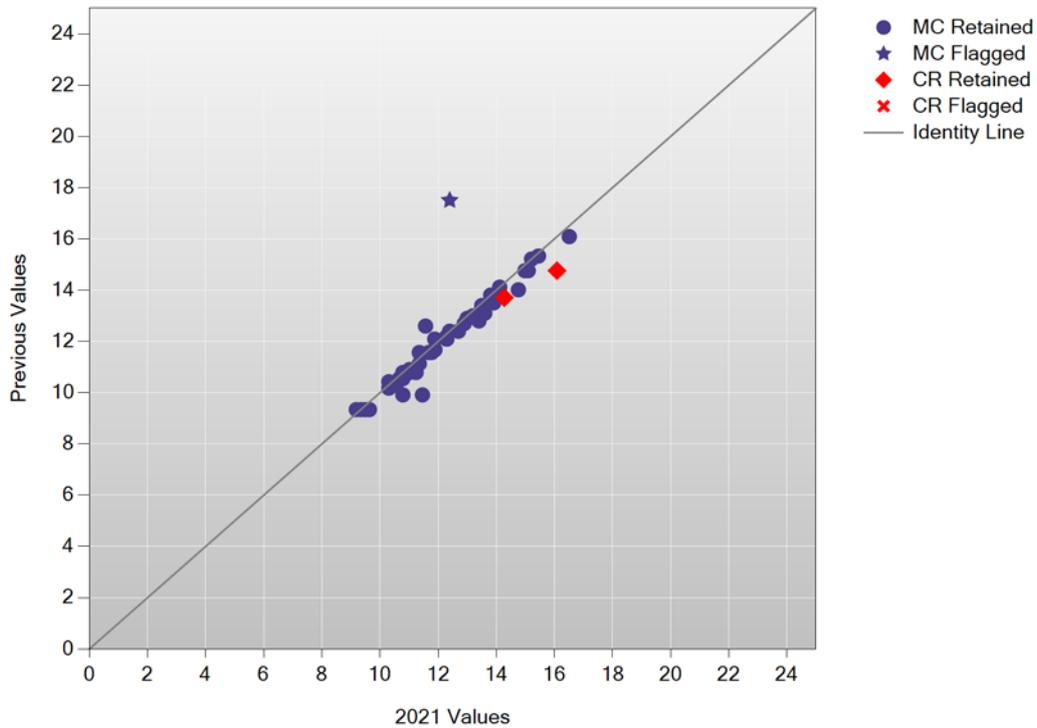
A/A Plot: English Language Arts Grade 4



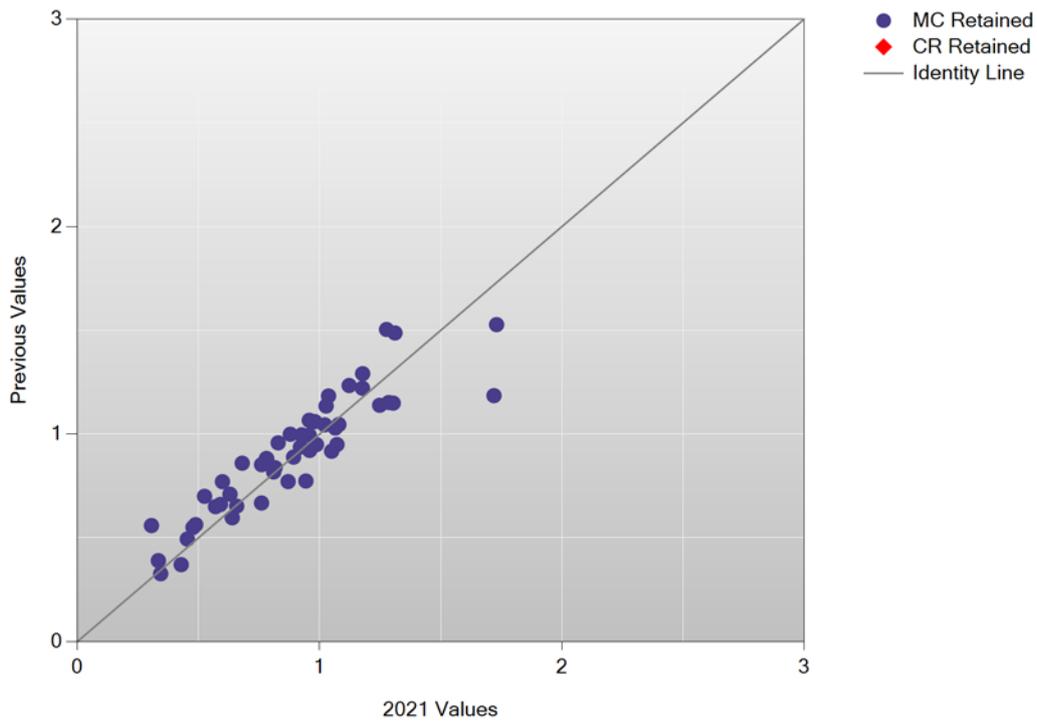
B/B Plot: English Language Arts Grade 4



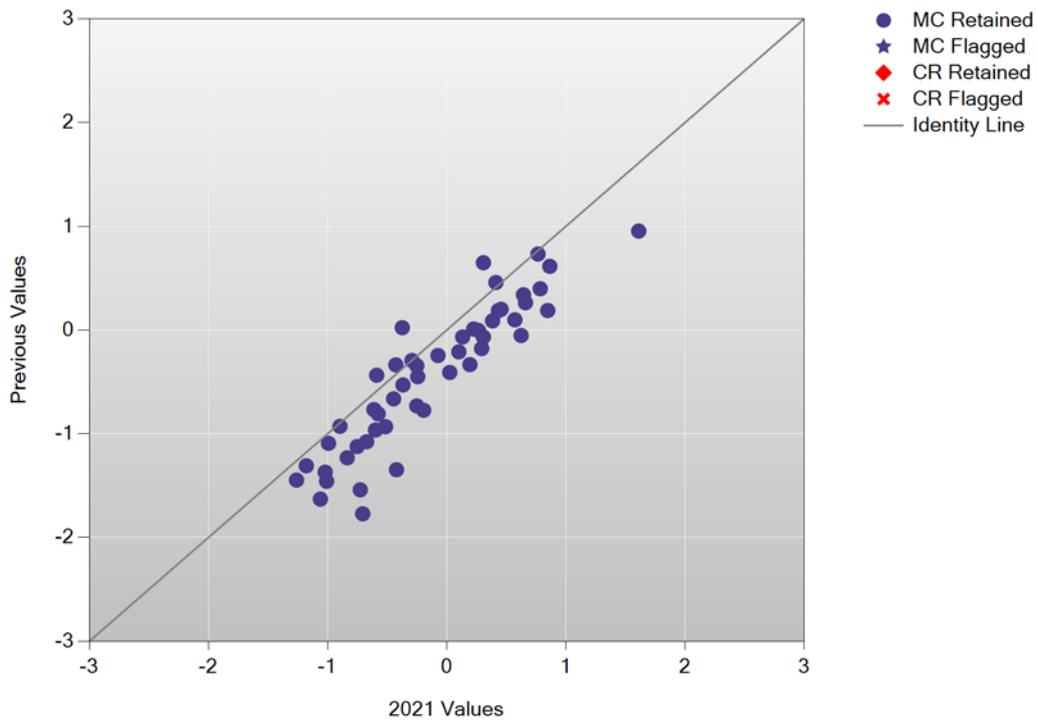
Delta Plot: English Language Arts Grade 4



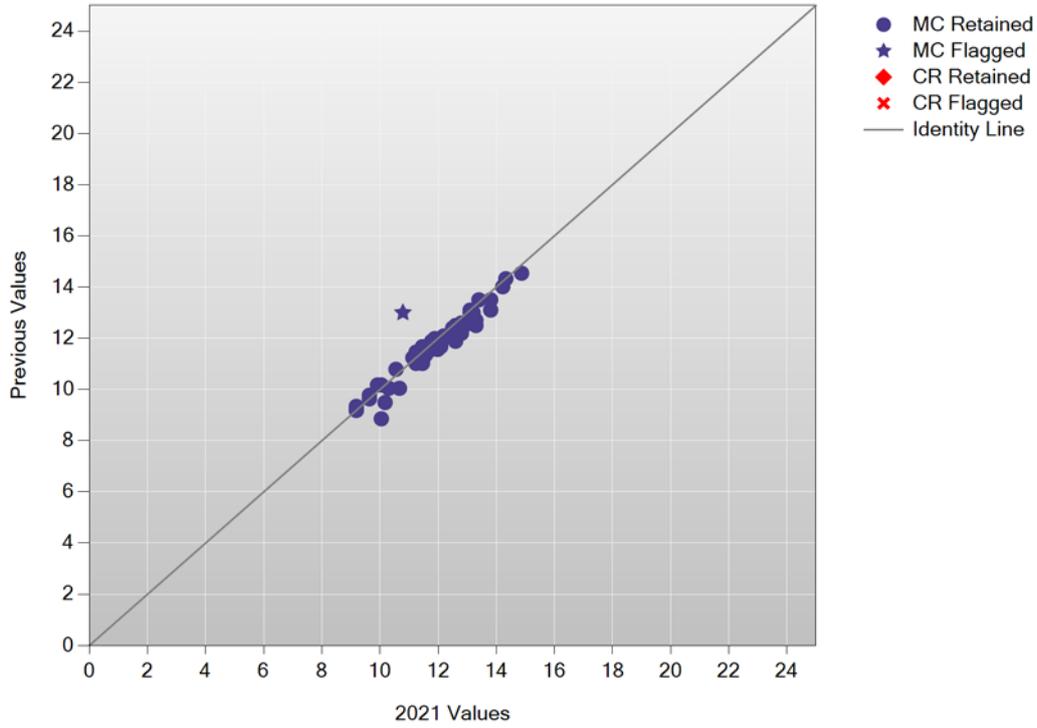
A/A Plot: English Language Arts Grade 5



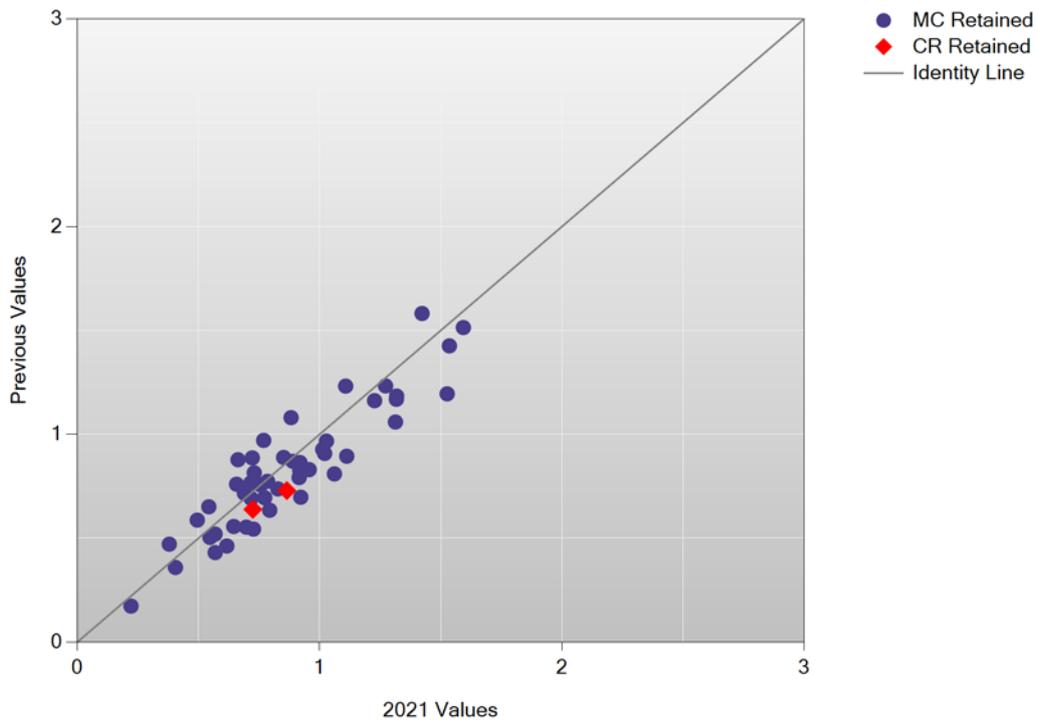
B/B Plot: English Language Arts Grade 5



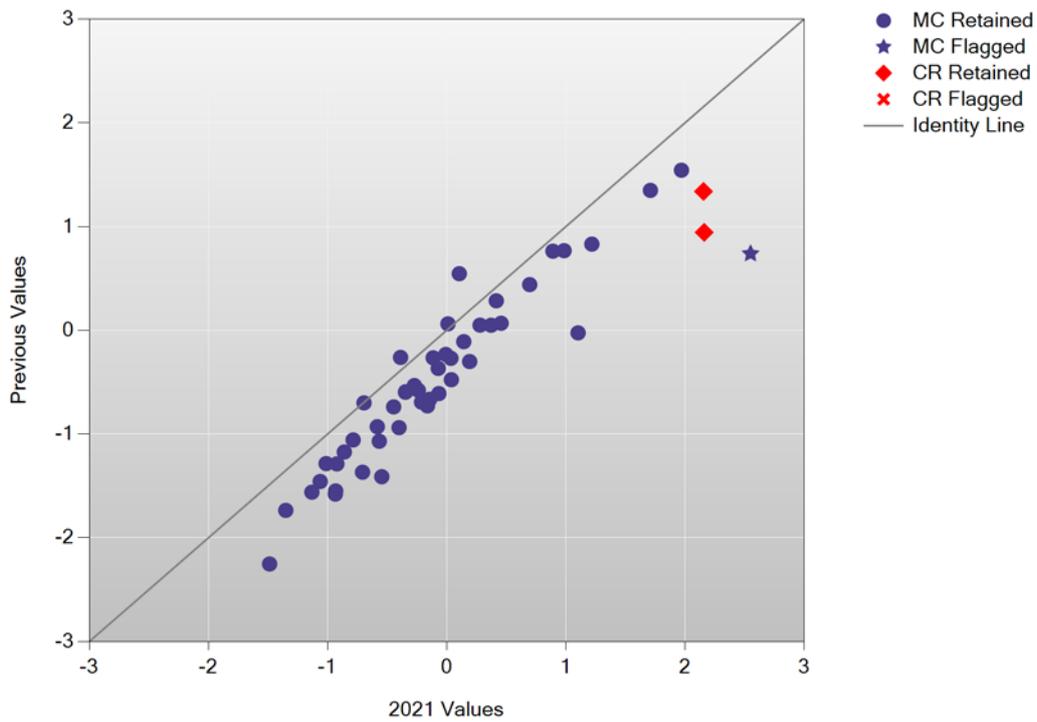
Delta Plot: English Language Arts Grade 5



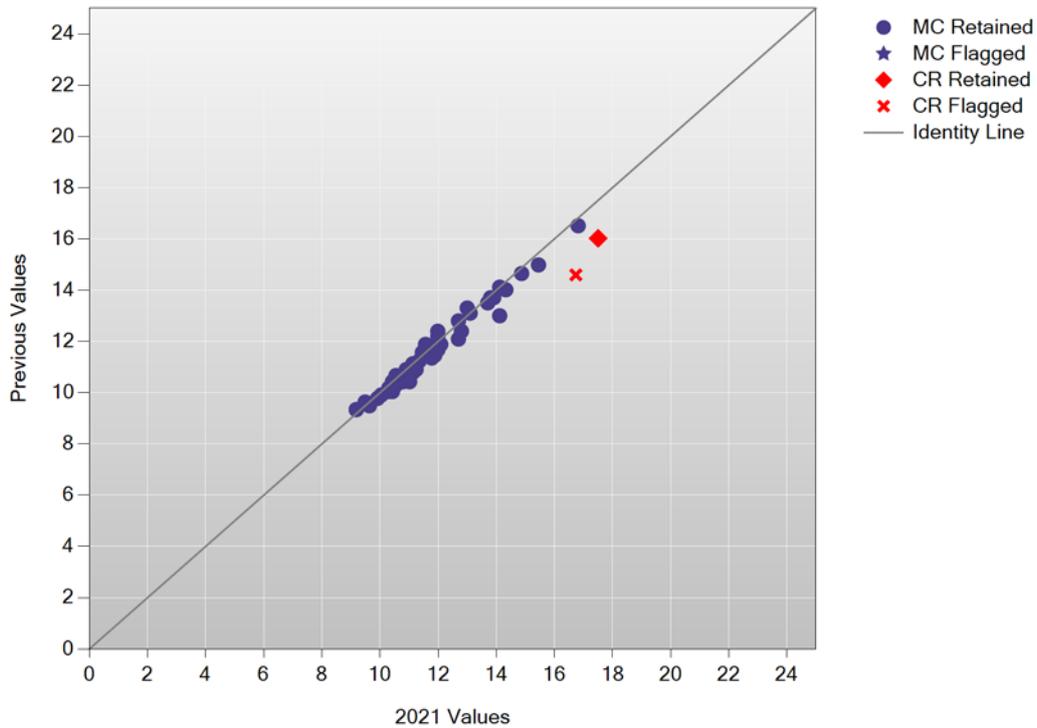
A/A Plot: English Language Arts Grade 6



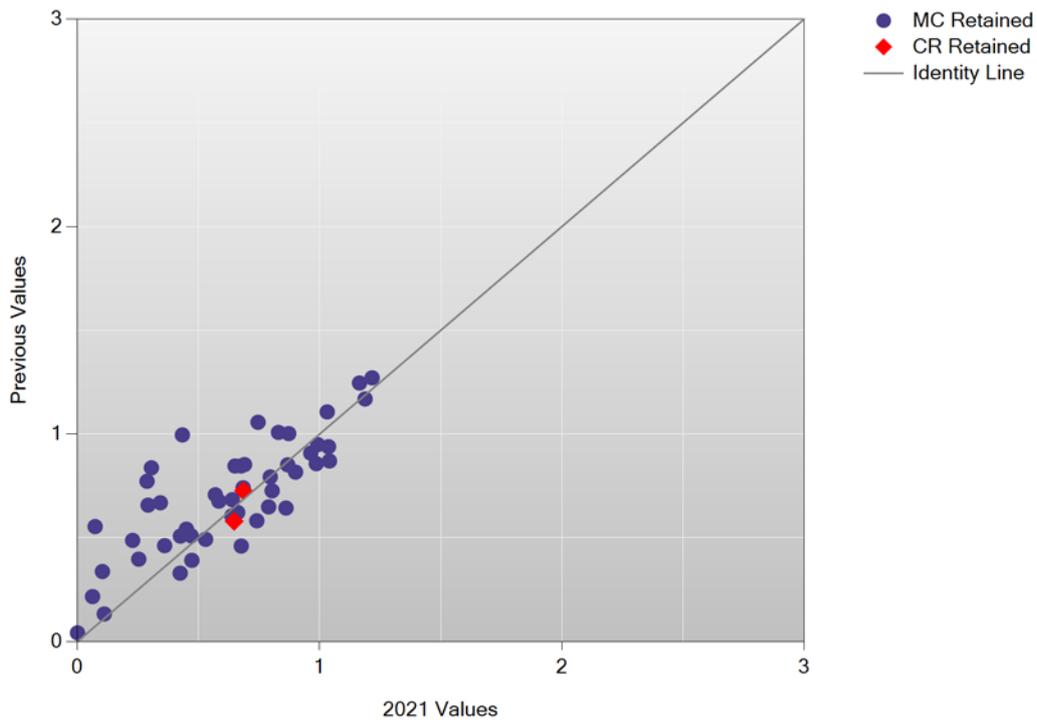
B/B Plot: English Language Arts Grade 6



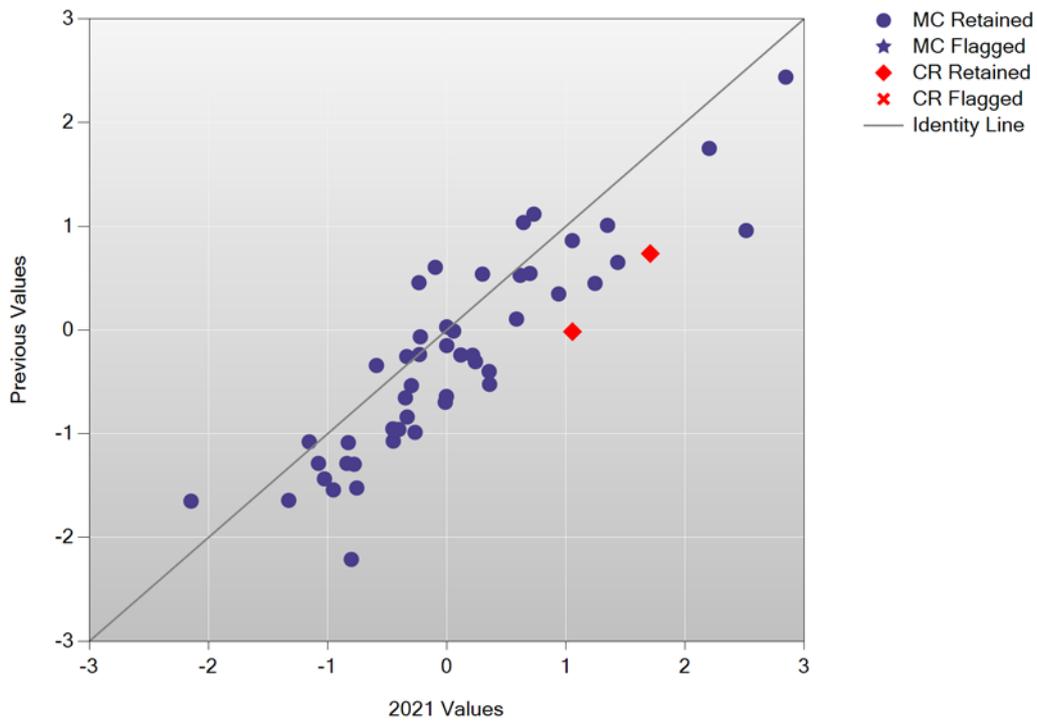
Delta Plot: English Language Arts Grade 6



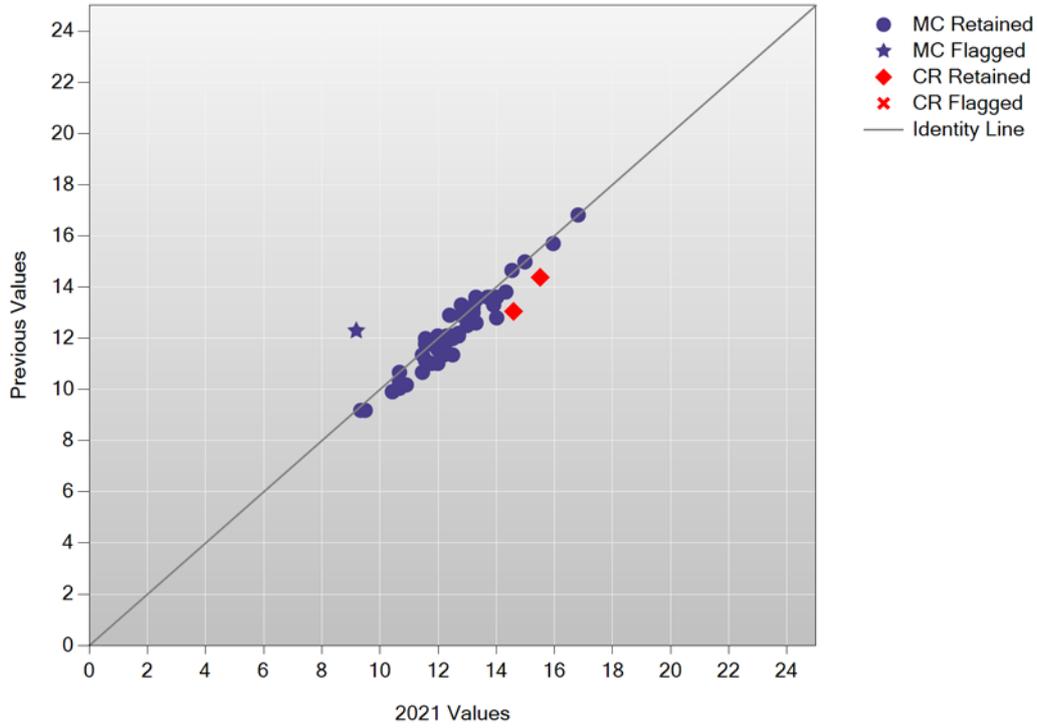
A/A Plot: English Language Arts Grade 7



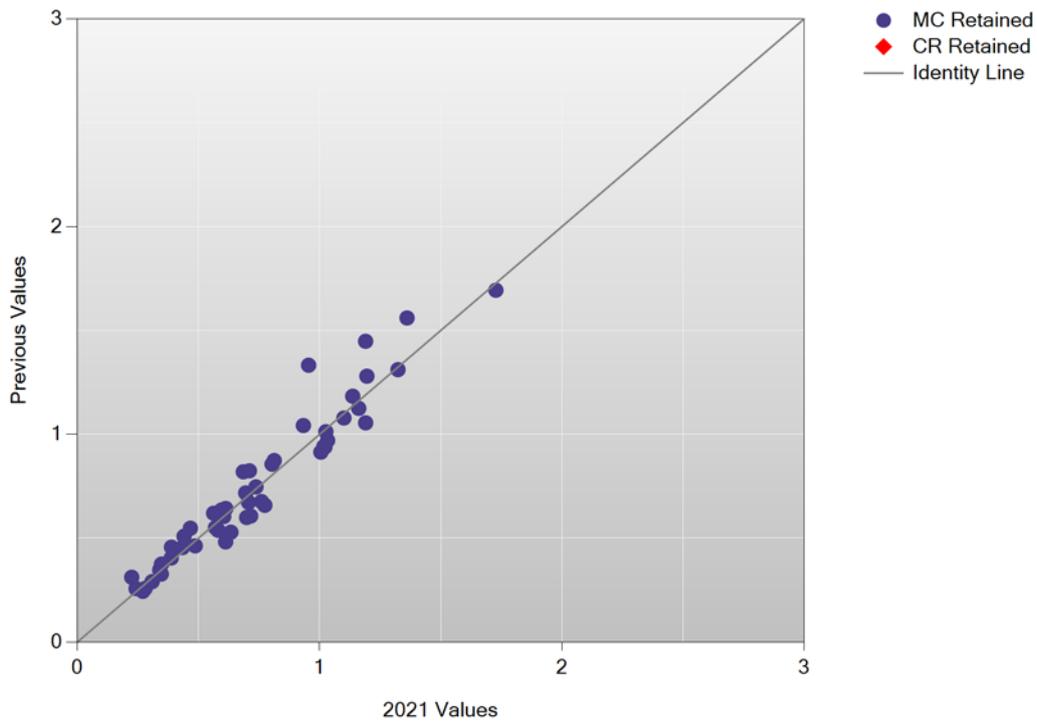
B/B Plot: English Language Arts Grade 7



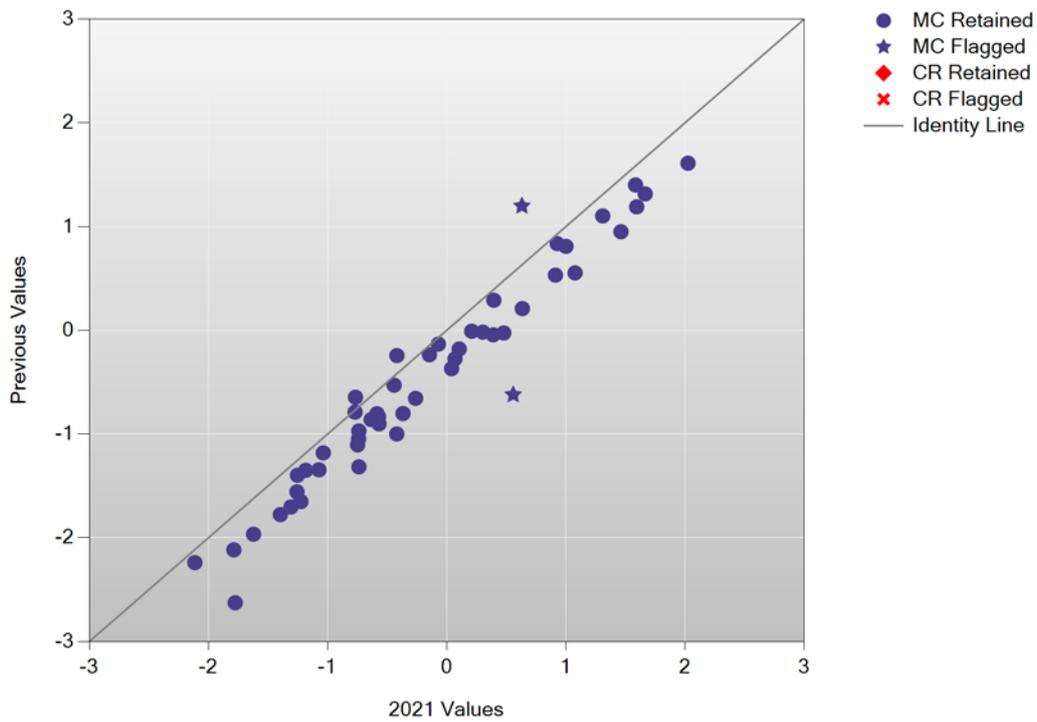
Delta Plot: English Language Arts Grade 7



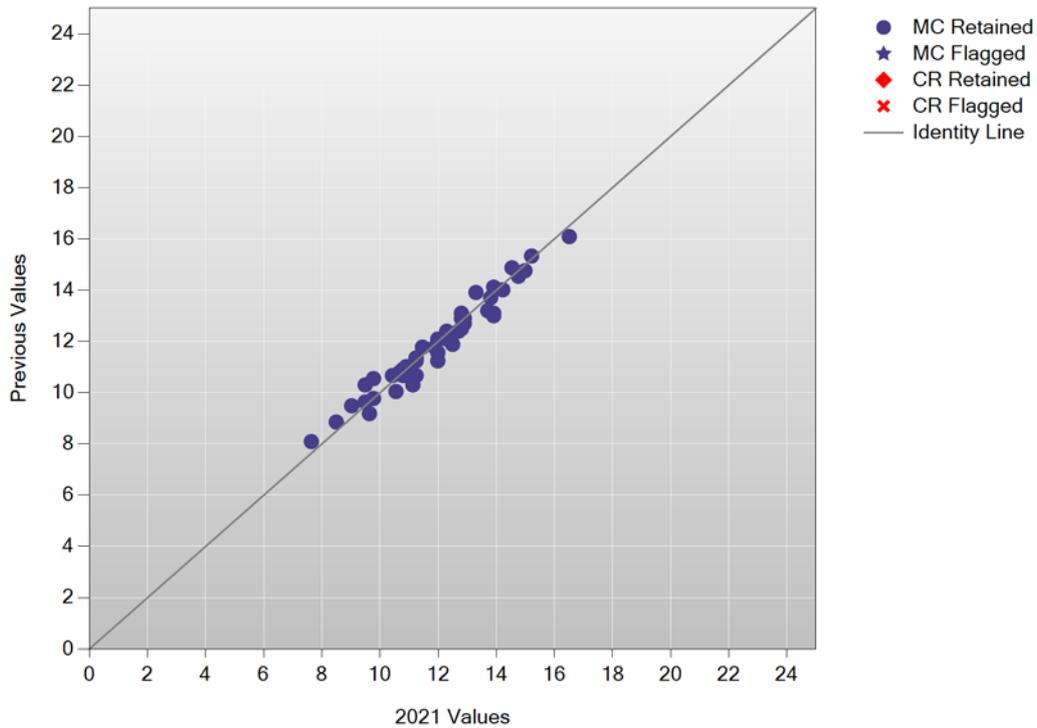
A/A Plot: English Language Arts Grade 8



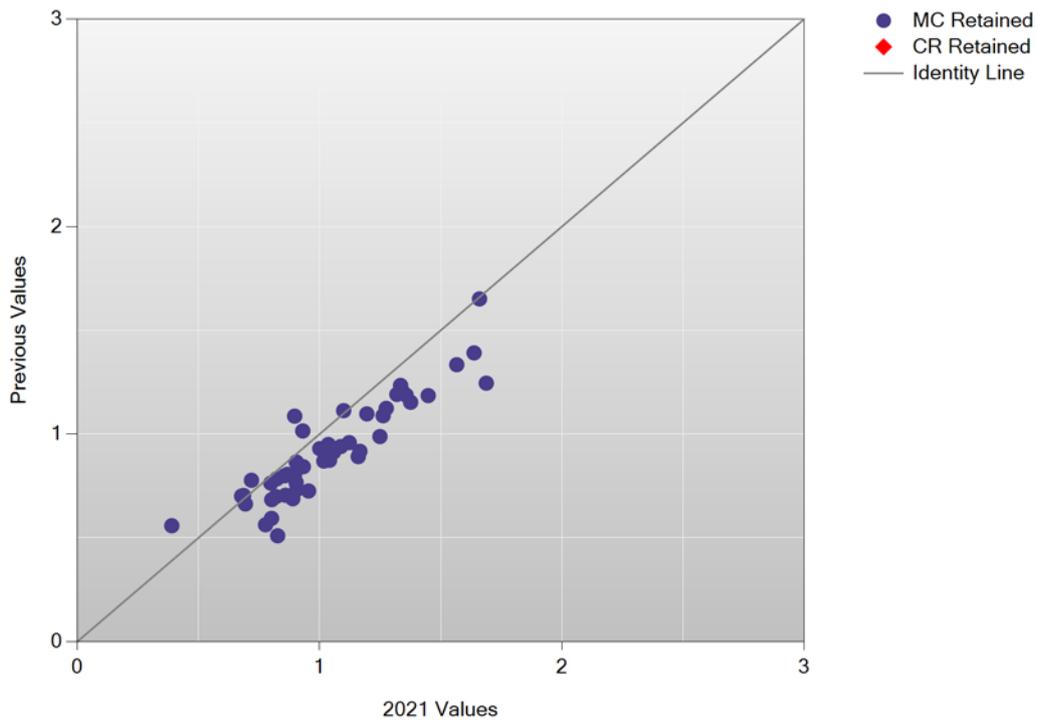
B/B Plot: English Language Arts Grade 8



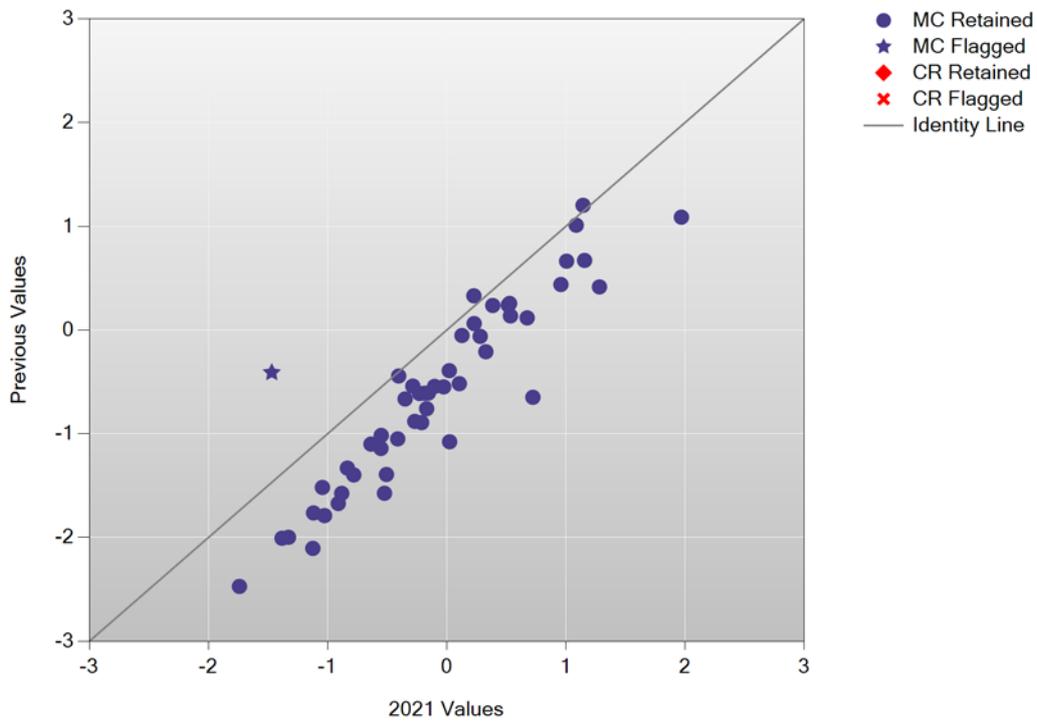
Delta Plot: English Language Arts Grade 8



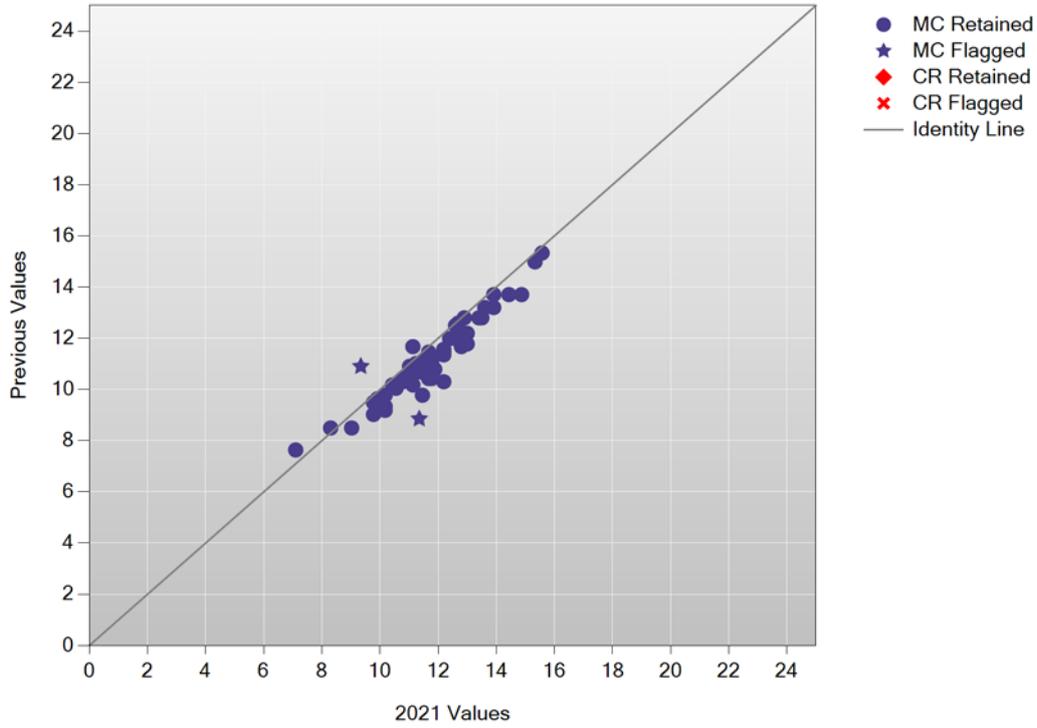
A/A Plot: Mathematics Grade 3



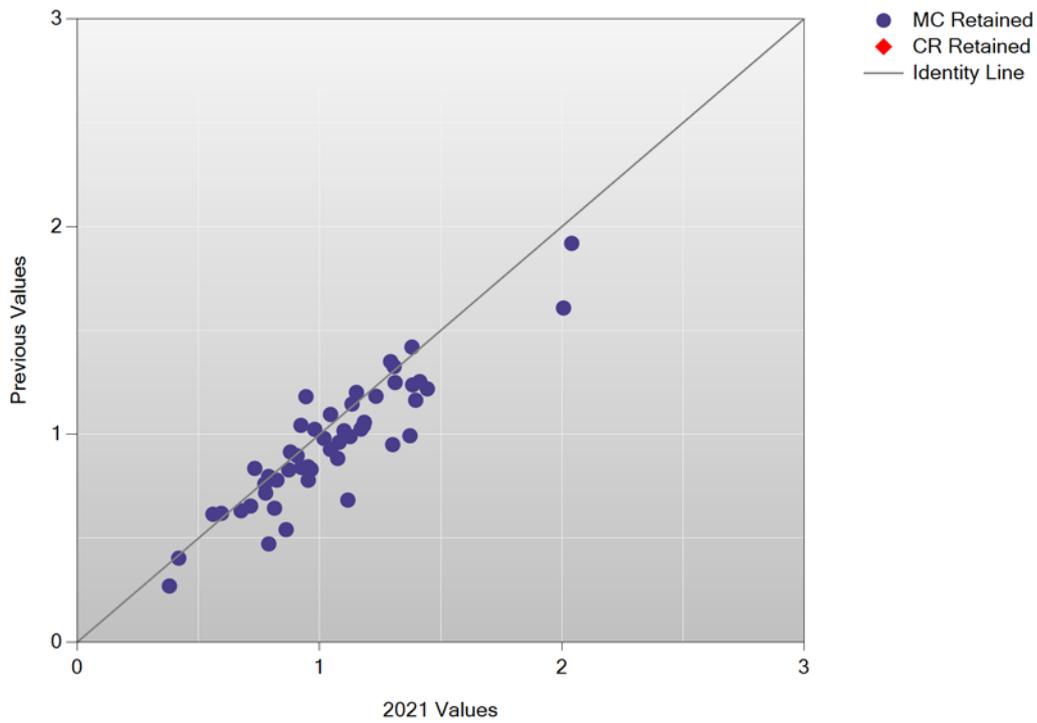
B/B Plot: Mathematics Grade 3



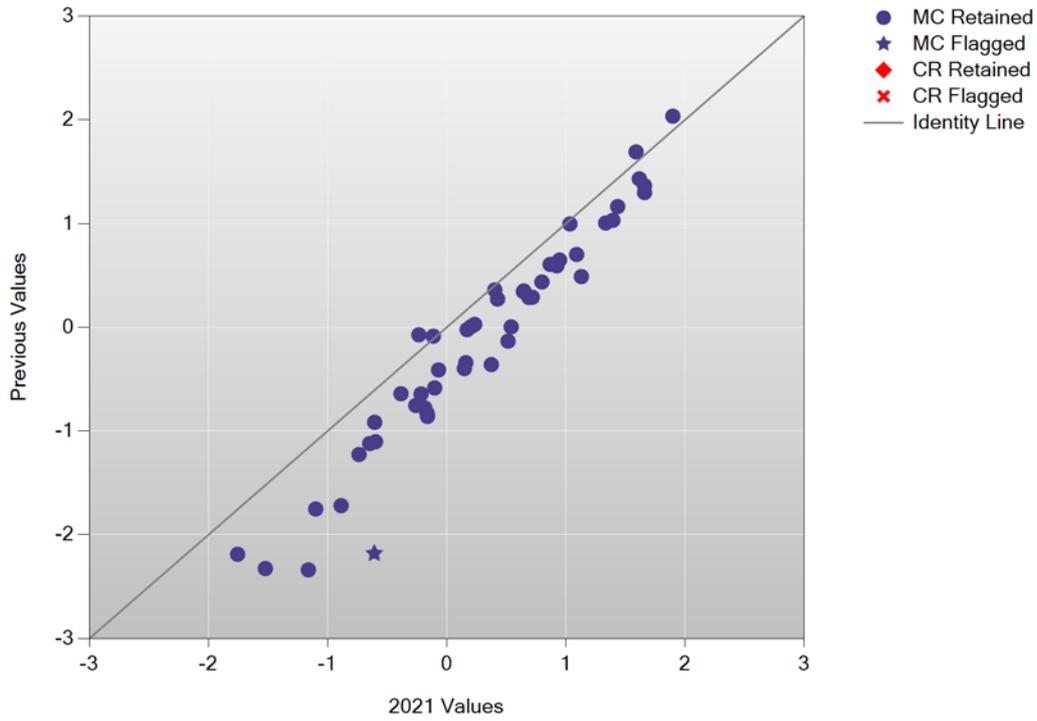
Delta Plot: Mathematics Grade 3



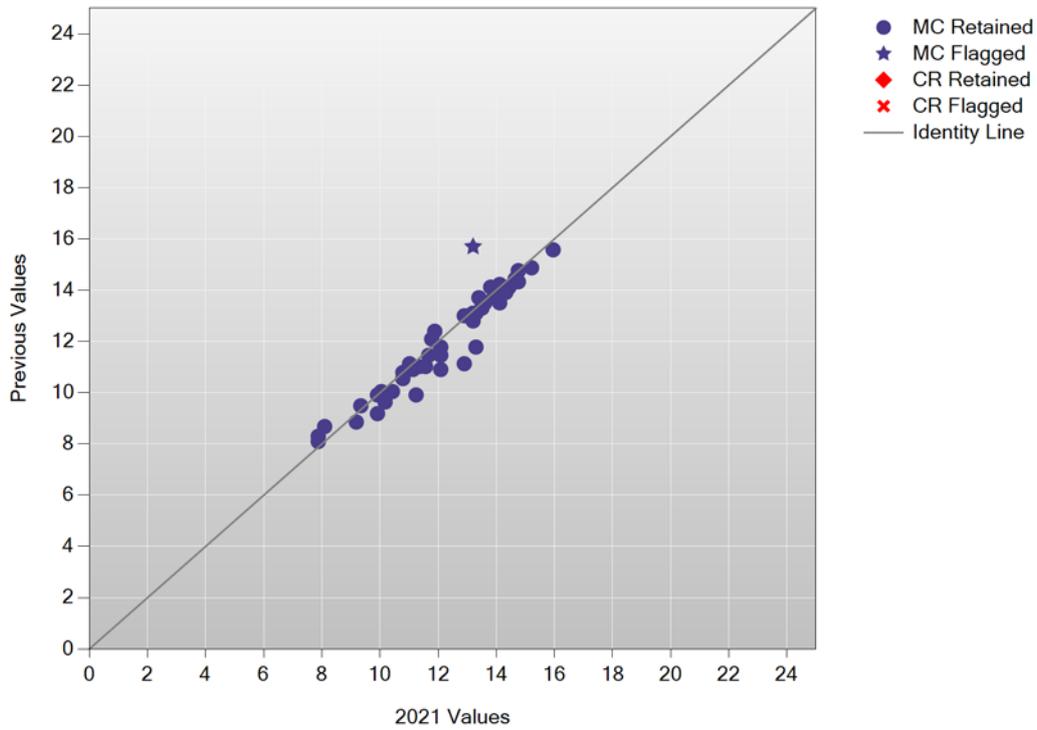
A/A Plot: Mathematics Grade 4



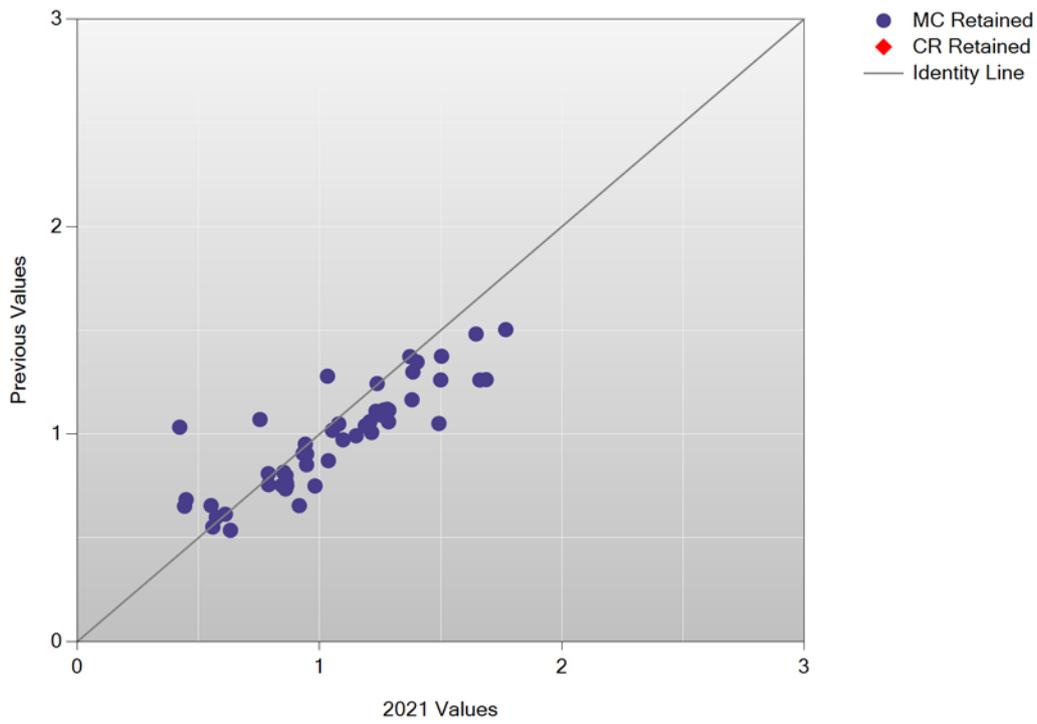
B/B Plot: Mathematics Grade 4



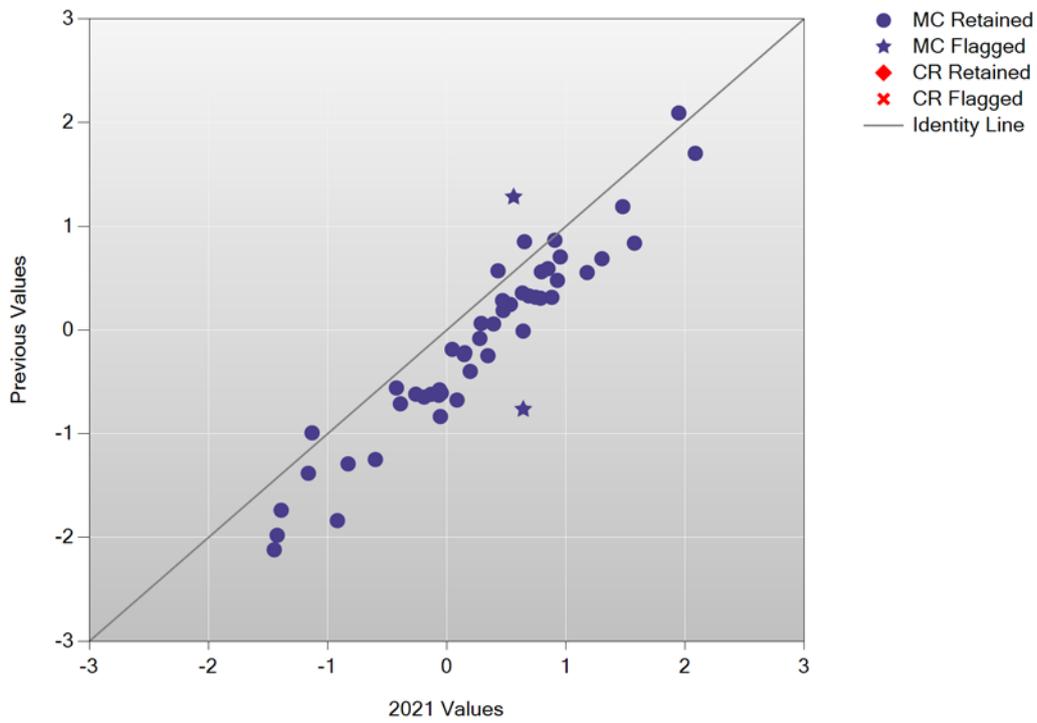
Delta Plot: Mathematics Grade 4



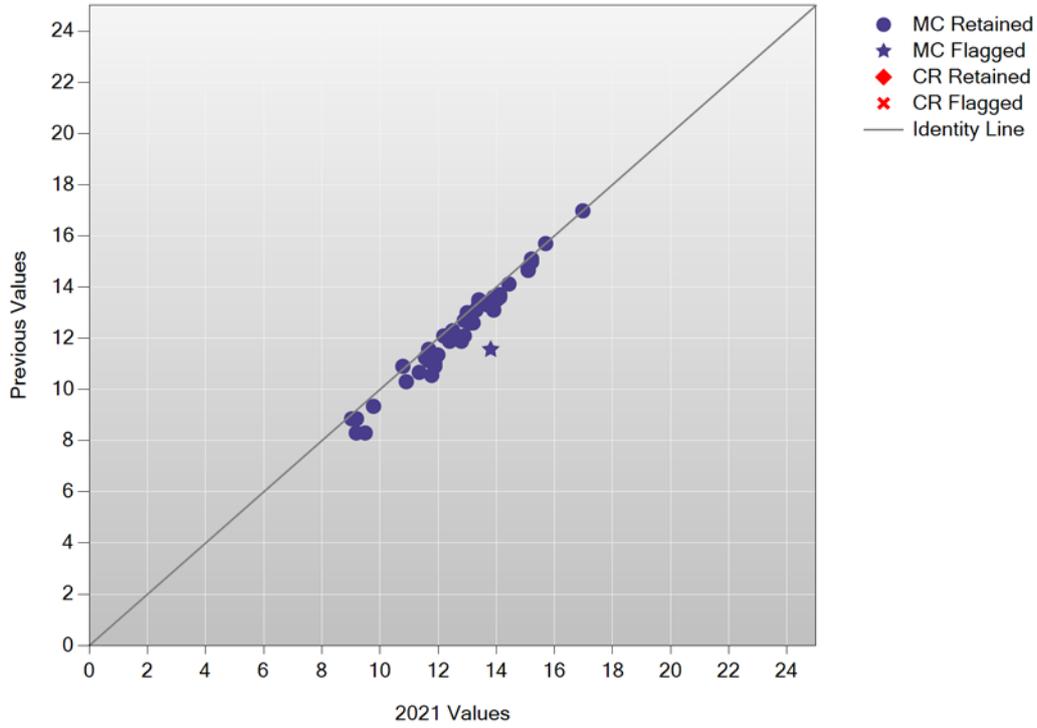
A/A Plot: Mathematics Grade 5



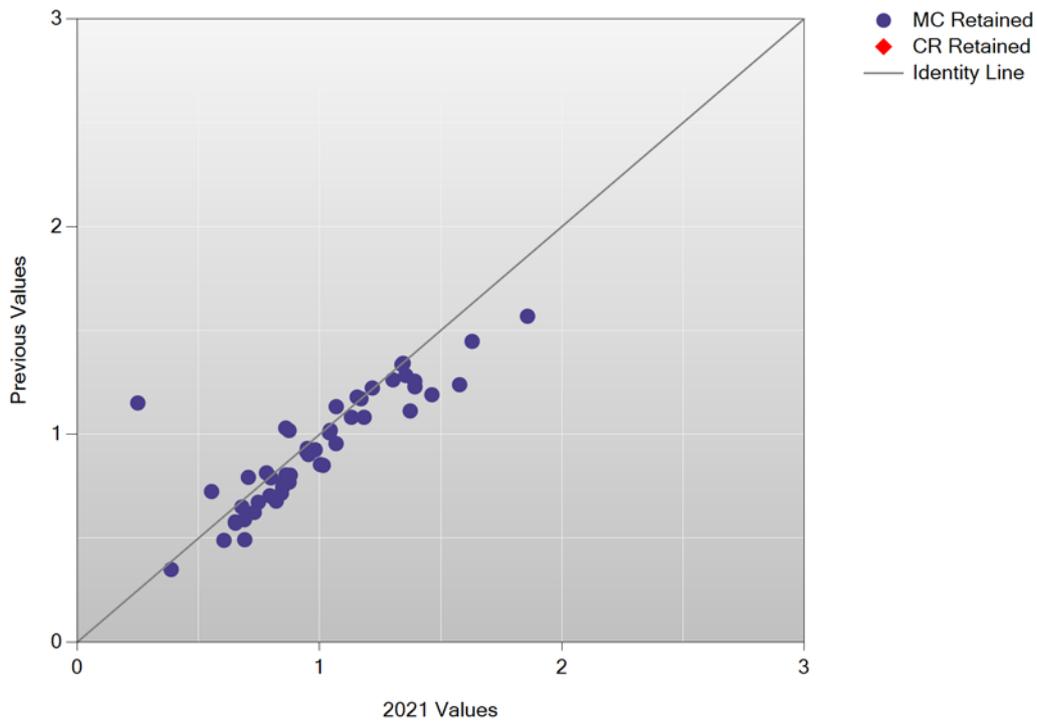
B/B Plot: Mathematics Grade 5



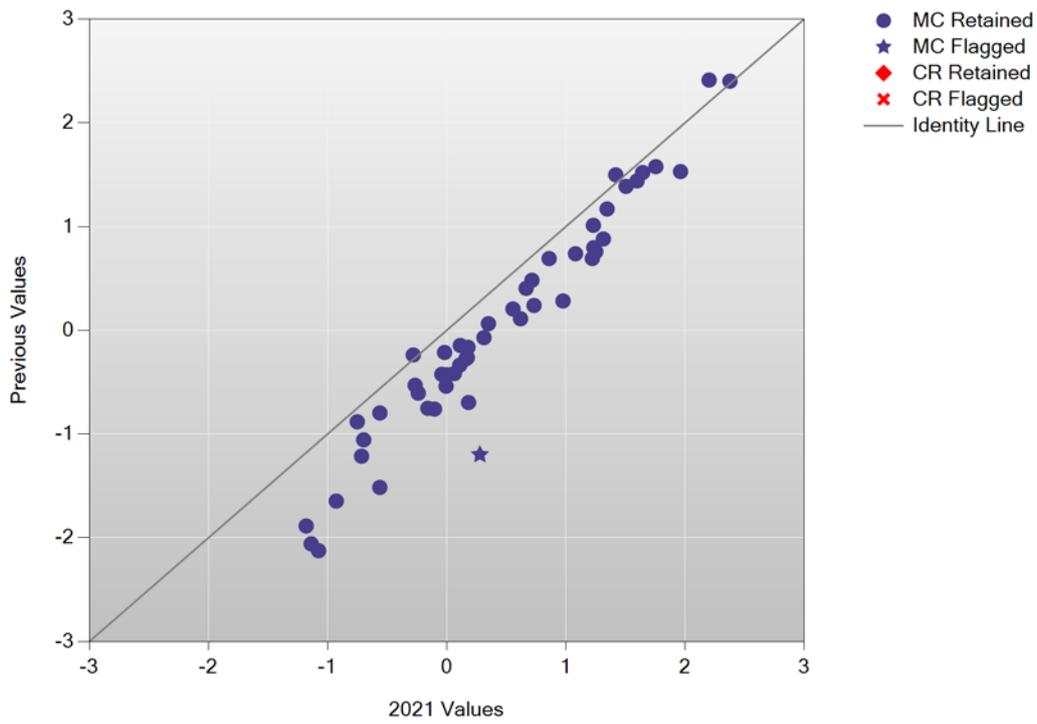
Delta Plot: Mathematics Grade 5



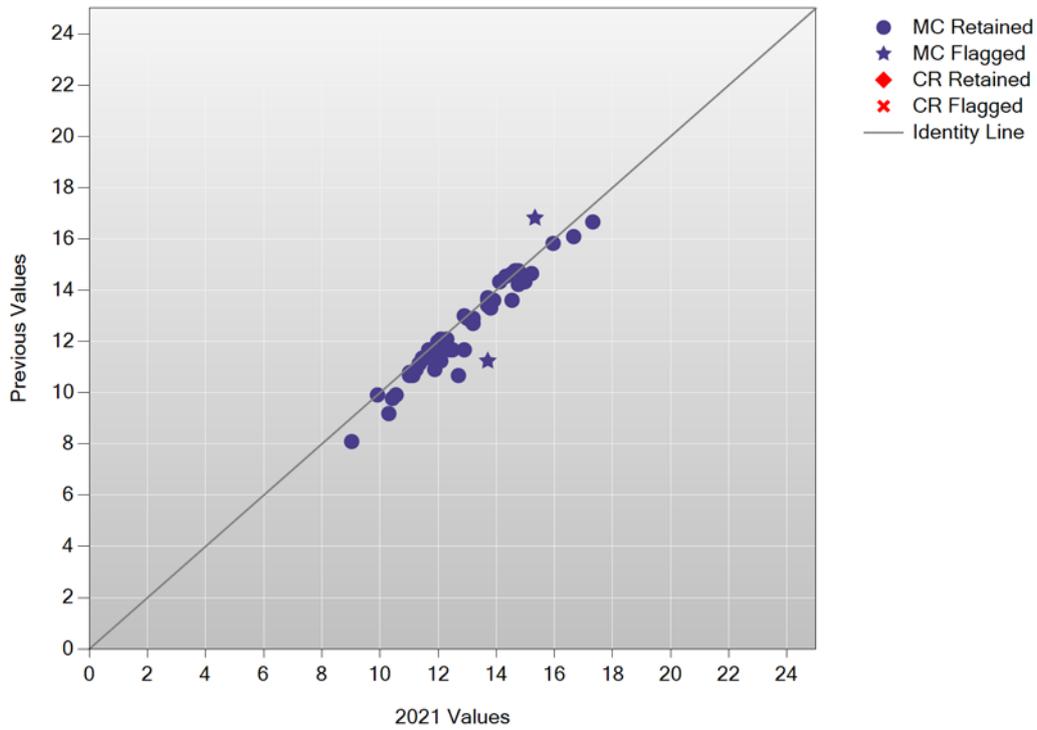
A/A Plot: Mathematics Grade 6



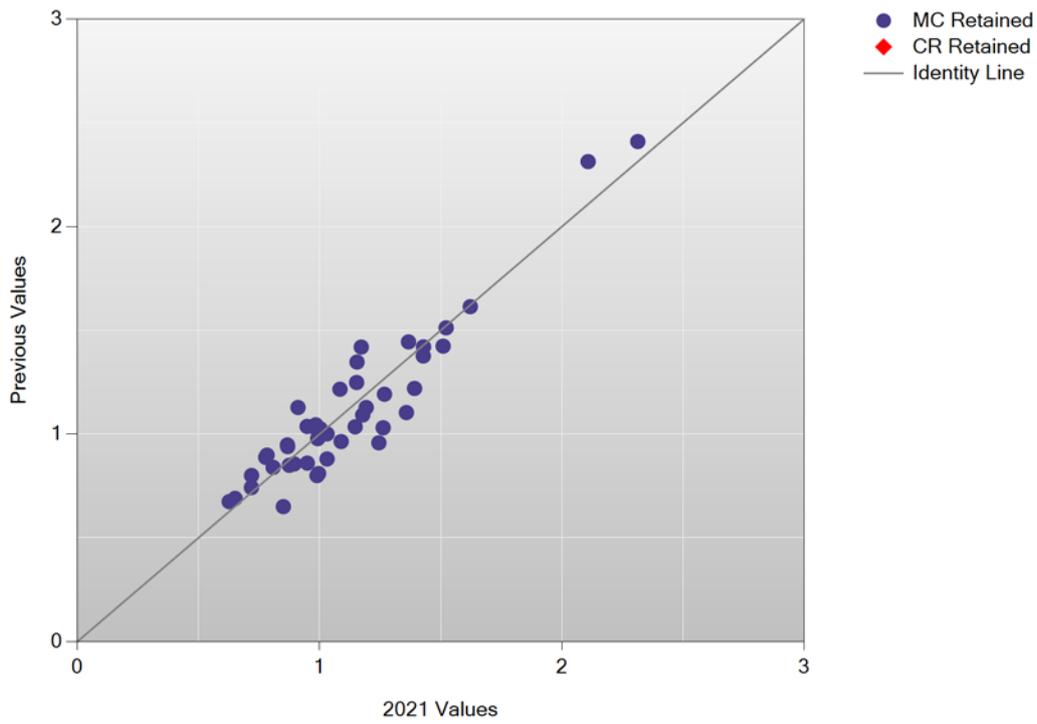
B/B Plot: Mathematics Grade 6



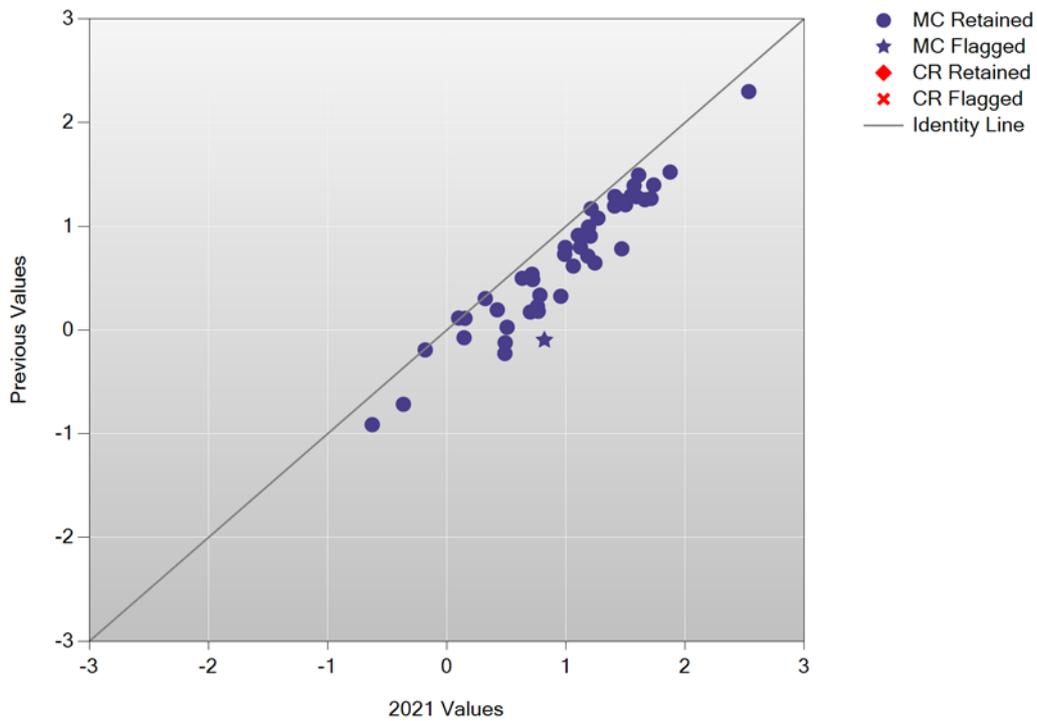
Delta Plot: Mathematics Grade 6



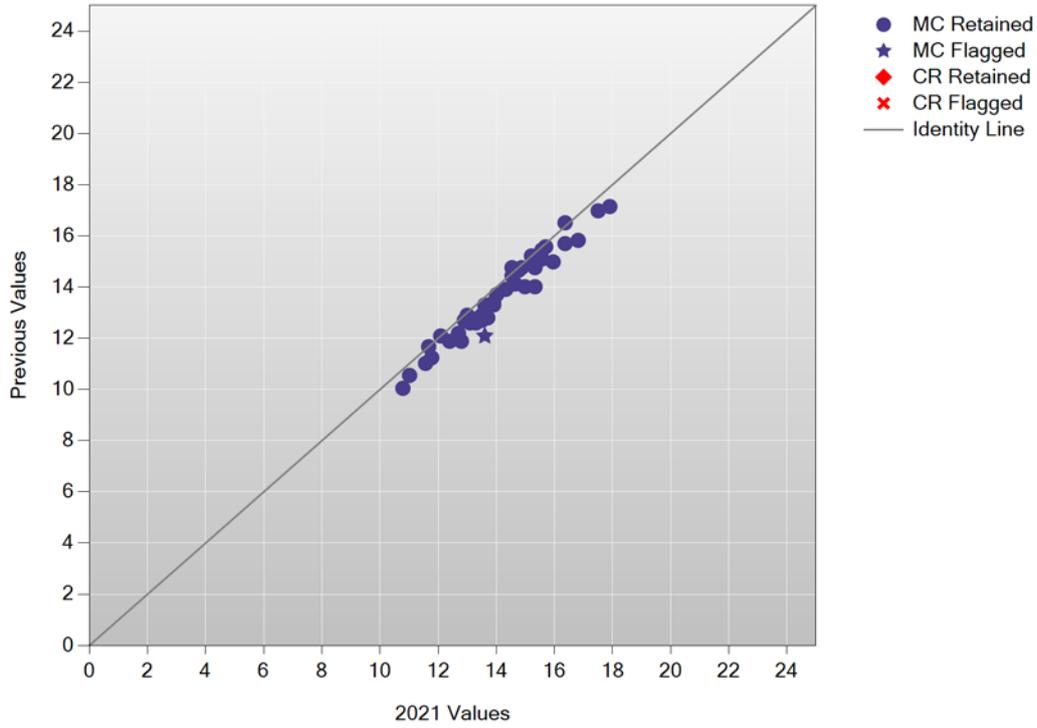
A/A Plot: Mathematics Grade 7



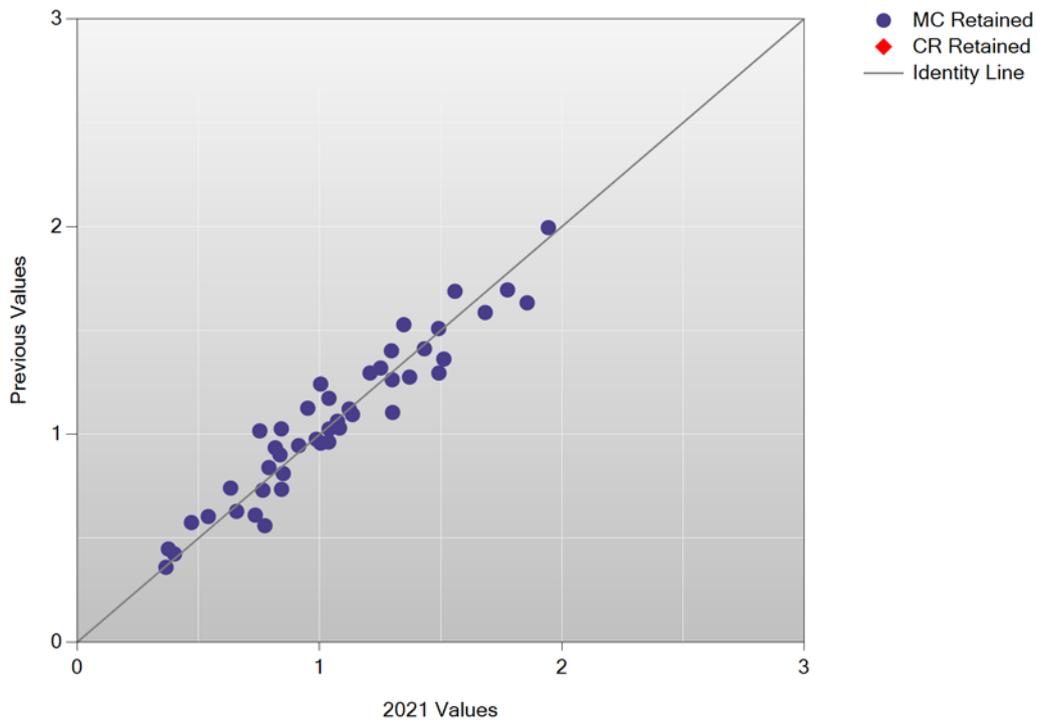
B/B Plot: Mathematics Grade 7



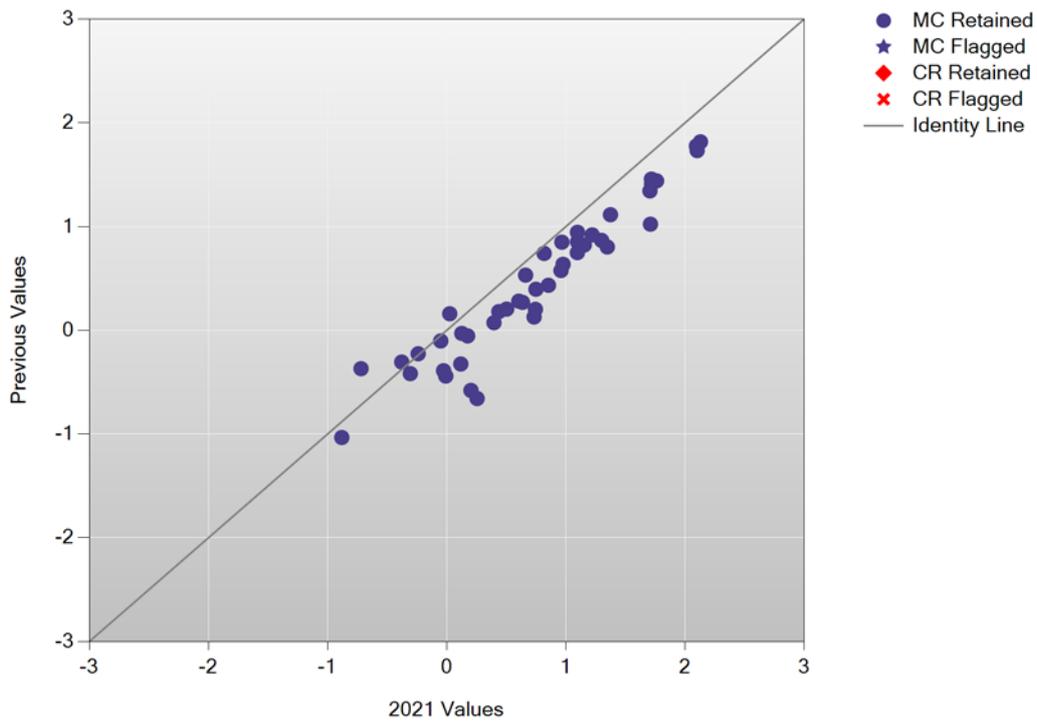
Delta Plot: Mathematics Grade 7



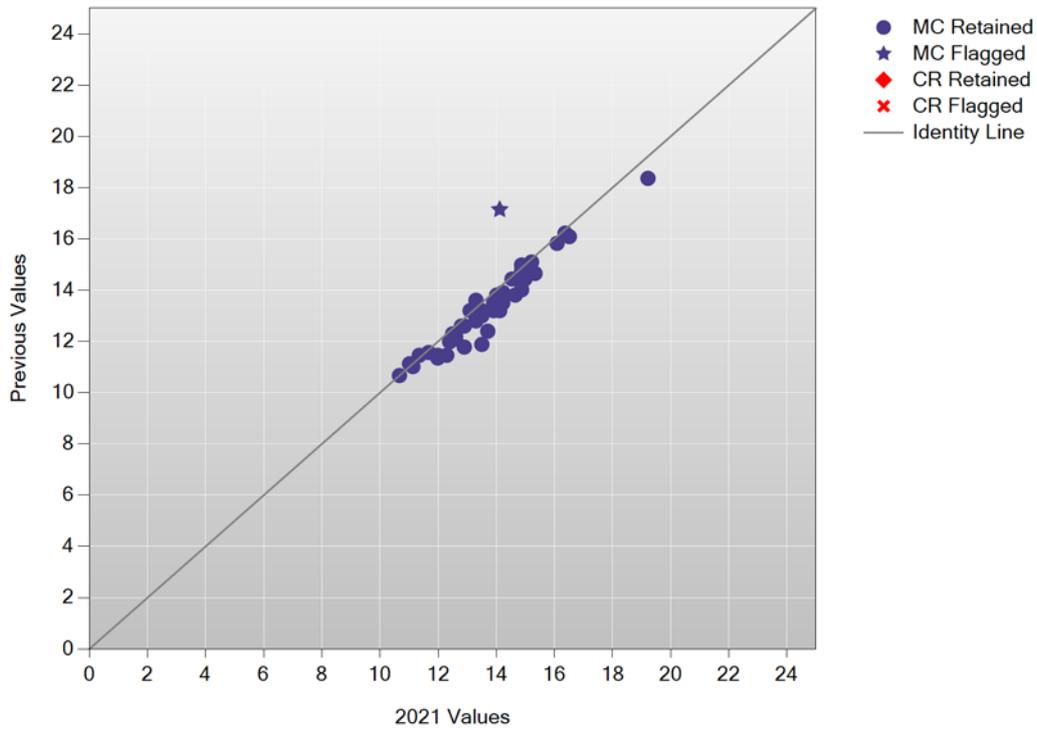
A/A Plot: Mathematics Grade 8



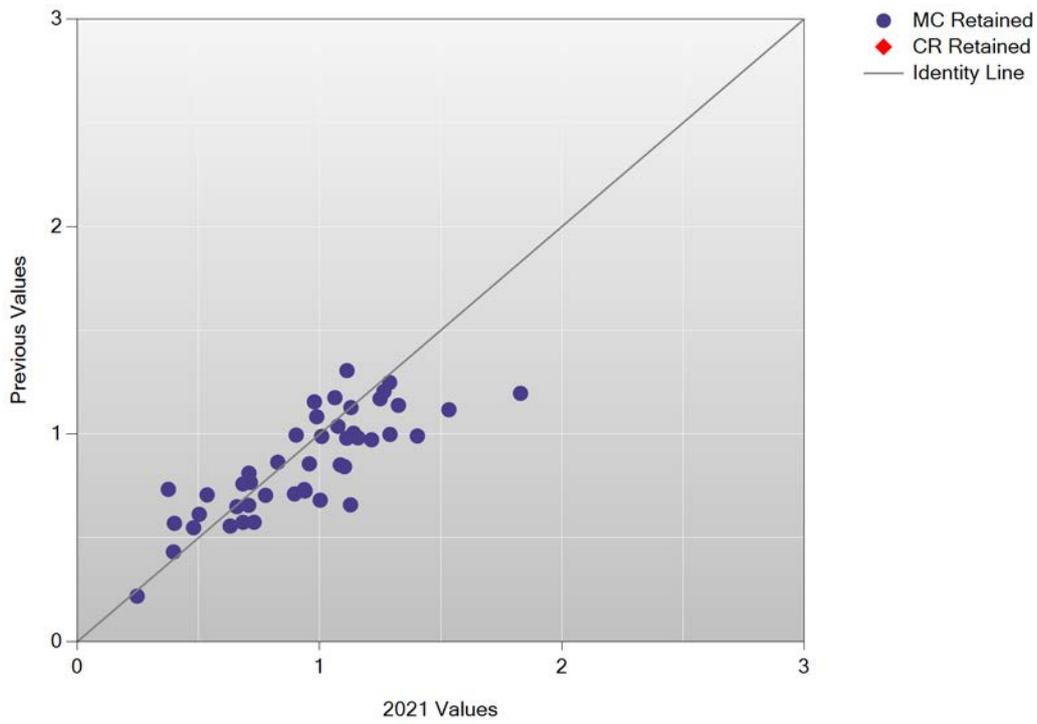
B/B Plot: Mathematics Grade 8



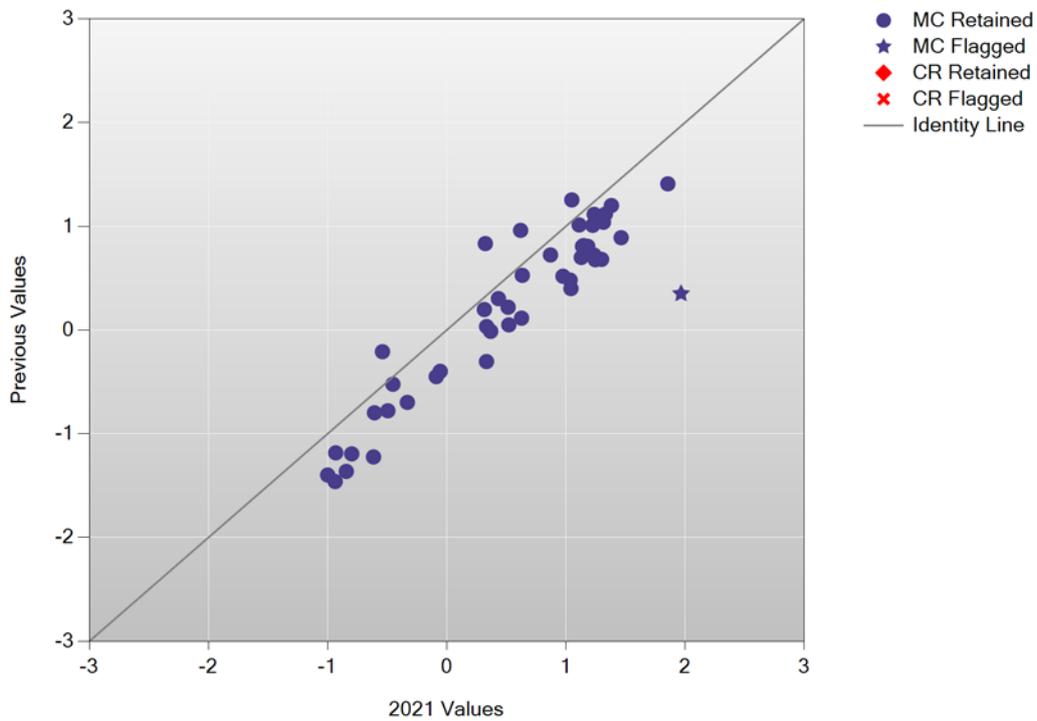
Delta Plot: Mathematics Grade 8



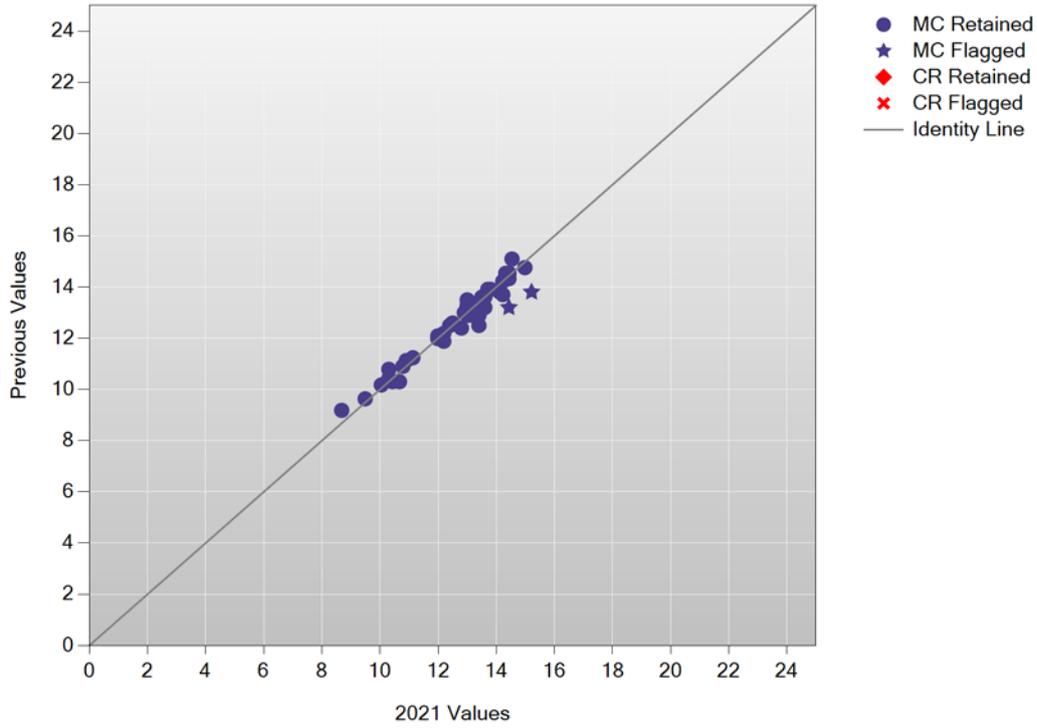
A/A Plot: Science Grade 5



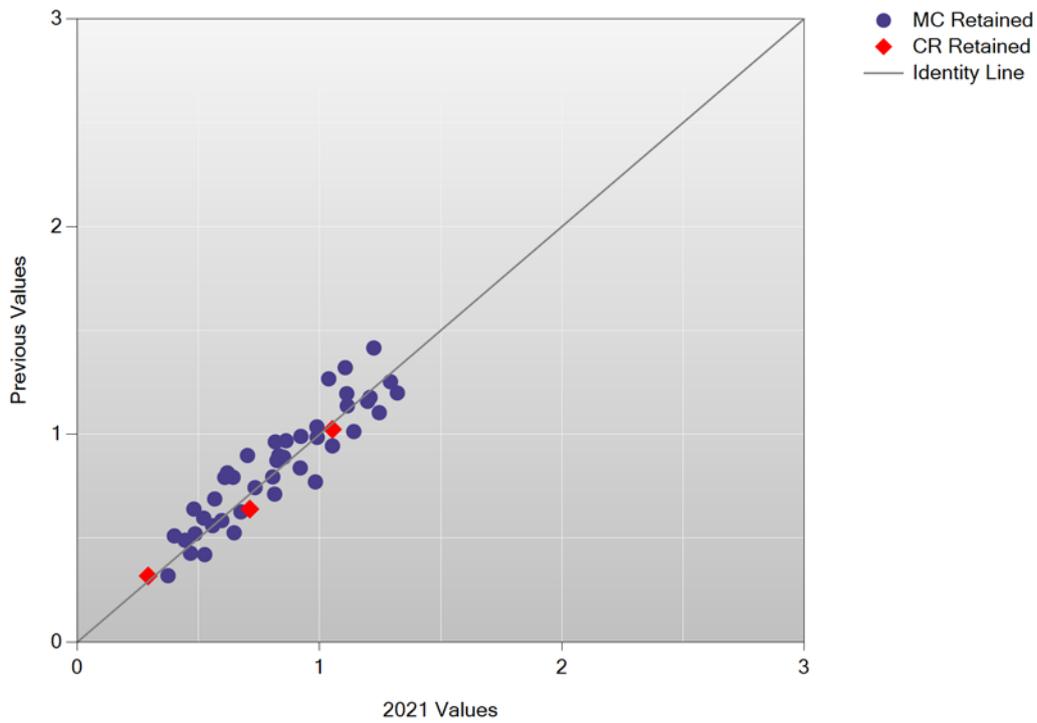
B/B Plot: Science Grade 5



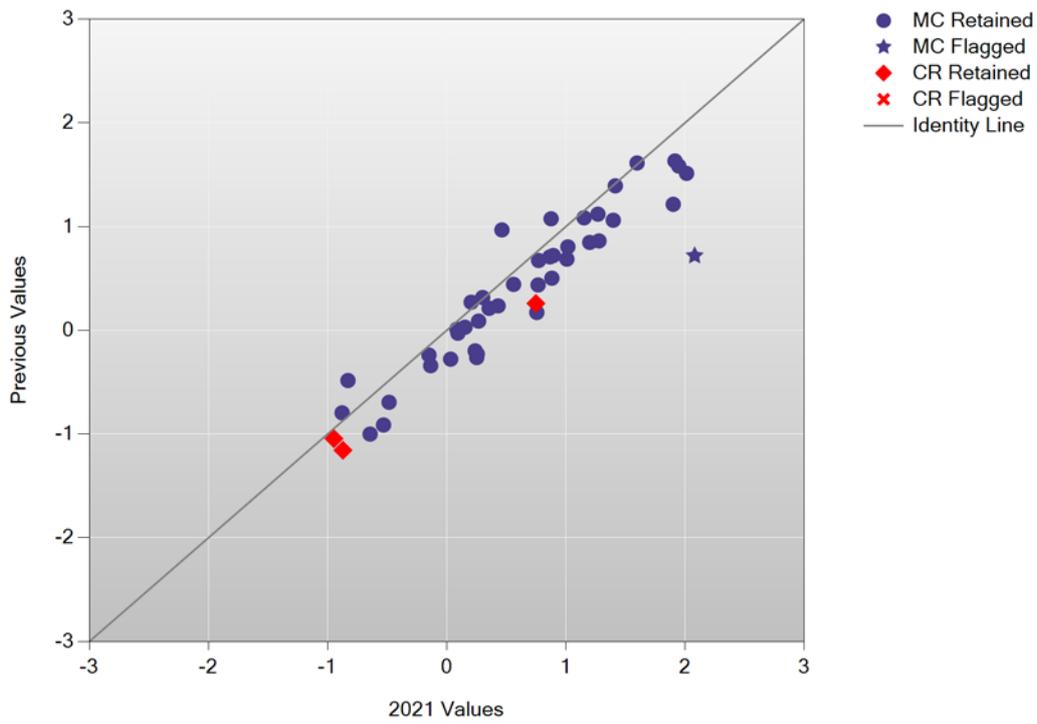
Delta Plot: Science Grade 5



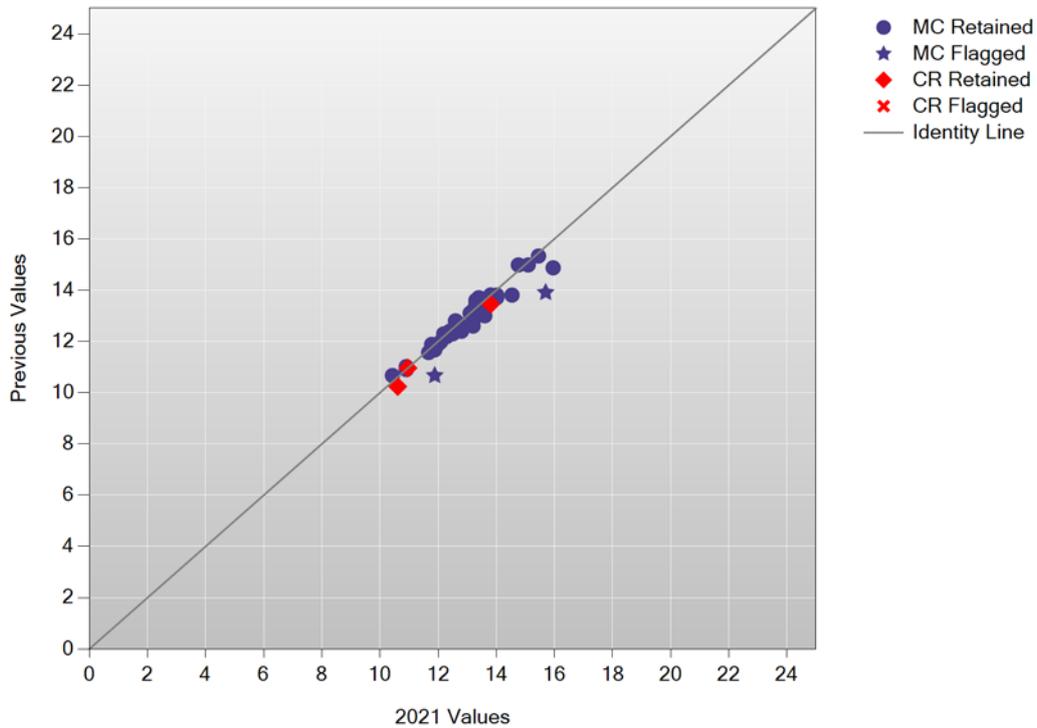
A/A Plot: Science Grade 8



B/B Plot: Science Grade 8



Delta Plot: Science Grade 8



Section 2.2

Lookup Tables



Table 2.2.1
Raw Score to Scale Score Lookup Table
English Language Arts Grade 3

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.355	0.64	10.0	200	1	200	1
1	-3.330	0.66	10.0	201	1	200	1
2	-3.305	0.68	10.0	201	1	200	1
3	-3.280	0.70	10.0	202	1	200	1
4	-3.255	0.72	10.0	203	1	200	1
5	-3.230	0.75	10.0	203	1	200	1
6	-3.205	0.77	10.0	204	1	200	1
7	-3.180	0.79	10.0	205	1	200	1
8	-3.155	0.82	10.0	205	1	200	1
9	-3.130	0.84	10.0	206	1	200	1
10	-3.105	0.87	10.0	207	1	200	1
11	-2.622	1.62	10.0	220	1	215	1
12	-2.293	2.55	10.0	229	1	225	1
13	-2.043	3.60	10.0	236	1	232	1
14	-1.839	4.70	10.0	241	1	238	1
15	-1.666	5.76	10.0	246	1	243	1
16	-1.513	6.76	10.0	250	1	247	1
17	-1.375	7.67	9.8	254	1	251	1
18	-1.249	8.49	9.3	257	1	254	1
19	-1.130	9.24	8.9	260	1	258	1
20	-1.018	9.91	8.6	263	1	261	1
21	-0.912	10.52	8.3	266	1	264	1
22	-0.809	11.07	8.1	269	1	266	1
23	-0.710	11.57	8.0	272	1	269	1
24	-0.614	12.01	7.8	274	1	272	1
25	-0.519	12.41	7.7	277	2	275	1
26	-0.426	12.74	7.6	279	2	277	2
27	-0.335	13.02	7.5	282	2	280	2
28	-0.244	13.24	7.4	284	2	282	2
29	-0.153	13.40	7.4	287	2	285	2
30	-0.063	13.49	7.4	289	2	288	2
31	0.028	13.51	7.4	292	2	290	2
32	0.120	13.47	7.4	294	2	293	2
33	0.213	13.36	7.4	297	2	295	2
34	0.308	13.18	7.5	299	2	298	2
35	0.404	12.93	7.5	302	3	301	3
36	0.504	12.61	7.6	304	3	304	3
37	0.607	12.23	7.7	307	3	307	3

Table 2.2.1 (continued)
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 3

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.714	11.78	7.9	310	3	310	3
39	0.826	11.27	8.1	313	3	313	3
40	0.944	10.70	8.3	316	3	317	3
41	1.069	10.07	8.5	320	3	321	3
42	1.203	9.38	8.8	323	3	325	3
43	1.347	8.63	9.2	327	3	330	4
44	1.506	7.84	9.7	332	4	335	4
45	1.682	6.99	10.0	336	4	341	4
46	1.881	6.10	10.0	342	4	349	4
47	2.111	5.17	10.0	348	4	359	4
48	2.386	4.18	10.0	355	4	374	4
49	2.734	3.10	10.0	365	4	399	4
50	3.228	1.91	10.0	378	4	399	4
51	4.000	0.81	10.0	399	4	N/A	N/A
52	4.000	0.81	10.0	399	4	N/A	N/A

Table 2.2.2
Raw Score to Scale Score Lookup Table
English Language Arts Grade 4

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.264	1.43	10.0	200	1	200	1
1	-3.230	1.48	10.0	201	1	200	1
2	-3.195	1.54	10.0	202	1	201	1
3	-3.160	1.59	10.0	203	1	201	1
4	-3.126	1.65	10.0	204	1	201	1
5	-3.091	1.71	10.0	205	1	202	1
6	-3.056	1.77	10.0	206	1	202	1
7	-3.021	1.83	10.0	207	1	203	1
8	-2.987	1.90	10.0	208	1	203	1
9	-2.952	1.97	10.0	209	1	203	1
10	-2.917	2.04	10.0	210	1	204	1
11	-2.883	2.11	10.0	210	1	213	1
12	-2.589	2.85	10.0	219	1	220	1
13	-2.351	3.63	10.0	225	1	226	1
14	-2.150	4.43	10.0	231	1	231	1
15	-1.974	5.26	10.0	235	1	236	1
16	-1.818	6.10	10.0	240	1	240	1
17	-1.675	6.93	10.0	244	1	244	1
18	-1.544	7.74	9.8	247	1	247	1
19	-1.421	8.51	9.4	250	1	251	1
20	-1.305	9.23	9.0	254	1	254	1
21	-1.195	9.89	8.7	257	1	257	1
22	-1.089	10.50	8.5	260	1	260	1
23	-0.987	11.04	8.2	262	1	263	1
24	-0.887	11.52	8.1	265	1	266	1
25	-0.789	11.93	7.9	268	1	268	1
26	-0.692	12.27	7.8	270	1	271	1
27	-0.597	12.52	7.7	273	1	274	1
28	-0.502	12.69	7.7	276	2	276	2
29	-0.406	12.75	7.7	278	2	279	2
30	-0.310	12.72	7.7	281	2	281	2
31	-0.213	12.58	7.7	284	2	284	2
32	-0.113	12.34	7.8	286	2	287	2
33	-0.012	12.01	7.9	289	2	290	2
34	0.092	11.60	8.0	292	2	292	2
35	0.200	11.14	8.2	295	2	295	2
36	0.312	10.64	8.4	298	2	298	2
37	0.428	10.13	8.6	301	3	301	3



Table 2.2.2 (continued)
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 4

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.549	9.61	8.8	304	3	305	3
39	0.677	9.11	9.1	308	3	308	3
40	0.810	8.64	9.3	312	3	312	3
41	0.951	8.19	9.6	315	3	316	3
42	1.100	7.75	9.8	320	3	321	3
43	1.259	7.29	10.0	324	3	325	3
44	1.431	6.77	10.0	329	3	331	4
45	1.619	6.16	10.0	334	4	337	4
46	1.831	5.43	10.0	340	4	345	4
47	2.076	4.56	10.0	346	4	355	4
48	2.374	3.57	10.0	354	4	370	4
49	2.771	2.45	10.0	365	4	399	4
50	3.395	1.26	10.0	382	4	399	4
51	4.000	0.64	10.0	399	4	N/A	N/A
52	4.000	0.64	10.0	399	4	N/A	N/A

Table 2.2.3
Raw Score to Scale Score Lookup Table
English Language Arts Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.386	0.54	10.0	200	1	200	1
1	-3.375	0.55	10.0	200	1	201	1
2	-3.363	0.56	10.0	201	1	202	1
3	-3.351	0.57	10.0	201	1	203	1
4	-3.339	0.58	10.0	201	1	203	1
5	-3.327	0.59	10.0	202	1	204	1
6	-3.315	0.60	10.0	202	1	205	1
7	-3.303	0.61	10.0	202	1	206	1
8	-3.292	0.62	10.0	203	1	207	1
9	-3.280	0.63	10.0	203	1	208	1
10	-3.268	0.64	10.0	203	1	208	1
11	-2.767	1.45	10.0	217	1	209	1
12	-2.446	2.44	10.0	225	1	217	1
13	-2.207	3.52	10.0	232	1	223	1
14	-2.014	4.64	10.0	237	1	228	1
15	-1.851	5.77	10.0	241	1	233	1
16	-1.708	6.90	10.0	245	1	237	1
17	-1.579	8.01	9.5	249	1	240	1
18	-1.461	9.10	8.9	252	1	243	1
19	-1.352	10.13	8.5	255	1	247	1
20	-1.249	11.10	8.1	258	1	249	1
21	-1.152	11.98	7.8	260	1	252	1
22	-1.058	12.76	7.5	263	1	255	1
23	-0.968	13.42	7.4	265	1	257	1
24	-0.880	13.98	7.2	268	1	260	1
25	-0.794	14.44	7.1	270	1	262	1
26	-0.709	14.80	7.0	272	2	264	1
27	-0.625	15.07	6.9	274	2	267	1
28	-0.541	15.28	6.9	277	2	269	1
29	-0.458	15.43	6.9	279	2	271	2
30	-0.375	15.54	6.8	281	2	273	2
31	-0.291	15.60	6.8	283	2	275	2
32	-0.207	15.63	6.8	286	2	278	2
33	-0.122	15.61	6.8	288	2	280	2
34	-0.036	15.54	6.8	290	2	282	2
35	0.051	15.42	6.9	293	2	285	2
36	0.141	15.21	6.9	295	2	287	2
37	0.233	14.91	7.0	298	2	289	2

Table 2.2.3 (continued)
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.328	14.51	7.1	300	3	292	2
39	0.428	13.97	7.2	303	3	295	2
40	0.533	13.29	7.4	306	3	297	2
41	0.645	12.45	7.6	309	3	300	3
42	0.766	11.46	8.0	312	3	303	3
43	0.899	10.32	8.4	315	3	307	3
44	1.048	9.03	9.0	319	3	310	3
45	1.221	7.60	9.8	324	4	314	3
46	1.430	6.06	10.0	330	4	318	3
47	1.697	4.43	10.0	337	4	322	3
48	2.076	2.77	10.0	347	4	327	4
49	2.754	1.18	10.0	365	4	334	4
50	4.000	0.27	10.0	399	4	341	4
51	N/A	N/A	N/A	N/A	N/A	352	4
52	N/A	N/A	N/A	N/A	N/A	367	4
53	N/A	N/A	N/A	N/A	N/A	392	4
54	N/A	N/A	N/A	N/A	N/A	399	4
55	N/A	N/A	N/A	N/A	N/A	399	4

Table 2.2.4
Raw Score to Scale Score Lookup Table
English Language Arts Grade 6

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.467	0.90	10.0	200	1	200	1
1	-3.452	0.91	10.0	200	1	200	1
2	-3.436	0.93	10.0	201	1	201	1
3	-3.421	0.95	10.0	201	1	201	1
4	-3.405	0.97	10.0	202	1	202	1
5	-3.390	0.99	10.0	202	1	202	1
6	-3.375	1.00	10.0	202	1	203	1
7	-3.359	1.02	10.0	203	1	203	1
8	-3.344	1.04	10.0	203	1	203	1
9	-3.328	1.06	10.0	204	1	204	1
10	-3.313	1.08	10.0	204	1	204	1
11	-2.872	1.87	10.0	216	1	214	1
12	-2.563	2.74	10.0	224	1	221	1
13	-2.323	3.69	10.0	230	1	227	1
14	-2.126	4.67	10.0	236	1	232	1
15	-1.957	5.67	10.0	240	1	237	1
16	-1.808	6.65	10.0	244	1	241	1
17	-1.673	7.58	9.7	248	1	244	1
18	-1.549	8.45	9.2	251	1	247	1
19	-1.434	9.26	8.8	254	1	250	1
20	-1.325	10.00	8.4	257	1	253	1
21	-1.221	10.67	8.2	260	1	256	1
22	-1.121	11.29	7.9	263	1	259	1
23	-1.025	11.86	7.7	265	1	261	1
24	-0.931	12.37	7.6	268	1	264	1
25	-0.839	12.82	7.4	270	2	266	1
26	-0.749	13.21	7.3	272	2	269	2
27	-0.659	13.53	7.2	275	2	271	2
28	-0.570	13.76	7.2	277	2	273	2
29	-0.481	13.92	7.1	280	2	276	2
30	-0.392	14.00	7.1	282	2	278	2
31	-0.302	13.99	7.1	284	2	281	2
32	-0.210	13.90	7.1	287	2	283	2
33	-0.117	13.72	7.2	289	2	286	2
34	-0.022	13.45	7.3	292	2	288	2
35	0.076	13.10	7.4	294	2	291	2
36	0.177	12.65	7.5	297	2	294	2
37	0.282	12.12	7.7	299	2	297	2



Table 2.2.4 (continued)
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 6

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.392	11.50	7.9	303	3	299	2
39	0.508	10.81	8.1	306	3	303	3
40	0.632	10.06	8.4	309	3	307	3
41	0.764	9.26	8.8	313	3	310	3
42	0.907	8.42	9.2	317	3	315	3
43	1.064	7.55	9.7	321	3	319	3
44	1.239	6.65	10.0	325	3	325	3
45	1.435	5.75	10.0	331	4	331	4
46	1.660	4.85	10.0	337	4	339	4
47	1.924	3.96	10.0	344	4	350	4
48	2.244	3.11	10.0	352	4	366	4
49	2.651	2.28	10.0	363	4	399	4
50	3.219	1.45	10.0	378	4	399	4
51	4.000	0.75	10.0	399	4	N/A	N/A
52	4.000	0.75	10.0	399	4	N/A	N/A

Table 2.2.5
Raw Score to Scale Score Lookup Table
English Language Arts Grade 7

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.102	1.52	10.0	200	1	200	1
1	-3.102	1.52	10.0	200	1	201	1
2	-3.101	1.53	10.0	200	1	202	1
3	-3.100	1.53	10.0	200	1	202	1
4	-3.099	1.53	10.0	200	1	203	1
5	-3.098	1.53	10.0	200	1	204	1
6	-3.097	1.53	10.0	200	1	205	1
7	-3.096	1.53	10.0	200	1	206	1
8	-3.095	1.54	10.0	200	1	206	1
9	-3.094	1.54	10.0	200	1	207	1
10	-3.094	1.54	10.0	200	1	208	1
11	-2.740	2.34	10.0	210	1	209	1
12	-2.469	3.19	10.0	218	1	210	1
13	-2.246	4.06	10.0	224	1	217	1
14	-2.056	4.92	10.0	229	1	223	1
15	-1.889	5.73	10.0	234	1	229	1
16	-1.737	6.49	10.0	238	1	233	1
17	-1.598	7.18	10.0	242	1	237	1
18	-1.468	7.80	10.0	246	1	241	1
19	-1.346	8.34	9.7	249	1	245	1
20	-1.228	8.81	9.4	253	1	248	1
21	-1.116	9.21	9.2	256	1	252	1
22	-1.006	9.54	9.1	259	1	255	1
23	-0.899	9.82	8.9	262	1	258	1
24	-0.794	10.04	8.8	265	1	261	1
25	-0.691	10.21	8.8	268	1	264	1
26	-0.588	10.33	8.7	270	1	267	1
27	-0.486	10.41	8.7	273	2	270	1
28	-0.384	10.45	8.7	276	2	272	1
29	-0.282	10.45	8.7	279	2	275	2
30	-0.179	10.42	8.7	282	2	278	2
31	-0.075	10.34	8.7	285	2	281	2
32	0.030	10.23	8.8	288	2	284	2
33	0.137	10.08	8.8	291	2	287	2
34	0.247	9.89	8.9	294	2	290	2
35	0.359	9.66	9.0	297	2	293	2
36	0.475	9.39	9.1	300	3	297	2
37	0.595	9.07	9.3	304	3	300	3



Table 2.2.5 (continued)
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 7

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.720	8.70	9.5	307	3	304	3
39	0.851	8.28	9.7	311	3	308	3
40	0.990	7.80	10.0	315	3	312	3
41	1.139	7.26	10.0	319	3	316	3
42	1.299	6.67	10.0	323	4	321	3
43	1.474	6.01	10.0	328	4	327	4
44	1.670	5.30	10.0	334	4	333	4
45	1.892	4.55	10.0	340	4	341	4
46	2.152	3.77	10.0	347	4	352	4
47	2.466	2.97	10.0	356	4	367	4
48	2.871	2.15	10.0	367	4	395	4
49	3.447	1.33	10.0	384	4	399	4
50	4.000	0.82	10.0	399	4	399	4
51	4.000	0.82	10.0	399	4	N/A	N/A

Table 2.2.6
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.134	1.65	10.0	200	1	200	1
1	-3.124	1.67	10.0	200	1	200	1
2	-3.113	1.69	10.0	201	1	200	1
3	-3.102	1.71	10.0	201	1	200	1
4	-3.091	1.73	10.0	201	1	200	1
5	-3.080	1.75	10.0	202	1	200	1
6	-3.070	1.77	10.0	202	1	200	1
7	-3.059	1.79	10.0	202	1	200	1
8	-3.048	1.81	10.0	202	1	200	1
9	-3.037	1.84	10.0	203	1	201	1
10	-3.026	1.86	10.0	203	1	201	1
11	-3.015	1.88	10.0	203	1	201	1
12	-2.724	2.63	10.0	211	1	201	1
13	-2.484	3.46	10.0	218	1	208	1
14	-2.280	4.34	10.0	224	1	214	1
15	-2.101	5.23	10.0	229	1	220	1
16	-1.941	6.12	10.0	233	1	225	1
17	-1.794	6.96	10.0	237	1	230	1
18	-1.657	7.74	10.0	241	1	234	1
19	-1.528	8.40	9.6	245	1	238	1
20	-1.405	8.93	9.3	248	1	241	1
21	-1.285	9.33	9.1	252	1	245	1
22	-1.170	9.60	9.0	255	1	248	1
23	-1.056	9.80	8.9	258	1	251	1
24	-0.944	9.94	8.8	261	1	255	1
25	-0.833	10.05	8.8	264	1	258	1
26	-0.722	10.13	8.8	267	1	261	1
27	-0.613	10.18	8.7	270	2	264	1
28	-0.503	10.20	8.7	273	2	267	1
29	-0.393	10.18	8.7	276	2	270	2
30	-0.282	10.11	8.8	280	2	274	2
31	-0.170	10.00	8.8	283	2	277	2
32	-0.057	9.87	8.9	286	2	280	2
33	0.058	9.73	8.9	289	2	283	2
34	0.175	9.58	9.0	292	2	286	2
35	0.294	9.43	9.1	296	2	289	2
36	0.417	9.27	9.2	299	2	292	2
37	0.542	9.11	9.2	303	3	295	2

Table 2.2.6 (continued)
 Raw Score to Scale Score Lookup Table
 English Language Arts Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.672	8.93	9.3	306	3	298	2
39	0.806	8.72	9.4	310	3	301	3
40	0.946	8.45	9.6	314	3	304	3
41	1.095	8.09	9.8	318	3	307	3
42	1.254	7.60	10.0	322	4	311	3
43	1.428	6.91	10.0	327	4	314	3
44	1.625	6.01	10.0	333	4	318	3
45	1.855	4.89	10.0	339	4	322	4
46	2.140	3.64	10.0	347	4	326	4
47	2.521	2.40	10.0	358	4	330	4
48	3.092	1.30	10.0	374	4	335	4
49	4.000	0.55	10.0	399	4	341	4
50	4.000	0.55	10.0	399	4	348	4
51	N/A	N/A	N/A	N/A	N/A	356	4
52	N/A	N/A	N/A	N/A	N/A	366	4
53	N/A	N/A	N/A	N/A	N/A	379	4
54	N/A	N/A	N/A	N/A	N/A	398	4
55	N/A	N/A	N/A	N/A	N/A	399	4
56	N/A	N/A	N/A	N/A	N/A	399	4
57	N/A	N/A	N/A	N/A	N/A	399	4

Table 2.2.7
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 3

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.665	0.74	10.0	200	1	200	1
1	-3.617	0.81	10.0	201	1	201	1
2	-3.568	0.89	10.0	203	1	203	1
3	-3.520	0.98	10.0	204	1	204	1
4	-3.472	1.07	10.0	205	1	205	1
5	-3.423	1.17	10.0	206	1	207	1
6	-3.375	1.27	10.0	208	1	208	1
7	-3.326	1.38	10.0	209	1	209	1
8	-3.278	1.50	10.0	210	1	211	1
9	-3.229	1.63	10.0	211	1	212	1
10	-3.181	1.77	10.0	213	1	213	1
11	-2.840	2.97	10.0	221	1	222	1
12	-2.588	4.11	10.0	228	1	228	1
13	-2.383	5.18	10.0	233	1	233	1
14	-2.209	6.19	10.0	238	1	238	1
15	-2.056	7.16	9.7	242	1	242	1
16	-1.918	8.10	9.1	245	1	245	1
17	-1.791	9.01	8.6	249	1	248	1
18	-1.674	9.91	8.2	252	1	251	1
19	-1.564	10.79	7.9	255	1	254	1
20	-1.460	11.64	7.6	257	1	257	1
21	-1.360	12.47	7.4	260	1	259	1
22	-1.265	13.26	7.1	262	1	262	1
23	-1.173	14.00	6.9	265	1	264	1
24	-1.084	14.66	6.8	267	1	266	1
25	-0.996	15.23	6.7	269	1	269	1
26	-0.910	15.70	6.6	272	1	271	1
27	-0.825	16.06	6.5	274	2	273	1
28	-0.741	16.31	6.4	276	2	275	2
29	-0.657	16.44	6.4	278	2	278	2
30	-0.573	16.45	6.4	280	2	280	2
31	-0.488	16.37	6.4	282	2	282	2
32	-0.402	16.18	6.5	285	2	285	2
33	-0.314	15.91	6.5	287	2	287	2
34	-0.225	15.57	6.6	289	2	289	2
35	-0.133	15.16	6.7	292	2	292	2
36	-0.038	14.69	6.8	294	2	294	2
37	0.059	14.18	6.9	297	2	297	2

Table 2.2.7 (continued)
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 3

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.161	13.61	7.0	299	2	299	2
39	0.268	13.00	7.2	302	3	302	3
40	0.381	12.34	7.4	305	3	305	3
41	0.500	11.61	7.6	308	3	308	3
42	0.628	10.81	7.9	311	3	311	3
43	0.768	9.93	8.2	315	3	315	3
44	0.922	8.93	8.7	319	3	319	3
45	1.096	7.81	9.3	324	4	323	4
46	1.301	6.54	10.0	329	4	329	4
47	1.553	5.10	10.0	335	4	335	4
48	1.896	3.47	10.0	344	4	344	4
49	2.470	1.68	10.0	359	4	360	4
50	4.000	0.23	10.0	399	4	399	4

Table 2.2.8
Raw Score to Scale Score Lookup Table
Mathematics Grade 4

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.498	1.01	10.0	200	1	200	1
1	-3.469	1.04	10.0	201	1	201	1
2	-3.441	1.08	10.0	202	1	202	1
3	-3.412	1.11	10.0	202	1	202	1
4	-3.384	1.15	10.0	203	1	203	1
5	-3.355	1.18	10.0	204	1	204	1
6	-3.327	1.22	10.0	205	1	205	1
7	-3.298	1.26	10.0	205	1	206	1
8	-3.270	1.30	10.0	206	1	206	1
9	-3.241	1.34	10.0	207	1	207	1
10	-3.212	1.38	10.0	208	1	208	1
11	-3.184	1.42	10.0	208	1	209	1
12	-3.155	1.47	10.0	209	1	210	1
13	-2.702	2.24	10.0	221	1	221	1
14	-2.365	2.88	10.0	230	1	230	1
15	-2.092	3.44	10.0	237	1	236	1
16	-1.860	3.97	10.0	243	1	242	1
17	-1.658	4.56	10.0	249	1	247	1
18	-1.478	5.24	10.0	254	1	252	1
19	-1.317	6.02	10.0	258	1	256	1
20	-1.170	6.87	10.0	262	1	260	1
21	-1.036	7.79	9.5	265	1	263	1
22	-0.911	8.73	9.0	269	1	267	1
23	-0.793	9.66	8.5	272	1	270	1
24	-0.682	10.56	8.2	275	2	273	2
25	-0.576	11.42	7.9	278	2	276	2
26	-0.475	12.22	7.6	280	2	279	2
27	-0.376	12.98	7.4	283	2	282	2
28	-0.281	13.69	7.2	285	2	285	2
29	-0.187	14.36	7.0	288	2	288	2
30	-0.095	14.99	6.9	290	2	290	2
31	-0.005	15.59	6.7	293	2	293	2
32	0.085	16.13	6.6	295	2	295	2
33	0.174	16.58	6.5	297	2	298	2
34	0.263	16.91	6.5	299	2	301	3
35	0.354	17.08	6.4	302	3	303	3
36	0.445	17.06	6.4	305	3	306	3
37	0.538	16.82	6.5	307	3	308	3

Table 2.2.8 (continued)
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 4

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.635	16.36	6.6	310	3	311	3
39	0.736	15.68	6.7	312	3	314	3
40	0.842	14.80	6.9	315	3	317	3
41	0.956	13.73	7.2	318	3	320	3
42	1.079	12.49	7.5	322	4	324	4
43	1.215	11.12	8.0	325	4	328	4
44	1.369	9.63	8.6	329	4	332	4
45	1.547	8.04	9.4	334	4	338	4
46	1.762	6.34	10.0	340	4	344	4
47	2.039	4.58	10.0	347	4	352	4
48	2.434	2.81	10.0	357	4	364	4
49	3.140	1.18	10.0	376	4	386	4
50	4.000	0.44	10.0	399	4	399	4

Table 2.2.9
Raw Score to Scale Score Lookup Table
Mathematics Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.182	0.89	10.0	200	1	200	1
1	-3.155	0.92	10.0	201	1	201	1
2	-3.127	0.96	10.0	202	1	202	1
3	-3.099	1.00	10.0	202	1	203	1
4	-3.071	1.03	10.0	203	1	204	1
5	-3.044	1.07	10.0	204	1	205	1
6	-3.016	1.11	10.0	205	1	206	1
7	-2.988	1.15	10.0	205	1	207	1
8	-2.960	1.19	10.0	206	1	208	1
9	-2.932	1.23	10.0	207	1	209	1
10	-2.905	1.28	10.0	208	1	210	1
11	-2.877	1.32	10.0	208	1	211	1
12	-2.849	2.12	10.0	220	1	212	1
13	-2.821	2.87	10.0	229	1	222	1
14	-1.904	3.61	10.0	235	1	231	1
15	-1.697	4.39	10.0	241	1	237	1
16	-1.516	5.21	10.0	246	1	243	1
17	-1.356	6.08	10.0	251	1	248	1
18	-1.212	6.98	10.0	255	1	252	1
19	-1.080	7.90	9.9	258	1	256	1
20	-0.957	8.83	9.3	262	1	260	1
21	-0.843	9.75	8.9	265	1	263	1
22	-0.736	10.67	8.5	268	2	266	2
23	-0.634	11.56	8.1	271	2	269	2
24	-0.536	12.43	7.9	273	2	272	2
25	-0.442	13.28	7.6	276	2	275	2
26	-0.352	14.09	7.4	278	2	278	2
27	-0.264	14.88	7.2	281	2	280	2
28	-0.178	15.62	7.0	283	2	283	2
29	-0.094	16.31	6.9	286	2	285	2
30	-0.011	16.94	6.7	288	2	288	2
31	0.071	17.48	6.6	290	2	290	2
32	0.153	17.94	6.5	292	2	292	2
33	0.234	18.28	6.5	295	2	295	2
34	0.316	18.50	6.4	297	2	297	2
35	0.399	18.58	6.4	299	2	299	2
36	0.484	18.52	6.4	302	3	302	3
37	0.570	18.29	6.5	304	3	304	3

Table 2.2.9 (continued)
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.659	17.91	6.5	306	3	307	3
39	0.752	17.35	6.7	309	3	309	3
40	0.849	16.62	6.8	312	3	312	3
41	0.952	15.71	7.0	315	3	315	3
42	1.063	14.62	7.2	318	3	318	3
43	1.185	13.33	7.6	321	4	322	4
44	1.320	11.85	8.0	325	4	326	4
45	1.474	10.17	8.7	329	4	330	4
46	1.658	8.32	9.6	334	4	335	4
47	1.887	6.35	10.0	340	4	342	4
48	2.200	4.31	10.0	349	4	350	4
49	2.714	2.19	10.0	363	4	365	4
50	4.000	0.33	10.0	399	4	399	4

Table 2.2.10
Raw Score to Scale Score Lookup Table
Mathematics Grade 6

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.155	0.83	10.0	200	1	200	1
1	-3.113	0.87	10.0	201	1	201	1
2	-3.072	0.92	10.0	202	1	202	1
3	-3.030	0.98	10.0	203	1	203	1
4	-2.988	1.03	10.0	205	1	204	1
5	-2.947	1.09	10.0	206	1	206	1
6	-2.905	1.15	10.0	207	1	207	1
7	-2.863	1.22	10.0	208	1	208	1
8	-2.822	1.28	10.0	209	1	209	1
9	-2.780	1.36	10.0	210	1	210	1
10	-2.739	1.43	10.0	212	1	211	1
11	-2.697	1.51	10.0	213	1	212	1
12	-2.655	1.60	10.0	214	1	213	1
13	-2.286	2.50	10.0	224	1	223	1
14	-2.008	3.32	10.0	232	1	230	1
15	-1.780	4.08	10.0	238	1	236	1
16	-1.585	4.82	10.0	244	1	241	1
17	-1.414	5.61	10.0	248	1	246	1
18	-1.260	6.45	10.0	253	1	250	1
19	-1.119	7.33	10.0	257	1	254	1
20	-0.990	8.24	9.7	260	1	258	1
21	-0.869	9.14	9.2	264	1	262	1
22	-0.755	10.03	8.8	267	2	265	1
23	-0.646	10.88	8.4	270	2	268	2
24	-0.542	11.67	8.1	273	2	271	2
25	-0.441	12.38	7.9	275	2	274	2
26	-0.343	13.00	7.7	278	2	277	2
27	-0.246	13.49	7.6	281	2	280	2
28	-0.150	13.87	7.5	284	2	283	2
29	-0.055	14.10	7.4	286	2	285	2
30	0.040	14.21	7.4	289	2	288	2
31	0.136	14.18	7.4	292	2	291	2
32	0.233	14.05	7.4	294	2	294	2
33	0.332	13.82	7.5	297	2	296	2
34	0.433	13.52	7.6	299	2	299	2
35	0.537	13.19	7.7	303	3	302	3
36	0.643	12.83	7.8	306	3	305	3
37	0.753	12.47	7.9	309	3	308	3

Table 2.2.10 (continued)
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 6

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	0.867	12.12	8.0	312	3	312	3
39	0.984	11.77	8.1	315	3	315	3
40	1.107	11.41	8.2	319	3	318	3
41	1.235	11.01	8.4	322	3	322	3
42	1.370	10.53	8.6	326	3	326	3
43	1.516	9.90	8.8	330	4	329	3
44	1.675	9.07	9.2	334	4	334	4
45	1.853	8.00	9.8	339	4	339	4
46	2.062	6.67	10.0	345	4	345	4
47	2.322	5.14	10.0	352	4	353	4
48	2.676	3.45	10.0	362	4	363	4
49	3.275	1.63	10.0	379	4	381	4
50	4.000	0.62	10.0	399	4	399	4

Table 2.2.11
Raw Score to Scale Score Lookup Table
Mathematics Grade 7

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.141	0.04	10.0	200	1	200	1
1	-3.027	0.05	10.0	203	1	203	1
2	-2.913	0.07	10.0	206	1	205	1
3	-2.799	0.08	10.0	210	1	208	1
4	-2.684	0.11	10.0	213	1	210	1
5	-2.570	0.14	10.0	216	1	213	1
6	-2.456	0.17	10.0	219	1	215	1
7	-2.342	0.22	10.0	222	1	218	1
8	-2.228	0.29	10.0	225	1	220	1
9	-2.113	0.37	10.0	229	1	223	1
10	-1.999	0.47	10.0	232	1	225	1
11	-1.885	0.60	10.0	235	1	228	1
12	-1.375	1.72	10.0	249	1	242	1
13	-1.065	3.03	10.0	258	1	251	1
14	-0.835	4.38	10.0	264	1	258	1
15	-0.650	5.75	10.0	269	1	264	1
16	-0.492	7.09	10.0	274	1	269	1
17	-0.354	8.41	9.6	278	1	273	1
18	-0.230	9.74	8.9	281	2	277	1
19	-0.117	11.17	8.3	284	2	280	2
20	-0.014	12.78	7.8	287	2	284	2
21	0.082	14.62	7.3	290	2	287	2
22	0.173	16.58	6.8	292	2	289	2
23	0.258	18.42	6.5	295	2	292	2
24	0.340	19.92	6.2	297	2	294	2
25	0.419	20.97	6.1	299	2	297	2
26	0.496	21.61	6.0	301	3	299	2
27	0.573	21.95	5.9	303	3	301	3
28	0.649	22.12	5.9	306	3	303	3
29	0.724	22.20	5.9	308	3	305	3
30	0.800	22.25	5.9	310	3	307	3
31	0.875	22.28	5.9	312	3	309	3
32	0.950	22.32	5.9	314	3	311	3
33	1.026	22.35	5.9	316	3	313	3
34	1.102	22.39	5.9	318	3	315	3
35	1.179	22.39	5.9	320	3	318	3
36	1.257	22.35	5.9	323	3	320	3
37	1.336	22.20	5.9	325	3	322	3

Table 2.2.11 (continued)
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 7

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	1.418	21.89	6.0	327	3	324	3
39	1.503	21.32	6.0	329	4	326	3
40	1.592	20.44	6.2	332	4	329	4
41	1.688	19.18	6.4	335	4	331	4
42	1.791	17.54	6.7	337	4	334	4
43	1.905	15.54	7.1	341	4	337	4
44	2.036	13.25	7.7	344	4	340	4
45	2.191	10.77	8.5	349	4	344	4
46	2.383	8.18	9.7	354	4	348	4
47	2.641	5.57	10.0	361	4	354	4
48	3.040	3.03	10.0	372	4	363	4
49	3.993	0.71	10.0	398	4	377	4
50	4.000	0.70	10.0	399	4	399	4

Table 2.2.12
Raw Score to Scale Score Lookup Table
Mathematics Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-2.521	0.42	10.0	200	1	200	1
1	-2.517	0.43	10.0	200	1	201	1
2	-2.513	0.43	10.0	200	1	202	1
3	-2.510	0.43	10.0	200	1	203	1
4	-2.506	0.43	10.0	200	1	205	1
5	-2.502	0.43	10.0	201	1	206	1
6	-2.499	0.44	10.0	201	1	207	1
7	-2.495	0.44	10.0	201	1	208	1
8	-2.491	0.44	10.0	201	1	209	1
9	-2.488	0.44	10.0	201	1	210	1
10	-2.484	0.44	10.0	201	1	211	1
11	-2.480	0.45	10.0	201	1	212	1
12	-1.800	1.23	10.0	222	1	225	1
13	-1.420	2.34	10.0	234	1	233	1
14	-1.154	3.64	10.0	242	1	240	1
15	-0.947	4.96	10.0	248	1	246	1
16	-0.775	6.24	10.0	253	1	250	1
17	-0.626	7.46	10.0	258	1	254	1
18	-0.493	8.63	10.0	262	1	258	1
19	-0.372	9.79	9.8	266	1	261	1
20	-0.260	10.98	9.2	269	1	265	1
21	-0.156	12.19	8.7	272	1	268	1
22	-0.059	13.43	8.3	275	1	270	1
23	0.034	14.66	8.0	278	2	273	1
24	0.122	15.83	7.7	281	2	276	1
25	0.207	16.91	7.4	283	2	278	2
26	0.289	17.87	7.2	286	2	281	2
27	0.370	18.67	7.1	288	2	283	2
28	0.449	19.33	6.9	291	2	285	2
29	0.527	19.83	6.9	293	2	288	2
30	0.604	20.20	6.8	295	2	290	2
31	0.682	20.44	6.7	298	2	293	2
32	0.760	20.57	6.7	300	3	295	2
33	0.838	20.60	6.7	303	3	297	2
34	0.918	20.54	6.7	305	3	299	2
35	0.999	20.38	6.8	307	3	303	3
36	1.083	20.13	6.8	310	3	305	3
37	1.169	19.75	6.9	313	3	308	3

Table 2.2.12 (continued)
 Raw Score to Scale Score Lookup Table
 Mathematics Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	1.258	19.23	7.0	315	3	311	3
39	1.351	18.53	7.1	318	4	314	3
40	1.450	17.61	7.3	321	4	318	4
41	1.556	16.45	7.5	324	4	321	4
42	1.671	15.01	7.9	328	4	325	4
43	1.800	13.31	8.4	332	4	329	4
44	1.946	11.36	9.1	336	4	334	4
45	2.120	9.19	10.0	342	4	340	4
46	2.336	6.89	10.0	348	4	346	4
47	2.624	4.60	10.0	357	4	355	4
48	3.056	2.56	10.0	370	4	368	4
49	3.843	1.01	10.0	394	4	390	4
50	4.000	0.85	10.0	399	4	399	4

Table 2.2.13
Raw Score to Scale Score Lookup Table
Science Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.687	0.14	10.0	200	1	200	1
1	-3.597	0.16	10.0	202	1	201	1
2	-3.506	0.19	10.0	205	1	201	1
3	-3.415	0.22	10.0	207	1	202	1
4	-3.325	0.26	10.0	209	1	202	1
5	-3.234	0.30	10.0	212	1	203	1
6	-3.143	0.35	10.0	214	1	203	1
7	-3.052	0.40	10.0	216	1	204	1
8	-2.962	0.46	10.0	219	1	204	1
9	-2.871	0.54	10.0	221	1	205	1
10	-2.780	0.62	10.0	223	1	205	1
11	-2.690	0.72	10.0	226	1	227	1
12	-2.195	1.57	10.0	239	1	239	1
13	-1.868	2.55	10.0	247	1	247	1
14	-1.618	3.53	10.0	254	1	252	1
15	-1.409	4.43	10.0	259	1	257	1
16	-1.226	5.23	10.0	264	1	262	1
17	-1.061	5.94	10.0	268	1	266	1
18	-0.910	6.57	10.0	272	2	269	1
19	-0.768	7.15	9.7	276	2	273	2
20	-0.635	7.69	9.3	279	2	276	2
21	-0.508	8.20	9.0	282	2	279	2
22	-0.386	8.69	8.8	285	2	282	2
23	-0.268	9.16	8.6	289	2	285	2
24	-0.155	9.61	8.3	291	2	288	2
25	-0.044	10.04	8.2	294	2	291	2
26	0.065	10.43	8.0	297	2	294	2
27	0.171	10.78	7.9	299	2	297	2
28	0.277	11.09	7.8	303	3	299	2
29	0.382	11.35	7.7	305	3	302	3
30	0.487	11.54	7.6	308	3	305	3
31	0.593	11.65	7.6	311	3	308	3
32	0.701	11.67	7.6	314	3	311	3
33	0.811	11.58	7.6	316	3	314	3
34	0.924	11.37	7.7	319	3	317	3
35	1.042	11.01	7.8	322	3	320	3
36	1.166	10.50	8.0	326	3	323	3
37	1.300	9.83	8.3	329	3	327	3

Table 2.2.13 (continued)
 Raw Score to Scale Score Lookup Table
 Science Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	1.445	8.97	8.6	333	4	330	4
39	1.607	7.93	9.2	337	4	335	4
40	1.794	6.72	10.0	342	4	339	4
41	2.019	5.36	10.0	348	4	345	4
42	2.308	3.89	10.0	355	4	352	4
43	2.723	2.40	10.0	366	4	363	4
44	3.481	0.98	10.0	386	4	382	4
45	4.000	0.54	10.0	399	4	399	4



Table 2.2.14
 Raw Score to Scale Score Lookup Table
 Science Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-3.478	0.38	10.0	200	1	200	1
1	-3.435	0.40	10.0	201	1	200	1
2	-3.393	0.42	10.0	202	1	201	1
3	-3.351	0.44	10.0	203	1	201	1
4	-3.309	0.46	10.0	204	1	201	1
5	-3.267	0.48	10.0	206	1	202	1
6	-3.225	0.51	10.0	207	1	202	1
7	-3.183	0.53	10.0	208	1	202	1
8	-3.141	0.56	10.0	209	1	203	1
9	-3.099	0.58	10.0	210	1	203	1
10	-3.056	0.61	10.0	211	1	220	1
11	-2.444	1.24	10.0	227	1	231	1
12	-2.056	1.93	10.0	238	1	240	1
13	-1.767	2.64	10.0	246	1	246	1
14	-1.534	3.36	10.0	252	1	252	1
15	-1.337	4.07	10.0	257	1	256	1
16	-1.163	4.79	10.0	262	1	261	1
17	-1.007	5.53	10.0	266	1	265	1
18	-0.865	6.27	10.0	270	1	268	1
19	-0.733	7.01	10.0	273	1	271	1
20	-0.609	7.75	9.6	276	1	274	1
21	-0.492	8.46	9.1	279	1	277	1
22	-0.381	9.15	8.8	282	1	280	1
23	-0.274	9.80	8.5	285	2	283	1
24	-0.170	10.39	8.3	288	2	286	2
25	-0.069	10.91	8.1	291	2	288	2
26	0.030	11.36	7.9	293	2	291	2
27	0.127	11.74	7.8	296	2	293	2
28	0.224	12.03	7.7	299	2	296	2
29	0.321	12.24	7.6	301	3	298	2
30	0.417	12.36	7.6	304	3	301	3
31	0.515	12.39	7.6	306	3	303	3
32	0.614	12.33	7.6	309	3	306	3
33	0.715	12.18	7.6	312	3	309	3
34	0.818	11.95	7.7	314	3	311	3
35	0.924	11.64	7.8	317	3	314	3
36	1.035	11.26	7.9	320	3	317	3
37	1.151	10.81	8.1	323	3	320	3



Table 2.2.14 (continued)
 Raw Score to Scale Score Lookup Table
 Science Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	1.273	10.30	8.3	326	3	324	3
39	1.402	9.71	8.5	330	4	327	3
40	1.542	9.02	8.9	334	4	331	4
41	1.695	8.22	9.3	338	4	335	4
42	1.866	7.27	9.9	342	4	339	4
43	2.064	6.13	10.0	347	4	344	4
44	2.303	4.83	10.0	354	4	351	4
45	2.613	3.42	10.0	362	4	358	4
46	3.064	2.00	10.0	374	4	370	4
47	3.898	0.77	10.0	396	4	391	4
48	4.000	0.69	10.0	399	4	399	4

Table 2.2.15
 Raw Score to Scale Score Lookup Table
 Science Grade 11

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
0	-1.985	1.44	10.0	200	1	200	1
1	-1.983	1.45	10.0	200	1	201	1
2	-1.981	1.45	10.0	200	1	202	1
3	-1.979	1.45	10.0	200	1	203	1
4	-1.977	1.46	10.0	200	1	204	1
5	-1.975	1.46	10.0	200	1	205	1
6	-1.973	1.46	10.0	200	1	205	1
7	-1.971	1.46	10.0	201	1	206	1
8	-1.969	1.47	10.0	201	1	207	1
9	-1.967	1.47	10.0	201	1	208	1
10	-1.965	1.47	10.0	201	1	209	1
11	-1.963	1.48	10.0	201	1	210	1
12	-1.961	1.48	10.0	201	1	211	1
13	-1.959	1.48	10.0	201	1	212	1
14	-1.956	1.49	10.0	201	1	213	1
15	-1.531	2.21	10.0	216	1	214	1
16	-1.214	2.91	10.0	228	1	224	1
17	-0.959	3.56	10.0	237	1	233	1
18	-0.744	4.19	10.0	245	1	240	1
19	-0.559	4.84	10.0	251	1	247	1
20	-0.397	5.56	10.0	257	1	252	1
21	-0.252	6.37	10.0	262	1	257	1
22	-0.123	7.31	10.0	267	1	262	1
23	-0.006	8.36	10.0	271	1	266	1
24	0.100	9.51	10.0	275	1	270	1
25	0.198	10.75	10.0	278	2	273	1
26	0.289	12.05	10.0	282	2	277	1
27	0.374	13.40	9.8	285	2	280	2
28	0.454	14.77	9.3	288	2	283	2
29	0.530	16.17	8.9	290	2	286	2
30	0.602	17.55	8.6	293	2	288	2
31	0.671	18.92	8.2	295	2	291	2
32	0.737	20.25	8.0	298	2	293	2
33	0.802	21.52	7.7	299	2	296	2
34	0.864	22.71	7.5	302	3	298	2
35	0.925	23.80	7.4	304	3	300	3
36	0.985	24.77	7.2	307	3	302	3
37	1.044	25.61	7.1	309	3	305	3

Table 2.2.15 (continued)
 Raw Score to Scale Score Lookup Table
 Science Grade 11

Raw Score	Theta	Information	SE (Scale Score)	2021		2019	
				Scale Score	Performance Level	Scale Score	Performance Level
38	1.103	26.30	7.0	311	3	307	3
39	1.161	26.86	6.9	313	3	309	3
40	1.219	27.26	6.9	315	3	311	3
41	1.278	27.51	6.8	317	3	313	3
42	1.336	27.61	6.8	319	3	316	3
43	1.396	27.55	6.8	321	3	318	3
44	1.456	27.35	6.9	323	3	320	3
45	1.518	26.99	6.9	326	3	322	3
46	1.581	26.47	7.0	328	4	325	3
47	1.646	25.78	7.1	330	4	327	4
48	1.714	24.91	7.2	333	4	330	4
49	1.785	23.85	7.3	335	4	333	4
50	1.859	22.60	7.5	338	4	336	4
51	1.938	21.16	7.8	341	4	339	4
52	2.023	19.52	8.1	344	4	342	4
53	2.115	17.71	8.5	347	4	346	4
54	2.217	15.76	9.0	351	4	350	4
55	2.331	13.70	9.7	355	4	354	4
56	2.462	11.56	10.0	360	4	359	4
57	2.616	9.41	10.0	365	4	365	4
58	2.804	7.27	10.0	372	4	373	4
59	3.049	5.18	10.0	381	4	382	4
60	3.398	3.21	10.0	393	4	397	4
61	4.000	1.44	10.0	399	4	399	4
62	4.000	1.44	10.0	399	4	399	4

Section 2.3

Cumulative Scale Score Distribution Tables



Table 2.3.1
 Cumulative Scale Score Distribution
 English Language Arts Grade 3

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
202	BB	2	0.00004	0.00004
203	BB	25	0.00054	0.00059
204	BB	55	0.00119	0.00178
205	BB	364	0.00790	0.00968
206	BB	413	0.00896	0.01864
207	BB	594	0.01289	0.03153
220	BB	847	0.01838	0.04990
229	BB	1114	0.02417	0.07407
236	BB	1234	0.02677	0.10085
241	BB	1350	0.02929	0.13014
246	BB	1460	0.03168	0.16181
250	BB	1413	0.03066	0.19247
254	BB	1443	0.03131	0.22378
257	BB	1378	0.02990	0.25368
260	BB	1372	0.02977	0.28345
263	BB	1405	0.03048	0.31393
264	BB	1	0.00002	0.31395
266	BB	1331	0.02888	0.34283
269	BB	1386	0.03007	0.37290
272	BB	1416	0.03072	0.40362
274	BB	1482	0.03215	0.43578
277	B	1438	0.03120	0.46698
279	B	1493	0.03239	0.49937
282	B	1468	0.03185	0.53122
284	B	1444	0.03133	0.56255
287	B	1474	0.03198	0.59453
289	B	1511	0.03278	0.62732
292	B	1473	0.03196	0.65928
294	B	1539	0.03339	0.69267
297	B	1399	0.03035	0.72302
299	B	1358	0.02946	0.75248
302	P	1306	0.02834	0.78082
304	P	1231	0.02671	0.80753
307	P	1194	0.02591	0.83343
310	P	1126	0.02443	0.85787
313	P	1132	0.02456	0.88243
316	P	1014	0.02200	0.90443
320	P	943	0.02046	0.92489
323	P	822	0.01783	0.94272
327	P	712	0.01545	0.95817
332	A	584	0.01267	0.97084
336	A	463	0.01005	0.98089
342	A	355	0.00770	0.98859
348	A	245	0.00532	0.99390
355	A	170	0.00369	0.99759
365	A	79	0.00171	0.99931
378	A	27	0.00059	0.99989
399	A	5	0.00011	1.00000



Table 2.3.2
 Cumulative Scale Score Distribution
 English Language Arts Grade 4

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	13	0.00029	0.00029
201	BB	3	0.00007	0.00035
202	BB	1	0.00002	0.00037
203	BB	1	0.00002	0.00039
204	BB	8	0.00018	0.00057
205	BB	19	0.00042	0.00099
206	BB	55	0.00121	0.00219
207	BB	101	0.00222	0.00441
208	BB	165	0.00362	0.00803
209	BB	263	0.00577	0.01380
210	BB	944	0.02071	0.03451
211	BB	1	0.00002	0.03453
219	BB	718	0.01575	0.05029
225	BB	846	0.01856	0.06885
231	BB	1015	0.02227	0.09112
235	BB	1041	0.02284	0.11396
236	BB	1	0.00002	0.11398
240	BB	1096	0.02405	0.13802
244	BB	1199	0.02631	0.16433
247	BB	1100	0.02413	0.18846
248	BB	2	0.00004	0.18851
249	BB	1	0.00002	0.18853
250	BB	1164	0.02554	0.21407
254	BB	1204	0.02642	0.24048
255	BB	1	0.00002	0.24051
257	BB	1234	0.02707	0.26758
260	BB	1245	0.02732	0.29489
261	BB	1	0.00002	0.29492
262	BB	1301	0.02854	0.32346
265	BB	1353	0.02968	0.35315
268	BB	1415	0.03104	0.38419
270	BB	1488	0.03265	0.41684
272	BB	1	0.00002	0.41686
273	BB	1504	0.03300	0.44986
276	B	1630	0.03576	0.48562
278	B	1654	0.03629	0.52191
281	B	1692	0.03712	0.55903
284	B	1690	0.03708	0.59611
286	B	1672	0.03668	0.63279
289	B	1658	0.03638	0.66917



Table 2.3.2 (continued)
 Cumulative Scale Score Distribution
 English Language Arts Grade 4

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
292	B	1653	0.03627	0.70543
295	B	1689	0.03706	0.74249
298	B	1578	0.03462	0.77711
301	P	1561	0.03425	0.81136
304	P	1557	0.03416	0.84552
308	P	1407	0.03087	0.87639
312	P	1240	0.02721	0.90360
315	P	1100	0.02413	0.92773
320	P	902	0.01979	0.94752
324	P	782	0.01716	0.96468
329	P	566	0.01242	0.97709
334	A	430	0.00943	0.98653
340	A	258	0.00566	0.99219
346	A	170	0.00373	0.99592
354	A	113	0.00248	0.99840
365	A	51	0.00112	0.99952
382	A	15	0.00033	0.99985
399	A	7	0.00015	1.00000



Table 2.3.3
Cumulative Scale Score Distribution
English Language Arts Grade 5

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
201	BB	13	0.00028	0.00028
202	BB	176	0.00379	0.00407
203	BB	955	0.02057	0.02464
217	BB	582	0.01253	0.03717
225	BB	693	0.01493	0.05210
232	BB	788	0.01697	0.06907
237	BB	860	0.01852	0.08759
241	BB	886	0.01908	0.10667
245	BB	908	0.01956	0.12623
249	BB	939	0.02022	0.14645
252	BB	917	0.01975	0.16620
255	BB	922	0.01986	0.18606
258	BB	1001	0.02156	0.20762
260	BB	1007	0.02169	0.22931
263	BB	1087	0.02341	0.25272
265	BB	1069	0.02302	0.27574
268	BB	1091	0.02350	0.29924
270	BB	1157	0.02492	0.32416
272	B	1262	0.02718	0.35134
274	B	1329	0.02862	0.37996
277	B	1353	0.02914	0.40910
279	B	1389	0.02992	0.43902
281	B	1377	0.02966	0.46867
283	B	1536	0.03308	0.50176
286	B	1532	0.03300	0.53475
288	B	1538	0.03312	0.56787
290	B	1612	0.03472	0.60259
293	B	1653	0.03560	0.63819
295	B	1713	0.03689	0.67509
298	B	1655	0.03564	0.71073
300	P	1681	0.03620	0.74694
303	P	1640	0.03532	0.78226
306	P	1588	0.03420	0.81646
309	P	1543	0.03323	0.84969
312	P	1475	0.03177	0.88146
315	P	1379	0.02970	0.91116
319	P	1185	0.02552	0.93668
324	A	1022	0.02201	0.95869
330	A	783	0.01686	0.97556
337	A	571	0.01230	0.98785
347	A	371	0.00799	0.99584
365	A	145	0.00312	0.99897
399	A	48	0.00103	1.00000



Table 2.3.4
Cumulative Scale Score Distribution
English Language Arts Grade 6

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	2	0.00004	0.00004
201	BB	3	0.00006	0.00011
202	BB	66	0.00140	0.00150
203	BB	223	0.00472	0.00623
204	BB	647	0.01371	0.01994
205	BB	9	0.00019	0.02013
216	BB	519	0.01100	0.03112
217	BB	6	0.00013	0.03125
224	BB	684	0.01449	0.04574
225	BB	1	0.00002	0.04577
230	BB	818	0.01733	0.06310
231	BB	6	0.00013	0.06322
236	BB	898	0.01903	0.08225
240	BB	905	0.01917	0.10143
241	BB	4	0.00008	0.10151
244	BB	917	0.01943	0.12094
245	BB	3	0.00006	0.12100
248	BB	890	0.01886	0.13986
249	BB	2	0.00004	0.13990
251	BB	989	0.02095	0.16086
252	BB	2	0.00004	0.16090
254	BB	1030	0.02182	0.18272
255	BB	1	0.00002	0.18274
257	BB	1060	0.02246	0.20520
258	BB	4	0.00008	0.20529
260	BB	1096	0.02322	0.22851
261	BB	2	0.00004	0.22855
263	BB	1205	0.02553	0.25408
265	BB	1188	0.02517	0.27926
266	BB	2	0.00004	0.27930
268	BB	1291	0.02735	0.30665
269	B	1	0.00002	0.30667
270	B	1340	0.02839	0.33506
272	B	1340	0.02839	0.36346
275	B	1443	0.03057	0.39403
277	B	1499	0.03176	0.42579
280	B	1506	0.03191	0.45770
281	B	1	0.00002	0.45772
282	B	1570	0.03326	0.49098
284	B	1584	0.03356	0.52455



Table 2.3.4 (continued)
 Cumulative Scale Score Distribution
 English Language Arts Grade 6

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
287	B	1653	0.03502	0.55957
289	B	1653	0.03502	0.59459
290	B	2	0.00004	0.59464
292	B	1699	0.03600	0.63063
293	B	1	0.00002	0.63065
294	B	1727	0.03659	0.66725
296	B	2	0.00004	0.66729
297	B	1793	0.03799	0.70528
299	B	1777	0.03765	0.74293
303	P	1725	0.03655	0.77948
306	P	1690	0.03581	0.81528
308	P	1	0.00002	0.81531
309	P	1547	0.03278	0.84808
313	P	1537	0.03257	0.88065
317	P	1363	0.02888	0.90953
321	P	1236	0.02619	0.93572
325	P	1020	0.02161	0.95733
331	A	799	0.01693	0.97426
337	A	548	0.01161	0.98587
344	A	371	0.00786	0.99373
352	A	174	0.00369	0.99742
363	A	88	0.00186	0.99928
378	A	26	0.00055	0.99983
399	A	8	0.00017	1.00000



Table 2.3.5
Cumulative Scale Score Distribution
English Language Arts Grade 7

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	983	0.02085	0.02085
201	BB	28	0.00059	0.02145
210	BB	543	0.01152	0.03297
211	BB	5	0.00011	0.03307
212	BB	1	0.00002	0.03309
218	BB	709	0.01504	0.04813
219	BB	6	0.00013	0.04826
220	BB	1	0.00002	0.04828
224	BB	877	0.01860	0.06689
225	BB	6	0.00013	0.06701
229	BB	1019	0.02162	0.08863
230	BB	5	0.00011	0.08874
234	BB	1073	0.02276	0.11150
235	BB	6	0.00013	0.11163
236	BB	2	0.00004	0.11167
238	BB	1228	0.02605	0.13772
239	BB	2	0.00004	0.13776
242	BB	1276	0.02707	0.16483
243	BB	2	0.00004	0.16487
244	BB	2	0.00004	0.16492
246	BB	1277	0.02709	0.19201
248	BB	4	0.00008	0.19209
249	BB	1447	0.03070	0.22279
251	BB	6	0.00013	0.22292
253	BB	1460	0.03097	0.25389
255	BB	2	0.00004	0.25393
256	BB	1488	0.03157	0.28550
257	BB	2	0.00004	0.28554
258	BB	2	0.00004	0.28558
259	BB	1556	0.03301	0.31859
261	BB	1	0.00002	0.31861
262	BB	1602	0.03398	0.35260
264	BB	1	0.00002	0.35262
265	BB	1687	0.03579	0.38840
268	BB	1729	0.03668	0.42508
270	BB	1815	0.03850	0.46359
272	BB	2	0.00004	0.46363
273	B	1811	0.03842	0.50205
276	B	1892	0.04014	0.54218
279	B	1819	0.03859	0.58077

Table 2.3.5 (continued)
 Cumulative Scale Score Distribution
 English Language Arts Grade 7

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
282	B	1739	0.03689	0.61766
285	B	1903	0.04037	0.65803
288	B	1873	0.03973	0.69777
291	B	1794	0.03806	0.73582
294	B	1735	0.03681	0.77263
297	B	1587	0.03367	0.80630
300	P	1561	0.03311	0.83941
304	P	1423	0.03019	0.86960
307	P	1293	0.02743	0.89703
308	P	1	0.00002	0.89705
311	P	1151	0.02442	0.92147
315	P	1025	0.02174	0.94321
319	P	819	0.01737	0.96058
323	A	669	0.01419	0.97478
328	A	475	0.01008	0.98485
334	A	333	0.00706	0.99192
340	A	199	0.00422	0.99614
347	A	107	0.00227	0.99841
356	A	55	0.00117	0.99958
367	A	18	0.00038	0.99996
384	A	2	0.00004	1.00000



Table 2.3.6
Cumulative Scale Score Distribution
English Language Arts Grade 8

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	1	0.00002	0.00002
201	BB	16	0.00034	0.00036
202	BB	183	0.00387	0.00423
203	BB	812	0.01717	0.02140
211	BB	471	0.00996	0.03136
218	BB	570	0.01205	0.04341
224	BB	646	0.01366	0.05707
229	BB	691	0.01461	0.07168
233	BB	771	0.01630	0.08798
237	BB	793	0.01677	0.10475
241	BB	855	0.01808	0.12283
245	BB	968	0.02047	0.14330
248	BB	976	0.02064	0.16394
252	BB	1131	0.02391	0.18785
255	BB	1215	0.02569	0.21354
258	BB	1244	0.02630	0.23985
261	BB	1452	0.03070	0.27055
264	BB	1483	0.03136	0.30191
267	BB	1632	0.03451	0.33641
270	B	1765	0.03732	0.37373
273	B	1848	0.03908	0.41281
276	B	1954	0.04132	0.45413
280	B	2065	0.04366	0.49779
283	B	2150	0.04546	0.54325
286	B	2094	0.04428	0.58753
289	B	2187	0.04624	0.63377
292	B	2138	0.04521	0.67898
296	B	2102	0.04445	0.72343
299	B	2063	0.04362	0.76705
303	P	1886	0.03988	0.80693
306	P	1726	0.03650	0.84342
310	P	1666	0.03523	0.87865
314	P	1411	0.02984	0.90849
318	P	1217	0.02573	0.93422
322	A	963	0.02036	0.95458
327	A	742	0.01569	0.97027
333	A	599	0.01267	0.98294
339	A	401	0.00848	0.99142
347	A	228	0.00482	0.99624
358	A	118	0.00250	0.99873
374	A	44	0.00093	0.99966
399	A	16	0.00034	1.00000



Table 2.3.7
 Cumulative Scale Score Distribution
 Mathematics Grade 3

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	2	0.00004	0.00004
203	BB	2	0.00004	0.00009
204	BB	2	0.00004	0.00013
205	BB	5	0.00011	0.00024
206	BB	14	0.00030	0.00054
208	BB	41	0.00089	0.00143
209	BB	82	0.00178	0.00322
210	BB	157	0.00341	0.00663
211	BB	238	0.00517	0.01180
213	BB	383	0.00832	0.02012
221	BB	486	0.01056	0.03067
228	BB	683	0.01484	0.04551
233	BB	801	0.01740	0.06291
238	BB	865	0.01879	0.08170
242	BB	931	0.02022	0.10193
245	BB	979	0.02127	0.12319
249	BB	1031	0.02240	0.14559
252	BB	1014	0.02203	0.16762
255	BB	1079	0.02344	0.19106
257	BB	995	0.02161	0.21267
260	BB	1091	0.02370	0.23637
262	BB	1003	0.02179	0.25816
265	BB	1077	0.02340	0.28156
267	BB	1129	0.02453	0.30608
269	BB	1092	0.02372	0.32981
272	BB	1155	0.02509	0.35490
274	B	1189	0.02583	0.38073
276	B	1135	0.02466	0.40538
278	B	1238	0.02689	0.43228
280	B	1212	0.02633	0.45861
282	B	1297	0.02818	0.48678
285	B	1291	0.02805	0.51483
287	B	1391	0.03022	0.54504
289	B	1453	0.03156	0.57661
292	B	1490	0.03237	0.60898
294	B	1449	0.03148	0.64045
297	B	1536	0.03337	0.67382
299	B	1516	0.03293	0.70675
302	P	1629	0.03539	0.74214
305	P	1678	0.03645	0.77859
308	P	1601	0.03478	0.81337
311	P	1514	0.03289	0.84626
315	P	1417	0.03078	0.87704
319	P	1339	0.02909	0.90613
324	A	1272	0.02763	0.93376
329	A	1054	0.02290	0.95666
335	A	874	0.01899	0.97565
344	A	608	0.01321	0.98886
359	A	364	0.00791	0.99676
399	A	149	0.00324	1.00000



Table 2.3.8
Cumulative Scale Score Distribution
Mathematics Grade 4

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
202	BB	5	0.00011	0.00011
203	BB	3	0.00007	0.00018
204	BB	6	0.00013	0.00031
205	BB	100	0.00220	0.00250
206	BB	151	0.00332	0.00582
207	BB	241	0.00529	0.01111
208	BB	873	0.01917	0.03029
209	BB	698	0.01533	0.04562
221	BB	921	0.02023	0.06585
230	BB	1097	0.02409	0.08994
237	BB	1234	0.02710	0.11704
243	BB	1293	0.02840	0.14544
249	BB	1422	0.03123	0.17667
254	BB	1472	0.03233	0.20901
258	BB	1484	0.03259	0.24160
262	BB	1486	0.03264	0.27424
265	BB	1530	0.03360	0.30784
269	BB	1469	0.03226	0.34011
272	BB	1546	0.03396	0.37406
275	B	1437	0.03156	0.40562
278	B	1439	0.03161	0.43723
280	B	1482	0.03255	0.46978
283	B	1455	0.03196	0.50174
285	B	1503	0.03301	0.53475
288	B	1433	0.03147	0.56622
290	B	1370	0.03009	0.59631
293	B	1366	0.03000	0.62631
295	B	1415	0.03108	0.65739
297	B	1402	0.03079	0.68818
299	B	1436	0.03154	0.71972
302	P	1367	0.03002	0.74975
305	P	1263	0.02774	0.77749
307	P	1174	0.02579	0.80327
310	P	1196	0.02627	0.82954
312	P	1109	0.02436	0.85390
315	P	1078	0.02368	0.87758
318	P	1069	0.02348	0.90105
322	A	894	0.01964	0.92069
325	A	856	0.01880	0.93949
329	A	726	0.01595	0.95544
334	A	684	0.01502	0.97046
340	A	540	0.01186	0.98232
347	A	389	0.00854	0.99086
357	A	232	0.00510	0.99596
376	A	141	0.00310	0.99906
399	A	43	0.00094	1.00000



Table 2.3.9
 Cumulative Scale Score Distribution
 Mathematics Grade 5

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
201	BB	1	0.00002	0.00002
202	BB	5	0.00011	0.00013
203	BB	9	0.00019	0.00032
204	BB	28	0.00060	0.00093
205	BB	136	0.00293	0.00386
206	BB	217	0.00468	0.00854
207	BB	361	0.00779	0.01633
208	BB	1354	0.02921	0.04555
220	BB	1014	0.02188	0.06742
229	BB	1200	0.02589	0.09332
235	BB	1394	0.03008	0.12339
241	BB	1609	0.03472	0.15811
246	BB	1637	0.03532	0.19343
251	BB	1625	0.03506	0.22849
255	BB	1639	0.03536	0.26385
258	BB	1688	0.03642	0.30027
262	BB	1538	0.03318	0.33346
265	BB	1558	0.03362	0.36707
268	B	1544	0.03331	0.40038
271	B	1529	0.03299	0.43337
273	B	1459	0.03148	0.46485
276	B	1467	0.03165	0.49650
278	B	1355	0.02924	0.52574
281	B	1438	0.03103	0.55677
283	B	1339	0.02889	0.58566
286	B	1346	0.02904	0.61470
288	B	1319	0.02846	0.64316
290	B	1328	0.02865	0.67181
292	B	1325	0.02859	0.70040
295	B	1195	0.02578	0.72618
297	B	1243	0.02682	0.75300
299	B	1172	0.02529	0.77829
302	P	1100	0.02373	0.80202
304	P	1083	0.02337	0.82539
306	P	1047	0.02259	0.84798
309	P	980	0.02114	0.86912
312	P	943	0.02035	0.88947
315	P	847	0.01827	0.90774
318	P	745	0.01607	0.92382
321	A	759	0.01638	0.94019
325	A	678	0.01463	0.95482
329	A	588	0.01269	0.96751
334	A	503	0.01085	0.97836
340	A	417	0.00900	0.98736
349	A	320	0.00690	0.99426
363	A	184	0.00397	0.99823
399	A	82	0.00177	1.00000



Table 2.3.10
Cumulative Scale Score Distribution
Mathematics Grade 6

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
201	BB	1	0.00002	0.00002
202	BB	2	0.00004	0.00006
203	BB	3	0.00006	0.00013
205	BB	6	0.00013	0.00025
206	BB	15	0.00032	0.00057
207	BB	47	0.00100	0.00157
208	BB	102	0.00216	0.00373
209	BB	209	0.00443	0.00816
210	BB	366	0.00776	0.01593
212	BB	584	0.01239	0.02831
213	BB	717	0.01521	0.04352
214	BB	934	0.01981	0.06333
224	BB	1257	0.02666	0.08998
232	BB	1423	0.03018	0.12016
238	BB	1593	0.03378	0.15395
244	BB	1643	0.03484	0.18879
248	BB	1653	0.03506	0.22385
253	BB	1735	0.03680	0.26064
257	BB	1729	0.03667	0.29731
260	BB	1689	0.03582	0.33313
264	BB	1721	0.03650	0.36963
267	B	1680	0.03563	0.40526
270	B	1729	0.03667	0.44192
273	B	1639	0.03476	0.47668
275	B	1580	0.03351	0.51019
278	B	1615	0.03425	0.54444
281	B	1603	0.03400	0.57844
284	B	1577	0.03344	0.61188
286	B	1543	0.03272	0.64460
289	B	1432	0.03037	0.67497
292	B	1434	0.03041	0.70538
294	B	1398	0.02965	0.73503
297	B	1327	0.02814	0.76318
299	B	1267	0.02687	0.79005
303	P	1231	0.02611	0.81615
306	P	1142	0.02422	0.84037
309	P	1089	0.02310	0.86347
312	P	1001	0.02123	0.88469
315	P	905	0.01919	0.90389
319	P	879	0.01864	0.92253
322	P	730	0.01548	0.93801
326	P	699	0.01482	0.95283
330	A	548	0.01162	0.96446
334	A	448	0.00950	0.97396
339	A	411	0.00872	0.98267
345	A	294	0.00624	0.98891
352	A	212	0.00450	0.99340
362	A	185	0.00392	0.99733
379	A	98	0.00208	0.99941
399	A	28	0.00059	1.00000



Table 2.3.11
Cumulative Scale Score Distribution
Mathematics Grade 7

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
203	BB	1	0.00002	0.00002
206	BB	7	0.00015	0.00017
210	BB	13	0.00028	0.00045
213	BB	47	0.00100	0.00144
216	BB	121	0.00257	0.00401
219	BB	309	0.00656	0.01058
222	BB	546	0.01160	0.02218
225	BB	1073	0.02279	0.04497
229	BB	1535	0.03261	0.07758
232	BB	2224	0.04724	0.12482
235	BB	2712	0.05761	0.18242
249	BB	3048	0.06474	0.24717
258	BB	3179	0.06753	0.31470
264	BB	3230	0.06861	0.38331
269	BB	2911	0.06183	0.44514
274	BB	2631	0.05589	0.50103
278	BB	2431	0.05164	0.55267
281	B	1987	0.04221	0.59488
284	B	1879	0.03991	0.63479
287	B	1660	0.03526	0.67005
290	B	1434	0.03046	0.70051
292	B	1357	0.02883	0.72934
295	B	1231	0.02615	0.75549
297	B	1151	0.02445	0.77994
299	B	970	0.02060	0.80054
301	P	919	0.01952	0.82006
303	P	870	0.01848	0.83854
306	P	783	0.01663	0.85517
308	P	741	0.01574	0.87091
310	P	707	0.01502	0.88593
312	P	621	0.01319	0.89912
314	P	606	0.01287	0.91200
316	P	536	0.01139	0.92338
318	P	527	0.01119	0.93458
320	P	479	0.01017	0.94475
323	P	413	0.00877	0.95352
325	P	348	0.00739	0.96092
327	P	303	0.00644	0.96735
329	A	277	0.00588	0.97324
332	A	292	0.00620	0.97944
335	A	215	0.00457	0.98400
337	A	205	0.00435	0.98836
341	A	160	0.00340	0.99176
344	A	121	0.00257	0.99433
349	A	91	0.00193	0.99626
354	A	71	0.00151	0.99777
361	A	50	0.00106	0.99883
372	A	28	0.00059	0.99943
398	A	22	0.00047	0.99989
399	A	5	0.00011	1.00000



Table 2.3.12
 Cumulative Scale Score Distribution
 Mathematics Grade 8

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	41	0.00087	0.00087
201	BB	5314	0.11330	0.11418
222	BB	2251	0.04800	0.16217
234	BB	2504	0.05339	0.21557
242	BB	2807	0.05985	0.27542
248	BB	2720	0.05800	0.33341
253	BB	2718	0.05795	0.39136
258	BB	2506	0.05343	0.44480
262	BB	2257	0.04812	0.49292
266	BB	2066	0.04405	0.53697
269	BB	1882	0.04013	0.57710
272	BB	1796	0.03829	0.61539
275	BB	1670	0.03561	0.65100
278	B	1477	0.03149	0.68249
281	B	1303	0.02778	0.71028
283	B	1254	0.02674	0.73701
286	B	1127	0.02403	0.76104
288	B	1105	0.02356	0.78461
291	B	1034	0.02205	0.80665
293	B	963	0.02053	0.82719
295	B	903	0.01925	0.84644
298	B	820	0.01748	0.86392
300	P	770	0.01642	0.88034
303	P	684	0.01458	0.89493
305	P	600	0.01279	0.90772
307	P	563	0.01200	0.91972
310	P	546	0.01164	0.93136
313	P	493	0.01051	0.94188
315	P	432	0.00921	0.95109
318	A	412	0.00878	0.95987
321	A	376	0.00802	0.96789
324	A	321	0.00684	0.97473
328	A	275	0.00586	0.98060
332	A	240	0.00512	0.98571
336	A	186	0.00397	0.98968
342	A	156	0.00333	0.99301
348	A	120	0.00256	0.99557
357	A	99	0.00211	0.99768
370	A	66	0.00141	0.99908
394	A	32	0.00068	0.99977
399	A	11	0.00023	1.00000



Table 2.3.13
Cumulative Scale Score Distribution
Science Grade 5

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
202	BB	1	0.00002	0.00002
205	BB	2	0.00004	0.00006
207	BB	7	0.00015	0.00022
209	BB	10	0.00022	0.00043
212	BB	40	0.00086	0.00130
214	BB	78	0.00169	0.00298
216	BB	169	0.00365	0.00664
219	BB	311	0.00672	0.01336
221	BB	569	0.01230	0.02566
223	BB	739	0.01598	0.04164
226	BB	1082	0.02339	0.06504
239	BB	1343	0.02904	0.09408
247	BB	1470	0.03178	0.12586
254	BB	1639	0.03544	0.16130
259	BB	1786	0.03862	0.19991
264	BB	1888	0.04082	0.24074
268	BB	1807	0.03907	0.27981
272	B	1955	0.04227	0.32208
276	B	1768	0.03823	0.36030
279	B	1890	0.04086	0.40117
282	B	1930	0.04173	0.44290
285	B	1969	0.04257	0.48547
289	B	1852	0.04004	0.52551
291	B	1823	0.03942	0.56493
294	B	1791	0.03872	0.60365
297	B	1750	0.03784	0.64149
299	B	1680	0.03632	0.67782
303	P	1697	0.03669	0.71451
305	P	1483	0.03206	0.74657
308	P	1487	0.03215	0.77872
311	P	1412	0.03053	0.80925
314	P	1354	0.02928	0.83853
316	P	1212	0.02621	0.86474
319	P	1183	0.02558	0.89031
322	P	1008	0.02179	0.91211
326	P	896	0.01937	0.93148
329	P	834	0.01803	0.94951
333	A	666	0.01440	0.96391
337	A	511	0.01105	0.97496
342	A	421	0.00910	0.98406
348	A	323	0.00698	0.99105
355	A	229	0.00495	0.99600
366	A	115	0.00249	0.99849
386	A	56	0.00121	0.99970
399	A	14	0.00030	1.00000

Table 2.3.14
Cumulative Scale Score Distribution
Science Grade 8

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
201	BB	1	0.00002	0.00002
202	BB	2	0.00004	0.00006
203	BB	3	0.00006	0.00013
204	BB	15	0.00032	0.00045
206	BB	37	0.00079	0.00124
207	BB	66	0.00141	0.00265
208	BB	124	0.00265	0.00530
209	BB	273	0.00583	0.01114
210	BB	428	0.00915	0.02028
211	BB	664	0.01419	0.03448
227	BB	965	0.02063	0.05510
238	BB	1193	0.02550	0.08060
246	BB	1418	0.03031	0.11091
252	BB	1586	0.03390	0.14481
257	BB	1717	0.03670	0.18150
262	BB	1757	0.03755	0.21906
266	BB	1893	0.04046	0.25952
270	BB	1835	0.03922	0.29874
273	BB	1830	0.03911	0.33785
276	BB	1833	0.03918	0.37703
279	BB	1842	0.03937	0.41640
282	BB	1790	0.03826	0.45466
285	B	1693	0.03619	0.49084
288	B	1753	0.03747	0.52831
291	B	1720	0.03676	0.56507
293	B	1676	0.03582	0.60089
296	B	1667	0.03563	0.63652
299	B	1702	0.03638	0.67290
301	P	1604	0.03428	0.70718
304	P	1565	0.03345	0.74063
306	P	1463	0.03127	0.77190
309	P	1398	0.02988	0.80178
312	P	1278	0.02732	0.82910
314	P	1207	0.02580	0.85490
317	P	1066	0.02278	0.87768
320	P	1074	0.02296	0.90063
323	P	946	0.02022	0.92085
326	P	779	0.01665	0.93750
330	A	676	0.01445	0.95195
334	A	581	0.01242	0.96437
338	A	478	0.01022	0.97459
342	A	396	0.00846	0.98305
347	A	292	0.00624	0.98929
354	A	204	0.00436	0.99365
362	A	145	0.00310	0.99675
374	A	93	0.00199	0.99874
396	A	45	0.00096	0.99970
399	A	14	0.00030	1.00000

Table 2.3.15
 Cumulative Scale Score Distribution
 Science Grade 11

Scale Score	Performance Level	N	Proportion	Cumulative Proportion
200	BB	24	0.00056	0.00056
201	BB	3917	0.09202	0.09259
216	BB	1635	0.03841	0.13100
228	BB	1833	0.04306	0.17406
237	BB	2036	0.04783	0.22189
245	BB	2036	0.04783	0.26972
251	BB	2064	0.04849	0.31821
257	BB	1917	0.04504	0.36325
262	BB	1898	0.04459	0.40784
267	BB	1762	0.04139	0.44923
271	BB	1645	0.03865	0.48788
275	BB	1550	0.03641	0.52429
278	B	1460	0.03430	0.55859
282	B	1302	0.03059	0.58918
285	B	1300	0.03054	0.61972
288	B	1148	0.02697	0.64669
290	B	1123	0.02638	0.67307
293	B	1016	0.02387	0.69694
295	B	937	0.02201	0.71895
298	B	974	0.02288	0.74184
299	B	866	0.02034	0.76218
302	P	852	0.02002	0.78220
304	P	808	0.01898	0.80118
307	P	651	0.01529	0.81647
309	P	740	0.01738	0.83386
311	P	648	0.01522	0.84908
313	P	642	0.01508	0.86416
315	P	547	0.01285	0.87701
317	P	605	0.01421	0.89123
319	P	526	0.01236	0.90359
321	P	494	0.01161	0.91519
323	P	431	0.01013	0.92532
326	P	419	0.00984	0.93516
328	A	357	0.00839	0.94355
330	A	358	0.00841	0.95196
333	A	345	0.00811	0.96006
335	A	333	0.00782	0.96789
338	A	262	0.00616	0.97404
341	A	226	0.00531	0.97935
344	A	184	0.00432	0.98367
347	A	184	0.00432	0.98800
351	A	143	0.00336	0.99135
355	A	120	0.00282	0.99417
360	A	105	0.00247	0.99664
365	A	65	0.00153	0.99817
372	A	43	0.00101	0.99918
381	A	21	0.00049	0.99967
393	A	9	0.00021	0.99988
399	A	5	0.00012	1.00000



Section 2.4

Tabled Delta Analysis Results



Table 2.4.1
Delta Analysis
English Language Arts Grade 3

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
146971A	0.43000	0.57000	13.70550	12.29450	1	True	3.20290
146994A	0.67000	0.64000	11.24035	11.56616	1	False	-0.63704
147007A	0.61000	0.60000	11.88272	11.98661	1	False	-0.18818
147008A	0.65000	0.57000	11.45872	12.29450	1	False	-0.10390
147012A	0.69000	0.64000	11.01660	11.56616	1	False	-0.84503
147341A	0.77000	0.75000	10.04461	10.30204	1	False	-0.32077
147348A	0.67000	0.56000	11.24035	12.39612	1	False	0.63368
147351A	0.78000	0.73000	9.91123	10.54875	1	False	-0.77577
147358A	0.71000	0.71000	10.78646	10.78646	1	False	0.20032
147359A	0.67000	0.59000	11.24035	12.08982	1	False	-0.09904
147433A	0.35000	0.49000	14.54128	13.10028	1	True	3.16798
147456A	0.54000	0.44000	12.59827	13.60388	1	False	0.44786
155253A	0.59000	0.58000	12.08982	12.19243	1	False	-0.21156
155255A	0.49000	0.45000	13.10028	13.50265	1	False	-0.93109
155274A	0.79000	0.71000	9.77432	10.78646	1	False	0.10291
155279A	0.63000	0.60000	11.67259	11.98661	1	False	-0.66403
155282A	0.58000	0.57000	12.19243	12.29450	1	False	-0.22339
155283A	0.69000	0.67000	11.01660	11.24035	1	False	-0.36431
156120A	0.71000	0.67000	10.78646	11.24035	1	False	-0.88545
156121A	0.63000	0.60000	11.67259	11.98661	1	False	-0.66403
156123A	0.53000	0.47000	12.69892	13.30108	1	False	-0.50441
156124A	0.73000	0.74000	10.54875	10.42662	1	False	0.52282
156125A	0.45000	0.39000	13.50265	14.11728	1	False	-0.37195
156126A	0.57000	0.44000	12.29450	13.60388	1	False	1.13572
156336A	0.78000	0.75000	9.91123	10.30204	1	False	-0.62282
156355A	0.67000	0.65000	11.24035	11.45872	1	False	-0.38002
156356A	0.64000	0.60000	11.56616	11.98661	1	False	-0.90501
156362A	0.54000	0.51000	12.59827	12.89972	1	False	-0.75216
184195A	0.59000	0.55000	12.08982	12.49735	1	False	-0.94099
184197A	0.71000	0.62000	10.78646	11.77808	1	False	0.18303
481996	0.48000	0.50000	13.20061	13.00000	1	False	0.37196
482322	0.34000	0.33000	14.64985	14.75965	1	False	-0.55565
484543	0.30000	0.24000	15.09760	15.82521	1	False	0.10196
484565	0.57000	0.39000	12.29450	14.11728	1	False	2.36384
484567	0.29000	0.24000	15.21354	15.82521	1	False	-0.16057
484569	0.63000	0.59000	11.67259	12.08982	1	False	-0.91092
484575	0.59000	0.56000	12.08982	12.39612	1	False	-0.69883
484577	0.49000	0.45000	13.10028	13.50265	1	False	-0.93109
484579	0.51000	0.48000	12.89972	13.20061	1	False	-0.78929
484581	0.37000	0.37000	14.32741	14.32741	1	False	-0.25182
627921	0.35500	0.29000	14.48742	15.21354	2	False	0.02048
628643	0.37000	0.38000	14.32741	14.22192	1	False	0.00053
628734	0.66000	0.57000	11.35015	12.29450	1	False	0.14196
628835	0.21000	0.30500	16.22568	15.04029	2	False	2.34144
628923	0.40000	0.29000	14.01339	15.21354	1	False	1.09392
628961	0.62000	0.49000	11.77808	13.10028	1	False	1.10045
630590	0.48000	0.43000	13.20061	13.70550	1	False	-0.67305
630598	0.48000	0.45000	13.20061	13.50265	1	False	-0.83044
630600	0.55000	0.49000	12.49735	13.10028	1	False	-0.52833
630602	0.47000	0.37000	13.30108	14.32741	1	False	0.58717

Table 2.4.2
Delta Analysis
English Language Arts Grade 4

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
146887A	0.59000	0.57000	12.08982	12.29450	1	False	-0.38097
148686A	0.56000	0.53000	12.39612	12.69892	1	False	-0.22542
148719A	0.46000	0.45000	13.40173	13.50265	1	False	-0.42857
148938A	0.82000	0.81000	9.33854	9.48841	1	False	-0.30242
149114A	0.74000	0.75000	10.42662	10.30204	1	False	-0.00631
149115A	0.45000	0.41000	13.50265	13.91018	1	False	-0.00366
149116A	0.73000	0.71000	10.54875	10.78646	1	False	-0.44612
149136A	0.49000	0.44000	13.10028	13.60388	1	False	0.09845
155490A	0.51000	0.50000	12.89972	13.00000	1	False	-0.46532
155569A	0.59000	0.61000	12.08982	11.88272	1	False	-0.01277
155571A	0.73000	0.72000	10.54875	10.66863	1	False	-0.34806
155572A	0.76000	0.75000	10.17479	10.30204	1	False	-0.33137
155580A	0.70000	0.69000	10.90240	11.01660	1	False	-0.36559
158587A	0.59000	0.57000	12.08982	12.29450	1	False	-0.38097
158589A	0.71000	0.69000	10.78646	11.01660	1	False	-0.43945
158602A	0.53000	0.51000	12.69892	12.89972	1	False	-0.34272
158603A	0.33000	0.30000	14.75965	15.09760	1	False	-0.00861
158604A	0.71000	0.71000	10.78646	10.78646	1	False	-0.20173
158611A	0.64000	0.66000	11.56616	11.35015	1	False	0.03681
158691A	0.82000	0.83000	9.33854	9.18334	1	False	0.11318
158692A	0.47000	0.45000	13.30108	13.50265	1	False	-0.29865
184822A	0.41000	0.39000	13.91018	14.11728	1	False	-0.24758
184824A	0.82000	0.82000	9.33854	9.33854	1	False	-0.09825
184827A	0.29000	0.29000	15.21354	15.21354	1	False	-0.43655
185806A	0.42000	0.42000	13.80757	13.80757	1	False	-0.41766
186016A	0.68000	0.66000	11.12920	11.35015	1	False	-0.42748
186018A	0.28000	0.27000	15.33137	15.45125	1	False	-0.26481
186065A	0.43000	0.40000	13.70550	14.01339	1	False	-0.12490
483086	0.13000	0.56000	17.50556	12.39612	1	True	6.27847
483092	0.22000	0.19000	16.08877	16.51159	1	False	0.20199
483113	0.33000	0.31000	14.75965	14.98340	1	False	-0.16418
484626	0.71000	0.67000	10.78646	11.24035	1	False	-0.13465
484628	0.75000	0.73000	10.30204	10.54875	1	False	-0.45150
484632	0.63000	0.61000	11.67259	11.88272	1	False	-0.40336
484636	0.56000	0.56000	12.39612	12.39612	1	False	-0.31678
484638	0.64000	0.63000	11.56616	11.67259	1	False	-0.40244
484646	0.58000	0.57000	12.19243	12.29450	1	False	-0.44128
484648	0.54000	0.64000	12.59827	11.56616	1	False	1.07477
484652	0.39000	0.39000	14.11728	14.11728	1	False	-0.43979
484654	0.50000	0.48000	13.00000	13.20061	1	False	-0.32146
484658	0.63000	0.61000	11.67259	11.88272	1	False	-0.40336
629160	0.43000	0.37500	13.70550	14.27456	2	False	0.23088
629614	0.33000	0.22000	14.75965	16.08877	2	False	1.34163
632843	0.40000	0.33000	14.01339	14.75965	1	False	0.49429
632853	0.78000	0.71000	9.91123	10.78646	1	False	0.37679
632863	0.52000	0.46000	12.79939	13.40173	1	False	0.21147
632877	0.64000	0.62000	11.56616	11.77808	1	False	-0.40855
635510	0.82000	0.80000	9.33854	9.63352	1	False	-0.45461
635527	0.78000	0.65000	9.91123	11.45872	1	False	1.29258
635530	0.63000	0.61000	11.67259	11.88272	1	False	-0.40336

Table 2.4.3
Delta Analysis
English Language Arts Grade 5

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
147920A	0.80000	0.80000	9.63352	9.63352	1	False	-0.52727
147921A	0.63000	0.63000	11.67259	11.67259	1	False	-0.32799
147923A	0.64000	0.62000	11.56616	11.77808	1	False	-0.65533
147924A	0.66000	0.65000	11.35015	11.45872	1	False	-0.65410
147926A	0.55000	0.54000	12.49735	12.59827	1	False	-0.52120
147969A	0.76000	0.77000	10.17479	10.04461	1	False	-0.12115
148003A	0.59000	0.56000	12.08982	12.39612	1	False	-0.45038
148007A	0.64000	0.60000	11.56616	11.98661	1	False	-0.08949
148008A	0.45000	0.46000	13.50265	13.40173	1	False	0.12467
148961A	0.63000	0.65000	11.67259	11.45872	1	False	0.25232
148963A	0.77000	0.75000	10.04461	10.30204	1	False	-0.38312
148967A	0.77000	0.72000	10.04461	10.66863	1	False	0.61159
149152A	0.83000	0.83000	9.18334	9.18334	1	False	-0.57126
149158A	0.49000	0.49000	13.10028	13.10028	1	False	-0.18847
149196A	0.69000	0.65000	11.01660	11.45872	1	False	0.02302
149321A	0.66000	0.64000	11.35015	11.56616	1	False	-0.62308
149334A	0.61000	0.54000	11.88272	12.59827	1	False	0.68028
149338A	0.62000	0.59000	11.77808	12.08982	1	False	-0.40516
149339A	0.56000	0.55000	12.39612	12.49735	1	False	-0.53196
158749A	0.55000	0.51000	12.49735	12.89972	1	False	-0.22955
159592A	0.61000	0.62000	11.88272	11.77808	1	False	-0.02351
159600A	0.82000	0.83000	9.33854	9.18334	1	False	-0.13498
160718A	0.79000	0.80000	9.77432	9.63352	1	False	-0.13146
186097A	0.37000	0.37000	14.32741	14.32741	1	False	-0.06854
186107A	0.71000	0.73000	10.78646	10.54875	1	False	0.23042
186115A	0.45000	0.42000	13.50265	13.80757	1	False	-0.59219
186121A	0.60000	0.61000	11.98661	11.88272	1	False	-0.01541
186131A	0.50000	0.49000	13.00000	13.10028	1	False	-0.47035
186469A	0.40000	0.38000	14.01339	14.22192	1	False	-0.66506
186471A	0.83000	0.83000	9.18334	9.18334	1	False	-0.57126
186474A	0.54000	0.52000	12.59827	12.79939	1	False	-0.78324
186476A	0.57000	0.54000	12.29450	12.59827	1	False	-0.47728
186488A	0.35000	0.32000	14.54128	14.87080	1	False	-0.62698
186777A	0.76000	0.78000	10.17479	9.91123	1	False	0.24078
483126	0.67000	0.68000	11.24035	11.12920	1	False	-0.06866
483134	0.63000	0.59000	11.67259	12.08982	1	False	-0.10861
483146	0.55000	0.47000	12.49735	13.30108	1	False	0.85949
483172	0.50000	0.71000	13.00000	10.78646	1	True	5.80793
630617	0.49000	0.42000	13.10028	13.80757	1	False	0.53892
630655	0.81000	0.76000	9.48841	10.17479	1	False	0.83513
630737	0.65000	0.67000	11.45872	11.24035	1	False	0.24363
631575	0.54000	0.50000	12.59827	13.00000	1	False	-0.24113
631601	0.59000	0.58000	12.08982	12.19243	1	False	-0.56563
631918	0.50000	0.48000	13.00000	13.20061	1	False	-0.74261
631955	0.85000	0.77000	8.85427	10.04461	1	False	2.26458
631981	0.58000	0.52000	12.19243	12.79939	1	False	0.35539
632003	0.69000	0.67000	11.01660	11.24035	1	False	-0.56950
632256	0.68000	0.65000	11.12920	11.45872	1	False	-0.29353
632269	0.53000	0.47000	12.69892	13.30108	1	False	0.29286
632323	0.57000	0.52000	12.29450	12.79939	1	False	0.06844

Table 2.4.4
Delta Analysis
English Language Arts Grade 6

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
147283A	0.74000	0.71000	10.42662	10.78646	1	False	0.07073
147289A	0.70000	0.67000	10.90240	11.24035	1	False	-0.22048
147290A	0.71000	0.68000	10.78646	11.12920	1	False	-0.15152
149400A	0.72000	0.71000	10.66863	10.78646	1	False	-0.93193
149414A	0.56000	0.52000	12.39612	12.79939	1	False	-0.63861
149570A	0.63000	0.60000	11.67259	11.98661	1	False	-0.64927
149571A	0.64000	0.62000	11.56616	11.77808	1	False	-0.98019
149737A	0.61000	0.61000	11.88272	11.88272	1	False	-0.26864
158702A	0.49000	0.49000	13.10028	13.10028	1	False	0.26922
158705A	0.82000	0.83000	9.33854	9.18334	1	False	-0.81811
158723A	0.80000	0.81000	9.63352	9.48841	1	False	-0.72519
158739A	0.78000	0.77000	9.91123	10.04461	1	False	-0.53976
158740A	0.61000	0.64000	11.88272	11.56616	1	False	0.90301
158747A	0.71000	0.69000	10.78646	11.01660	1	False	-0.56830
158756A	0.40000	0.37000	14.01339	14.32741	1	False	-0.48968
158774A	0.70000	0.70000	10.90240	10.90240	1	False	-0.70170
158786A	0.76000	0.75000	10.17479	10.30204	1	False	-0.67890
158886A	0.82000	0.83000	9.33854	9.18334	1	False	-0.81811
158897A	0.65000	0.63000	11.45872	11.67259	1	False	-0.92549
158935A	0.58000	0.60000	12.19243	11.98661	1	False	0.62993
158943A	0.43000	0.41000	13.70550	13.91018	1	False	-0.22100
158947A	0.61000	0.59000	11.88272	12.08982	1	False	-1.03514
158954A	0.72000	0.73000	10.66863	10.54875	1	False	-0.36125
158978A	0.43000	0.42000	13.70550	13.80757	1	False	0.15877
159281A	0.81000	0.80000	9.48841	9.63352	1	False	-0.30962
159297A	0.60000	0.60000	11.98661	11.98661	1	False	-0.22275
159451A	0.74000	0.74000	10.42662	10.42662	1	False	-0.91188
159453A	0.74000	0.69000	10.42662	11.01660	1	False	0.92251
159454A	0.50000	0.39000	13.00000	14.11728	1	False	1.73734
159457A	0.77000	0.75000	10.04461	10.30204	1	False	-0.13958
159458A	0.67000	0.66000	11.24035	11.35015	1	False	-0.95880
485443	0.39000	0.39000	14.11728	14.11728	1	False	0.71848
485688	0.75000	0.73000	10.30204	10.54875	1	False	-0.29298
485700	0.19000	0.17000	16.51159	16.81666	1	False	0.64703
485702	0.79000	0.78000	9.77432	9.91123	1	False	-0.46623
486350	0.47000	0.50000	13.30108	13.00000	1	False	1.47228
486369	0.64000	0.65000	11.56616	11.45872	1	False	-0.01080
486371	0.64000	0.65000	11.56616	11.45872	1	False	-0.01080
486376	0.68000	0.68000	11.12920	11.12920	1	False	-0.60151
629854	0.31000	0.27000	14.98340	15.45125	1	False	-0.63051
629856	0.66000	0.62000	11.35015	11.77808	1	False	-0.08524
629863	0.56000	0.60000	12.39612	11.98661	1	False	1.47384
629867	0.77000	0.74000	10.04461	10.42662	1	False	0.32151
629869	0.52000	0.53000	12.79939	12.69892	1	False	0.50814
629875	0.45000	0.43000	13.50265	13.70550	1	False	-0.30383
629885	0.59000	0.53000	12.08982	12.69892	1	False	0.25855
629889	0.34000	0.32000	14.64985	14.87080	1	False	0.13600
629895	0.65000	0.61000	11.45872	11.88272	1	False	-0.14773
630339	0.22500	0.13000	16.02166	17.50556	2	False	1.75947
630430	0.34500	0.17500	14.59542	16.73836	2	True	4.82873

Table 2.4.5
Delta Analysis
English Language Arts Grade 7

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
148104A	0.69000	0.62000	11.01660	11.77808	1	False	0.16873
148117A	0.59000	0.55000	12.08982	12.49735	1	False	-0.58414
148759A	0.61000	0.57000	11.88272	12.29450	1	False	-0.56565
148760A	0.68000	0.64000	11.12920	11.56616	1	False	-0.47913
148762A	0.72000	0.72000	10.66863	10.66863	1	False	-0.38480
148823A	0.72000	0.65000	10.66863	11.45872	1	False	0.24230
148850A	0.78000	0.74000	9.91123	10.42662	1	False	-0.26459
148859A	0.83000	0.82000	9.18334	9.33854	1	False	-0.76432
154639A	0.44000	0.40000	13.60388	14.01339	1	False	-0.65393
158719A	0.44000	0.47000	13.60388	13.30108	1	False	0.35747
158724A	0.69000	0.60000	11.01660	11.98661	1	False	0.58152
158765A	0.59000	0.60000	12.08982	11.98661	1	False	-0.11132
158766A	0.60000	0.64000	11.98661	11.56616	1	False	0.51163
158769A	0.59000	0.57000	12.08982	12.29450	1	False	-0.72079
158810A	0.66000	0.55000	11.35015	12.49735	1	False	0.91604
158847A	0.57000	0.83000	12.29450	9.18334	1	True	5.85286
158849A	0.64000	0.60000	11.56616	11.98661	1	False	-0.53309
158871A	0.78000	0.74000	9.91123	10.42662	1	False	-0.26459
159120A	0.66000	0.65000	11.35015	11.45872	1	False	-0.56654
159122A	0.48000	0.48000	13.20061	13.20061	1	False	-0.26155
159133A	0.45000	0.47000	13.50265	13.30108	1	False	0.15215
159137A	0.42000	0.37000	13.80757	14.32741	1	False	-0.44545
159394A	0.51000	0.56000	12.89972	12.39612	1	False	0.72068
159646A	0.55000	0.50000	12.49735	13.00000	1	False	-0.41571
160457A	0.50000	0.48000	13.00000	13.20061	1	False	-0.66842
160508A	0.66000	0.58000	11.35015	12.19243	1	False	0.31244
160511A	0.61000	0.58000	11.88272	12.19243	1	False	-0.76772
160937A	0.77000	0.72000	10.04461	10.66863	1	False	-0.05605
160940A	0.83000	0.81000	9.18334	9.48841	1	False	-0.64547
182584A	0.54000	0.47000	12.59827	13.30108	1	False	-0.02439
182596A	0.76000	0.70000	10.17479	10.90240	1	False	0.14267
182597A	0.62000	0.62000	11.77808	11.77808	1	False	-0.33079
485447	0.75000	0.72000	10.30204	10.66863	1	False	-0.57815
485451	0.47000	0.41000	13.30108	13.91018	1	False	-0.24410
485453	0.58000	0.53000	12.19243	12.69892	1	False	-0.39324
485467	0.52000	0.40000	12.79939	14.01339	1	False	0.97772
486286	0.31000	0.31000	14.98340	14.98340	1	False	-0.17476
486294	0.34000	0.35000	14.64985	14.54128	1	False	0.02392
486317	0.47000	0.52000	13.30108	12.79939	1	False	0.73644
486331	0.17000	0.17000	16.81666	16.81666	1	False	-0.08552
486333	0.62000	0.64000	11.77808	11.56616	1	False	0.08868
630545	0.36500	0.26500	14.38050	15.51202	2	False	0.73748
630649	0.49500	0.34500	13.05013	14.59542	2	False	1.62128
633929	0.25000	0.23000	15.69796	15.95539	1	False	-0.64955
634354	0.44000	0.43000	13.60388	13.70550	1	False	-0.44307
634364	0.51000	0.52000	12.89972	12.79939	1	False	-0.07757
634366	0.59000	0.53000	12.08982	12.69892	1	False	-0.18514
634374	0.44000	0.42000	13.60388	13.80757	1	False	-0.64513
634379	0.60000	0.55000	11.98661	12.49735	1	False	-0.37481
634389	0.59000	0.56000	12.08982	12.39612	1	False	-0.78453

Table 2.4.6
Delta Analysis
English Language Arts Grade 8

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
148177A	0.72000	0.70000	10.66863	10.90240	1	False	-0.26769
148187A	0.71000	0.72000	10.78646	10.66863	1	False	-0.70274
148189A	0.55000	0.52000	12.49735	12.79939	1	False	-0.43722
148191A	0.64000	0.60000	11.56616	11.98661	1	False	0.26738
149373A	0.85000	0.87000	8.85427	8.49444	1	False	-0.19620
149374A	0.80000	0.81000	9.63352	9.48841	1	False	-0.87326
149507A	0.59000	0.60000	12.08982	11.98661	1	False	-0.44454
149580A	0.22000	0.19000	16.08877	16.51159	1	False	-0.82378
149583A	0.35000	0.33000	14.54128	14.75965	1	False	-1.14590
149591A	0.48000	0.43000	13.20061	13.70550	1	False	0.21040
149597A	0.72000	0.74000	10.66863	10.42662	1	False	-0.23016
149600A	0.58000	0.57000	12.19243	12.29450	1	False	-1.17008
149603A	0.81000	0.84000	9.48841	9.02217	1	False	0.38767
149619A	0.51000	0.52000	12.89972	12.79939	1	False	-0.25901
149623A	0.67000	0.67000	11.24035	11.24035	1	False	-1.06786
160000A	0.56000	0.57000	12.39612	12.29450	1	False	-0.37641
160467A	0.72000	0.70000	10.66863	10.90240	1	False	-0.26769
160472A	0.69000	0.70000	11.01660	10.90240	1	False	-0.66137
160477A	0.33000	0.31000	14.75965	14.98340	1	False	-1.11446
160742A	0.75000	0.68000	10.30204	11.12920	1	False	2.21667
160745A	0.79000	0.79000	9.77432	9.77432	1	False	-0.99358
160747A	0.72000	0.67000	10.66863	11.24035	1	False	1.09637
160780A	0.28000	0.29000	15.33137	15.21354	1	False	0.40338
160782A	0.66000	0.67000	11.35015	11.24035	1	False	-0.59795
160784A	0.89000	0.91000	8.09389	7.63698	1	False	0.01058
160787A	0.66000	0.67000	11.35015	11.24035	1	False	-0.59795
160788A	0.58000	0.56000	12.19243	12.39612	1	False	-0.75991
160789A	0.43000	0.42000	13.70550	13.80757	1	False	-0.87992
160790A	0.77000	0.73000	10.04461	10.54875	1	False	0.97548
160946A	0.61000	0.55000	11.88272	12.49735	1	False	0.97412
160947A	0.70000	0.71000	10.90240	10.78646	1	False	-0.68216
160956A	0.59000	0.57000	12.08982	12.29450	1	False	-0.73096
160989A	0.53000	0.51000	12.69892	12.89972	1	False	-0.89486
485473	0.62000	0.65000	11.77808	11.45872	1	False	0.35204
485493	0.62000	0.61000	11.77808	11.88272	1	False	-1.05886
485510	0.51000	0.51000	12.89972	12.89972	1	False	-0.66401
486738	0.41000	0.47000	13.91018	13.30108	1	False	2.04043
486744	0.49000	0.52000	13.10028	12.79939	1	False	0.59928
486757	0.40000	0.38000	14.01339	14.22192	1	False	-1.18356
486763	0.75000	0.81000	10.30204	9.48841	1	False	1.98781
487006	0.73000	0.79000	10.54875	9.77432	1	False	1.88966
626597	0.57000	0.55000	12.29450	12.49735	1	False	-0.78817
626602	0.56000	0.53000	12.39612	12.69892	1	False	-0.40948
626606	0.32000	0.35000	14.87080	14.54128	1	False	1.14572
626623	0.67000	0.60000	11.24035	11.98661	1	False	1.66177
626626	0.49000	0.41000	13.10028	13.91018	1	False	1.46598
626777	0.50000	0.41000	13.00000	13.91018	1	False	1.89513
626785	0.72000	0.71000	10.66863	10.78646	1	False	-0.73565
626800	0.39000	0.41000	14.11728	13.91018	1	False	0.46822
627061	0.83000	0.80000	9.18334	9.63352	1	False	0.96730

Table 2.4.7
Delta Analysis
Mathematics Grade 3

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
146917A	0.83000	0.76000	9.18334	10.17479	1	False	0.08789
146955A	0.72000	0.65000	10.66863	11.45872	1	False	-0.46334
147044A	0.65000	0.63000	11.45872	11.67259	1	False	-0.12767
147064A	0.87000	0.88000	8.49444	8.30005	1	False	0.54201
147330A	0.80000	0.78000	9.63352	9.91123	1	False	-0.40395
147503A	0.74000	0.63000	10.42662	11.67259	1	False	0.55072
147542A	0.70000	0.69000	10.90240	11.01660	1	False	0.04837
147712A	0.76000	0.74000	10.17479	10.42662	1	False	-0.30683
147718A	0.72000	0.67000	10.66863	11.24035	1	False	-0.94040
147741A	0.83000	0.78000	9.18334	9.91123	1	False	-0.48789
147966A	0.43000	0.41000	13.70550	13.91018	1	False	0.06080
150663A	0.69000	0.67000	11.01660	11.24035	1	False	-0.18239
151560A	0.75000	0.71000	10.30204	10.78646	1	False	-0.80541
152255A	0.62000	0.50000	11.77808	13.00000	1	False	0.39689
152325A	0.85000	0.66000	8.85427	11.35015	1	True	3.39912
152546A	0.77000	0.73000	10.04461	10.54875	1	False	-0.86778
152598A	0.48000	0.41000	13.20061	13.91018	1	False	-0.82903
152739A	0.79000	0.76000	9.77432	10.17479	1	False	-0.66158
152842A	0.31000	0.28000	14.98340	15.33137	1	False	-0.15642
152864A	0.55000	0.54000	12.49735	12.59827	1	False	0.19695
153154A	0.76000	0.68000	10.17479	11.12920	1	False	-0.06733
153168A	0.74000	0.62000	10.42662	11.77808	1	False	0.78117
154329A	0.81000	0.79000	9.48841	9.77432	1	False	-0.43271
154484A	0.74000	0.71000	10.42662	10.78646	1	False	-0.52392
154533A	0.64000	0.58000	11.56616	12.19243	1	False	-0.88850
154758A	0.65000	0.58000	11.45872	12.19243	1	False	-0.64572
154760A	0.66000	0.58000	11.35015	12.19243	1	False	-0.40040
155162A	0.28000	0.26000	15.33137	15.57338	1	False	0.10112
155260A	0.82000	0.76000	9.33854	10.17479	1	False	-0.26279
155268A	0.52000	0.51000	12.79939	12.89972	1	False	0.22084
155455A	0.43000	0.32000	13.70550	14.87080	1	False	0.12872
155478A	0.60000	0.54000	11.98661	12.59827	1	False	-0.95193
155501A	0.43000	0.36000	13.70550	14.43384	1	False	-0.82586
155594A	0.60000	0.56000	11.98661	12.39612	1	False	-0.51550
155999A	0.54000	0.53000	12.59827	12.69892	1	False	0.20507
161166A	0.79000	0.65000	9.77432	11.45872	1	False	1.55741
184059A	0.58000	0.50000	12.19243	13.00000	1	False	-0.53935
479107	0.84000	0.79000	9.02217	9.77432	1	False	-0.42281
479111	0.68000	0.64000	11.12920	11.56616	1	False	-0.63973
479113	0.87000	0.84000	8.49444	9.02217	1	False	-0.87351
479117	0.68000	0.62000	11.12920	11.77808	1	False	-0.80636
479125	0.91000	0.93000	7.63698	7.09684	1	False	1.23308
479138	0.48000	0.44000	13.20061	13.60388	1	False	-0.41085
479140	0.75000	0.58000	10.30204	12.19243	1	False	1.96784
488998	0.52000	0.46000	12.79939	13.40173	1	False	-0.87585
636402	0.71000	0.61000	10.78646	11.88272	1	False	0.19670
636410	0.70000	0.82000	10.90240	9.33854	1	True	3.71424
636412	0.52000	0.45000	12.79939	13.50265	1	False	-0.81273
636429	0.63000	0.68000	11.67259	11.12920	1	False	1.54265
636443	0.63000	0.52000	11.67259	12.79939	1	False	0.19699

Table 2.4.8
Delta Analysis
Mathematics Grade 4

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
147318A	0.89000	0.90000	8.09389	7.87379	1	False	0.17440
147319A	0.83000	0.78000	9.18334	9.91123	1	False	0.27475
147525A	0.69000	0.64000	11.01660	11.56616	1	False	-0.06058
147975A	0.47000	0.45000	13.30108	13.50265	1	False	-0.74599
148069A	0.80000	0.76000	9.63352	10.17479	1	False	-0.11137
148301A	0.39000	0.36000	14.11728	14.43384	1	False	-0.48184
148500A	0.49000	0.48000	13.10028	13.20061	1	False	-0.62713
148654A	0.37000	0.33000	14.32741	14.75965	1	False	-0.23076
148675A	0.33000	0.33000	14.75965	14.75965	1	False	-0.45349
149723A	0.49000	0.47000	13.10028	13.30108	1	False	-0.75242
150227A	0.39000	0.42000	14.11728	13.80757	1	False	0.22061
150664A	0.62000	0.59000	11.77808	12.08982	1	False	-0.54815
150722A	0.39000	0.36000	14.11728	14.43384	1	False	-0.48184
151506A	0.45000	0.44000	13.50265	13.60388	1	False	-0.63867
151519A	0.81000	0.82000	9.48841	9.33854	1	False	-0.00837
151549A	0.70000	0.68000	10.90240	11.12920	1	False	-0.74980
151554A	0.77000	0.74000	10.04461	10.42662	1	False	-0.44026
151556A	0.65000	0.63000	11.45872	11.67259	1	False	-0.76398
151997A	0.62000	0.47000	11.77808	13.30108	1	False	2.02808
152343A	0.43000	0.41000	13.70550	13.91018	1	False	-0.72966
152353A	0.59000	0.62000	12.08982	11.77808	1	False	0.27355
152355A	0.77000	0.77000	10.04461	10.04461	1	False	-0.34047
152518A	0.71000	0.71000	10.78646	10.78646	1	False	-0.35826
152776A	0.69000	0.66000	11.01660	11.35015	1	False	-0.52003
152789A	0.45000	0.39000	13.50265	14.11728	1	False	0.13740
152874A	0.33000	0.33000	14.75965	14.75965	1	False	-0.45349
152988A	0.65000	0.59000	11.45872	12.08982	1	False	0.12344
153171A	0.50000	0.50000	13.00000	13.00000	1	False	-0.41131
153185A	0.47000	0.45000	13.30108	13.50265	1	False	-0.74599
153189A	0.43000	0.46000	13.70550	13.40173	1	False	0.21785
153206A	0.56000	0.61000	12.39612	11.88272	1	False	0.69511
153325A	0.38000	0.39000	14.22192	14.11728	1	False	-0.21803
153346A	0.88000	0.90000	8.30005	7.87379	1	False	0.60795
154024A	0.25000	0.48000	15.69796	13.20061	1	True	4.83563
154479A	0.37000	0.34000	14.32741	14.64985	1	False	-0.46430
155121A	0.32000	0.29000	14.87080	15.21354	1	False	-0.40809
155167A	0.86000	0.89000	8.67872	8.09389	1	False	0.93615
155192A	0.50000	0.51000	13.00000	12.89972	1	False	-0.19804
155220A	0.68000	0.69000	11.12920	11.01660	1	False	-0.12697
156019A	0.68000	0.51000	11.12920	12.89972	1	False	2.53897
161617A	0.26000	0.23000	15.57338	15.95539	1	False	-0.30774
184099A	0.52000	0.48000	12.79939	13.20061	1	False	-0.33335
184241A	0.69000	0.68000	11.01660	11.12920	1	False	-0.60328
479500	0.85000	0.83000	8.85427	9.18334	1	False	-0.58138
479507	0.78000	0.78000	9.91123	9.91123	1	False	-0.33728
479932	0.41000	0.37000	13.91018	14.32741	1	False	-0.27268
636619	0.73000	0.71000	10.54875	10.78646	1	False	-0.73508
636627	0.36000	0.34000	14.43384	14.64985	1	False	-0.68810
636666	0.78000	0.67000	9.91123	11.24035	1	False	1.57096
636668	0.70000	0.59000	10.90240	12.08982	1	False	1.29334

Table 2.4.9
Delta Analysis
Mathematics Grade 5

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
146915A	0.67000	0.64000	11.24035	11.56616	1	False	-0.23215
146959A	0.64000	0.42000	11.56616	13.80757	1	True	5.45542
147968A	0.88000	0.81000	8.30005	9.48841	1	False	0.80916
147990A	0.44000	0.39000	13.60388	14.11728	1	False	-0.39265
148011A	0.68000	0.62000	11.12920	11.77808	1	False	-0.49004
148659A	0.61000	0.52000	11.88272	12.79939	1	False	0.67300
148852A	0.43000	0.39000	13.70550	14.11728	1	False	-0.74094
149230A	0.59000	0.51000	12.08982	12.89972	1	False	0.33120
149246A	0.60000	0.56000	11.98661	12.39612	1	False	-0.71829
149261A	0.39000	0.36000	14.11728	14.43384	1	False	-0.88901
149289A	0.46000	0.46000	13.40173	13.40173	1	False	0.44377
149384A	0.73000	0.62000	10.54875	11.77808	1	False	1.49937
149640A	0.34000	0.30000	14.64985	15.09760	1	False	-0.38226
150267A	0.45000	0.46000	13.50265	13.40173	1	False	0.78962
150631A	0.68000	0.63000	11.12920	11.67259	1	False	-0.87692
150689A	0.50000	0.50000	13.00000	13.00000	1	False	0.54023
150703A	0.25000	0.25000	15.69796	15.69796	1	False	-0.10761
150711A	0.44000	0.41000	13.60388	13.91018	1	False	-0.72812
152807A	0.45000	0.40000	13.50265	14.01339	1	False	-0.42670
152859A	0.61000	0.56000	11.88272	12.39612	1	False	-0.80594
152933A	0.53000	0.51000	12.69892	12.89972	1	False	-0.12391
152946A	0.68000	0.62000	11.12920	11.77808	1	False	-0.49004
152972A	0.70000	0.61000	10.90240	11.88272	1	False	0.67109
153075A	0.47000	0.43000	13.30108	13.70550	1	False	-0.86505
153107A	0.57000	0.55000	12.29450	12.49735	1	False	-0.03431
153162A	0.85000	0.83000	8.85427	9.18334	1	False	0.32886
153165A	0.47000	0.46000	13.30108	13.40173	1	False	0.09879
153972A	0.66000	0.60000	11.35015	11.98661	1	False	-0.48249
154046A	0.46000	0.43000	13.40173	13.70550	1	False	-0.67026
155145A	0.64000	0.63000	11.56616	11.67259	1	False	0.49423
155234A	0.16000	0.16000	16.97783	16.97783	1	False	-0.41493
155426A	0.85000	0.83000	8.85427	9.18334	1	False	0.32886
155434A	0.54000	0.48000	12.59827	13.20061	1	False	-0.30791
155474A	0.69000	0.61000	11.01660	11.88272	1	False	0.27968
155479A	0.33000	0.30000	14.75965	15.09760	1	False	-0.75858
155489A	0.49000	0.41000	13.10028	13.91018	1	False	0.57383
155523A	0.82000	0.79000	9.33854	9.77432	1	False	-0.17875
161469A	0.72000	0.66000	10.66863	11.35015	1	False	-0.48092
181426A	0.52000	0.50000	12.79939	13.00000	1	False	-0.14733
184261A	0.60000	0.56000	11.98661	12.39612	1	False	-0.71829
184263A	0.75000	0.70000	10.30204	10.90240	1	False	-0.86659
187144A	0.49000	0.47000	13.10028	13.30108	1	False	-0.22028
187147A	0.58000	0.55000	12.19243	12.49735	1	False	-0.38416
484706	0.59000	0.58000	12.08982	12.19243	1	False	0.38249
484714	0.30000	0.29000	15.09760	15.21354	1	False	-0.38864
489954	0.85000	0.84000	8.85427	9.02217	1	False	0.91995
636681	0.31000	0.29000	14.98340	15.21354	1	False	-0.78004
636693	0.88000	0.83000	8.30005	9.18334	1	False	-0.30968
636726	0.54000	0.49000	12.59827	13.10028	1	False	-0.67589
636735	0.70000	0.71000	10.90240	10.78646	1	False	1.46911

Table 2.4.10
Delta Analysis
Mathematics Grade 6

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
147412A	0.63000	0.61000	11.67259	11.88272	1	False	-0.26441
147578A	0.37000	0.31000	14.32741	14.98340	1	False	0.13073
148159A	0.68000	0.66000	11.12920	11.35015	1	False	-0.16081
148231A	0.70000	0.67000	10.90240	11.24035	1	False	-0.41761
148926A	0.78000	0.73000	9.91123	10.54875	1	False	-0.97506
149062A	0.83000	0.75000	9.18334	10.30204	1	False	0.11129
149140A	0.59000	0.57000	12.08982	12.29450	1	False	-0.35154
149231A	0.63000	0.55000	11.67259	12.49735	1	False	-0.06606
149234A	0.72000	0.69000	10.66863	11.01660	1	False	-0.38736
149511A	0.63000	0.51000	11.67259	12.89972	1	False	1.00710
149730A	0.60000	0.60000	11.98661	11.98661	1	False	0.21953
150604A	0.50000	0.51000	13.00000	12.89972	1	False	0.24002
150723A	0.72000	0.68000	10.66863	11.12920	1	False	-0.68769
150972A	0.44000	0.35000	13.60388	14.54128	1	False	0.70499
151145A	0.66000	0.61000	11.35015	11.88272	1	False	-0.92394
151316A	0.68000	0.66000	11.12920	11.35015	1	False	-0.16081
151782A	0.24000	0.23000	15.82521	15.95539	1	False	-0.90667
151835A	0.38000	0.33000	14.22192	14.75965	1	False	-0.21038
152379A	0.51000	0.48000	12.89972	13.20061	1	False	-0.80549
152754A	0.33000	0.33000	14.75965	14.75965	1	False	-0.45623
153103A	0.51000	0.50000	12.89972	13.00000	1	False	-0.27043
153315A	0.47000	0.42000	13.30108	13.80757	1	False	-0.51809
153382A	0.43000	0.43000	13.70550	13.70550	1	False	-0.19935
153512A	0.72000	0.53000	10.66863	12.69892	1	False	2.90453
153601A	0.66000	0.65000	11.35015	11.45872	1	False	0.08506
153952A	0.79000	0.74000	9.77432	10.42662	1	False	-0.98113
155177A	0.89000	0.84000	8.09389	9.02217	1	False	-0.66207
155184A	0.63000	0.56000	11.67259	12.39612	1	False	-0.33606
155298A	0.67000	0.59000	11.24035	12.08982	1	False	-0.10550
181240A	0.66000	0.64000	11.35015	11.56616	1	False	-0.20152
181455A	0.67000	0.43000	11.24035	13.70550	1	True	4.20368
479039	0.46000	0.43000	13.40173	13.70550	1	False	-0.93549
479041	0.78000	0.73000	9.91123	10.54875	1	False	-0.97506
479043	0.17000	0.28000	16.81666	15.33137	1	True	3.00394
479047	0.37000	0.39000	14.32741	14.11728	1	False	0.20956
479049	0.33000	0.34000	14.75965	14.64985	1	False	-0.16338
479057	0.71000	0.69000	10.78646	11.01660	1	False	-0.10181
479067	0.35000	0.37000	14.54128	14.32741	1	False	0.16739
479069	0.78000	0.78000	9.91123	9.91123	1	False	0.72527
479077	0.34000	0.35000	14.64985	14.54128	1	False	-0.13990
479083	0.59000	0.59000	12.08982	12.08982	1	False	0.19438
479087	0.44000	0.43000	13.60388	13.70550	1	False	-0.44561
479095	0.18000	0.14000	16.66146	17.32128	1	False	0.70973
479097	0.34000	0.29000	14.64985	15.21354	1	False	-0.03687
479148	0.22000	0.18000	16.08877	16.66146	1	False	0.33778
636459	0.70000	0.61000	10.90240	11.88272	1	False	0.16114
636463	0.44000	0.41000	13.60388	13.91018	1	False	-0.97823
636465	0.65000	0.60000	11.45872	11.98661	1	False	-0.90997
636479	0.53000	0.48000	12.69892	13.20061	1	False	-0.67763
636499	0.63000	0.63000	11.67259	11.67259	1	False	0.29605

Table 2.4.11
Delta Analysis
Mathematics Grade 7

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
147541A	0.73000	0.69000	10.54875	11.01660	1	False	-0.93644
148154A	0.77000	0.71000	10.04461	10.78646	1	False	-0.40765
148171A	0.47000	0.41000	13.30108	13.91018	1	False	-0.69102
148193A	0.31000	0.28000	14.98340	15.33137	1	False	-0.81544
148330A	0.40000	0.31000	14.01339	14.98340	1	False	0.94340
148478A	0.29000	0.27000	15.21354	15.45125	1	False	-0.35660
148527A	0.59000	0.59000	12.08982	12.08982	1	False	0.95966
148530A	0.54000	0.47000	12.59827	13.30108	1	False	-0.34681
148711A	0.59000	0.44000	12.08982	13.60388	1	True	3.13642
148739A	0.69000	0.64000	11.01660	11.56616	1	False	-1.15635
148912A	0.51000	0.50000	12.89972	13.00000	1	False	0.45028
149102A	0.33000	0.35000	14.75965	14.54128	1	False	1.66850
149204A	0.51000	0.44000	12.89972	13.60388	1	False	-0.31376
149705A	0.63000	0.63000	11.67259	11.67259	1	False	0.99735
149759A	0.61000	0.56000	11.88272	12.39612	1	False	-1.23545
150199A	0.51000	0.45000	12.89972	13.50265	1	False	-0.75415
150232A	0.19000	0.20000	16.51159	16.36648	1	False	1.19151
150891A	0.33000	0.32000	14.75965	14.87080	1	False	0.23502
152009A	0.36000	0.35000	14.43384	14.54128	1	False	0.28052
152051A	0.30000	0.26000	15.09760	15.57338	1	False	-1.10874
152195A	0.58000	0.53000	12.19243	12.69892	1	False	-1.23752
152288A	0.29000	0.29000	15.21354	15.21354	1	False	0.67752
152901A	0.61000	0.52000	11.88272	12.79939	1	False	0.51886
152915A	0.53000	0.51000	12.69892	12.89972	1	False	0.03109
153291A	0.52000	0.43000	12.79939	13.70550	1	False	0.55576
153299A	0.33000	0.28000	14.75965	15.33137	1	False	-0.72192
153485A	0.54000	0.49000	12.59827	13.10028	1	False	-1.22037
153504A	0.39000	0.34000	14.11728	14.64985	1	False	-0.95020
155126A	0.25000	0.20000	15.69796	16.36648	1	False	-0.21601
155443A	0.43000	0.40000	13.70550	14.01339	1	False	-0.52569
182026A	0.67000	0.62000	11.24035	11.77808	1	False	-1.18763
182027A	0.47000	0.44000	13.30108	13.60388	1	False	-0.46700
480259	0.41000	0.37000	13.91018	14.32741	1	False	-1.01985
480287	0.46000	0.41000	13.40173	13.91018	1	False	-1.11981
480295	0.34000	0.33000	14.64985	14.75965	1	False	0.25077
480307	0.27000	0.26000	15.45125	15.57338	1	False	0.12475
480339	0.31000	0.23000	14.98340	15.95539	1	False	1.03960
480360	0.16000	0.13000	16.97783	17.50556	1	False	-0.71290
480373	0.24000	0.17000	15.82521	16.81666	1	False	1.20031
480380	0.15000	0.11000	17.14573	17.90611	1	False	0.31435
489119	0.26000	0.25000	15.57338	15.69796	1	False	0.10307
489176	0.53000	0.45000	12.69892	13.50265	1	False	0.10127
490454	0.29000	0.29000	15.21354	15.21354	1	False	0.67752
636508	0.52000	0.49000	12.79939	13.10028	1	False	-0.41339
636512	0.40000	0.28000	14.01339	15.33137	1	False	2.45716

Table 2.4.12
Delta Analysis
Mathematics Grade 8

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
148061A	0.36000	0.32000	14.43384	14.87080	1	False	-0.47465
148303A	0.42000	0.39000	13.80757	14.11728	1	False	-0.71134
148327A	0.48000	0.39000	13.20061	14.11728	1	False	0.38247
148379A	0.65000	0.57000	11.45872	12.29450	1	False	0.08361
148689A	0.40000	0.32000	14.01339	14.87080	1	False	0.32888
149067A	0.65000	0.60000	11.45872	11.98661	1	False	-0.52918
150198A	0.42000	0.34000	13.80757	14.64985	1	False	0.28247
150202A	0.52000	0.47000	12.79939	13.30108	1	False	-0.47519
150215A	0.46000	0.47000	13.40173	13.30108	1	False	0.13751
150218A	0.50000	0.45000	13.00000	13.50265	1	False	-0.45742
150223A	0.62000	0.51000	11.77808	12.89972	1	False	0.67784
151253A	0.47000	0.39000	13.30108	14.11728	1	False	0.19047
151283A	0.49000	0.46000	13.10028	13.40173	1	False	-0.63895
153423A	0.72000	0.72000	10.66863	10.66863	1	False	0.15353
154159A	0.59000	0.54000	12.08982	12.59827	1	False	-0.51793
154160A	0.48000	0.45000	13.20061	13.50265	1	False	-0.64803
154320A	0.54000	0.52000	12.59827	12.79939	1	False	-0.39951
161462A	0.48000	0.41000	13.20061	13.91018	1	False	-0.02971
183763A	0.30000	0.29000	15.09760	15.21354	1	False	-0.42782
183764A	0.41000	0.38000	13.91018	14.22192	1	False	-0.72353
183795A	0.36000	0.35000	14.43384	14.54128	1	False	-0.35838
183885A	0.60000	0.56000	11.98661	12.39612	1	False	-0.72300
484739	0.09000	0.06000	18.36302	19.21909	1	False	0.67054
484750	0.24000	0.22000	15.82521	16.08877	1	False	-0.70961
484766	0.57000	0.55000	12.29450	12.49735	1	False	-0.37891
484772	0.48000	0.49000	13.20061	13.10028	1	False	0.15280
484815	0.33000	0.32000	14.75965	14.87080	1	False	-0.39152
484821	0.58000	0.54000	12.19243	12.59827	1	False	-0.71402
484823	0.68000	0.69000	11.12920	11.01660	1	False	0.34119
484828	0.66000	0.60000	11.35015	11.98661	1	False	-0.32169
484841	0.21000	0.20000	16.22568	16.36648	1	False	-0.56660
484853	0.61000	0.45000	11.88272	13.50265	1	False	1.67782
484855	0.15000	0.39000	17.14573	14.11728	1	True	5.66825
484860	0.31000	0.32000	14.98340	14.87080	1	False	0.03609
484866	0.34000	0.28000	14.64985	15.33137	1	False	0.02918
484873	0.36000	0.31000	14.43384	14.98340	1	False	-0.25053
484877	0.65000	0.66000	11.45872	11.35015	1	False	0.30707
484881	0.64000	0.63000	11.56616	11.67259	1	False	-0.12933
484977	0.42000	0.40000	13.80757	14.01339	1	False	-0.50458
490067	0.45000	0.38000	13.50265	14.22192	1	False	0.01353
490116	0.54000	0.51000	12.59827	12.89972	1	False	-0.59921
490151	0.44000	0.47000	13.60388	13.30108	1	False	0.52382
636559	0.45000	0.41000	13.50265	13.91018	1	False	-0.60692
636567	0.56000	0.43000	12.39612	13.70550	1	False	1.10039
636602	0.22000	0.19000	16.08877	16.51159	1	False	-0.37180
636610	0.69000	0.68000	11.01660	11.12920	1	False	-0.09813

Table 2.4.13
Delta Analysis
Science Grade 5

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
184387A	0.56000	0.52000	12.39612	12.79939	1	False	0.32825
184423A	0.44000	0.44000	13.60388	13.60388	1	False	-0.51887
185413A	0.33000	0.31000	14.75965	14.98340	1	False	-0.92428
186483A	0.51000	0.50000	12.89972	13.00000	1	False	-0.86832
186489A	0.50000	0.51000	13.00000	12.89972	1	False	-0.32567
186490A	0.41000	0.42000	13.91018	13.80757	1	False	-0.07792
186754A	0.68000	0.70000	11.12920	10.90240	1	False	-0.37375
186756A	0.71000	0.75000	10.78646	10.30204	1	False	0.44071
186759A	0.74000	0.75000	10.42662	10.30204	1	False	-0.91769
187487A	0.45000	0.50000	13.50265	13.00000	1	False	1.21966
187491A	0.35000	0.36000	14.54128	14.43384	1	False	0.10520
187497A	0.30000	0.35000	15.09760	14.54128	1	False	1.82797
187503A	0.46000	0.46000	13.40173	13.40173	1	False	-0.57208
187505A	0.76000	0.77000	10.17479	10.04461	1	False	-0.96037
187510A	0.83000	0.86000	9.18334	8.67872	1	False	0.08966
188334A	0.41000	0.43000	13.91018	13.70550	1	False	0.28056
188338A	0.55000	0.56000	12.49735	12.39612	1	False	-0.45462
188340A	0.51000	0.49000	12.89972	13.10028	1	False	-0.51618
188698A	0.42000	0.29000	13.80757	15.21354	1	True	3.47799
188699A	0.55000	0.46000	12.49735	13.40173	1	False	2.06142
188700A	0.48000	0.36000	13.20061	14.43384	1	True	3.03112
188717A	0.67000	0.68000	11.24035	11.12920	1	False	-0.75069
188718A	0.80000	0.81000	9.63352	9.48841	1	False	-0.87030
188720A	0.75000	0.74000	10.30204	10.42662	1	False	-0.09922
189235A	0.70000	0.71000	10.90240	10.78646	1	False	-0.82280
189237A	0.48000	0.50000	13.20061	13.00000	1	False	0.07950
189238A	0.44000	0.45000	13.60388	13.50265	1	False	-0.16337
189340A	0.61000	0.58000	11.88272	12.19243	1	False	0.13483
189341A	0.58000	0.58000	12.19243	12.19243	1	False	-0.89039
189345A	0.35000	0.36000	14.54128	14.43384	1	False	0.10520
189356A	0.42000	0.39000	13.80757	14.11728	1	False	-0.37183
189358A	0.47000	0.46000	13.30108	13.40173	1	False	-0.95205
189361A	0.75000	0.72000	10.30204	10.66863	1	False	0.75068
437226	0.59000	0.60000	12.08982	11.98661	1	False	-0.55495
437231	0.54000	0.55000	12.59827	12.49735	1	False	-0.42919
437235	0.60000	0.60000	11.98661	11.98661	1	False	-0.94456
437241	0.46000	0.46000	13.40173	13.40173	1	False	-0.57208
437243	0.38000	0.38000	14.22192	14.22192	1	False	-0.35619
437245	0.35000	0.37000	14.54128	14.32741	1	False	0.47893
638751	0.43000	0.38000	13.70550	14.22192	1	False	0.38101
638753	0.48000	0.44000	13.20061	13.60388	1	False	0.11650
638755	0.51000	0.46000	12.89972	13.40173	1	False	0.54248
638783	0.49000	0.48000	13.10028	13.20061	1	False	-0.92089
638785	0.47000	0.50000	13.30108	13.00000	1	False	0.45875
638787	0.37000	0.36000	14.32741	14.43384	1	False	-0.70215

Table 2.4.14
Delta Analysis
Science Grade 8

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
185899A	0.60000	0.59000	11.98661	12.08982	1	False	-0.87424
185901A	0.28000	0.27000	15.33137	15.45125	1	False	0.03516
185916A	0.57000	0.58000	12.29450	12.19243	1	False	-0.09836
186154A	0.31000	0.30000	14.98340	15.09760	1	False	-0.04623
186293A	0.45000	0.47000	13.50265	13.30108	1	False	0.58323
186309A	0.46000	0.45000	13.40173	13.50265	1	False	-0.45818
186321A	0.52000	0.54000	12.79939	12.59827	1	False	0.37880
186325A	0.72000	0.74000	10.66863	10.42662	1	False	-0.09922
186364A	0.43000	0.46000	13.70550	13.40173	1	False	0.98379
187032A	0.58000	0.57000	12.19243	12.29450	1	False	-0.81106
187038A	0.49000	0.47000	13.10028	13.30108	1	False	-0.87948
187047A	0.42000	0.40000	13.80757	14.01339	1	False	-0.69215
188149A	0.54000	0.48000	12.59827	13.20061	1	False	0.53273
188150A	0.52000	0.48000	12.79939	13.20061	1	False	-0.19840
188153A	0.41000	0.25000	13.91018	15.69796	1	True	4.12140
188312A	0.31000	0.33000	14.98340	14.75965	1	False	1.08478
188317A	0.69000	0.70000	11.01660	10.90240	1	False	-0.42656
188328A	0.56000	0.52000	12.39612	12.79939	1	False	-0.07522
188332A	0.57000	0.55000	12.29450	12.49735	1	False	-0.71661
188846A	0.49000	0.49000	13.10028	13.10028	1	False	-0.20746
188847A	0.53000	0.53000	12.69892	12.69892	1	False	-0.32328
188849A	0.48000	0.48000	13.20061	13.20061	1	False	-0.17850
189061A	0.43000	0.40000	13.70550	14.01339	1	False	-0.77225
189076A	0.56000	0.56000	12.39612	12.39612	1	False	-0.41066
189080A	0.55000	0.53000	12.49735	12.69892	1	False	-0.77945
189438A	0.52000	0.54000	12.79939	12.59827	1	False	0.37880
189440A	0.61000	0.62000	11.88272	11.77808	1	False	-0.20859
189442A	0.70000	0.70000	10.90240	10.90240	1	False	-0.84171
300093A	0.63000	0.61000	11.67259	11.88272	1	False	-0.51276
300095A	0.42000	0.42000	13.80757	13.80757	1	False	-0.00335
300097A	0.64000	0.63000	11.56616	11.67259	1	False	-0.82915
437757	0.48000	0.45000	13.20061	13.50265	1	False	-0.64617
437771	0.48000	0.45000	13.20061	13.50265	1	False	-0.64617
437788	0.42000	0.35000	13.80757	14.54128	1	False	0.62337
437995	0.42000	0.42000	13.80757	13.80757	1	False	-0.00335
437999	0.61000	0.60000	11.88272	11.98661	1	False	-0.90649
438018	0.45500	0.42000	13.45215	13.80757	2	False	-0.54008
494074	0.75500	0.72500	10.23876	10.60896	2	False	0.43667
494991	0.69500	0.69500	10.95971	10.95971	2	False	-0.82517
638857	0.55000	0.54000	12.49735	12.59827	1	False	-0.71916
638862	0.44000	0.47000	13.60388	13.30108	1	False	0.95123
638866	0.45000	0.44000	13.50265	13.60388	1	False	-0.43013
638873	0.32000	0.23000	14.87080	15.95539	1	False	1.49085
638875	0.50000	0.44000	13.00000	13.60388	1	False	0.42191
638883	0.72000	0.61000	10.66863	11.88272	1	True	3.13687

Section 2.5

Tabled B/B Analysis Results



Table 2.5.1
b/b Analysis
English Language Arts Grade 3

Item Id	Old b	New b	Std Dist	Flag
146971A	0.43095	0.29275	0.93089	False
146994A	-0.36172	-0.05387	-0.26026	False
147007A	-0.43364	-0.06850	-0.43428	False
147008A	-0.86467	0.32514	1.37215	False
147012A	-1.09830	-0.36754	-0.59188	False
147341A	-1.95925	-1.06051	-0.53892	False
147348A	-0.55537	0.37186	0.56028	False
147351A	-1.28486	-0.56177	-0.75318	False
147358A	-0.32598	-0.54250	1.77038	False
147359A	-0.78599	-0.04481	-0.33135	False
147433A	2.27109	0.84779	4.67473	True
147456A	0.01358	0.68306	-0.05002	False
155253A	-0.09891	0.23219	-0.53628	False
155255A	0.25018	0.82960	-0.23667	False
155274A	-1.27827	-0.40324	-0.15286	False
155279A	-0.45028	0.01526	-0.81619	False
155282A	-0.17137	0.54375	-0.00119	False
155283A	-0.98463	-0.35465	-0.90703	False
156120A	-0.55225	-0.19630	-0.31482	False
156121A	-0.56941	-0.07611	-0.84122	False
156123A	0.29724	0.71468	-0.83861	False
156124A	-1.42465	-1.11167	0.46730	False
156125A	0.70867	1.48412	0.85436	False
156126A	-0.01845	0.65451	-0.05891	False
156336A	-1.24522	-0.77026	-0.29395	False
156355A	-1.24205	-0.90998	0.26401	False
156356A	-0.50445	-0.02937	-0.81549	False
156362A	-0.56083	-0.10905	-0.68448	False
184195A	0.37413	0.12102	1.42136	False
184197A	-1.12036	-0.19330	0.16219	False
481996	1.06387	1.34476	-0.83470	False
482322	1.49208	1.37042	0.11964	False
484543	1.27033	1.97069	0.95505	False
484565	-0.15869	0.97611	1.65308	False
484567	1.26278	1.63658	-0.33053	False
484569	-0.90974	-0.26179	-0.78390	False
484575	-0.35471	0.13691	-0.98566	False
484577	0.70002	0.84167	-0.35552	False
484579	0.08037	0.56420	-0.73088	False
484581	1.03322	1.90582	1.46353	False
627921	0.76157	1.42572	0.45523	False
628643	1.49683	1.51759	-0.44205	False
628734	-0.38749	0.01847	-0.62677	False
628835	1.40345	1.30768	0.08048	False
628923	0.58798	1.19000	0.08954	False
628961	-0.31478	0.19346	-0.91313	False
630590	0.64766	0.76532	-0.22463	False
630598	1.14684	1.14446	-0.10515	False
630600	0.24008	0.65896	-0.87317	False
630602	0.83409	1.20828	-0.63054	False

Table 2.5.2
b/b Analysis
English Language Arts Grade 4

Item Id	Old b	New b	Std Dist	Flag
146887A	-0.54726	0.05135	-0.52896	False
148686A	-0.44968	0.76575	0.57709	False
148719A	1.55734	2.28912	1.06089	False
148938A	-1.35826	-0.77421	-0.34565	False
149114A	-1.45039	-1.04506	0.01622	False
149115A	0.55582	0.96292	-0.13743	False
149116A	-0.84663	-0.46399	-0.33692	False
149136A	0.00702	0.53795	-0.28395	False
155490A	0.11102	0.45048	-0.54021	False
155569A	-0.07105	-0.12224	-0.10643	False
155571A	-1.41074	-0.94587	-0.11014	False
155572A	-1.57206	-0.90877	-0.34097	False
155580A	-0.86251	-0.48638	-0.31562	False
158587A	-0.32569	0.07007	-0.69690	False
158589A	-0.77948	-0.36640	-0.43193	False
158602A	-0.32091	0.58405	0.13572	False
158603A	1.81233	2.32230	0.85126	False
158604A	-1.98892	-1.12561	-0.40881	False
158611A	-1.50932	-0.74103	-0.55917	False
158691A	-1.95261	-1.39332	0.08161	False
158692A	-0.03775	0.72629	0.08110	False
184822A	1.28057	1.48652	-0.00752	False
184824A	-1.77671	-0.99968	-0.40055	False
184827A	1.00132	1.33045	0.01964	False
185806A	0.32641	1.00431	0.17161	False
186016A	-1.97745	-1.10739	-0.42766	False
186018A	1.21275	1.70039	0.42471	False
186065A	0.25296	0.86052	0.00507	False
483086	0.12813	0.37839	-0.67991	False
483092	6.28065	0.06790	6.19131	True
483113	1.11194	1.81448	0.72264	False
484626	-1.09391	-0.36572	-0.66437	False
484628	-0.98853	-0.45990	-0.49171	False
484632	-0.35834	0.14546	-0.56673	False
484636	-0.13996	-0.28941	0.10437	False
484638	-0.63286	-0.22839	-0.51244	False
484646	0.08998	0.10710	-0.32633	False
484648	0.22379	0.04020	-0.07379	False
484652	1.09657	1.12732	-0.42302	False
484654	0.40218	0.62927	-0.54137	False
484658	-0.46224	0.02128	-0.66839	False
629160	0.07475	0.78685	0.06624	False
629614	0.63853	1.74128	1.09224	False
632843	0.67823	1.32865	0.35329	False
632853	-1.22616	-0.59314	-0.51410	False
632863	0.19006	0.51137	-0.51964	False
632877	-0.56256	-0.60566	0.19861	False
635510	-2.61272	-1.84420	0.15594	False
635527	-1.40409	-0.66369	-0.58025	False
635530	-0.55165	-0.61828	0.23132	False

Table 2.5.3
b/b Analysis
English Language Arts Grade 5

Item Id	Old b	New b	Std Dist	Flag
147920A	-1.77139	-0.70529	2.67461	False
147921A	-0.45046	-0.24358	-0.56552	False
147923A	-0.34393	-0.25158	0.04073	False
147924A	-0.76706	-0.61156	-0.16454	False
147926A	0.08863	0.38432	-0.99861	False
147969A	-1.09251	-0.99271	0.26385	False
148003A	-0.73157	-0.25157	-0.25268	False
148007A	-1.54051	-0.72635	1.33979	False
148008A	0.73318	0.76576	-0.00453	False
148961A	0.02281	-0.37308	2.65607	False
148963A	-1.07669	-0.67248	-0.80099	False
148967A	-0.93182	-0.51367	-0.67133	False
149152A	-1.30874	-1.17879	0.17088	False
149158A	0.64915	0.30768	2.12835	False
149196A	-1.34680	-0.42237	2.02837	False
149321A	-1.23164	-0.83558	-0.90167	False
149334A	-0.33312	0.19414	0.15411	False
149338A	-0.40882	0.02541	-0.39576	False
149339A	-0.77335	-0.19379	0.29232	False
158749A	0.45854	0.41232	0.53576	False
159592A	-0.06609	0.13377	-0.66212	False
159600A	-1.44667	-1.26124	-0.09223	False
160718A	-1.45853	-1.00859	-0.67905	False
186097A	0.61432	0.86540	-1.06332	False
186107A	-0.66332	-0.44628	-0.54728	False
186115A	0.18858	0.84768	1.08009	False
186121A	-0.24533	-0.07347	-0.44123	False
186131A	-0.17835	0.29321	-0.10428	False
186469A	0.39778	0.78488	-0.37520	False
186471A	-1.62970	-1.06062	-0.06977	False
186474A	-0.05258	0.62420	1.09412	False
186476A	-0.06747	0.30693	-0.61131	False
186488A	0.95440	1.61176	1.34143	False
186777A	-0.96416	-0.59784	-0.97420	False
483126	-1.12315	-0.75142	-1.00006	False
483134	-0.29330	-0.29198	0.53463	False
483146	0.26303	0.66085	-0.36263	False
483172	-0.80776	-0.57621	-0.57773	False
630617	0.09881	0.57188	0.00234	False
630655	-0.92841	-0.89638	0.58680	False
630737	-0.52958	-0.36719	-0.28736	False
631575	-0.00333	0.26481	-1.06825	False
631601	-0.21036	0.10170	-1.01241	False
631918	0.18764	0.43337	-1.00986	False
631955	-1.37014	-1.02054	-1.04239	False
631981	0.01022	0.22620	-0.77977	False
632003	-0.33577	-0.42752	1.07296	False
632256	-0.43552	-0.58846	1.45232	False
632269	0.33994	0.64427	-0.86106	False
632323	0.20018	0.45624	-1.07238	False

Table 2.5.4
b/b Analysis
English Language Arts Grade 6

Item Id	Old b	New b	Std Dist	Flag
147283A	-1.41192	-0.54546	1.03134	False
147289A	-0.36708	-0.07167	-0.51764	False
147290A	-0.73859	-0.44593	-0.57044	False
149400A	-0.70003	-0.69496	0.57629	False
149414A	-0.61010	-0.06634	-0.38546	False
149570A	-0.30118	0.19233	-0.63764	False
149571A	-0.69309	-0.21142	-0.61738	False
149737A	-0.53265	-0.27187	-0.40874	False
158702A	0.04978	0.27980	-0.18693	False
158705A	-1.45758	-1.06242	-0.82925	False
158723A	-1.56087	-1.13219	-0.67866	False
158739A	-1.28487	-1.01249	-0.58371	False
158740A	-1.28781	-0.92232	-0.95334	False
158747A	-1.05703	-0.78572	-0.54040	False
158756A	0.73912	2.55037	4.40802	True
158774A	-0.59729	-0.34647	-0.38034	False
158786A	-1.36829	-0.70692	0.21080	False
158886A	-1.73606	-1.35141	-0.82317	False
158897A	-0.66537	-0.14307	-0.46106	False
158935A	-0.23270	-0.00813	-0.21376	False
158943A	0.83098	1.21803	-0.67551	False
158947A	0.04904	0.37214	-0.55606	False
158954A	-1.17342	-0.86000	-0.72730	False
158978A	0.76802	0.98505	-0.01228	False
159281A	-2.25299	-1.48723	0.77634	False
159297A	-0.10922	0.14280	-0.30141	False
159451A	-1.54873	-0.93266	0.06215	False
159453A	-1.57923	-0.93520	0.17822	False
159454A	-0.02468	1.10268	1.82778	False
159457A	-0.92953	-0.58337	-0.81527	False
159458A	-0.57893	-0.23869	-0.73169	False
485443	0.76320	0.89131	0.33941	False
485688	-0.93851	-0.40071	-0.35277	False
485700	2.90078	3.06011	0.58217	False
485702	-1.06969	-0.56629	-0.46666	False
486350	0.54607	0.10542	2.55697	False
486369	-0.26136	-0.38791	1.17330	False
486371	-0.26996	0.03470	-0.53765	False
486376	-0.72877	-0.16198	-0.27381	False
629854	1.54361	1.97046	-0.71110	False
629856	-0.26556	-0.11369	0.06882	False
629863	0.06244	0.01000	0.93502	False
629867	-0.59205	-0.34455	-0.36628	False
629869	0.28477	0.41575	0.24600	False
629875	0.44063	0.69626	-0.22144	False
629885	0.06834	0.45602	-0.80877	False
629889	1.34954	1.71002	-0.48126	False
629895	-0.47662	0.03838	-0.52236	False
630339	1.33960	2.15549	0.35906	False
630430	0.94445	2.16166	2.01781	False

Table 2.5.5
b/b Analysis
English Language Arts Grade 7

Item Id	Old b	New b	Std Dist	Flag
148104A	-0.98645	-0.26607	0.09590	False
148117A	-0.39993	0.35571	0.14189	False
148759A	-0.63973	-0.00301	-0.22051	False
148760A	-0.95256	-0.45235	-0.63204	False
148762A	-1.08568	-0.82668	-1.03881	False
148823A	-1.07094	-0.44875	-0.21686	False
148850A	-1.28529	-1.07702	-0.89582	False
148859A	-1.64212	-1.32660	-1.15705	False
154639A	0.44947	1.24487	0.17132	False
158719A	0.54589	0.69857	-0.49465	False
158724A	-0.24307	0.21717	-0.84808	False
158765A	-0.00913	0.05793	-0.27933	False
158766A	-0.06512	-0.22172	0.44937	False
158769A	-2.21133	-0.80106	2.51030	False
158810A	-0.69675	-0.01219	-0.05642	False
158847A	-1.64996	-2.14655	1.37823	False
158849A	-1.52274	-0.75528	0.31466	False
158871A	-1.54138	-0.95175	-0.26781	False
159120A	-0.65390	-0.34706	-1.14461	False
159122A	0.52728	0.61675	-0.28904	False
159133A	0.86259	1.05422	-0.58494	False
159137A	0.65213	1.43563	0.10802	False
159394A	0.53933	0.30006	0.79327	False
159646A	-0.24041	0.11810	-1.18287	False
160457A	0.10643	0.58535	-0.82834	False
160508A	-0.83860	-0.33242	-0.62600	False
160511A	-1.07793	-1.15438	0.06506	False
160937A	-1.29384	-0.77738	-0.53791	False
160940A	-1.43494	-1.02636	-0.87579	False
182584A	-0.52377	0.35948	0.57623	False
182596A	-0.95857	-0.40254	-0.44779	False
182597A	-0.53569	-0.29703	-0.90634	False
485447	-1.28566	-0.83843	-0.76651	False
485451	0.34784	0.93953	-0.48635	False
485453	-0.30531	0.24099	-0.55769	False
485467	0.95962	2.51368	2.60490	False
486286	2.43925	2.84638	-1.10546	False
486294	1.00978	1.34938	-1.05390	False
486317	-0.14986	0.00000	-0.56835	False
486331	0.03097	0.00000	0.04777	False
486333	-0.34153	-0.59002	0.71854	False
630545	0.73731	1.70852	0.71504	False
630649	-0.01525	1.05579	1.13302	False
633929	1.75123	2.20375	-1.11130	False
634354	1.11782	0.73121	1.34671	False
634364	0.60475	-0.09602	2.31846	False
634366	0.45700	-0.23338	2.26668	False
634374	1.03684	0.64381	1.35816	False
634379	-0.23556	-0.22894	-0.10761	False
634389	-0.25541	-0.33536	0.17466	False

Table 2.5.6
b/b Analysis
English Language Arts Grade 8

Item Id	Old b	New b	Std Dist	Flag
148177A	-1.04644	-0.74049	-0.93638	False
148187A	-1.65135	-1.22456	-0.33674	False
148189A	-0.36973	0.04061	-0.28358	False
148191A	-0.80244	-0.36715	-0.19437	False
149373A	-1.39781	-1.25304	-0.01165	False
149374A	-1.18222	-1.03653	-0.04096	False
149507A	-0.00898	0.20992	-0.57731	False
149580A	1.61080	2.02556	-0.03655	False
149583A	1.40127	1.58505	-0.54178	False
149591A	-0.04346	0.39033	-0.11735	False
149597A	-0.97051	-0.73802	-0.54432	False
149600A	-1.31649	-0.73711	0.54393	False
149603A	-1.34511	-1.07263	-0.72315	False
149619A	-0.01778	0.30313	-0.73811	False
149623A	-0.86062	-0.63480	-0.51982	False
160000A	0.29014	0.39486	0.01990	False
160467A	-1.70368	-1.30782	-0.51351	False
160472A	-1.10529	-0.74855	-0.66239	False
160477A	1.19060	1.59483	-0.14196	False
160742A	-0.90212	-0.56919	-0.77110	False
160745A	-1.77688	-1.39664	-0.60804	False
160747A	-0.83430	-0.57290	-0.71935	False
160780A	1.10290	1.30947	-0.63416	False
160782A	-0.64504	-0.76644	1.37430	False
160784A	-1.96605	-1.62215	-0.83007	False
160787A	-0.78874	-0.76930	0.61233	False
160788A	-0.65607	-0.26146	-0.40267	False
160789A	0.83610	0.92692	0.03533	False
160790A	-2.62721	-1.77606	1.89811	False
160946A	-0.27552	0.06897	-0.63680	False
160947A	-2.11670	-1.78704	-0.92568	False
160956A	-0.99975	-0.41969	0.58329	False
160989A	-0.13291	-0.06990	0.29790	False
485473	-0.24324	-0.41890	1.62892	False
485493	-0.62056	0.55765	3.93061	True
485510	-0.18009	0.10487	-0.92305	False
486738	1.19939	0.63108	3.63611	True
486744	-0.02535	0.47897	0.27436	False
486757	0.95081	1.46269	0.42584	False
486763	-2.23999	-2.11485	0.19146	False
487006	-1.55776	-1.25760	-0.85218	False
626597	0.53205	0.91237	-0.34808	False
626602	-0.23580	-0.14530	0.15758	False
626606	1.31497	1.66587	-0.42262	False
626623	-0.80405	-0.58594	-0.48358	False
626626	0.20966	0.63483	-0.13652	False
626777	0.55342	1.07728	0.44736	False
626785	-0.52912	-0.44182	0.20823	False
626800	0.80982	1.00083	-0.51525	False
627061	-1.35020	-1.18380	-0.13650	False

Table 2.5.7
b/b Analysis
Mathematics Grade 3

Item Id	Old b	New b	Std Dist	Flag
146917A	-1.51745	-1.04368	-0.36507	False
146955A	-0.61222	-0.22806	-0.39243	False
147044A	-0.75801	-0.16839	-0.49341	False
147064A	-2.00737	-1.38278	-0.74114	False
147330A	-1.33082	-0.83417	-0.52869	False
147503A	-0.88037	-0.26857	-0.45865	False
147542A	-0.44284	-0.40372	0.85647	False
147712A	-1.01590	-0.54989	-0.54025	False
147718A	-0.54054	-0.28486	0.06910	False
147741A	-1.67229	-0.91051	-0.20911	False
147966A	1.08856	1.97013	1.37596	False
150663A	-1.04938	-0.41186	-0.42941	False
151560A	-1.14152	-0.55272	-0.65315	False
152255A	-0.64830	0.72317	2.53812	False
152325A	-0.89214	-0.21059	-0.19700	False
152546A	-1.39699	-0.78059	-0.65205	False
152598A	0.11765	0.67511	-0.25866	False
152739A	-1.78939	-1.02572	-0.24971	False
152842A	1.01086	1.08672	0.12247	False
152864A	0.25643	0.52732	-0.31447	False
153154A	-1.57390	-0.52297	0.93564	False
153168A	-0.60748	-0.15473	-0.65639	False
154329A	-1.76290	-1.11822	-0.69345	False
154484A	-1.09990	-0.63618	-0.49720	False
154533A	-0.51722	0.10583	-0.26737	False
154758A	-0.54262	-0.10169	-0.63772	False
154760A	-0.39180	0.02121	-0.59266	False
155162A	1.20304	1.14444	0.55763	False
155260A	-1.57486	-0.88206	-0.43283	False
155268A	0.06273	0.22993	0.16074	False
155455A	0.41615	1.28185	1.04074	False
155478A	-0.54787	-0.02588	-0.66594	False
155501A	0.43908	0.95823	-0.27374	False
155594A	-0.06065	0.28067	-0.45403	False
155999A	0.23675	0.38621	0.15744	False
161166A	-1.39250	-0.50636	0.38021	False
184059A	0.24029	0.51676	-0.32919	False
479107	-2.10528	-1.12400	0.45257	False
479111	-0.66443	-0.34949	-0.10669	False
479113	-1.99796	-1.32846	-0.69463	False
479117	-0.20911	0.32847	-0.46804	False
479125	-2.47202	-1.74013	-0.64989	False
479138	0.13648	0.53470	-0.75189	False
479140	-1.07710	0.02403	1.33029	False
488998	0.67136	1.15711	-0.30647	False
636402	-0.60930	-0.18540	-0.54543	False
636410	-0.40963	-1.46920	5.03998	True
636412	0.66428	1.00598	-0.75153	False
636429	-0.05254	0.12755	0.15857	False
636443	0.33045	0.22776	1.08240	False

Table 2.5.8
b/b Analysis
Mathematics Grade 4

Item Id	Old b	New b	Std Dist	Flag
147318A	-2.32587	-1.52245	-0.85513	False
147319A	-1.71957	-0.88697	-0.48099	False
147525A	-0.77719	-0.18487	-0.85618	False
147975A	1.00575	1.33464	-0.23024	False
148069A	-0.91595	-0.60512	0.63622	False
148301A	0.48905	1.13027	1.23730	False
148500A	-0.02270	0.17145	0.21574	False
148654A	0.59257	0.92361	-0.78684	False
148675A	1.43183	1.61645	-0.64885	False
149723A	0.00428	0.54070	-0.16564	False
150227A	1.69166	1.58940	-0.08488	False
150664A	-0.34088	0.15992	-0.89205	False
150722A	1.29932	1.66052	0.40166	False
151506A	0.34497	0.64330	-1.02087	False
151519A	-1.75177	-1.10013	-0.58883	False
151549A	-0.82903	-0.16456	-0.42376	False
151554A	-0.64268	-0.21528	-0.55636	False
151556A	-0.41086	-0.06872	-0.28133	False
151997A	-0.13375	0.51432	0.42354	False
152343A	0.35046	0.64684	-1.01484	False
152353A	-0.08597	-0.11291	1.84811	False
152355A	-1.10306	-0.59810	-0.46138	False
152518A	-1.12110	-0.64732	-0.21856	False
152776A	-2.33854	-1.16165	1.06838	False
152789A	0.43689	0.79896	-0.78540	False
152874A	0.70239	1.09002	-0.23949	False
152988A	-0.39781	0.14784	-0.65742	False
153171A	0.27288	0.42670	0.08861	False
153185A	0.28771	0.68916	-0.71662	False
153189A	0.36092	0.40360	0.74339	False
153206A	-0.07225	-0.23393	2.77061	False
153325A	0.64930	0.94719	-0.93999	False
153346A	-3.30468	-1.93927	1.04903	False
154024A	0.02801	0.23446	0.05964	False
154479A	1.03201	1.39475	0.04261	False
155121A	1.16444	1.43451	-0.42170	False
155167A	-2.18855	-1.75595	1.54596	False
155192A	0.60677	0.86799	-1.12376	False
155220A	-0.58423	-0.10133	-1.02502	False
156019A	-0.35967	0.37419	0.71044	False
161617A	2.03596	1.89822	-0.31329	False
184099A	0.28991	0.71833	-0.52512	False
184241A	-1.22669	-0.73656	-0.18672	False
479500	-2.18024	-0.60859	4.04573	True
479507	0.00748	0.20563	0.14603	False
479932	1.36608	1.65995	0.02356	False
636619	-0.64047	-0.38442	0.63788	False
636627	0.99708	1.03357	-0.09346	False
636666	-0.75385	-0.25987	-0.86778	False
636668	-0.85955	-0.16159	-0.23197	False

Table 2.5.9
b/b Analysis
Mathematics Grade 5

Item Id	Old b	New b	Std Dist	Flag
146915A	-0.71093	-0.38924	-0.34865	False
146959A	-0.76314	0.64217	3.57608	True
147968A	-1.73709	-1.39010	0.07697	False
147990A	0.32883	0.68916	-0.86469	False
148011A	-0.61973	-0.13254	-0.76073	False
148659A	-0.39876	0.19690	-0.12149	False
148852A	0.30722	0.78731	-0.30054	False
149230A	-0.08181	0.27752	-0.86507	False
149246A	-0.21873	0.15143	-0.84411	False
149261A	0.56212	0.79498	-0.60054	False
149289A	0.55440	1.17870	0.52447	False
149384A	-0.60712	-0.04610	-0.39912	False
149640A	0.83733	1.57569	1.22363	False
150267A	0.57139	0.43054	1.19090	False
150631A	-0.61877	-0.25965	-0.57771	False
150689A	0.59209	0.84928	-0.73347	False
150703A	2.09279	1.94795	0.39875	False
150711A	0.86604	0.90683	0.16065	False
152807A	0.31639	0.74583	-0.53912	False
152859A	-0.83412	-0.05336	0.53609	False
152933A	1.28386	0.56191	3.60423	True
152946A	-0.64623	-0.18985	-0.92296	False
152972A	-0.67487	0.08625	0.52661	False
153075A	0.18798	0.47375	-0.65535	False
153107A	0.24704	0.53387	-0.69194	False
153162A	-1.29007	-0.82814	-0.71392	False
153165A	0.35705	0.63493	-0.70758	False
153972A	-0.23663	0.14659	-0.89735	False
154046A	0.28472	0.46877	-0.21798	False
155145A	-0.57651	-0.06090	-0.60107	False
155234A	1.19007	1.47743	-0.75617	False
155426A	-1.97908	-1.42325	-0.79785	False
155434A	-0.00982	0.64149	0.35342	False
155474A	-0.62879	-0.06660	-0.40505	False
155479A	0.68811	1.30291	0.55011	False
155489A	0.31560	0.88195	0.11857	False
155523A	-1.83736	-0.91801	0.66728	False
161469A	-1.24799	-0.59906	-0.31830	False
181426A	0.85226	0.65243	1.32463	False
184261A	-0.18609	0.04611	-0.19836	False
184263A	-0.55849	-0.42250	0.46270	False
187144A	0.47896	0.92898	-0.35350	False
187147A	-0.24721	0.34561	-0.05433	False
484706	0.06436	0.28945	-0.29774	False
484714	1.70363	2.08639	-0.02372	False
489954	-2.11877	-1.44821	-0.67870	False
636681	0.70522	0.95297	-0.74842	False
636693	-1.38088	-1.16180	0.50186	False
636726	0.05901	0.39293	-0.81802	False
636735	-0.99116	-1.13044	2.01662	False

Table 2.5.10
b/b Analysis
Mathematics Grade 6

Item Id	Old b	New b	Std Dist	Flag
147412A	-0.16314	0.17837	-0.36120	False
147578A	0.79719	1.23381	0.04764	False
148159A	-2.05882	-1.13828	0.00241	False
148231A	-0.75926	-0.10316	-0.26104	False
148926A	-1.64691	-0.92756	-0.83459	False
149062A	-0.79683	-0.56135	1.01881	False
149140A	0.06382	0.34975	-0.25486	False
149231A	-0.33575	0.10952	-0.83682	False
149234A	-1.05627	-0.69758	0.51416	False
149511A	-1.19861	0.27798	4.52140	True
149730A	-0.42391	-0.04121	-0.33784	False
150604A	0.40443	0.66604	-0.47463	False
150723A	-0.75178	-0.15841	-0.65549	False
150972A	0.28310	0.97582	1.12439	False
151145A	-0.26306	0.17298	-0.85778	False
151316A	-0.52985	-0.26556	0.53923	False
151782A	1.53062	1.96259	0.82720	False
151835A	2.40238	2.37773	-0.84184	False
152379A	-0.07063	0.31208	-0.72778	False
152754A	0.88073	1.31486	0.12385	False
153103A	0.11193	0.61936	-0.25402	False
153315A	0.20566	0.55605	-0.82521	False
153382A	0.69257	1.22177	0.52652	False
153512A	-0.14580	0.11352	0.14730	False
153601A	-0.42743	0.00330	-0.64230	False
153952A	-2.12478	-1.07602	0.75275	False
155177A	-1.88689	-1.18030	-0.80260	False
155184A	-0.69631	0.18303	1.24157	False
155298A	-0.53904	-0.00535	-0.80384	False
181240A	-0.27461	0.16121	-0.84362	False
181455A	0.23990	0.73285	-0.20575	False
479039	0.75850	1.25106	0.36406	False
479041	-1.51485	-0.56215	0.80919	False
479043	1.44069	1.59737	-0.94461	False
479047	1.38795	1.50517	-0.63309	False
479049	2.41281	2.20251	0.33847	False
479057	-1.21402	-0.71493	-0.21308	False
479067	1.52114	1.64459	-0.82007	False
479069	-0.88245	-0.75118	1.78230	False
479077	1.16990	1.34584	-0.76941	False
479083	-0.23762	-0.28103	2.19207	False
479087	1.49931	1.41881	0.51332	False
479095	1.57773	1.75543	-0.75315	False
479097	0.69171	0.85942	-0.18886	False
479148	1.01219	1.23075	-0.86898	False
636459	-0.41683	0.06380	-0.97434	False
636463	0.73822	1.08078	-0.62127	False
636465	-0.60632	-0.23928	-0.03601	False
636479	0.48288	0.71543	-0.37465	False
636499	-0.21349	-0.01805	0.63209	False

Table 2.5.11
b/b Analysis
Mathematics Grade 7

Item Id	Old b	New b	Std Dist	Flag
147541A	-0.71554	-0.36373	-1.22582	False
148154A	-0.91249	-0.62565	-0.63562	False
148171A	0.17361	0.70190	0.23025	False
148193A	1.28522	1.59374	-1.28961	False
148330A	0.18022	0.76747	0.71971	False
148478A	1.25693	1.66256	-0.49394	False
148527A	0.11272	0.15316	1.12767	False
148530A	0.73013	0.99008	-0.85353	False
148711A	0.02690	0.50660	-0.21100	False
148739A	-0.19130	-0.18054	1.45467	False
148912A	0.48661	0.72127	-0.57906	False
149102A	1.39198	1.57264	-0.37509	False
149204A	-0.12164	0.49070	0.84633	False
149705A	-0.07377	0.14558	-0.30220	False
149759A	0.11579	0.10007	1.59138	False
150199A	0.19488	0.42418	-0.45652	False
150232A	1.28866	1.41155	0.13045	False
150891A	1.49456	1.61109	0.12786	False
152009A	0.91348	1.10452	-0.33268	False
152051A	0.99437	1.19042	-0.39581	False
152195A	-0.22649	0.48815	1.66440	False
152288A	1.07891	1.26924	-0.37116	False
152901A	-0.09592	0.81979	3.36256	True
152915A	0.22736	0.76144	0.29255	False
153291A	0.33669	0.78245	-0.40869	False
153299A	0.71296	1.18470	-0.09293	False
153485A	0.61676	1.06286	-0.33080	False
153504A	0.53848	0.71622	-0.12215	False
155126A	1.26760	1.71513	-0.14450	False
155443A	0.49933	0.63410	0.24378	False
182026A	0.78331	1.46911	1.69654	False
182027A	0.79889	1.12228	-1.29698	False
480259	1.25784	1.44006	-0.35204	False
480287	0.79699	0.99483	-0.35770	False
480295	1.19531	1.40927	-0.59782	False
480307	2.29992	2.53546	-1.07243	False
480339	0.90521	1.20490	-1.22917	False
480360	1.39863	1.73742	-1.00883	False
480373	1.16991	1.21166	0.83344	False
480380	1.29429	1.54824	-0.95513	False
489119	1.20791	1.50092	-1.25506	False
489176	0.32594	0.95733	1.12388	False
490454	1.52358	1.87542	-0.86739	False
636508	0.30367	0.32364	1.24580	False
636512	0.64684	1.24347	0.92238	False

Table 2.5.12
b/b Analysis
Mathematics Grade 8

Item Id	Old b	New b	Std Dist	Flag
148061A	0.63668	0.97669	-0.67445	False
148303A	0.53217	0.66178	-0.07058	False
148327A	0.20442	0.50259	-0.90095	False
148379A	-0.44119	-0.00800	-0.08241	False
148689A	0.57645	0.95888	-0.42342	False
149067A	-0.38953	-0.02655	-0.49585	False
150198A	0.20263	0.74402	0.52366	False
150202A	0.39600	0.74881	-0.58915	False
150215A	0.85277	1.09804	-0.73423	False
150218A	0.12818	0.73307	0.89878	False
150223A	-0.57932	0.20332	1.97023	False
151253A	0.43410	0.85365	-0.19989	False
151283A	0.07368	0.39671	-0.74973	False
153423A	-0.22608	-0.23967	0.73557	False
154159A	-0.32463	0.11792	-0.03260	False
154160A	0.84994	0.96649	0.01956	False
154320A	0.15987	0.02509	1.46195	False
161462A	0.28176	0.60497	-0.75761	False
183763A	1.45787	1.71834	-0.79727	False
183764A	1.02338	1.71014	1.33984	False
183795A	0.94552	1.09751	-0.18391	False
183885A	-0.02954	0.12641	-0.24898	False
484739	3.10506	2.81885	2.47535	False
484750	1.81757	2.12968	-0.88857	False
484766	-0.30636	-0.37789	1.07148	False
484772	0.74128	0.81742	0.25157	False
484815	1.41248	1.71975	-0.89953	False
484821	0.18013	0.43704	-0.83129	False
484823	-0.41766	-0.30617	-0.00524	False
484828	-0.05399	0.17549	-0.68069	False
484841	1.77775	2.09607	-0.85049	False
484853	-0.65776	0.25522	2.73700	False
484860	1.34449	1.70592	-0.57939	False
484866	0.86709	1.30003	-0.14006	False
484873	1.44111	1.76138	-0.82462	False
484877	-0.10257	-0.05045	0.35602	False
484881	-1.03358	-0.88128	-0.27071	False
484977	1.11493	1.37459	-0.80725	False
490067	0.26947	0.63616	-0.50242	False
490116	0.74888	1.09666	-0.63376	False
490151	0.92008	1.22080	-0.91674	False
636559	0.82246	1.15431	-0.73022	False
636567	0.80367	1.34771	0.51337	False
636602	1.73315	2.10246	-0.54993	False
636610	-0.36991	-0.71954	2.69757	False

Table 2.5.13
b/b Analysis
Science Grade 5

Item Id	Old b	New b	Std Dist	Flag
184387A	0.03340	0.33493	-0.80796	False
184423A	0.67790	1.24700	0.10275	False
185413A	0.89080	1.46402	0.11520	False
186483A	0.35127	1.96698	4.43568	True
186489A	0.30305	0.43359	-0.09541	False
186490A	1.11827	1.33188	-0.42122	False
186754A	-0.79776	-0.60656	-0.36982	False
186756A	-0.20859	-0.53985	1.80232	False
186759A	-0.77861	-0.49464	-0.75285	False
187487A	0.83345	0.32402	2.56116	False
187491A	1.40992	1.85593	-0.42176	False
187497A	1.25510	1.04989	1.31281	False
187503A	0.72299	1.23620	-0.12923	False
187505A	-1.36266	-0.84351	-0.05980	False
187510A	-1.39798	-0.99997	-0.55975	False
188334A	1.01307	1.11173	0.05163	False
188338A	0.22007	0.51517	-0.77736	False
188340A	0.04988	0.52130	-0.28747	False
188698A	0.80678	1.13985	-0.87560	False
188699A	0.39987	1.04232	0.41191	False
188700A	0.48177	1.03523	0.04233	False
188717A	-0.52254	-0.45181	0.13404	False
188718A	-1.19357	-0.79783	-0.57353	False
188720A	-1.46077	-0.93693	-0.03831	False
189235A	-1.18430	-0.93190	-0.63109	False
189237A	0.19806	0.31562	-0.04402	False
189238A	0.68155	1.29963	0.30512	False
189340A	-0.44897	-0.08773	-0.73214	False
189341A	-0.01229	0.36884	-0.65933	False
189345A	1.20128	1.38228	-0.28465	False
189356A	0.51905	0.97543	-0.35973	False
189358A	0.69985	1.12962	-0.47361	False
189361A	-1.22359	-0.61505	0.30668	False
437226	-0.39807	-0.05455	-0.80648	False
437231	-0.30386	0.33392	0.40774	False
437235	-0.69740	-0.33062	-0.70390	False
437241	0.11484	0.62766	-0.11776	False
437243	1.00965	1.22520	-0.43158	False
437245	0.81493	1.14806	-0.87552	False
638751	0.80767	1.18321	-0.70008	False
638753	0.96096	0.61980	1.86840	False
638755	1.11587	1.23773	-0.04205	False
638783	0.52727	0.63434	0.00642	False
638785	0.72420	0.87090	-0.15314	False
638787	1.03988	1.31546	-0.67905	False

Table 2.5.14
b/b Analysis
Science Grade 8

Item Id	Old b	New b	Std Dist	Flag
185899A	-0.02827	0.09351	-0.64652	False
185901A	1.63294	1.91609	-0.70096	False
185916A	0.08882	0.26721	-0.86979	False
186154A	1.39350	1.41509	0.46285	False
186293A	0.84758	1.20031	-0.63911	False
186309A	0.50279	0.88248	-0.35716	False
186321A	0.27074	0.20496	0.39440	False
186325A	-0.79571	-0.87864	0.01001	False
186364A	0.31625	0.30105	0.16900	False
187032A	-0.19807	0.23868	0.22692	False
187038A	-0.22845	0.25603	0.47177	False
187047A	1.06131	1.39796	-0.81082	False
188149A	0.86200	1.27799	-0.33857	False
188150A	0.43725	0.76674	-0.57193	False
188153A	0.71967	2.08098	4.30943	True
188312A	1.61317	1.59792	0.73786	False
188317A	-0.69426	-0.48426	-0.65546	False
188328A	-0.27799	0.03290	-0.34857	False
188332A	0.21208	0.35576	-0.64738	False
188846A	0.17184	0.75597	0.77965	False
188847A	0.02973	0.15326	-0.62958	False
188849A	0.44281	0.56127	-0.42388	False
189061A	0.70804	0.86646	-0.50143	False
189076A	0.23591	0.43113	-0.88694	False
189080A	-0.26261	0.25170	0.63144	False
189438A	0.96797	0.46309	2.83009	False
189440A	-0.48402	-0.82923	1.41895	False
189442A	-1.00059	-0.64337	0.19299	False
300093A	-0.23823	-0.14953	-0.57811	False
300095A	0.80463	1.01662	-0.71894	False
300097A	-0.34120	-0.13463	-0.82689	False
437757	0.67357	0.77104	-0.22088	False
437771	0.72194	0.89435	-0.56320	False
437788	1.21488	1.90155	0.81974	False
437995	0.68630	1.00840	-0.71698	False
437999	0.01087	0.08528	-0.39958	False
438018	0.25874	0.74887	0.28557	False
494074	-1.15646	-0.87114	-0.08745	False
494991	-1.04464	-0.94718	-0.97417	False
638857	1.12024	1.26915	-0.27457	False
638862	1.07552	0.87604	1.39580	False
638866	1.08468	1.15305	0.10052	False
638873	1.58366	1.94822	-0.90445	False
638875	1.51351	2.01312	-0.21859	False
638883	-0.91293	-0.53090	0.27490	False

Table 2.5.15
b/b Analysis
Science Grade 11

Item Id	Old b	New b	Std Dist	Flag
186972A	1.31521	1.06944	0.81088	False
186989A	0.45358	0.37344	-0.75534	False
186992A	-0.50007	-0.60919	-0.43758	False
187933A	-0.77622	-0.78700	0.37200	False
187935A	-0.28563	-0.24344	0.46442	False
187938A	-0.78203	-0.84057	0.05403	False
188947A	1.57494	1.60025	-0.64913	False
188949A	2.03761	1.99927	-0.19539	False
188952A	0.54383	0.48481	-0.66186	False
439200	1.15726	1.18019	-0.44063	False
439206	1.80442	1.14480	3.85617	True
439223	1.23208	1.27360	-0.35586	False
439239	1.48985	1.44563	-0.45029	False
439259	-0.32424	-0.30536	0.32846	False
457186	0.46379	0.47331	-0.15804	False
457197	0.99417	1.02631	-0.29104	False
457199	1.21847	1.22781	-0.56489	False
586027	1.29266	1.08936	0.51323	False
586029	0.62514	0.64295	-0.18903	False
586031	0.35964	0.40670	0.15033	False
586051	1.15261	1.11076	-0.64749	False
586069	1.63552	1.58130	-0.30476	False
586218	0.52243	0.17455	1.07124	False
586631	1.56320	1.63438	-0.33443	False
586636	-0.23701	-0.37311	-0.76036	False
586640	2.19458	2.24262	-0.69176	False
586649	0.93152	0.89334	-0.73014	False
586655	1.18518	1.22002	-0.37556	False
586659	-0.31800	-0.36944	-0.14766	False
586691	1.52837	1.65304	0.04390	False
586693	1.05134	1.02703	-0.70129	False
586701	0.94130	0.91210	-0.67502	False
586709	1.01130	0.96952	-0.72391	False
586711	1.48778	1.40704	-0.20587	False
591949	1.32218	1.35187	-0.48382	False
592069	-0.01573	-0.16067	-0.58240	False
592071	-0.44555	-0.68156	-0.20116	False
592073	1.65738	1.55109	0.05706	False
593424	1.45396	1.10622	1.57101	False
593426	0.69318	0.36407	1.03683	False
594373	1.48172	1.46205	-0.61971	False
594375	0.84115	0.63395	0.29676	False
594379	1.91961	1.96947	-0.66934	False
603684	0.53622	0.29044	0.39223	False
638964	1.99054	2.45656	2.09040	False
638968	1.12585	1.11467	-0.65307	False
638970	1.65808	2.39651	4.10053	True
639009	1.58752	1.64942	-0.40990	False
639014	1.15798	1.07003	-0.33467	False
639018	1.77353	1.75416	-0.46487	False
656455	1.89312	1.94779	-0.62277	False
656457	1.12891	1.13905	-0.51138	False
656465	1.14962	1.20638	-0.20908	False



Section 2.6

Final Item Parameters



Table 2.6.1
IRT Parameters for Dichotomous Items
English Language Arts Grade 3

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
146971A	0.26700	0.00000	0.43095	0.00000	0.00000	0.00000
146994A	1.10152	0.00000	-0.36172	0.00000	0.20500	0.00000
147007A	0.86977	0.00000	-0.43364	0.00000	0.13931	0.00000
147008A	0.50261	0.00000	-0.86467	0.00000	0.13129	0.00000
147012A	0.68926	0.00000	-1.09830	0.00000	0.04009	0.00000
147341A	0.65254	0.00000	-1.95925	0.00000	0.07978	0.00000
147348A	0.92189	0.00000	-0.55537	0.00000	0.19399	0.00000
147351A	1.08352	0.00000	-1.28486	0.00000	0.12622	0.00000
147358A	0.79371	0.00000	-0.32598	0.00000	0.40869	0.00000
147359A	0.81278	0.00000	-0.78599	0.00000	0.10239	0.00000
147433A	0.43234	0.00000	2.27109	0.00000	0.23652	0.00000
147456A	1.03544	0.00000	0.01358	0.00000	0.15126	0.00000
155253A	0.75863	0.00000	-0.09891	0.00000	0.20069	0.00000
155255A	1.01331	0.00000	0.25018	0.00000	0.20563	0.00000
155274A	1.31553	0.00000	-1.27827	0.00000	0.10587	0.00000
155279A	0.95816	0.00000	-0.45028	0.00000	0.19143	0.00000
155282A	0.66539	0.00000	-0.17137	0.00000	0.20141	0.00000
155283A	0.70565	0.00000	-0.98463	0.00000	0.07303	0.00000
156120A	1.28781	0.00000	-0.55225	0.00000	0.27271	0.00000
156121A	0.82222	0.00000	-0.56941	0.00000	0.11129	0.00000
156123A	1.13711	0.00000	0.29724	0.00000	0.25581	0.00000
156124A	0.63750	0.00000	-1.42465	0.00000	0.00000	0.00000
156125A	0.85684	0.00000	0.70867	0.00000	0.24338	0.00000
156126A	1.16604	0.00000	-0.01845	0.00000	0.16428	0.00000
156336A	1.20403	0.00000	-1.24522	0.00000	0.06725	0.00000
156355A	0.37198	0.00000	-1.24205	0.00000	0.15361	0.00000
156356A	0.97900	0.00000	-0.50445	0.00000	0.18369	0.00000
156362A	0.26951	0.00000	-0.56083	0.00000	0.00000	0.00000
184195A	0.86142	0.00000	0.37413	0.00000	0.37452	0.00000
184197A	0.64308	0.00000	-1.12036	0.00000	0.06543	0.00000
481996	0.68252	0.00000	1.06387	0.00000	0.32766	0.00000
482322	0.62899	0.00000	1.49208	0.00000	0.14296	0.00000
484543	0.61930	0.00000	1.27033	0.00000	0.12304	0.00000
484565	0.95985	0.00000	-0.15869	0.00000	0.12424	0.00000
484567	1.13181	0.00000	1.26278	0.00000	0.18662	0.00000
484569	0.49188	0.00000	-0.90974	0.00000	0.13369	0.00000
484575	0.63154	0.00000	-0.35471	0.00000	0.11446	0.00000
484577	1.02280	0.00000	0.70002	0.00000	0.24516	0.00000
484579	0.96786	0.00000	0.08037	0.00000	0.15031	0.00000
484581	0.20864	0.00000	1.03322	0.00000	0.00000	0.00000
628643	0.93589	0.00000	1.49683	0.00000	0.26014	0.00000
628734	0.82418	0.00000	-0.38749	0.00000	0.20006	0.00000
628923	0.84296	0.00000	0.58798	0.00000	0.09727	0.00000
628961	0.75363	0.00000	-0.31478	0.00000	0.14110	0.00000
630590	1.08180	0.00000	0.64766	0.00000	0.23572	0.00000
630598	0.77148	0.00000	1.14684	0.00000	0.33031	0.00000
630600	0.89461	0.00000	0.24008	0.00000	0.21928	0.00000
630602	0.90658	0.00000	0.83409	0.00000	0.24654	0.00000

Table 2.6.2
 IRT Parameters for Polytomous Items
 English Language Arts Grade 3

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
627921	0.90170	0.00000	0.76157	0.00000	1.38845	0.00000	-1.38845	0.00000	0.00000	0.00000
628835	0.95196	0.00000	1.40345	0.00000	0.96772	0.00000	-0.96772	0.00000	0.00000	0.00000

Table 2.6.3
IRT Parameters for Dichotomous Items
English Language Arts Grade 4

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
146887A	0.70784	0.00000	-0.54726	0.00000	0.15375	0.00000
148686A	0.56770	0.00000	-0.44968	0.00000	0.16314	0.00000
148719A	0.71595	0.00000	1.55734	0.00000	0.38253	0.00000
148938A	1.30096	0.00000	-1.35826	0.00000	0.20495	0.00000
149114A	0.71767	0.00000	-1.45039	0.00000	0.00000	0.00000
149115A	0.68408	0.00000	0.55582	0.00000	0.17039	0.00000
149116A	1.19498	0.00000	-0.84663	0.00000	0.23739	0.00000
149136A	1.04136	0.00000	0.00702	0.00000	0.16852	0.00000
155490A	1.18610	0.00000	0.11102	0.00000	0.17400	0.00000
155569A	0.78693	0.00000	-0.07105	0.00000	0.20540	0.00000
155571A	0.72291	0.00000	-1.41074	0.00000	0.03052	0.00000
155572A	0.76902	0.00000	-1.57206	0.00000	0.05504	0.00000
155580A	0.99055	0.00000	-0.86251	0.00000	0.18307	0.00000
158587A	1.01957	0.00000	-0.32569	0.00000	0.16652	0.00000
158589A	1.22820	0.00000	-0.77948	0.00000	0.13158	0.00000
158602A	0.45448	0.00000	-0.32091	0.00000	0.08112	0.00000
158603A	0.87830	0.00000	1.81233	0.00000	0.31453	0.00000
158604A	0.36366	0.00000	-1.98892	0.00000	0.00000	0.00000
158611A	0.44616	0.00000	-1.50932	0.00000	0.00000	0.00000
158691A	0.78193	0.00000	-1.95261	0.00000	0.00000	0.00000
158692A	0.68141	0.00000	-0.03775	0.00000	0.13314	0.00000
184822A	1.30680	0.00000	1.28057	0.00000	0.30821	0.00000
184824A	0.94929	0.00000	-1.77671	0.00000	0.07656	0.00000
184827A	0.93967	0.00000	1.00132	0.00000	0.13529	0.00000
185806A	0.51615	0.00000	0.32641	0.00000	0.13514	0.00000
186016A	0.39412	0.00000	-1.97745	0.00000	0.00000	0.00000
186018A	1.04067	0.00000	1.21275	0.00000	0.17355	0.00000
186065A	0.70596	0.00000	0.25296	0.00000	0.18453	0.00000
483086	0.48873	0.00000	0.12813	0.00000	0.23136	0.00000
483092	0.11155	0.00000	6.28065	0.00000	0.00000	0.00000
483113	0.30403	0.00000	1.11194	0.00000	0.00000	0.00000
484626	0.71741	0.00000	-1.09391	0.00000	0.13687	0.00000
484628	1.10022	0.00000	-0.98853	0.00000	0.14512	0.00000
484632	1.57892	0.00000	-0.35834	0.00000	0.24139	0.00000
484636	0.21315	0.00000	-0.13996	0.00000	0.08721	0.00000
484638	1.11997	0.00000	-0.63286	0.00000	0.17497	0.00000
484646	0.91213	0.00000	0.08998	0.00000	0.22858	0.00000
484648	1.06347	0.00000	0.22379	0.00000	0.28472	0.00000
484652	0.80639	0.00000	1.09657	0.00000	0.21750	0.00000
484654	0.64427	0.00000	0.40218	0.00000	0.15842	0.00000
484658	1.12855	0.00000	-0.46224	0.00000	0.20908	0.00000
632843	0.62629	0.00000	0.67823	0.00000	0.12854	0.00000
632853	0.96668	0.00000	-1.22616	0.00000	0.11572	0.00000
632863	0.57110	0.00000	0.19006	0.00000	0.17493	0.00000
632877	0.53279	0.00000	-0.56256	0.00000	0.17418	0.00000
635510	0.44030	0.00000	-2.61272	0.00000	0.00000	0.00000
635527	0.69878	0.00000	-1.40409	0.00000	0.14506	0.00000
635530	0.46842	0.00000	-0.55165	0.00000	0.15188	0.00000

Table 2.6.4
IRT Parameters for Polytomous Items
English Language Arts Grade 4

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
629160	0.57782	0.00000	0.07475	0.00000	0.97804	0.00000	-0.97804	0.00000	0.00000	0.00000
629614	0.98788	0.00000	0.63853	0.00000	1.39217	0.00000	-1.39217	0.00000	0.00000	0.00000

Table 2.6.5
IRT Parameters for Dichotomous Items
English Language Arts Grade 5

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
147920A	0.91701	0.00000	-1.77139	0.00000	0.17090	0.00000
147921A	0.99436	0.00000	-0.45046	0.00000	0.18389	0.00000
147923A	0.88078	0.00000	-0.34393	0.00000	0.24464	0.00000
147924A	0.70967	0.00000	-0.76706	0.00000	0.13588	0.00000
147926A	0.85229	0.00000	0.08863	0.00000	0.23604	0.00000
147969A	1.05996	0.00000	-1.09251	0.00000	0.14451	0.00000
148003A	0.49374	0.00000	-0.73157	0.00000	0.07704	0.00000
148007A	0.32651	0.00000	-1.54051	0.00000	0.00000	0.00000
148008A	0.55873	0.00000	0.73318	0.00000	0.15629	0.00000
148961A	0.99886	0.00000	0.02281	0.00000	0.25685	0.00000
148963A	1.23388	0.00000	-1.07669	0.00000	0.20146	0.00000
148967A	1.52728	0.00000	-0.93182	0.00000	0.19482	0.00000
149152A	1.02921	0.00000	-1.30874	0.00000	0.34080	0.00000
149158A	0.69983	0.00000	0.64915	0.00000	0.14842	0.00000
149196A	0.65240	0.00000	-1.34680	0.00000	0.04038	0.00000
149321A	0.55010	0.00000	-1.23164	0.00000	0.07367	0.00000
149334A	0.81721	0.00000	-0.33312	0.00000	0.21326	0.00000
149338A	1.15185	0.00000	-0.40882	0.00000	0.16709	0.00000
149339A	0.37020	0.00000	-0.77335	0.00000	0.00000	0.00000
158749A	1.13491	0.00000	0.45854	0.00000	0.25160	0.00000
159592A	1.18351	0.00000	-0.06609	0.00000	0.29523	0.00000
159600A	1.04557	0.00000	-1.44667	0.00000	0.15686	0.00000
160718A	0.94915	0.00000	-1.45853	0.00000	0.10241	0.00000
186097A	0.95729	0.00000	0.61432	0.00000	0.14060	0.00000
186107A	1.14893	0.00000	-0.66332	0.00000	0.19946	0.00000
186115A	0.88871	0.00000	0.18858	0.00000	0.18286	0.00000
186121A	1.04420	0.00000	-0.24533	0.00000	0.20548	0.00000
186131A	0.38966	0.00000	-0.17835	0.00000	0.05156	0.00000
186469A	1.50399	0.00000	0.39778	0.00000	0.13693	0.00000
186471A	1.13869	0.00000	-1.62970	0.00000	0.11682	0.00000
186474A	0.66746	0.00000	-0.05258	0.00000	0.20565	0.00000
186476A	0.77347	0.00000	-0.06747	0.00000	0.17072	0.00000
186488A	1.18511	0.00000	0.95440	0.00000	0.25832	0.00000
186777A	1.48734	0.00000	-0.96416	0.00000	0.23739	0.00000
483126	0.59624	0.00000	-1.12315	0.00000	0.08425	0.00000
483134	0.56323	0.00000	-0.29330	0.00000	0.11938	0.00000
483146	0.77069	0.00000	0.26303	0.00000	0.19418	0.00000
483172	0.93711	0.00000	-0.80776	0.00000	0.15128	0.00000
630617	0.64975	0.00000	0.09881	0.00000	0.11424	0.00000
630655	1.06607	0.00000	-0.92841	0.00000	0.20472	0.00000
630737	0.92103	0.00000	-0.52958	0.00000	0.18467	0.00000
631575	0.66068	0.00000	-0.00333	0.00000	0.15964	0.00000
631601	0.99603	0.00000	-0.21036	0.00000	0.19694	0.00000
631918	0.88212	0.00000	0.18764	0.00000	0.18140	0.00000
631955	0.94923	0.00000	-1.37014	0.00000	0.09187	0.00000
631981	1.22067	0.00000	0.01022	0.00000	0.16620	0.00000
632003	0.83766	0.00000	-0.33577	0.00000	0.23892	0.00000
632256	0.77026	0.00000	-0.43552	0.00000	0.17821	0.00000
632269	0.85940	0.00000	0.33994	0.00000	0.20451	0.00000
632323	1.29104	0.00000	0.20018	0.00000	0.24654	0.00000

Table 2.6.7
IRT Parameters for Dichotomous Items
English Language Arts Grade 6

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
147283A	0.69703	0.00000	-1.41192	0.00000	0.05644	0.00000
147289A	0.65102	0.00000	-0.36708	0.00000	0.42842	0.00000
147290A	0.97056	0.00000	-0.73859	0.00000	0.27629	0.00000
149400A	0.73686	0.00000	-0.70003	0.00000	0.23615	0.00000
149414A	0.50349	0.00000	-0.61010	0.00000	0.00000	0.00000
149570A	0.80936	0.00000	-0.30118	0.00000	0.22436	0.00000
149571A	1.05916	0.00000	-0.69309	0.00000	0.09458	0.00000
149737A	0.51942	0.00000	-0.53265	0.00000	0.14352	0.00000
158702A	1.51389	0.00000	0.04978	0.00000	0.12281	0.00000
158705A	1.42574	0.00000	-1.45758	0.00000	0.10671	0.00000
158723A	0.92708	0.00000	-1.56087	0.00000	0.05980	0.00000
158739A	0.87012	0.00000	-1.28487	0.00000	0.16208	0.00000
158740A	0.35860	0.00000	-1.28781	0.00000	0.00000	0.00000
158747A	0.71605	0.00000	-1.05703	0.00000	0.08150	0.00000
158756A	0.17263	0.00000	0.73912	0.00000	0.00000	0.00000
158774A	1.23276	0.00000	-0.59729	0.00000	0.20168	0.00000
158786A	0.89452	0.00000	-1.36829	0.00000	0.04110	0.00000
158886A	0.86409	0.00000	-1.73606	0.00000	0.04220	0.00000
158897A	0.77351	0.00000	-0.66537	0.00000	0.22533	0.00000
158935A	0.69097	0.00000	-0.23270	0.00000	0.14358	0.00000
158943A	1.19464	0.00000	0.83098	0.00000	0.28270	0.00000
158947A	1.23183	0.00000	0.04904	0.00000	0.30765	0.00000
158954A	0.82968	0.00000	-1.17342	0.00000	0.01023	0.00000
158978A	0.43034	0.00000	0.76802	0.00000	0.07627	0.00000
159281A	0.55282	0.00000	-2.25299	0.00000	0.00000	0.00000
159297A	0.96716	0.00000	-0.10922	0.00000	0.26026	0.00000
159451A	0.55614	0.00000	-1.54873	0.00000	0.06861	0.00000
159453A	0.58695	0.00000	-1.57923	0.00000	0.06698	0.00000
159454A	0.63420	0.00000	-0.02468	0.00000	0.12678	0.00000
159457A	0.81436	0.00000	-0.92953	0.00000	0.30728	0.00000
159458A	0.75955	0.00000	-0.57893	0.00000	0.28163	0.00000
485443	0.82424	0.00000	0.76320	0.00000	0.14989	0.00000
485688	1.16189	0.00000	-0.93851	0.00000	0.18933	0.00000
485700	0.46199	0.00000	2.90078	0.00000	0.11127	0.00000
485702	1.18404	0.00000	-1.06969	0.00000	0.25077	0.00000
486350	0.47076	0.00000	0.54607	0.00000	0.16300	0.00000
486369	0.79159	0.00000	-0.26136	0.00000	0.16771	0.00000
486371	0.90774	0.00000	-0.26996	0.00000	0.28647	0.00000
486376	1.16847	0.00000	-0.72877	0.00000	0.22168	0.00000
629854	0.87749	0.00000	1.54361	0.00000	0.19715	0.00000
629856	0.88845	0.00000	-0.26556	0.00000	0.25054	0.00000
629863	0.88641	0.00000	0.06244	0.00000	0.20565	0.00000
629867	1.58166	0.00000	-0.59205	0.00000	0.31378	0.00000
629869	0.76584	0.00000	0.28477	0.00000	0.19581	0.00000
629875	1.08020	0.00000	0.44063	0.00000	0.16098	0.00000
629885	0.69461	0.00000	0.06834	0.00000	0.23742	0.00000
629889	0.75580	0.00000	1.34954	0.00000	0.18751	0.00000
629895	0.54357	0.00000	-0.47662	0.00000	0.19314	0.00000

Table 2.6.8
IRT Parameters for Polytomous Items
English Language Arts Grade 6

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
630339	0.72910	0.00000	1.33960	0.00000	0.99178	0.00000	-0.99178	0.00000	0.00000	0.00000
630430	0.63830	0.00000	0.94445	0.00000	1.38995	0.00000	-1.38995	0.00000	0.00000	0.00000

Table 2.6.9
IRT Parameters for Dichotomous Items
English Language Arts Grade 7

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
148104A	0.85157	0.00000	-0.98645	0.00000	0.08748	0.00000
148117A	0.64310	0.00000	-0.39993	0.00000	0.15750	0.00000
148759A	0.45997	0.00000	-0.63973	0.00000	0.13809	0.00000
148760A	0.72628	0.00000	-0.95256	0.00000	0.05081	0.00000
148762A	0.67629	0.00000	-1.08568	0.00000	0.15984	0.00000
148823A	0.74084	0.00000	-1.07094	0.00000	0.09262	0.00000
148850A	0.60519	0.00000	-1.28529	0.00000	0.11400	0.00000
148859A	1.00185	0.00000	-1.64212	0.00000	0.05671	0.00000
154639A	0.58169	0.00000	0.44947	0.00000	0.17640	0.00000
158719A	0.94885	0.00000	0.54589	0.00000	0.21133	0.00000
158724A	1.16889	0.00000	-0.24307	0.00000	0.32066	0.00000
158765A	1.00777	0.00000	-0.00913	0.00000	0.25990	0.00000
158766A	0.85270	0.00000	-0.06512	0.00000	0.26432	0.00000
158769A	0.13249	0.00000	-2.21133	0.00000	0.00000	0.00000
158810A	0.50923	0.00000	-0.69675	0.00000	0.09518	0.00000
158847A	0.55384	0.00000	-1.64996	0.00000	0.10370	0.00000
158849A	0.33729	0.00000	-1.52274	0.00000	0.00000	0.00000
158871A	0.79319	0.00000	-1.54138	0.00000	0.00000	0.00000
159120A	1.10644	0.00000	-0.65390	0.00000	0.08722	0.00000
159122A	0.84575	0.00000	0.52728	0.00000	0.16860	0.00000
159133A	0.64845	0.00000	0.86259	0.00000	0.25412	0.00000
159137A	0.87006	0.00000	0.65213	0.00000	0.21649	0.00000
159394A	0.50793	0.00000	0.53933	0.00000	0.30595	0.00000
159646A	0.62174	0.00000	-0.24041	0.00000	0.02797	0.00000
160457A	0.32914	0.00000	0.10643	0.00000	0.08959	0.00000
160508A	0.70715	0.00000	-0.83860	0.00000	0.03860	0.00000
160511A	0.46193	0.00000	-1.07793	0.00000	0.00000	0.00000
160937A	0.85715	0.00000	-1.29384	0.00000	0.01521	0.00000
160940A	1.24604	0.00000	-1.43494	0.00000	0.10829	0.00000
182584A	0.39116	0.00000	-0.52377	0.00000	0.00000	0.00000
182596A	1.27093	0.00000	-0.95857	0.00000	0.21944	0.00000
182597A	0.49234	0.00000	-0.53569	0.00000	0.15215	0.00000
485447	0.68333	0.00000	-1.28566	0.00000	0.09443	0.00000
485451	0.93889	0.00000	0.34784	0.00000	0.17686	0.00000
485453	0.81630	0.00000	-0.30531	0.00000	0.11363	0.00000
485467	0.77208	0.00000	0.95962	0.00000	0.26059	0.00000
486286	0.39677	0.00000	2.43925	0.00000	0.18317	0.00000
486294	0.90749	0.00000	1.00978	0.00000	0.18132	0.00000
486317	0.21626	0.00000	-0.14986	0.00000	0.00000	0.00000
486331	0.04148	0.00000	0.03097	0.00000	0.16000	0.00000
486333	1.05673	0.00000	-0.34153	0.00000	0.24344	0.00000
633929	0.66846	0.00000	1.75123	0.00000	0.11185	0.00000
634354	0.48728	0.00000	1.11782	0.00000	0.20213	0.00000
634364	0.99566	0.00000	0.60475	0.00000	0.29459	0.00000
634366	0.65712	0.00000	0.45700	0.00000	0.33000	0.00000
634374	0.83711	0.00000	1.03684	0.00000	0.26892	0.00000
634379	0.84600	0.00000	-0.23556	0.00000	0.12473	0.00000
634389	0.54125	0.00000	-0.25541	0.00000	0.11478	0.00000

Table 2.6.10
IRT Parameters for Polytomous Items
English Language Arts Grade 7

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
630545	0.72586	0.00000	0.73731	0.00000	1.63332	0.00000	-1.63332	0.00000	0.00000	0.00000
630649	0.57940	0.00000	-0.01525	0.00000	1.43332	0.00000	-1.43332	0.00000	0.00000	0.00000

Table 2.6.11
IRT Parameters for Dichotomous Items
English Language Arts Grade 8

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
148177A	0.85606	0.00000	-1.04644	0.00000	0.03563	0.00000
148187A	0.46291	0.00000	-1.65135	0.00000	0.00000	0.00000
148189A	0.50884	0.00000	-0.36973	0.00000	0.08423	0.00000
148191A	0.60399	0.00000	-0.80244	0.00000	0.07500	0.00000
149373A	1.69356	0.00000	-1.39781	0.00000	0.16751	0.00000
149374A	1.18332	0.00000	-1.18222	0.00000	0.13482	0.00000
149507A	0.67602	0.00000	-0.00898	0.00000	0.26700	0.00000
149580A	0.64278	0.00000	1.61080	0.00000	0.07757	0.00000
149583A	0.60623	0.00000	1.40127	0.00000	0.18162	0.00000
149591A	0.93872	0.00000	-0.04346	0.00000	0.05251	0.00000
149597A	0.71763	0.00000	-0.97051	0.00000	0.18797	0.00000
149600A	0.25702	0.00000	-1.31649	0.00000	0.00000	0.00000
149603A	0.97031	0.00000	-1.34511	0.00000	0.21053	0.00000
149619A	0.59929	0.00000	-0.01778	0.00000	0.13475	0.00000
149623A	0.82419	0.00000	-0.86062	0.00000	0.07567	0.00000
160000A	1.05504	0.00000	0.29014	0.00000	0.30011	0.00000
160467A	0.45460	0.00000	-1.70368	0.00000	0.00000	0.00000
160472A	0.52849	0.00000	-1.10529	0.00000	0.19787	0.00000
160477A	1.07836	0.00000	1.19060	0.00000	0.23788	0.00000
160742A	0.87359	0.00000	-0.90212	0.00000	0.11134	0.00000
160745A	0.67199	0.00000	-1.77688	0.00000	0.00000	0.00000
160747A	0.63542	0.00000	-0.83430	0.00000	0.17112	0.00000
160780A	1.04226	0.00000	1.10290	0.00000	0.14544	0.00000
160782A	0.55058	0.00000	-0.64504	0.00000	0.07309	0.00000
160784A	1.31121	0.00000	-1.96605	0.00000	0.07307	0.00000
160787A	0.48184	0.00000	-0.78874	0.00000	0.00000	0.00000
160788A	0.34697	0.00000	-0.65607	0.00000	0.07776	0.00000
160789A	1.01256	0.00000	0.83610	0.00000	0.23908	0.00000
160790A	0.37475	0.00000	-2.62721	0.00000	0.00000	0.00000
160946A	1.12487	0.00000	-0.27552	0.00000	0.11856	0.00000
160947A	0.29039	0.00000	-2.11670	0.00000	0.00000	0.00000
160956A	0.32680	0.00000	-0.99975	0.00000	0.00000	0.00000
160989A	0.25773	0.00000	-0.13291	0.00000	0.00000	0.00000
485473	0.81936	0.00000	-0.24324	0.00000	0.22513	0.00000
485493	0.54768	0.00000	-0.62056	0.00000	0.23570	0.00000
485510	0.44609	0.00000	-0.18009	0.00000	0.05490	0.00000
486738	0.24393	0.00000	1.19939	0.00000	0.08671	0.00000
486744	0.53764	0.00000	-0.02535	0.00000	0.14906	0.00000
486757	0.65812	0.00000	0.95081	0.00000	0.22693	0.00000
486763	0.45626	0.00000	-2.23999	0.00000	0.08462	0.00000
487006	0.74681	0.00000	-1.55776	0.00000	0.05401	0.00000
626597	0.40404	0.00000	0.53205	0.00000	0.28467	0.00000
626602	0.61982	0.00000	-0.23580	0.00000	0.06848	0.00000
626606	1.44777	0.00000	1.31497	0.00000	0.24320	0.00000
626623	0.31139	0.00000	-0.80405	0.00000	0.19952	0.00000
626626	1.27996	0.00000	0.20966	0.00000	0.13650	0.00000
626777	0.91405	0.00000	0.55342	0.00000	0.24969	0.00000
626785	1.56002	0.00000	-0.52912	0.00000	0.19372	0.00000
626800	1.33249	0.00000	0.80982	0.00000	0.20943	0.00000
627061	0.94070	0.00000	-1.35020	0.00000	0.11954	0.00000

Table 2.6.13
IRT Parameters for Dichotomous Items
Mathematics Grade 3

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
146917A	0.86479	0.00000	-1.51745	0.00000	0.07248	0.00000
146955A	0.79863	0.00000	-0.61222	0.00000	0.28844	0.00000
147044A	0.70487	0.00000	-0.75801	0.00000	0.13016	0.00000
147064A	0.87347	0.00000	-2.00737	0.00000	0.27037	0.00000
147330A	1.18524	0.00000	-1.33082	0.00000	0.07883	0.00000
147503A	1.65145	0.00000	-0.88037	0.00000	0.09959	0.00000
147542A	1.01476	0.00000	-0.44284	0.00000	0.24229	0.00000
147712A	1.23431	0.00000	-1.01590	0.00000	0.23953	0.00000
147718A	0.91335	0.00000	-0.54054	0.00000	0.30458	0.00000
147741A	0.94936	0.00000	-1.67229	0.00000	0.11717	0.00000
147966A	0.50948	0.00000	1.08856	0.00000	0.21960	0.00000
150663A	0.69848	0.00000	-1.04938	0.00000	0.11779	0.00000
151560A	0.73224	0.00000	-1.14152	0.00000	0.16678	0.00000
152255A	0.76318	0.00000	-0.64830	0.00000	0.15481	0.00000
152325A	0.84129	0.00000	-0.89214	0.00000	0.21368	0.00000
152546A	0.78384	0.00000	-1.39699	0.00000	0.11549	0.00000
152598A	1.24517	0.00000	0.11765	0.00000	0.13953	0.00000
152739A	0.56238	0.00000	-1.78939	0.00000	0.13698	0.00000
152842A	0.89098	0.00000	1.01086	0.00000	0.07450	0.00000
152864A	0.80569	0.00000	0.25643	0.00000	0.27150	0.00000
153154A	0.59336	0.00000	-1.57390	0.00000	0.06193	0.00000
153168A	1.39094	0.00000	-0.60748	0.00000	0.13522	0.00000
154329A	0.80318	0.00000	-1.76290	0.00000	0.02936	0.00000
154484A	1.11278	0.00000	-1.09990	0.00000	0.12777	0.00000
154533A	1.08803	0.00000	-0.51722	0.00000	0.13098	0.00000
154758A	1.18775	0.00000	-0.54262	0.00000	0.10215	0.00000
154760A	1.33413	0.00000	-0.39180	0.00000	0.08659	0.00000
155162A	1.09708	0.00000	1.20304	0.00000	0.10031	0.00000
155260A	1.15285	0.00000	-1.57486	0.00000	0.03072	0.00000
155268A	0.76622	0.00000	0.06273	0.00000	0.09178	0.00000
155455A	0.91673	0.00000	0.41615	0.00000	0.14180	0.00000
155478A	0.84222	0.00000	-0.54787	0.00000	0.06238	0.00000
155501A	1.20531	0.00000	0.43908	0.00000	0.18903	0.00000
155594A	0.93970	0.00000	-0.06065	0.00000	0.21707	0.00000
155999A	0.70065	0.00000	0.23675	0.00000	0.23219	0.00000
161166A	1.08611	0.00000	-1.39250	0.00000	0.07204	0.00000
184059A	0.66269	0.00000	0.24029	0.00000	0.21461	0.00000
479107	0.68796	0.00000	-2.10528	0.00000	0.10158	0.00000
479111	0.92927	0.00000	-0.66443	0.00000	0.17352	0.00000
479113	0.93993	0.00000	-1.99796	0.00000	0.03642	0.00000
479117	0.86959	0.00000	-0.20911	0.00000	0.30527	0.00000
479125	1.12358	0.00000	-2.47202	0.00000	0.08277	0.00000
479138	0.95837	0.00000	0.13648	0.00000	0.09642	0.00000
479140	0.72533	0.00000	-1.07710	0.00000	0.09684	0.00000
488998	0.98780	0.00000	0.67136	0.00000	0.20087	0.00000
636402	0.77694	0.00000	-0.60930	0.00000	0.22007	0.00000
636410	0.68356	0.00000	-0.40963	0.00000	0.29601	0.00000
636412	1.19084	0.00000	0.66428	0.00000	0.31204	0.00000
636429	0.70402	0.00000	-0.05254	0.00000	0.26076	0.00000
636443	0.55778	0.00000	0.33045	0.00000	0.35119	0.00000

Table 2.6.15
IRT Parameters for Dichotomous Items
Mathematics Grade 4

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
147318A	0.95021	0.00000	-2.32587	0.00000	0.05551	0.00000
147319A	0.64393	0.00000	-1.71957	0.00000	0.24364	0.00000
147525A	0.98888	0.00000	-0.77719	0.00000	0.15925	0.00000
147975A	1.04311	0.00000	1.00575	0.00000	0.34449	0.00000
148069A	1.02390	0.00000	-0.91595	0.00000	0.38448	0.00000
148301A	0.83067	0.00000	0.48905	0.00000	0.14935	0.00000
148500A	0.82860	0.00000	-0.02270	0.00000	0.11567	0.00000
148654A	1.32609	0.00000	0.59257	0.00000	0.13513	0.00000
148675A	0.91482	0.00000	1.43183	0.00000	0.21310	0.00000
149723A	0.96166	0.00000	0.00428	0.00000	0.16036	0.00000
150227A	0.40330	0.00000	1.69166	0.00000	0.20323	0.00000
150664A	1.25374	0.00000	-0.34088	0.00000	0.24105	0.00000
150722A	1.34991	0.00000	1.29932	0.00000	0.26957	0.00000
151506A	0.97995	0.00000	0.34497	0.00000	0.15372	0.00000
151519A	0.99292	0.00000	-1.75177	0.00000	0.00000	0.00000
151549A	0.47181	0.00000	-0.82903	0.00000	0.29782	0.00000
151554A	1.04136	0.00000	-0.64268	0.00000	0.44704	0.00000
151556A	1.16397	0.00000	-0.41086	0.00000	0.21945	0.00000
151997A	1.24912	0.00000	-0.13375	0.00000	0.17471	0.00000
152343A	1.91927	0.00000	0.35046	0.00000	0.14348	0.00000
152353A	0.92690	0.00000	-0.08597	0.00000	0.18542	0.00000
152355A	0.88364	0.00000	-1.10306	0.00000	0.22808	0.00000
152518A	0.77862	0.00000	-1.12110	0.00000	0.20021	0.00000
152776A	0.26928	0.00000	-2.33854	0.00000	0.00000	0.00000
152789A	0.89697	0.00000	0.43689	0.00000	0.18852	0.00000
152874A	1.41987	0.00000	0.70239	0.00000	0.16833	0.00000
152988A	1.23786	0.00000	-0.39781	0.00000	0.25117	0.00000
153171A	1.01707	0.00000	0.27288	0.00000	0.18664	0.00000
153185A	1.14566	0.00000	0.28771	0.00000	0.20451	0.00000
153189A	1.18310	0.00000	0.36092	0.00000	0.15479	0.00000
153206A	1.18134	0.00000	-0.07225	0.00000	0.19956	0.00000
153325A	1.60798	0.00000	0.64930	0.00000	0.17642	0.00000
153346A	0.54075	0.00000	-3.30468	0.00000	0.00000	0.00000
154024A	1.09561	0.00000	0.02801	0.00000	0.09956	0.00000
154479A	0.83543	0.00000	1.03201	0.00000	0.25699	0.00000
155121A	0.79709	0.00000	1.16444	0.00000	0.11445	0.00000
155167A	0.83972	0.00000	-2.18855	0.00000	0.05165	0.00000
155192A	0.63192	0.00000	0.60677	0.00000	0.25836	0.00000
155220A	0.65442	0.00000	-0.58423	0.00000	0.31995	0.00000
156019A	1.05773	0.00000	-0.35967	0.00000	0.16678	0.00000
161617A	0.61929	0.00000	2.03596	0.00000	0.14637	0.00000
184099A	0.84368	0.00000	0.28991	0.00000	0.24846	0.00000
184241A	0.71687	0.00000	-1.22669	0.00000	0.00000	0.00000
479500	0.68319	0.00000	-2.18024	0.00000	0.20029	0.00000
479507	0.76138	0.00000	0.00748	0.00000	0.58717	0.00000
479932	0.61506	0.00000	1.36608	0.00000	0.24104	0.00000
636619	1.20176	0.00000	-0.64047	0.00000	0.30226	0.00000
636627	1.02503	0.00000	0.99708	0.00000	0.15576	0.00000
636666	1.21874	0.00000	-0.75385	0.00000	0.19335	0.00000
636668	0.77903	0.00000	-0.85955	0.00000	0.15693	0.00000



Table 2.6.17
IRT Parameters for Dichotomous Items
Mathematics Grade 5

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
146915A	1.04866	0.00000	-0.71093	0.00000	0.11747	0.00000
146959A	0.53576	0.00000	-0.76314	0.00000	0.00000	0.00000
147968A	0.80899	0.00000	-1.73709	0.00000	0.10418	0.00000
147990A	1.34687	0.00000	0.32883	0.00000	0.13632	0.00000
148011A	1.05981	0.00000	-0.61973	0.00000	0.18420	0.00000
148659A	1.29906	0.00000	-0.39876	0.00000	0.16433	0.00000
148852A	0.65462	0.00000	0.30722	0.00000	0.07342	0.00000
149230A	1.24311	0.00000	-0.08181	0.00000	0.18665	0.00000
149246A	0.90577	0.00000	-0.21873	0.00000	0.17969	0.00000
149261A	1.03923	0.00000	0.56212	0.00000	0.11030	0.00000
149289A	1.27879	0.00000	0.55440	0.00000	0.24854	0.00000
149384A	0.99155	0.00000	-0.60712	0.00000	0.25380	0.00000
149640A	1.05059	0.00000	0.83733	0.00000	0.13094	0.00000
150267A	0.65494	0.00000	0.57139	0.00000	0.18127	0.00000
150631A	1.11641	0.00000	-0.61877	0.00000	0.16966	0.00000
150689A	1.26026	0.00000	0.59209	0.00000	0.24530	0.00000
150703A	1.07002	0.00000	2.09279	0.00000	0.19946	0.00000
150711A	1.26202	0.00000	0.86604	0.00000	0.18435	0.00000
152807A	0.87144	0.00000	0.31639	0.00000	0.12855	0.00000
152859A	0.61343	0.00000	-0.83412	0.00000	0.04449	0.00000
152933A	1.03294	0.00000	1.28386	0.00000	0.40894	0.00000
152946A	0.97183	0.00000	-0.64623	0.00000	0.15121	0.00000
152972A	0.75549	0.00000	-0.67487	0.00000	0.18610	0.00000
153075A	1.37479	0.00000	0.18798	0.00000	0.14006	0.00000
153107A	1.48213	0.00000	0.24704	0.00000	0.28389	0.00000
153162A	0.81598	0.00000	-1.29007	0.00000	0.44281	0.00000
153165A	1.11960	0.00000	0.35705	0.00000	0.16928	0.00000
153972A	0.95084	0.00000	-0.23663	0.00000	0.26011	0.00000
154046A	1.26054	0.00000	0.28472	0.00000	0.10556	0.00000
155145A	0.74958	0.00000	-0.57651	0.00000	0.14057	0.00000
155234A	1.50330	0.00000	1.19007	0.00000	0.04920	0.00000
155426A	0.73519	0.00000	-1.97908	0.00000	0.08859	0.00000
155434A	0.90361	0.00000	-0.00982	0.00000	0.23063	0.00000
155474A	1.10977	0.00000	-0.62879	0.00000	0.09831	0.00000
155479A	1.11427	0.00000	0.68811	0.00000	0.18241	0.00000
155489A	1.05870	0.00000	0.31560	0.00000	0.17302	0.00000
155523A	0.85172	0.00000	-1.83736	0.00000	0.11035	0.00000
161469A	0.75267	0.00000	-1.24799	0.00000	0.02948	0.00000
181426A	0.65176	0.00000	0.85226	0.00000	0.35505	0.00000
184261A	0.55180	0.00000	-0.18609	0.00000	0.21886	0.00000
184263A	0.68353	0.00000	-0.55849	0.00000	0.51737	0.00000
187144A	1.09075	0.00000	0.47896	0.00000	0.29875	0.00000
187147A	1.00711	0.00000	-0.24721	0.00000	0.19800	0.00000
484706	0.79988	0.00000	0.06436	0.00000	0.22452	0.00000
484714	1.01781	0.00000	1.70363	0.00000	0.24322	0.00000
489954	0.76381	0.00000	-2.11877	0.00000	0.06880	0.00000
636681	1.37334	0.00000	0.70522	0.00000	0.10002	0.00000
636693	0.75110	0.00000	-1.38088	0.00000	0.36454	0.00000
636726	1.16515	0.00000	0.05901	0.00000	0.20553	0.00000
636735	0.59894	0.00000	-0.99116	0.00000	0.12554	0.00000

Table 2.6.19
IRT Parameters for Dichotomous Items
Mathematics Grade 6

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
147412A	1.25588	0.00000	-0.16314	0.00000	0.28456	0.00000
147578A	0.49237	0.00000	0.79719	0.00000	0.06619	0.00000
148159A	0.34888	0.00000	-2.05882	0.00000	0.00000	0.00000
148231A	1.13307	0.00000	-0.75926	0.00000	0.23964	0.00000
148926A	0.64989	0.00000	-1.64691	0.00000	0.10105	0.00000
149062A	0.80442	0.00000	-0.79683	0.00000	0.40651	0.00000
149140A	0.91514	0.00000	0.06382	0.00000	0.27577	0.00000
149231A	1.08184	0.00000	-0.33575	0.00000	0.16408	0.00000
149234A	0.85398	0.00000	-1.05627	0.00000	0.01121	0.00000
149511A	0.48926	0.00000	-1.19861	0.00000	0.05132	0.00000
149730A	0.70377	0.00000	-0.42391	0.00000	0.12004	0.00000
150604A	0.92531	0.00000	0.40443	0.00000	0.24453	0.00000
150723A	1.22836	0.00000	-0.75178	0.00000	0.22810	0.00000
150972A	1.01885	0.00000	0.28310	0.00000	0.11079	0.00000
151145A	0.79255	0.00000	-0.26306	0.00000	0.30953	0.00000
151316A	1.08188	0.00000	-0.52985	0.00000	0.20046	0.00000
151782A	1.23877	0.00000	1.53062	0.00000	0.16757	0.00000
151835A	1.15089	0.00000	2.40238	0.00000	0.33822	0.00000
152379A	1.56840	0.00000	-0.07063	0.00000	0.11608	0.00000
152754A	0.76876	0.00000	0.88073	0.00000	0.11010	0.00000
153103A	0.71564	0.00000	0.11193	0.00000	0.18548	0.00000
153315A	1.28286	0.00000	0.20566	0.00000	0.17381	0.00000
153382A	1.11241	0.00000	0.69257	0.00000	0.28216	0.00000
153512A	0.81423	0.00000	-0.14580	0.00000	0.35103	0.00000
153601A	0.85044	0.00000	-0.42743	0.00000	0.26305	0.00000
153952A	0.58856	0.00000	-2.12478	0.00000	0.00000	0.00000
155177A	1.26208	0.00000	-1.88689	0.00000	0.08070	0.00000
155184A	0.62354	0.00000	-0.69631	0.00000	0.15186	0.00000
155298A	1.17910	0.00000	-0.53904	0.00000	0.18290	0.00000
181240A	1.34174	0.00000	-0.27461	0.00000	0.34417	0.00000
181455A	1.22291	0.00000	0.23990	0.00000	0.30265	0.00000
479039	0.67826	0.00000	0.75850	0.00000	0.24684	0.00000
479041	0.76955	0.00000	-1.51485	0.00000	0.17795	0.00000
479043	1.19033	0.00000	1.44069	0.00000	0.18652	0.00000
479047	1.03007	0.00000	1.38795	0.00000	0.29310	0.00000
479049	0.57211	0.00000	2.41281	0.00000	0.21710	0.00000
479057	0.57800	0.00000	-1.21402	0.00000	0.08162	0.00000
479067	1.44725	0.00000	1.52114	0.00000	0.32090	0.00000
479069	0.90237	0.00000	-0.88245	0.00000	0.33986	0.00000
479077	1.33549	0.00000	1.16990	0.00000	0.22784	0.00000
479083	0.72434	0.00000	-0.23762	0.00000	0.16439	0.00000
479087	1.01805	0.00000	1.49931	0.00000	0.30467	0.00000
636459	0.95491	0.00000	-0.41683	0.00000	0.21794	0.00000
636463	1.17101	0.00000	0.73822	0.00000	0.25257	0.00000
636465	0.93196	0.00000	-0.60632	0.00000	0.12175	0.00000
636479	0.80361	0.00000	0.48288	0.00000	0.24068	0.00000
636499	0.67270	0.00000	-0.21349	0.00000	0.26611	0.00000
479095	0.79019	0.00000	1.57773	0.00000	0.00000	0.00000
479097	0.74666	0.00000	0.69171	0.00000	0.00000	0.00000
479148	1.00714	0.00000	1.01219	0.00000	0.00000	0.00000

Table 2.6.21
IRT Parameters for Dichotomous Items
Mathematics Grade 7

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
147541A	1.21595	0.00000	-0.71554	0.00000	0.32336	0.00000
148154A	0.97771	0.00000	-0.91249	0.00000	0.21473	0.00000
148171A	0.95735	0.00000	0.17361	0.00000	0.08408	0.00000
148193A	1.04444	0.00000	1.28522	0.00000	0.17566	0.00000
148330A	0.79942	0.00000	0.18022	0.00000	0.00763	0.00000
148478A	0.94748	0.00000	1.25693	0.00000	0.15382	0.00000
148527A	1.24842	0.00000	0.11272	0.00000	0.30986	0.00000
148530A	0.84913	0.00000	0.73013	0.00000	0.30987	0.00000
148711A	1.21973	0.00000	0.02690	0.00000	0.12400	0.00000
148739A	1.19164	0.00000	-0.19130	0.00000	0.22720	0.00000
148912A	1.02537	0.00000	0.48661	0.00000	0.28769	0.00000
149102A	1.03031	0.00000	1.39198	0.00000	0.22195	0.00000
149204A	0.83937	0.00000	-0.12164	0.00000	0.11006	0.00000
149705A	0.80012	0.00000	-0.07377	0.00000	0.34345	0.00000
149759A	1.12790	0.00000	0.11579	0.00000	0.28835	0.00000
150199A	1.42031	0.00000	0.19488	0.00000	0.20930	0.00000
150232A	1.44407	0.00000	1.28866	0.00000	0.08180	0.00000
150891A	1.37620	0.00000	1.49456	0.00000	0.25242	0.00000
152009A	1.41934	0.00000	0.91348	0.00000	0.20557	0.00000
152051A	0.74189	0.00000	0.99437	0.00000	0.02755	0.00000
152195A	0.96376	0.00000	-0.22649	0.00000	0.18901	0.00000
152288A	1.61399	0.00000	1.07891	0.00000	0.15661	0.00000
152901A	0.85973	0.00000	-0.09592	0.00000	0.27361	0.00000
152915A	0.64988	0.00000	0.22736	0.00000	0.19819	0.00000
153291A	1.09177	0.00000	0.33669	0.00000	0.31373	0.00000
153299A	1.10351	0.00000	0.71296	0.00000	0.12360	0.00000
153485A	2.41007	0.00000	0.61676	0.00000	0.40936	0.00000
153504A	0.80951	0.00000	0.53848	0.00000	0.05250	0.00000
155126A	0.93939	0.00000	1.26760	0.00000	0.11246	0.00000
155443A	1.03565	0.00000	0.49933	0.00000	0.11551	0.00000
182026A	0.85595	0.00000	0.78331	0.00000	0.56690	0.00000
182027A	0.67406	0.00000	0.79889	0.00000	0.25261	0.00000
480259	0.68976	0.00000	1.25784	0.00000	0.24663	0.00000
480287	0.87991	0.00000	0.79699	0.00000	0.24585	0.00000
480295	1.42373	0.00000	1.19531	0.00000	0.24692	0.00000
480307	1.03662	0.00000	2.29992	0.00000	0.24264	0.00000
480339	1.00049	0.00000	0.90521	0.00000	0.10091	0.00000
489119	1.51222	0.00000	1.20791	0.00000	0.14224	0.00000
489176	3.08877	0.00000	0.32594	0.00000	0.25751	0.00000
490454	2.31335	0.00000	1.52358	0.00000	0.24478	0.00000
636508	0.88755	0.00000	0.30367	0.00000	0.21466	0.00000
636512	1.12777	0.00000	0.64684	0.00000	0.10803	0.00000
480360	0.89831	0.00000	1.39863	0.00000	0.00000	0.00000
480373	1.03467	0.00000	1.16991	0.00000	0.00000	0.00000
480380	1.34688	0.00000	1.29429	0.00000	0.00000	0.00000
CB23120	1.37398	0.04208	1.41549	0.01578	0.15630	0.00243
CB23921	0.09831	0.00000	0.00000	0.55516	0.00000	0.00000
CB52883	0.84135	0.03750	2.12827	0.04453	0.09294	0.00280
CB56794	0.08831	0.00000	0.00000	0.49271	0.00000	0.00000
CB57198	1.59362	0.07356	1.82269	0.02483	0.23000	0.00000



Table 2.6.23
IRT Parameters for Dichotomous Items
Mathematics Grade 8

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
148061A	1.58634	0.00000	0.63668	0.00000	0.15996	0.00000
148303A	0.94524	0.00000	0.53217	0.00000	0.14915	0.00000
148327A	1.12173	0.00000	0.20442	0.00000	0.07182	0.00000
148379A	0.96278	0.00000	-0.44119	0.00000	0.13413	0.00000
148689A	1.68837	0.00000	0.57645	0.00000	0.13528	0.00000
149067A	1.09496	0.00000	-0.38953	0.00000	0.19247	0.00000
150198A	1.10518	0.00000	0.20263	0.00000	0.03228	0.00000
150202A	0.97606	0.00000	0.39600	0.00000	0.22000	0.00000
150215A	0.93494	0.00000	0.85277	0.00000	0.30412	0.00000
150218A	1.03004	0.00000	0.12818	0.00000	0.21293	0.00000
150223A	1.40195	0.00000	-0.57932	0.00000	0.11125	0.00000
151253A	1.26277	0.00000	0.43410	0.00000	0.23753	0.00000
151283A	0.81112	0.00000	0.07368	0.00000	0.08460	0.00000
153423A	1.02615	0.00000	-0.22608	0.00000	0.37357	0.00000
154159A	0.61084	0.00000	-0.32463	0.00000	0.19348	0.00000
154160A	1.17316	0.00000	0.84994	0.00000	0.34575	0.00000
154320A	0.57490	0.00000	0.15987	0.00000	0.19188	0.00000
161462A	1.99506	0.00000	0.28176	0.00000	0.18291	0.00000
183763A	1.31887	0.00000	1.45787	0.00000	0.22301	0.00000
183764A	1.01645	0.00000	1.02338	0.00000	0.26777	0.00000
183795A	0.95736	0.00000	0.94552	0.00000	0.18734	0.00000
183885A	0.60400	0.00000	-0.02954	0.00000	0.19208	0.00000
484772	0.90127	0.00000	0.74128	0.00000	0.26668	0.00000
484815	1.12558	0.00000	1.41248	0.00000	0.24618	0.00000
484821	1.52782	0.00000	0.18013	0.00000	0.28283	0.00000
484823	1.24185	0.00000	-0.41766	0.00000	0.33602	0.00000
484828	0.73496	0.00000	-0.05399	0.00000	0.26170	0.00000
484841	1.50919	0.00000	1.77775	0.00000	0.16800	0.00000
484853	1.02545	0.00000	-0.65776	0.00000	0.00000	0.00000
484860	1.69535	0.00000	1.34449	0.00000	0.25604	0.00000
484866	1.06286	0.00000	0.86709	0.00000	0.14097	0.00000
484873	0.55998	0.00000	1.44111	0.00000	0.20725	0.00000
484877	0.83970	0.00000	-0.10257	0.00000	0.35326	0.00000
484881	0.42347	0.00000	-1.03358	0.00000	0.00000	0.00000
484977	0.73084	0.00000	1.11493	0.00000	0.27666	0.00000
490067	1.27551	0.00000	0.26947	0.00000	0.10628	0.00000
490116	1.29485	0.00000	0.74888	0.00000	0.39612	0.00000
490151	1.36213	0.00000	0.92008	0.00000	0.22325	0.00000
636559	1.41176	0.00000	0.82246	0.00000	0.28812	0.00000
636567	1.63307	0.00000	0.80367	0.00000	0.39704	0.00000
636602	1.29510	0.00000	1.73315	0.00000	0.14120	0.00000
636610	0.74089	0.00000	-0.36991	0.00000	0.29883	0.00000
484739	0.62904	0.00000	3.10506	0.00000	0.00000	0.00000
484750	0.44742	0.00000	1.81757	0.00000	0.00000	0.00000
484766	0.35934	0.00000	-0.30636	0.00000	0.00000	0.00000
CB23158	1.79439	0.05232	1.34398	0.01227	0.14725	0.00208
CB30135	1.50326	0.03964	1.14991	0.01234	0.17594	0.00253
CB48551	0.89578	0.02317	0.88969	0.01558	0.14651	0.00443
CB52933	0.89979	0.04898	2.36503	0.05726	0.13726	0.00268
CB6713	0.31031	0.03161	0.55116	0.24863	0.40933	0.03721

Table 2.6.25
IRT Parameters for Dichotomous Items
Science Grade 5

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
184387A	1.08313	0.00000	0.03340	0.00000	0.24463	0.00000
184423A	0.99798	0.00000	0.67790	0.00000	0.27734	0.00000
185413A	1.13834	0.00000	0.89080	0.00000	0.17450	0.00000
186483A	0.43178	0.00000	0.35127	0.00000	0.25337	0.00000
186489A	0.76669	0.00000	0.30305	0.00000	0.22766	0.00000
186490A	0.57449	0.00000	1.11827	0.00000	0.23040	0.00000
186754A	0.73236	0.00000	-0.79776	0.00000	0.15008	0.00000
186756A	0.71098	0.00000	-0.20859	0.00000	0.34444	0.00000
186759A	1.11714	0.00000	-0.77861	0.00000	0.23988	0.00000
187487A	0.73316	0.00000	0.83345	0.00000	0.23188	0.00000
187491A	0.75906	0.00000	1.40992	0.00000	0.24546	0.00000
187497A	1.30568	0.00000	1.25510	0.00000	0.20715	0.00000
187503A	0.57430	0.00000	0.72299	0.00000	0.25602	0.00000
187505A	0.70457	0.00000	-1.36266	0.00000	0.16783	0.00000
187510A	1.20537	0.00000	-1.39798	0.00000	0.33812	0.00000
188334A	0.65643	0.00000	1.01307	0.00000	0.24007	0.00000
188338A	1.12748	0.00000	0.22007	0.00000	0.29700	0.00000
188340A	0.98855	0.00000	0.04988	0.00000	0.22559	0.00000
188698A	1.00381	0.00000	0.80678	0.00000	0.18267	0.00000
188699A	0.72537	0.00000	0.39987	0.00000	0.23992	0.00000
188700A	0.84247	0.00000	0.48177	0.00000	0.16281	0.00000
188717A	0.97237	0.00000	-0.52254	0.00000	0.18366	0.00000
188718A	1.19594	0.00000	-1.19357	0.00000	0.20314	0.00000
188720A	0.85629	0.00000	-1.46077	0.00000	0.04077	0.00000
189235A	0.64964	0.00000	-1.18430	0.00000	0.06014	0.00000
189237A	0.99472	0.00000	0.19806	0.00000	0.22949	0.00000
189238A	0.55606	0.00000	0.68155	0.00000	0.24757	0.00000
189340A	1.17013	0.00000	-0.44897	0.00000	0.22185	0.00000
189341A	0.65855	0.00000	-0.01229	0.00000	0.16546	0.00000
189345A	0.99038	0.00000	1.20128	0.00000	0.22452	0.00000
189356A	0.86395	0.00000	0.51905	0.00000	0.15916	0.00000
189358A	1.24853	0.00000	0.69985	0.00000	0.32550	0.00000
189361A	0.98006	0.00000	-1.22359	0.00000	0.24385	0.00000
437226	0.98158	0.00000	-0.39807	0.00000	0.14582	0.00000
437231	0.68109	0.00000	-0.30386	0.00000	0.16269	0.00000
437235	0.54844	0.00000	-0.69740	0.00000	0.09595	0.00000
437241	1.15528	0.00000	0.11484	0.00000	0.18450	0.00000
437243	0.85149	0.00000	1.00965	0.00000	0.22020	0.00000
437245	1.03726	0.00000	0.81493	0.00000	0.17498	0.00000
638751	0.21837	0.00000	0.80767	0.00000	0.00000	0.00000
638753	0.56929	0.00000	0.96096	0.00000	0.24798	0.00000
638755	0.70648	0.00000	1.11587	0.00000	0.34395	0.00000
638783	0.81124	0.00000	0.52727	0.00000	0.24973	0.00000
638785	1.17517	0.00000	0.72420	0.00000	0.30145	0.00000
638787	0.61290	0.00000	1.03988	0.00000	0.15369	0.00000

Table 2.6.27
IRT Parameters for Dichotomous Items
Science Grade 8

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
185899A	1.32080	0.00000	-0.02827	0.00000	0.25293	0.00000
185901A	1.10401	0.00000	1.63294	0.00000	0.21896	0.00000
185916A	0.98515	0.00000	0.08882	0.00000	0.24672	0.00000
186154A	0.89714	0.00000	1.39350	0.00000	0.21415	0.00000
186293A	0.42694	0.00000	0.84758	0.00000	0.15958	0.00000
186309A	0.74313	0.00000	0.50279	0.00000	0.19494	0.00000
186321A	0.79304	0.00000	0.27074	0.00000	0.22650	0.00000
186325A	0.79219	0.00000	-0.79571	0.00000	0.23979	0.00000
186364A	0.68865	0.00000	0.31625	0.00000	0.08293	0.00000
187032A	0.77065	0.00000	-0.19807	0.00000	0.15772	0.00000
187038A	0.59606	0.00000	-0.22845	0.00000	0.04566	0.00000
187047A	0.71180	0.00000	1.06131	0.00000	0.24416	0.00000
188149A	0.55997	0.00000	0.86200	0.00000	0.31975	0.00000
188150A	1.15881	0.00000	0.43725	0.00000	0.25487	0.00000
188153A	0.96359	0.00000	0.71967	0.00000	0.15472	0.00000
188312A	1.41572	0.00000	1.61317	0.00000	0.23598	0.00000
188317A	0.88935	0.00000	-0.69426	0.00000	0.16797	0.00000
188328A	1.01306	0.00000	-0.27799	0.00000	0.04825	0.00000
188332A	1.25299	0.00000	0.21208	0.00000	0.26110	0.00000
188846A	0.42040	0.00000	0.17184	0.00000	0.07858	0.00000
188847A	0.87370	0.00000	0.02973	0.00000	0.14451	0.00000
188849A	0.58448	0.00000	0.44281	0.00000	0.14869	0.00000
189061A	0.96888	0.00000	0.70804	0.00000	0.17190	0.00000
189076A	0.79455	0.00000	0.23591	0.00000	0.29344	0.00000
189080A	0.52061	0.00000	-0.26261	0.00000	0.12148	0.00000
189438A	0.63982	0.00000	0.96797	0.00000	0.34414	0.00000
189440A	0.31891	0.00000	-0.48402	0.00000	0.17111	0.00000
189442A	0.98972	0.00000	-1.00059	0.00000	0.12864	0.00000
300093A	1.03571	0.00000	-0.23823	0.00000	0.19312	0.00000
300095A	1.13681	0.00000	0.80463	0.00000	0.24234	0.00000
300097A	1.17761	0.00000	-0.34120	0.00000	0.20855	0.00000
437757	1.26702	0.00000	0.67357	0.00000	0.22830	0.00000
437771	0.81424	0.00000	0.72194	0.00000	0.21090	0.00000
437788	0.51068	0.00000	1.21488	0.00000	0.16844	0.00000
437995	1.19895	0.00000	0.68630	0.00000	0.20874	0.00000
437999	1.19542	0.00000	0.01087	0.00000	0.19371	0.00000
638857	0.62664	0.00000	1.12024	0.00000	0.36723	0.00000
638862	0.83760	0.00000	1.07552	0.00000	0.28346	0.00000
638866	0.94398	0.00000	1.08468	0.00000	0.27711	0.00000
638873	0.89801	0.00000	1.58366	0.00000	0.19220	0.00000
638875	0.48963	0.00000	1.51351	0.00000	0.32187	0.00000
638883	0.52556	0.00000	-0.91293	0.00000	0.10810	0.00000

Table 2.6.28
IRT Parameters for Polytomous Items
Science Grade 8

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
438018	0.31804	0.00000	0.25874	0.00000	1.28125	0.00000	-1.28125	0.00000	0.00000	0.00000
494074	1.02367	0.00000	-1.15646	0.00000	0.30611	0.00000	-0.30611	0.00000	0.00000	0.00000
494991	0.63987	0.00000	-1.04464	0.00000	0.70006	0.00000	-0.70006	0.00000	0.00000	0.00000

Table 2.6.29
IRT Parameters for Dichotomous Items
Science Grade 11

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
186972A	0.68389	0.00000	1.31521	0.00000	0.18848	0.00000
186989A	1.06741	0.00000	0.45358	0.00000	0.22703	0.00000
186992A	0.73284	0.00000	-0.50007	0.00000	0.02151	0.00000
187933A	1.01420	0.00000	-0.77622	0.00000	0.08294	0.00000
187935A	0.66172	0.00000	-0.28563	0.00000	0.03566	0.00000
187938A	0.59009	0.00000	-0.78203	0.00000	0.02645	0.00000
188657A	0.85110	0.03749	1.48803	0.02488	0.37720	0.00572
188658A	1.14610	0.05289	1.84966	0.02491	0.32656	0.00371
188659A	0.39933	0.01582	0.68616	0.06937	0.05996	0.01998
188833A	1.12657	0.04270	1.72892	0.02023	0.25385	0.00365
188834A	1.40701	0.03818	1.20145	0.01225	0.28696	0.00368
188835A	1.62959	0.03471	0.81907	0.00964	0.25677	0.00371
188947A	0.71364	0.00000	1.57494	0.00000	0.19840	0.00000
188949A	0.65890	0.00000	2.03761	0.00000	0.16226	0.00000
188952A	0.49092	0.00000	0.54383	0.00000	0.05978	0.00000
439192	1.03543	0.02717	1.16140	0.01407	0.19690	0.00446
439200	1.42274	0.00000	1.15726	0.00000	0.30867	0.00000
439206	0.88025	0.00000	1.80442	0.00000	0.24859	0.00000
439223	1.67024	0.00000	1.23208	0.00000	0.19894	0.00000
439239	1.21144	0.00000	1.48985	0.00000	0.22723	0.00000
457186	1.53520	0.00000	0.46379	0.00000	0.14419	0.00000
457197	0.91596	0.00000	0.99417	0.00000	0.18739	0.00000
457199	1.02453	0.00000	1.21847	0.00000	0.19859	0.00000
586027	0.77538	0.00000	1.29266	0.00000	0.15617	0.00000
586029	1.01547	0.00000	0.62514	0.00000	0.17267	0.00000
586031	1.10928	0.00000	0.35964	0.00000	0.23458	0.00000
586051	1.27618	0.00000	1.15261	0.00000	0.32330	0.00000
586069	1.11773	0.00000	1.63552	0.00000	0.30274	0.00000
586218	1.65982	0.00000	0.52243	0.00000	0.29535	0.00000
586631	0.73623	0.00000	1.56320	0.00000	0.04339	0.00000
586636	0.54971	0.00000	-0.23701	0.00000	0.08671	0.00000
586640	0.75147	0.00000	2.19458	0.00000	0.15041	0.00000
586649	1.27720	0.00000	0.93152	0.00000	0.24814	0.00000
586655	0.75189	0.00000	1.18518	0.00000	0.17680	0.00000
586691	1.29009	0.00000	1.52837	0.00000	0.35255	0.00000
586693	1.32939	0.00000	1.05134	0.00000	0.25995	0.00000
586701	1.10292	0.00000	0.94130	0.00000	0.25512	0.00000
586709	2.05604	0.00000	1.01130	0.00000	0.18441	0.00000
586711	1.34470	0.00000	1.48778	0.00000	0.26943	0.00000

Table 2.6.29 (continued)
IRT Parameters for Dichotomous Items
Science Grade 11

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
591949	1.53067	0.00000	1.32218	0.00000	0.27075	0.00000
592069	1.06862	0.00000	-0.01573	0.00000	0.06665	0.00000
592071	0.96576	0.00000	-0.44555	0.00000	0.14965	0.00000
592073	1.00262	0.00000	1.65738	0.00000	0.18418	0.00000
593424	1.83578	0.00000	1.45396	0.00000	0.31337	0.00000
593426	1.38580	0.00000	0.69318	0.00000	0.25282	0.00000
594373	1.01876	0.00000	1.48172	0.00000	0.19376	0.00000
594375	0.54647	0.00000	0.84115	0.00000	0.15131	0.00000
594379	1.02133	0.00000	1.91961	0.00000	0.15673	0.00000
603684	0.57799	0.00000	0.53622	0.00000	0.07107	0.00000
638964	0.73754	0.00000	1.99054	0.00000	0.33669	0.00000
638968	0.95789	0.00000	1.12585	0.00000	0.14058	0.00000
638970	0.59926	0.00000	1.65808	0.00000	0.16443	0.00000
639009	1.33901	0.00000	1.58752	0.00000	0.23617	0.00000
639014	1.68383	0.00000	1.15798	0.00000	0.20932	0.00000
639018	1.98784	0.00000	1.77353	0.00000	0.21251	0.00000
656455	1.19685	0.00000	1.89312	0.00000	0.25172	0.00000
656457	1.12789	0.00000	1.12891	0.00000	0.33648	0.00000
656465	1.21415	0.00000	1.14962	0.00000	0.19316	0.00000

Table 2.6.30
IRT Parameters for Polytomous Items
Science Grade 11

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
439259	0.49970	0.00000	-0.32424	0.00000	1.96167	0.00000	-1.96167	0.00000	0.00000	0.00000
586659	0.79250	0.00000	-0.31800	0.00000	0.94045	0.00000	-0.94045	0.00000	0.00000	0.00000

Section 2.7

Decision Accuracy and Consistency (DAC)



Table 2.7.1
 DAC Results
 English Language Arts Grade 3

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46090	0.92	0.58	Overall	0.80	0.72	0.13	0.08
			Cut 1	0.91	0.88	0.05	0.03
			Cut 2	0.92	0.88	0.04	0.04
			Cut 3	0.96	0.95	0.03	0.00
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.88	0.85		
			Perf 2	0.75	0.66		
			Perf 3	0.69	0.59		
			Perf 4	0.69	0.44		

Table 2.7.2
 DAC Results
 English Language Arts Grade 4

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
45579	0.91	0.59	Overall	0.81	0.73	0.11	0.09
			Cut 1	0.91	0.88	0.04	0.04
			Cut 2	0.92	0.88	0.04	0.04
			Cut 3	0.98	0.97	0.02	0.00
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.90	0.85		
			Perf 2	0.75	0.65		
			Perf 3	0.70	0.62		
			Perf 4	1.00	0.31		

Table 2.7.3
 DAC Results
 English Language Arts Grade 5

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46431	0.93	0.59	Overall	0.79	0.71	0.12	0.09
			Cut 1	0.93	0.90	0.04	0.03
			Cut 2	0.91	0.88	0.04	0.05
			Cut 3	0.94	0.93	0.05	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.89	0.84		
			Perf 2	0.81	0.74		
			Perf 3	0.66	0.58		
			Perf 4	0.65	0.43		

Table 2.7.4
 DAC Results
 English Language Arts Grade 6

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
47197	0.92	0.60	Overall	0.80	0.73	0.11	0.09
			Cut 1	0.93	0.90	0.04	0.03
			Cut 2	0.91	0.88	0.03	0.05
			Cut 3	0.96	0.95	0.04	0.00
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.88	0.82		
			Perf 2	0.84	0.77		
			Perf 3	0.65	0.59		
			Perf 4	1.00	0.42		



Table 2.7.5
 DAC Results
 English Language Arts Grade 7

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
47139	0.90	0.54	Overall	0.73	0.71	0.05	0.22
			Cut 1	0.90	0.87	0.02	0.09
			Cut 2	0.88	0.87	0.01	0.11
			Cut 3	0.95	0.95	0.02	0.03
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.95	0.86		
			Perf 2	0.69	0.64		
			Perf 3	0.48	0.49		
			Perf 4	0.43	0.33		

Table 2.7.6
 DAC Results
 English Language Arts Grade 8

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
47293	0.90	0.54	Overall	0.77	0.69	0.13	0.10
			Cut 1	0.92	0.88	0.04	0.04
			Cut 2	0.90	0.86	0.04	0.06
			Cut 3	0.94	0.93	0.05	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.88	0.82		
			Perf 2	0.81	0.74		
			Perf 3	0.53	0.45		
			Perf 4	0.67	0.44		

Table 2.7.7
 DAC Results
 Mathematics Grade 3

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46033	0.93	0.61	Overall	0.80	0.72	0.10	0.09
			Cut 1	0.92	0.89	0.04	0.04
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.96	0.94	0.02	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.89	0.83		
			Perf 2	0.78	0.70		
			Perf 3	0.70	0.59		
			Perf 4	0.79	0.67		

Table 2.7.8
 DAC Results
 Mathematics Grade 4

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
45530	0.93	0.59	Overall	0.79	0.71	0.12	0.09
			Cut 1	0.93	0.90	0.05	0.03
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.94	0.92	0.04	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.88	0.85		
			Perf 2	0.80	0.72		
			Perf 3	0.61	0.50		
			Perf 4	0.76	0.61		



Table 2.7.9
 DAC Results
 Mathematics Grade 5

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46348	0.93	0.62	Overall	0.81	0.74	0.10	0.08
			Cut 1	0.93	0.90	0.04	0.03
			Cut 2	0.93	0.90	0.03	0.04
			Cut 3	0.96	0.94	0.03	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.89	0.85		
			Perf 2	0.83	0.77		
			Perf 3	0.61	0.49		
			Perf 4	0.78	0.63		

Table 2.7.10
 DAC Results
 Mathematics Grade 6

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
47153	0.93	0.62	Overall	0.82	0.75	0.10	0.08
			Cut 1	0.92	0.89	0.05	0.03
			Cut 2	0.93	0.90	0.03	0.04
			Cut 3	0.97	0.96	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.87	0.83		
			Perf 2	0.84	0.77		
			Perf 3	0.67	0.56		
			Perf 4	0.78	0.60		

Table 2.7.11
 DAC Results
 Mathematics Grade 7

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
47077	0.91	0.58	Overall	0.81	0.75	0.12	0.07
			Cut 1	0.90	0.87	0.06	0.03
			Cut 2	0.93	0.90	0.04	0.03
			Cut 3	0.98	0.97	0.02	0.00
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.89	0.88		
			Perf 2	0.68	0.57		
			Perf 3	0.73	0.60		
			Perf 4	0.76	0.52		

Table 2.7.12
 DAC Results
 Mathematics Grade 8

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46900	0.93	0.55	Overall	0.81	0.76	0.11	0.08
			Cut 1	0.92	0.89	0.03	0.04
			Cut 2	0.93	0.90	0.03	0.04
			Cut 3	0.95	0.94	0.05	0.00
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.95	0.92		
			Perf 2	0.67	0.55		
			Perf 3	0.42	0.35		
			Perf 4	1.00	0.38		



Table 2.7.13
 DAC Results
 Science Grade 5

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46250	0.91	0.56	Overall	0.78	0.70	0.13	0.09
			Cut 1	0.92	0.89	0.05	0.03
			Cut 2	0.90	0.86	0.05	0.05
			Cut 3	0.96	0.94	0.03	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.83	0.78		
			Perf 2	0.79	0.71		
			Perf 3	0.73	0.64		
			Perf 4	0.67	0.45		

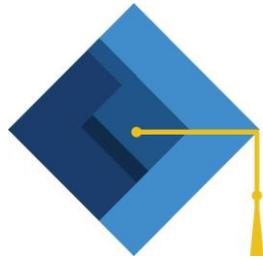
Table 2.7.14
 DAC Results
 Science Grade 8

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
46787	0.91	0.55	Overall	0.77	0.70	0.13	0.10
			Cut 1	0.91	0.87	0.05	0.04
			Cut 2	0.91	0.87	0.04	0.05
			Cut 3	0.95	0.93	0.03	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.89	0.85		
			Perf 2	0.60	0.49		
			Perf 3	0.72	0.63		
			Perf 4	0.67	0.47		

Table 2.7.15
 DAC Results
 Science Grade 11

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
42566	0.94	0.57	Overall	0.79	0.73	0.13	0.09
			Cut 1	0.93	0.90	0.04	0.03
			Cut 2	0.92	0.89	0.03	0.05
			Cut 3	0.93	0.93	0.06	0.00
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.93	0.89		
			Perf 2	0.72	0.61		
			Perf 3	0.56	0.51		
			Perf 4	0.23	0.41		

APPENDIX O
2017 OSTP STANDARD SETTING
REPORT



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —

Oklahoma School Testing Program

Standard Setting Report

August 7– 11, 2017

Oklahoma City, OK



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Chapter 1. OVERVIEW OF STANDARD SETTING PROCEDURES

The purpose of this report is to summarize the activities involved in the standard setting process for the Oklahoma School Testing Program (OSTP) assessments in grades 3–8 and high school English languages arts (ELA) and mathematics as well as grades 5 and 8 and high school science on behalf of the Oklahoma State Department of Education (SDE). The need for standard setting arises from the fact that this is a new assessment that was administered for the first time in 2017. For these new assessments, performance standards must be set. The primary goal of the standard setting was to determine the knowledge, skills, and abilities (KSAs) that students must demonstrate in order to be classified into each of the student status levels (performance levels).

The standard setting process used was the bookmark procedure (see, e.g., Lewis et al., 1996; Mitzel et al., 2000; Cizek & Bunch, 2007). There were two main reasons this method was chosen. First, the assessment consists primarily of multiple-choice items but also includes some constructed-response items, and the bookmark procedure is appropriate for use with assessments that contain primarily or exclusively multiple-choice items, scaled using item response theory (IRT; Cizek & Bunch, 2007). Second, the modified bookmark method has been used successfully to establish performance standards for SDE in the past (CTB/McGraw-Hill, 2013, 2014; Measured Progress, 2015).

The standard setting meeting was held between August 7 and August 11, 2017. In all, 111 panelists participated in the process and were organized into eight panels of 8–11 panelists each plus a facilitator provided by Measured Progress.

This report is organized into three major sections, describing tasks completed prior to, during, and after the standard setting meeting.

Chapter 2. TASKS COMPLETED PRIOR TO THE STANDARD SETTING MEETING

2.1 Creation of Performance Level Descriptors

Oklahoma State Statute: Title 70. Schools, Chapter 22 – Testing and Assessment, Section 1210.541 – Student Performance Levels and Cut Scores – Accountability System mandates the adoption of “a series of student performance levels and the corresponding cut scores pursuant to the Oklahoma School Testing Program Act.” The law states that performance levels must be labeled and defined as follows:

1. Advanced, which shall indicate that students demonstrate superior performance on challenging subject matter;
2. Proficient, which shall indicate that students demonstrate mastery over appropriate grade-level subject matter and that students are ready for the next grade, course, or level of education, as applicable;
3. Limited knowledge, which shall indicate that students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level or course; and
4. Unsatisfactory, which shall indicate that students have not performed at least at the limited knowledge level.

In March 2016, the 62 Oklahoma educators who formed the English language arts (ELA) and mathematics Performance Level Descriptor (PLD) committees, members of the SDE, and six Measured Progress staff members met for a three-day PLD writing meeting in Oklahoma City and two additional two-hour conference calls. In July 2016, the 29 Oklahoma educators who formed the science PLD committees, members of the Oklahoma SDE, and three Measured Progress staff members met for another three-day PLD writing meeting in Oklahoma City. The purpose of the meetings was to write PLDs that describe what students know and are able to display on a statewide assessment of the Oklahoma academic standards. The descriptors are used to provide a common understanding of each performance level for recommending cut scores during standard setting and to inform stakeholders on how to interpret student test scores.

After introductions of those in attendance at the PLD writing meetings, a brief overview of the purpose of PLDs, and an explanation of the PLD writing process, the Oklahoma PLD committees used the standards and the SDE test and item specifications document to begin development of the PLDs. To ensure that the committee members focused on the state-adopted standards and objectives, the committee members were not shown any items that appeared on the assessment.

Independently, PLD committee members filled in the PLD tables by writing down the skills and knowledge students would demonstrate in the Advanced, Proficient, and Limited Knowledge levels for each standard and objective. After the individual work was completed, the group discussed and arrived at a consensus on the wording for the performance levels. As a final step, the PLD committee members reviewed and revised the suggested wording for each level to ensure appropriateness and consistency, and that each level indicated a trajectory of students’ knowledge of the content.

2.2 Preparation of Materials for Panelists

The following materials were assembled for presentation to the panelists at the standard setting meeting:

- PLDs
- Meeting agendas
- Nondisclosure forms
- Test booklets
- Answer keys/scoring rubrics
- Ordered item booklets
- Item map forms
- Rating forms
- Evaluation forms

Copies of the PLDs, meeting agenda, nondisclosure form, sample item map form, sample rating form, and evaluation form are included in Appendices A through F.

2.3 Preparation of Presentation Materials

The PowerPoint presentation used in the opening session was prepared prior to the meeting. A copy of the presentation is included in Appendix G.

2.4 Preparation of Instructions for Facilitators

Scripts were created for the group facilitators to refer to while working through each step of the standard setting process. This document is included in Appendix H. The facilitators also attended a training session, led by a Measured Progress psychometrician, approximately four weeks before the standard setting. The purpose of the training was to prepare the facilitators for the panel activities and to ensure consistency in the implemented procedures.

2.5 Preparation of Systems and Materials for Analysis During the Meeting

The computational programming used to calculate cutpoints and impact data during the standard setting meeting was completed and thoroughly tested prior to the standard setting meeting. See Section 3.3.2, Round 1 Judgments and Results, for a description of the analyses performed during standard setting.

2.6 Selection of Panelists

As emphasized in Cizek and Bunch (2007), regardless of the method used, the selection of panelists is an important factor in determining standard setting outcomes and maximizing the validity of the standard setting process. The guidance provided by *Standards for Educational and Psychological Testing* (AERA et al., 1999) states that “a sufficiently large and representative group of judges should be involved to provide reasonable assurance that results would not vary greatly if the process were repeated.” Consistent with the above guidance, as well as practical considerations regarding the maximum size of a group that can be successfully managed, the goal was to recruit standard setting panels each with 10–12 members representing different stakeholder groups to set standards for each grade. Targets for the size and composition of the panels were also consistent with federal guidelines as described in *Standards and Assessment Peer Review Guidance: Information and examples for meeting requirements of the No Child Left Behind Act of 2001* (U.S. Department of Education, 2009).

Panelists were selected by the SDE prior to the standard setting meeting. The goal was for each panel to include participants who are primarily teachers but also to include school administrators, higher education personnel, and stakeholders from other interest groups. Moreover, to the extent possible, panelists were selected to reflect a balance of gender, race/ethnicity, and geographic location. Finally, panelists were selected who were familiar not only with the subject matter but also with the grade for which they would be setting standards. A list of the panelists is included in Appendix I.

Chapter 3. TASKS COMPLETED DURING THE STANDARD SETTING MEETING

3.1 Overview of the Bookmark Method

The bookmark method (Lewis et al., 1996; Mitzel et al., 2000; Cizek & Bunch, 2007) involves rank ordering the items by difficulty and asking the panelists to identify the point in the ordered set of items at which the students at the borderline of two adjacent performance levels no longer have at least a two-thirds chance of answering the item correctly.

3.2 General Orientation and Panelist Training

With regard to panelist training, *Standards for Educational and Psychological Testing* (AERA et al., 2014) states the following:

Care must be taken to assure these persons understand what they are to do and that their judgments are as thoughtful and objective as possible. The process must be such that well-qualified participants can apply their knowledge and experience to reach meaningful and relevant judgments that accurately reflect their understandings and intentions. (p. 101)

The training of the panelists began with a general orientation session at the start of the standard setting meeting. The purpose of the orientation was to ensure that all panelists received the same information about the need for and goals of standard setting and about their part in the process. The orientation consisted of three parts. First, Oklahoma State Superintendent of Education Joy Hofmeister provided an overview of education policy in the state of Oklahoma followed by more specific assessment context provided by t Assistant Executive Director of State Assessments for SDE Maria Harris. Next, a Measured Progress psychometrician, Dr. Matthew Gushta, presented a brief overview of the bookmark procedure and the activities that would occur during the standard setting meeting. Finally, Measured Progress Portfolio Manager Julie DiBona provided panelists with various logistical information (e.g., materials review, content security, attendance).

An additional presentation was provided to English language arts (ELA) panelists specifically regarding the writing prompts administered in grades 5, 8, and 10. Student responses to these items were formula-scored based on five substantive rubrics, generating an overall writing composite score. This composite score could be the result of numerous combinations of rubric scores; this formula-scoring approach was described to the panelists, and the most frequent rubric score combinations for each grade and composite score were presented.

Once the general orientation was complete, panelists convened in break-out rooms associated with their specific subject and grade span (i.e., ELA and mathematics, grades 3/4, 5/6, and 7/8) or single grades (i.e., ELA and mathematics 10; science 5, 8, and 10), where they received more detailed training and completed the standard setting activities.

3.3 Table Leader Training

During breakfast on Day 1, the two table leaders identified for each panel attended a brief training session led by Measured Progress Test Development Manager David Harrison. During this training, expectations for the table leaders were set to include: leading panelist review of the ordered item booklet, leading panelist development of borderline descriptors, facilitation of panel discussion, collection and review of standard setting materials, control of secure materials, and attendance at vertical articulation (for ELA and mathematics participants). Table leaders were expected to support the lead facilitators in ensuring that discussion and logistics within panels were conducted fairly and efficiently; introductions were made at this time to the Measured Progress staff members who served as lead facilitators in their respective rooms

3.4 Review of Assessment Materials

The first step after the opening session was for the panelists to take the test. The purpose of this step was to familiarize the panelists with the assessment and what it asks students to do. Once panelists completed the test, the answer key was distributed. At this point, panelists were encouraged to discuss any issues regarding items or scoring. For grade-span panels, review of materials and all subsequent activities proceeded for the lower grade first followed by the upper grade as indicated in the meeting agenda (see Appendix B).

3.5 Review of Performance Level Descriptors and Definition of Borderline Students

Next, panelists reviewed the Performance Level Descriptors (PLDs). This important step was designed to ensure that panelists thoroughly understood the knowledge, skills, and abilities (KSAs) needed for students to be classified into performance levels (Unsatisfactory, Limited Knowledge, Proficient, and Advanced). Panelists first reviewed the PLDs on their own and then participated in group discussion of the PLDs, clarifying each level. Afterward, panelists developed consensus definitions of borderline students—that is, students who have only barely qualified for a particular performance level. Bulleted lists of characteristics for each level were generated based on the whole-group discussion and posted in the room for reference throughout the bookmark process. Note that the purpose of this step was to clarify and add specificity to the PLDs based on the KSAs, paying particular attention to the definitions of the borderline students.

The bulleted lists were developed as working documents to be used by the panelists for the purposes of standard setting. They supplemented the PLDs, which provide the official definition of what it means for a student to be classified into each performance level, by specifically addressing the KSAs that define the borderline of each level.

The PLDs are provided in Appendix A.

3.6 Completion of the Item Map Form

Each panelist then reviewed the ordered item booklet item by item, considering the KSAs students needed to answer each one. The ordered item booklet contained one item per page, ordered from the easiest item to the most difficult item. The ordered item booklet was created by sorting the items according to their item response theory (IRT)-based difficulty values ($RP_{0.67}$ was used). A three-parameter logistic IRT model was used to calculate the $RP_{0.67}$ values for dichotomous items.

Panelists then completed the item map form. The item map form listed the items in the same order as they were presented in the ordered item booklet; the form included space for the panelists to write in the KSAs required to answer each item correctly as well as indicating why they believed each item was more difficult than the previous one.

Additionally, the item map form was shaded to indicate regions of comparability to NAEP Proficiency (grades 3 through 8) or ACT Benchmark (grade 10), as shown in Table 3-1. Item map entries that would produce percentages of students at or above Proficient comparable to those external assessments were identified as benchmarking items. The shaded region on the item map form was then calculated as ± 2 standard errors around the IRT-based difficulty of the OSTP benchmarking items.

Table 3-1: OSTP Standard Setting Benchmarking Regions

<i>Subject</i>	<i>Grade</i>	<i>External Assessment</i>	<i>Percentage*</i>	<i>OIB Shaded Region</i>
English Language Arts	3	NAEP	34**	25-45
	4	NAEP	33	26-45
	5	NAEP	32	31-51
	6	NAEP	31	33-51
	7	NAEP	30	30-50
	8	NAEP	29	33-51
	10	ACT	37	25-55
Mathematics	3	NAEP	40.5	33-51
	4	NAEP	37	27-47
	5	NAEP	33.5	29-46
	6	NAEP	30	27-41
	7	NAEP	26.5	21-37
	8	NAEP	23	18-40
	10	ACT	25	17-37
Science	5	NAEP	34	17-38
	8	NAEP	28	18-43
	10	ACT	24	12-33

* Percentage of students at or above Proficient (NAEP) or Benchmark (ACT).

** NAEP grades 4 and 8 ELA and mathematics used to generate linear interpolations of grades 3, 5, 6, and 7.

After they finished working individually, panelists had the opportunity to discuss the item map form as a group and make necessary additions or adjustments. The purpose of this step was to ensure that panelists became familiar with the ordered item booklet and understood the relationships among the ordered items.

3.7 Rating Rounds and Feedback

3.7.1 Practice Round

Next, the panelists completed a practice round of ratings. The purpose of the practice round was to familiarize the panelists with all the materials they would be using for the standard setting process and to walk them through the process of placing bookmarks. In addition to the PLDs and borderline descriptions, panelists were given a practice ordered item booklet, which consisted of 10 items representing the range of difficulty on the test, and a practice rating form.

The facilitator explained what each of the materials was and how panelists would use it to make their ratings. Then, beginning with the first ordered item and considering the skills and abilities needed to complete it, panelists were instructed to ask themselves, “Would at least two out of three students performing at the borderline of Proficient answer this question correctly?” Panelists considered each ordered item in turn, asking themselves the same question until their answer changed from “yes” (or predominantly “yes”) to “no” (or predominantly “no”). Each panelist practiced placing the Proficient bookmark in the ordered item booklet. The facilitator then led the panelists in a readiness discussion, asking panelists to share the reasoning behind their bookmark placements with the group and assessing each panelist’s understanding of the rating task, borderline students, and the two-thirds rule. At the end of the practice round, panelists completed the practice evaluation form. The evaluation form was designed to ascertain whether the panelists were comfortable moving ahead to the rating task or whether there were lingering questions or issues that needed to be addressed before proceeding to the Round 1 ratings. Facilitators were instructed to glance over each panelist’s evaluation as he or she completed it to make sure panelists were ready to move on. The results of the training evaluation can be found in Appendix J.

For panelists who participated in grade-span panels, this practice round was conducted only for the lower grade (i.e., grades 3, 5, and 7).

3.7.2 Round 1 Judgments and Results

In the first round, panelists worked individually with the PLDs, the item map form, and the ordered item booklet. Beginning with the first ordered item in the shaded region described previously and considering the skills and abilities needed to complete it, panelists asked themselves, “Would at least two out of three students performing at the borderline of Proficient answer this question correctly?” Panelists considered each ordered item in turn, asking themselves the same question. They placed the bookmark between the two items where their answer changed from “yes” (or predominantly “yes”) to “no” (or predominantly “no”). For the

identification of this Proficient cut, panelists were instructed to place their bookmark within the shaded region; placing a bookmark outside the shaded region required explicit written justification by the panelist. Panelists then repeated the process for the other two cuts and used the rating form to record their ratings for each cut.

After the Round 1 ratings were complete, Measured Progress staff members calculated the median cut points for the group based on Round 1 bookmark placements. First, each panelist's cutpoints were found on the theta scale by averaging the $RP_{0.67}$ values of the items on either side of the bookmark placed by that panelist for each cut. The cutpoints were then determined by calculating the median of the individual cutpoints obtained from each panelist

Results for panelist ratings across all rounds are displayed in Appendix L. Shown are the theta scale cuts along with the Median Absolute Deviation (MAD) of the panelists' cutpoints, which indicates the extent to which judgments were consistent across panelists and reflects the level of agreement among the ratings with each successive round of ratings, as well as the conditional standard error of measurement (SEM) for each of the scale cuts. Finally, impact data—reflecting the percentage of students across the state who would fall into each performance level category according to the Round 1 total group median cutpoints—were calculated.

3.7.3 Round 2 Judgments and Results

The purpose of Round 2 was for panelists to discuss their Round 1 placements and, if necessary, to revise their ratings. Prior to beginning their discussions, the panelists at each table were presented with the median cutpoints based on the Round 1 ratings for the panelists in that subject and grade. A Measured Progress psychometrician presented this information to the group using a projector and laptop and explained how to use it as they completed their Round 2 discussions. The distribution of panelists' cutpoints was presented in terms of location in the ordered item booklet, both as numerical summaries of cutpoints ranges and graphically as histograms.

Panelists were then given the opportunity to share their individual rationales for their bookmark placements in terms of the necessary knowledge and skills for each classification. Panelists were asked to pay particular attention to how their individual ratings compared to those of other panelists in their room and get a sense for whether they were unusually stringent or lenient within the group. Once the discussions were complete, panelists were given the opportunity to revise their Round 1 ratings on the rating form. Panelists were told to set bookmarks according to their *individual* best judgments; consensus among the panelists was not necessary. Panelists were encouraged to listen to the points made by their colleagues but not to feel compelled to change their bookmark placements.

When Round 2 ratings were complete, Measured Progress staff members calculated the median cutpoints and associated impact data and discussed the results with SDE staff. During this discussion, a number of cutpoints were identified that yielded impact data which was notably discrepant from the

Benchmarking percentages (see Table 3-1). This provided an opportunity for Measured Progress and SDE staff to return to the panels for the purpose of clarifying and confirming both the judgmental task - for each item answering, "Would at least two out of three students performing at the borderline of the current PLD answer this item correctly?" - and the policy context, which sought to align OSTP results more closely with nationally-recognized test results such as demonstrated via NAEP and ACT.

3.7.4 Round 3 Judgments and Results

The purpose of Round 3 was for panelists to again discuss their Round 2 placements and, if necessary, to revise their ratings. Prior to the discussions, the panelists were presented with the median cuts based on Round 2 results as well as impact data (i.e., the percentage of students classified into each performance level based on the median cuts). A Measured Progress psychometrician presented the information and explained how to use it, as described in Round 2. Additionally, SDE staff members presented condensed versions of the educational context information originally provided during the opening session.

The lead facilitator then led an extended discussion of the Round 2 results, which walked the panelists through the ordered item booklet, focusing on the KSAs needed for each item and how they related to the PLDs. In addition, the discussion explored the differences in where each panelist and table placed the cuts. After the discussions, panelists were given a final opportunity to revise their bookmark placements. Once again, the facilitator reminded the panelists to place the bookmarks according to their individual best judgment and that it was not necessary for them to reach a consensus. When Round 3 ratings were complete, Measured Progress staff members once again calculated the median cutpoints and associated impact data and reviewed these results with SDE staff.

3.7.5 Round 4 Judgments and Results

While Round 3 marked the completion of standard setting activities for most panelists, an additional round was convened in specific instances after review and consideration by SDE staff, Measured Progress staff, together with the panelists. Described earlier, the results of Round 2 led Measured Progress and SDE staff to identify points in the standard setting process that required further clarification and confirmation. As a result, staff and panelists worked together to identify the need for an additional round in order to produce ratings reflective of panelists understanding of the assessment content and standard setting process. Specifically, ELA grade 5, mathematics grade 3, and science grade 5 conducted a Round 4, where the purpose was again for panelists to further discuss their cutpoint placements and to revise their ratings, if necessary.

Prior to the discussions, a Measured Progress psychometrician presented the panelists with the median cuts based on Round 3 results as well as impact data. The lead facilitator then led an extended discussion of the Round 3 results. After discussion, panelists were given a final opportunity to revise their bookmark placements. When Round 4 ratings were complete, Measured Progress staff members once again calculated the median cutpoints and associated impact data.

A summary of the results is provided in Tables 3-2–3-4, reporting final median cutpoints on the theta scale and impact data (percentage of students in performance level; percentage of students at-or-above performance level), respectively. Note that disaggregated impact data broken down by demographics are provided in Appendix K.

Table 3-2: OSTP Standard Setting: Round 3 Results – Theta Scale Cuts

<i>Subject</i>	<i>Grade</i>	<i>Unsatisfactory</i>	<i>Limited Knowledge</i>	<i>Proficient</i>	<i>Advanced</i>
English Language Arts	3	--	-0.53135	0.26234	1.39558
	4	--	-0.52719	0.24183	1.49870
	5	--	-0.78321	0.27136	1.17231
	6	--	-0.91412	0.23755	1.39169
	7	--	-0.49771	0.19463	1.19095
	8	--	-0.69508	0.53881	1.46111
	10	--	-1.09572	0.10061	1.40466
Mathematics	3	--	-0.85713	0.08600	0.98750
	4	--	-0.85598	0.21582	1.06199
	5	--	-1.01408	0.25552	1.16994
	6	--	-0.89687	0.44047	1.51120
	7	--	-0.00998	0.44732	1.47147
	8	--	-0.00143	0.75594	1.21172
	10	--	0.14320	0.70757	1.34848
Science	5	--	-0.91364	0.17570	1.32213
	8	--	-0.34011	0.27999	1.32579
	10	--	0.28292	1.02248	1.77837

Table 3-3: OSTP Standard Setting: Round 3 Results – Percentage of Students At/In Performance Level

<i>Subject_Name</i>	<i>Grade</i>	<i>Unsatisfactory</i>	<i>Limited Knowledge</i>	<i>Proficient</i>	<i>Advanced</i>
English Language Arts	3	29.5	27.6	35.3	7.6
	4	28.8	28.0	36.5	6.7
	5	21.1	39.0	27.7	12.2
	6	18.2	40.0	32.4	9.4
	7	29.2	25.2	33.6	12.0
	8	20.8	42.4	25.2	11.6
	10	13.0	31.5	45.0	10.5
Mathematics	3	19.7	31.7	31.5	17.0
	4	20.6	36.0	29.3	14.0
	5	16.8	41.2	29.8	12.2
	6	18.8	45.5	29.5	6.2
	7	46.8	19.1	27.0	7.1

continued

<i>Subject_Name</i>	<i>Grade</i>	<i>Unsatisfactory</i>	<i>Limited Knowledge</i>	<i>Proficient</i>	<i>Advanced</i>
Mathematics	8	48.9	27.8	11.4	11.9
	10	53.9	21.3	15.4	9.4
Science	5	21.5	35.4	33.7	9.4
	8	37.7	21.4	30.1	10.8
	10	60.0	21.0	14.7	4.4

Table 3-4: OSTP Standard Setting: Round 3 Results – Percentage of Students At/Above Performance Level

<i>Subject_Name</i>	<i>Grade</i>	<i>Unsatisfactory</i>	<i>Limited Knowledge</i>	<i>Proficient</i>	<i>Advanced</i>
English Language Arts	3	100.0	70.5	42.9	7.6
	4	100.0	71.2	43.1	6.7
	5	100.0	78.9	39.9	12.2
	6	100.0	81.8	41.8	9.4
	7	100.0	70.8	45.6	12.0
	8	100.0	79.2	36.8	11.6
	10	100.0	87.0	55.5	10.5
Mathematics	3	100.0	80.3	48.5	17.0
	4	100.0	79.4	43.4	14.0
	5	100.0	83.2	42.0	12.2
	6	100.0	81.2	35.7	6.2
	7	100.0	53.2	34.1	7.1
	8	100.0	51.1	23.3	11.9
	10	100.0	46.1	24.8	9.4
Science	5	100.0	78.5	43.0	9.4
	8	100.0	62.3	40.9	10.8
	10	100.0	40.0	19.0	4.4

Chapter 4. VERTICAL ARTICULATION

4.1 The Vertical Articulation Process

Following regular standard setting activities, table leaders from the English language arts (ELA) and mathematics panels participated in a vertical articulation meeting. The mathematics articulation panel was convened first and then the ELA articulation panel was convened after the mathematics group completed the articulation process.

An overview PowerPoint was presented that outlined, at a very high level, the steps of the articulation process. Once this was completed, panelists were presented with the same materials available during regular standard setting activities as well as the impact data that were provided during the final round of discussions for each grade level (i.e., the percentage of students at each performance level based on the 2017 administration results). In addition, cutpoint locations (i.e., ordered item booklet item numbers) corresponding to the final ranges indicated by specific panels, benchmarking values (i.e., NAEP or ACT impact data and ordered item booklet locations), and linearly smoothed percentages of students in each performance level across grades were presented. Panelists shared the discussion that had taken place within their grade-span panels with the larger articulation panel, and then were asked to complete the articulation feedback form from the perspective of their grade-span panel.

The full articulation panel conducted a discussion of these cutpoints and impact data and provided individual recommendations for each cutpoint, indicating the panel-recommended cutpoint when no change was deemed necessary. As in the general process, these ratings were tabulated and presented back to the table leader as well as final impact data associated with median cutpoints resulting from their recommendations. A final opportunity to change any cutpoint was afforded to the vertical articulation panel's given consensus. Discussion and a final individual survey regarding the appropriateness of the adjusted cuts and any comments were finally collected.

Articulation evaluation results are presented in Appendix J.

4.2 Vertical Articulation Results

Cuts that resulted from vertical articulation for ELA and mathematics are included in Table 4-1 and Table 4-2 below. Final cutpoints are presented as the median theta cuts resulting from Round 3, Round 4, and Vertical Articulation, as appropriate; at the time of writing, the reporting scale scores had not yet been defined.

Table 4-1. OSTP Standard Setting: ELA Vertical Articulation Results

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
3	Unsatisfactory		29.5	100.0
	Limited Knowledge	-0.53135	31.8	70.5
	Proficient	0.34092	31.1	38.7
	Advanced	1.39558	7.6	7.6
4	Unsatisfactory		28.8	100.0
	Limited Knowledge	-0.52719	34.0	71.2
	Proficient	0.38608	30.5	37.1
	Advanced	1.49870	6.7	6.7
5	Unsatisfactory		21.1	100.0
	Limited Knowledge	-0.78321	39.0	78.9
	Proficient	0.32533	27.7	39.9
	Advanced	1.17231	12.2	12.2
6	Unsatisfactory		18.2	100.0
	Limited Knowledge	-0.90856	41.5	81.8
	Proficient	0.28516	31.0	40.3
	Advanced	1.39169	9.4	9.4
7	Unsatisfactory		29.2	100.0
	Limited Knowledge	-0.49771	38.0	70.8
	Proficient	0.46660	22.3	32.8
	Advanced	1.25890	10.6	10.6
8	Unsatisfactory		20.8	100.0
	Limited Knowledge	-0.69508	45.5	79.2
	Proficient	0.60707	22.1	33.6
	Advanced	1.46111	11.6	11.6
10	Unsatisfactory		16.4	100.0
	Limited Knowledge	-0.88010	44.6	83.6
	Proficient	0.50703	28.5	39.0
	Advanced	1.40466	10.5	10.5

Table 4-2. OSTP Standard Setting: Mathematics Vertical Articulation Results

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
3	Unsatisfactory		20.6	100.0
	Limited Knowledge	-0.84047	35.2	79.4
	Proficient	0.18660	27.2	44.2
	Advanced	0.98750	17.0	17.0
4	Unsatisfactory		23.5	100.0
	Limited Knowledge	-0.77087	35.9	76.5
	Proficient	0.26986	26.6	40.6
	Advanced	1.06199	14.0	14.0
5	Unsatisfactory		21.6	100.0

continued

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
5	Limited Knowledge	-0.82901	43.2	78.4
	Proficient	0.42687	23.1	35.3
	Advanced	1.16994	12.2	12.2
6	Unsatisfactory		21.8	100.0
	Limited Knowledge	-0.75897	42.5	78.2
	Proficient	0.44047	29.5	35.7
	Advanced	1.51120	6.2	6.2
7	Unsatisfactory		46.8	100.0
	Limited Knowledge	-0.00998	19.1	53.2
	Proficient	0.44732	27.0	34.1
	Advanced	1.47147	7.1	7.1
8	Unsatisfactory		48.9	100.0
	Limited Knowledge	-0.02698	27.8	51.1
	Proficient	0.75594	11.4	23.3
	Advanced	1.21172	11.9	11.9
10	Unsatisfactory		53.9	100.0
	Limited Knowledge	0.13593	20.0	46.1
	Proficient	0.68404	16.7	26.2
	Advanced	1.33423	9.4	9.4

Chapter 5. TASKS COMPLETED AFTER THE STANDARD SETTING MEETING

Upon conclusion of the standard setting meeting, several important tasks were completed. These tasks centered on the following: reviewing the standard setting process and addressing issues presented by the outcomes; presenting the results to the SDE; and making any final revisions or adjustments based on policy considerations under direction of the SDE.

The SDE was provided the recommended cuts from the standard setting panels and the recommended adjusted cuts from the articulation panel. In addition, the evaluation results from the cross-grade and articulation panels were provided.

5.1 Analysis and Review of Panelists' Feedback

The measurement literature sometimes considers the evaluation process to be another product of the standard setting process (e.g., Reckase, 2001), as it provides important validity evidence supporting the cutpoints that are obtained. To provide evidence of the participants' views of the standard setting process, panelists were asked to complete questionnaires after the practice round and again after the completion of Round 3.

After the evaluation forms were completed, panelists' responses were reviewed. This review did not reveal any anomalies in the standard setting process or indicate any reason that a particular panelist's data should not be included when the final cutpoints were calculated. In general, participants felt that the recommended cutpoints were appropriate and that their judgments were based on appropriate information and decision making. The results of the evaluations are presented in Appendix J.

5.2 Policy Adjustments

After all standard setting activities had been completed and all materials reviewed, the SDE recommended adjustments to the Limited Knowledge cut for grade 7 mathematics and Advanced cut for grade 8 mathematics that resulted from the standard setting process, as shown in Table 4-3. The full set of cuts, along with the SDE-recommended adjustment, were presented to the CEQA and approved for use on August 16, 2017.

Table 4-3. OSTP Standard Setting: Policy Adjustments to Mathematics

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
7	Unsatisfactory		34.9	100.0
	Limited Knowledge	-0.33556	31.0	65.1
	Proficient	0.44732	27.0	34.1
	Advanced	1.47147	7.1	7.1
8	Unsatisfactory		48.9	100.0
	Limited Knowledge	-0.02698	27.8	51.1
	Proficient	0.75594	12.6	23.3
	Advanced	1.26746	10.6	10.6

After the policy adjustments, Measured Progress suggested adjustments to SDE for the Proficient and Advanced cutpoints in grade 8 and 10 ELA. These adjustments were suggested to ensure that the cutpoints appropriately represented the total number of score categories associated with each writing prompt instead of the score categories achieved by students during the Spring 2017 administration, which were fewer. To achieve this resolution, the cutpoints were lowered on the theta scale to preserve the student level outcomes as accepted by the standard setting panelists during their reviews of impact data. The final grade 8 and 10 ELA cutpoints are presented in table 4-4.

Table 4-4. OSTP Standard Setting: Writing Prompt Adjustments to ELA

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
8	Unsatisfactory		23.1	100.0
	Limited Knowledge	-0.69508	42.3	76.9
	Proficient	0.45070	23.4	34.5
	Advanced	1.20801	11.2	11.2
10	Unsatisfactory		20.1	100.0
	Limited Knowledge	-0.88010	44.2	79.9
	Proficient	0.45602	26.0	35.6
	Advanced	1.25613	9.7	9.7

5.3 Preparation of Standard Setting Report

Following final compilation of standard setting results, Measured Progress prepared this report, which documents the procedures and results of the 2017 standard setting meeting that was held to establish performance standards for the assessment.

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APPENDICES

APPENDIX A—PERFORMANCE LEVEL DESCRIPTORS

Grade 3 ELA

Borderline Advanced

- Identify main idea, key details, and summaries
- Infer 1st and 3rd person, point of view in complex texts
- Compare and contrast details to describe genres in text
- Identify characters, setting, plot, characterization, and theme
- Can analyze all objectives in standard 4
- Determine relevance of sources

Grade 3 ELA

Borderline Limited Knowledge

- May identify 1st person point of view
- May identify main idea
- May compare within text
- Identify characters, setting
- Use common prefixes or suffixes to determine word meaning
- Identify synonyms
- May use some graphic features to understand a text

Grade 3 ELA

Borderline Proficient

- Identify main idea
- May not be able to identify key details
- Choose best summary
- Identify basic genres
- Identify 1st and 3rd person point of view
- Identify author's purpose
- Identify characters, setting, plot
- Find examples of simile and metaphor
- Distinguish between fact and opinion
- Use prefixes and suffixes to interpret word meaning
- Use synonyms, antonyms, homographs, and homonyms to interpret text meaning
- Use context clues to interpret text meaning within a single sentence ????
- Use dictionary or glossary to clarify word meaning
- Recognize subject/verb agreement
- Identify pronouns, adjectives, verb tense, conjunctions, prepositions ????
- Recognize correct capitalization of titles of respect and geographical names
- Recognize end marks in dialogue
- Recognize simple and compound sentences that are declarative, interrogative, exclamatory, and imperative
- Use graphic features to understand a text
- Identify appropriate reference source to find information

Grade 4 ELA

Borderline Advanced

- Analyze details
- Describe genres
- Efficiently use vocabulary knowledge/resources to analyze complex text through context clues

Grade 4 ELA

Borderline Limited Knowledge

- Compare NOT contrast
- Inconsistently identify NOT describe or apply (literary elements, author's purpose, point of view)
- Inconsistently use context clues
- Inconsistently identify appropriate grammar
- Inconsistently use graphic features

Grade 4 ELA

Borderline Proficient

- Choose best summary
- Identify key details that may or may not support main idea
- Discriminate genres by comparing and contrasting details
- May recognize paraphrase in simple text
- May identify some text structure
- Identify author's purpose, some literary elements, and point of view
- Identify some literary devices
- Identify fact from opinion
- May infer meaning from text
- Use some word parts to interpret word meaning
- Students may apply and identify appropriate grammar and mechanics
- Use graphic features

Grade 5 ELA

Borderline Advanced

- DOK 1-2, usually 3; capable of 4
- Compare/contrast details from fiction/nonfiction to describe genre and subgenres
- Use more descriptive vocabulary/better word choice
- Great organization in writing, but may not be as engaging
- Use effective transitions and phrases
- Understand complex ideas, but not abstract ones in a consistent manner
- Can evaluate or analyze, but not always both
- Compare/contrast to support simple inferences within and between texts

Grade 5 ELA

Borderline Limited Knowledge

- Can answer some DOK1s, no real DOK 2's – 4's
- Can find obvious answers in simple items
- Can find details in a passage, but not categories them
- Knows the topic, but not the main idea
- Inconsistently identifies literary elements
- Can usually eliminate only one distractors – get hung up on others
- Have a very limited vocabulary
- Genre: Know Fiction from Non-fiction (no sub-genres)
- Random mechanics – probably know first word capitalization and periods
- No transfer of knowledge
- Very little to no structure in writing
- More fragments than complete sentences
- Attempt topic in writing passage
- Cannot generalize

Grade 5 ELA

Borderline Proficient

- Can get most DOK 1's, usually 2's, and handful 3's
- Can consistently locate apparent information
- Can identify main ideas, but seldom apply
- Can identify inferences in passages, but can't support the inference
- Partially comprehends text in relationship to length (struggles with longer, more dense passages)
- Can connect between texts that are similar in structure or topic
- Can understand most used/simple genres and subgenres (poetry, fiction, main sub-genre categories)
- May have difficulty eliminating close distractors
- May miss the judgement calls of "best, most, etc."
- Usually comprehends and can sometimes apply
- Makes simple connections within texts, but not implied or complex connections
- Mostly understands context clues, but struggles with word part relationships
- Struggles with but can make obvious generalizations
- May only do 2 of 3 modes of writing; can do narrative writing
- Writing is formulaic
- Can find and locate information, but lacks evidence or content
- Bare-minimum writing information – lacks explanations and expansion
- Engages in writing process, but writing is not complex
- Students write on topic, but editing may be inconsistent
- Identifies grammar well in MC items but not in own writing
- Understands main/common grammar (ie verbs, nouns)
- Has organizational structure to writing, but transitions may be the same; repeats words
- Can find/locate the best resources to use, but may not be able to apply or organize it
- Mastered use of simple resources
- Inconsistent judging BEST resource

Grade 6 ELA

Borderline Advanced

- Can comprehend and interpret text and inconsistently evaluate
- Know most genres (80-90%)
- Can evaluate or analyze but not always both
- Skillfully Understand context clues
- Use pre-fix suffix to understand unfamiliar language
- Solid command of grammar - Only minimal grammar issues
- Recognize thesis statements
- Identify a thesis statement

Grade 6 ELA

Borderline Limited Knowledge

- Comprehend simple information in short texts
- Limited response and critical thinking – with vocabulary. Understand fundamental vocabulary
- Inconsistently compare/contrast. Compare is easier.
- Struggle with word parts
- Understand major/common genres – non fiction
- Recognize blatant main ideas
- Simple inferences within one text
- Can do familiar context clues
- Use dictionary/thesaurus – simple research tools
- No transfer of knowledge
- Inconsistently know common grammar – should identify noun, verb, adjective, adjectives

Grade 6 ELA

Borderline Proficient

- Can comprehend and interpret most genres (most familiar), but may not be able to analyze/evaluate
- Can recognize/determine details that support a stated main idea within 1 text
- Can determine simple main idea within one text but not usually 2
- Can do explicit/obvious compare/contrast between and within texts
- Identify point of view/sometimes can evaluate
- Can breakdown some words parts
- Can do basic /obvious context clues
- Identify basic parts of speech
- Understand simple verb tenses
- Demonstrate basic understanding of grammar, punctuation
- Can find/locate resources but inconsistently apply
- Can get hung up between two close distractors
- Recognize title, author, publisher date
- Can recognize multiple-meaning high frequency words

Grade 7 ELA

Borderline Advanced

- Summaries of more complex texts; summary is not as in-depth
- Can create an objective, complete summary, but may be missing some details
- Paraphrase is completely reworded
- Compare/contrast multiple traits
- Can analyze/evaluate literary devices in a more complex text, but their analysis of how it is used is weaker
- Can synthesize across more complex texts – go beyond surface level
- Handful of advanced vocabulary words that they repeat
- They bring in prior knowledge, because they are reading more complex words
- They eliminate distractors, because they know more vocabulary

Grade 7 ELA

Borderline Limited Knowledge

- Summaries of simple texts, with more complex texts, they focus on details. They try to match words from texts to identify a summary
- Paraphrase is partially a direct quote
- Can compare/contrast directly stated authors' purposes
- Can find evidence, but can't synthesize ideas between texts
- Know a few fact/opinion code words
- Very little background knowledge to help with decoding
- May have some vocabulary skills, but have difficulty when texts move beyond their experience

Grade 7 ELA

Borderline Proficient

- Create a simple summary with fewer, more obvious details. Not enough stamina to get all the details. Main idea is not developed
- Paraphrase – not changes many words (not verbatim, but not enough of a paraphrase) Not demonstrating as much connection with text
- Compare and contrast stated/obvious purpose of author’s writing
- Can identify literary devices, point of view and perspectives and gain some meaning
- Fact vs. opinion – They are dependent on the “code/magic” words that clue fact or opinion
- Obvious, surface level conclusions or inferences from texts that have fewer, less complex details
- Less stamina
- Limited prior knowledge of vocabulary words
- Some understanding of word parts – Common prefixes and suffixes
- Can use obvious context clues, often only in the same sentence
- Can understand less nuanced work meanings
- Not good with parallel Structure

Grade 8 ELA

Borderline Advanced

- Can analyze/evaluate literary devices in a more complex text, but their analysis of how it is used is weaker
- Can synthesize across more complex texts – go beyond surface level
- Can use more evidence to support a claim or inference
- Claim and counter claim
- Use unique reasons or evidence
- Use varied evidence
- Clear organization, consistent voice
- Varied word choice and sentence structure
- Some errors in more complex sentences
- Can recognize research questions without repetitive words

Grade 8 ELA

Borderline Limited Knowledge

- Summaries of simple texts, with more complex texts, they focus on details. They try to match words from texts to identify a summary
- Paraphrase is partially a direct quote
- Can compare/contrast directly stated authors' purposes
- Can find evidence, but can't synthesize ideas between texts
- Very little background knowledge to help with decoding
- May have some vocabulary skills, but have difficulty when texts move beyond their experience
- Can use basic prefixes/suffixes
- Familiar only with common sources
- Incomplete understanding of sources
- Can evaluate the main literary devices at a very surface level
- Can find explicit evidence and use it to support simple inferences/conclusions
- Weak organization
- Not varied sentences/simple sentences
- Not enough extension
- Very limited reasons and evidence
- Have a lot of difficulty recognizing good research questions

Grade 8 ELA

Borderline Proficient

- Can identify literary devices, point of view and perspectives and gain some meaning
- Can make simple evaluations of literary devices, but misses big impacts on text
- Obvious, surface level conclusions or inferences from texts that have fewer, less complex details
- Less stamina
- Some understanding of word parts – Common prefixes and suffixes
- Can use obvious context clues, often only in the same sentence
- Can understand less nuanced work meanings
- Can make simple evaluations of literary devices, with more complex texts
- Draws purposeful conclusions or inferences and can identify obvious support
- Mostly complex sentences; some sentence variety
- More obvious transition words
- Paragraph structure
- Organizational structure is attempted
- Recognize different types of writing
- Introduce a claim
- An attempt at recognizing an opposing viewpoint
- Organization is there, but may contain errors. Reason that are so close, the support all seems the same
- Organization can be muddled or out-of-order
- Can use appropriate voice for 1 or 2 situations
- Start focused, lose it on the body of the writing
- Repetitive limited word choice/figurative language
- Familiar with a wider variety of sources
- Can do a limited evaluation of sources
- Should know which sources are “no-no’s”
- Should know gov. edu, etc. are more credible
- Can identify good research questions mostly when the words are repetitive

Grade 10 ELA

Borderline Advanced

- Comprehend, analyze, and make connections within and between texts
- Summarize, paraphrase, and synthesize texts
- Identify and connect genres to author's purpose
- Evaluate effectiveness of differing perspectives and rhetorical devices
- Distinguish different types of evidence to support conclusions and inferences
- Purposefully engage in the writing process to create writing that is focused, organized, and coherent... for multiple purposes.
- Use context clues, word parts, and reference tools to determine or clarify precise word meaning
- Select effective vocabulary to communicate complex ideas
- Effectively evaluate the reliability and validity of evidence and synthesize relevant information
- Purposefully integrate and cite evidence
- Intentionally apply knowledge of grammatical and rhetorical style choices
- Strong command of standard English
- Recognize strong research questions and thesis statements

Grade 10 ELA

Borderline Limited Knowledge

- Inconsistently comprehend texts
- Recognize a basic summary
- Recognize basic genres
- Attempt to determine author's basic purpose
- Recognize different perspectives and common rhetorical devices
- Recognize evidence and attempt to support conclusions
- Attempt parts of the writing process
- Create a piece of writing that lacks focus
- Attempt to use context clues, word parts or reference tools to determine word meaning
- Use limited vocabulary to communicate simple ideas
- Limited recognition of basic grammatical choices
- Limited use of standard English
- May recognize a thesis sentence
- Recognize evidence
- Attempt to use and cite evidence

Grade 10 ELA

Borderline Proficient

- Comprehend and make simple connections within and between texts
- Recognize and/or generate a basic summary
- Identify some genres
- Determine author's basic purpose
- Identify differing perspectives and rhetorical devices
- Distinguish different types of evidence to sometimes support conclusions or inferences
- Engage in parts of the writing process
- Create a coherent piece of writing with focus, for multiple purposes
- Use context clues, word part, and reference tools to determine or clarify word meaning
- Select vocabulary intentionally
- Recognize grammatical and rhetorical style choices
- General command of standard English
- Distinguish between strong and weak research Qs and Ts.
- Distinguish between reliable/unreliable and valid/invalid evidence to include relevant information
- Students will cite evidence used

Grade 5 & 6 Math Parking Lot Questions

- Question # 22: Has a pictograph – no pictographs in 5th grade only line and double bar
- Triangle prisms are not in the limits of the item specs
- #15 Questions # 15 & 17 address estimate multiplication; not our objective – 4th graders do that
- #52 – we do not convert in 5th grade
- Why does question #12 go to the ten millions when objective is to the millions place?
- 6th grade #38 – Several ways to correctly estimate and come up with an answer given that not correct
- The following questions do not meet the item spec requirements:
 - # 1 Triangle prisms not assessed per item spec
 - #19 Fractional rules not assessed per item spec
 - #14 Triangular pyramids not assessed per item specs
 - #16 Conversions should not be assessed
- Find a rule limited to whole #5
- #52 conversions should not be assessed
- Estimator – there needs to be a greater rang within the answer choices
- How do we deal with the backlash from administration regarding low scores?
- Will all schools, administrators, parents, etc. have access or be given the letter info regarding scores from Superintendent Hofmeister?
- 6th – direction #50 poorly explained
- 6th - #55 – could measures be skewed on computer screen?

Grade 8 science parking lot

- CO₂ in glucose question said provided but not in stimulus (requires prior knowledge?)
 - Form B1 item 16 (listed as an assessment boundary as not tested)
- NAEO Limited knowledge is too high, esp. for barely limited (critique is higher level)
- Form B1 item 30 add (70 kg) after rider 3

Grade 3 Math

Borderline Advanced

- Complex: addition, subtraction, multiplication
 - With more than one regrouping (addition and subtraction)
 - Multiply 2 by 1 with regrouping
 - Modeling division and show the relationship between multiplication and division
 - Identify the unknown using the relationship between multiplication and division
- Fractions
 - Comparing fractions with a number line and order
 - Composing fractions
- Extend number patterns using multiplication by 5 or less
- Solve for an unknown in a basic multiplication problem
- Determine volume by counting unit cubes
- Solving elapsed time problems within 5 minute increments up to an hour
- Solve a complex real work problem using multi-steps to draw logical conclusions
- Compare data in 2 different representations
- Identify the next step in a geometric pattern
- Apply knowledge about angles

Grade 3 Math

Borderline Limited Knowledge

- Simplify estimating to solve basic +, -, x, / one step word problems
- Simple equivalent fractions using models ($1/2 = 2/4 = 3/6$)
- Compare and order whole numbers and fractions with a model
- Decompose fractions ($3/4 = 1/4 + 1/4 + 1/4$)
- Read and write decimals to the tenths place
- Compare and order simple whole numbers and decimals
- Make changes with whole dollars
- Determine rule for a simple patten and extend
- Determine missing value of unknown
- Identify quads and simply polygons and their area of squares and rectangles with a grid
- Select appropriate unit of measurement
- Solve one step problem using data sets

Grade 3 Math

Borderline Proficient

- Addition and subtraction with regrouping in the 1's place without word problems
- Represent whole numbers
- Multiplication facts: 1s, 2s, 3s, 5s, 10s
- Match a simple fraction to a model
- Identify the value of dollar bills
- Adding coins of like values
- Extend shape patterns (A,B,C) 2s, 5s, 10s
- Solving an unknown using a basic addition problem
- Identify a right angle
- Use appropriate tool for measurement
- Read a digital clock

Grade 4 Math

Borderline Advanced

- Determine rule and extend pattern with one step (\times , $/$ with larger numbers)
- Measure angles using a protractor
- Measurement problems using more than one operations
- Solve two step problems using data that include decimals and fractions. One line plots and frequency tables
- Determine volume with cubes, cm^3
- Compose and decompose shapes to find the area
- Estimate and solve complex problems
- Determine the unknown in a non-equivalent fraction
- Compare decimals and fractions
- Find the change in complex money problems, providing change when given \$20, in dollar bills and coins

Grade 4 Math

Borderline Limited Knowledge

- Simplify estimating to solve basic +, -, x, / one step word problems
- Simple equivalent fractions using models ($1/2 = 2/4 = 3/6$)
- Compare and order whole numbers and fractions with a model
- Decompose fractions ($3/4 = 1/4 + 1/4 + 1/4$)
- Read and write decimals to the tenths place
- Compare and order simple whole numbers and decimals
- Make changes with whole dollars
- Determine rule for a simple pattern and extend
- Determine missing value of unknown
- Identify quads and simple polygons and their area of squares and rectangles with a grid
- Select appropriate unit of measurement
- Solve one step problem using data sets

Grade 4 Math

Borderline Limited Proficient

- Simplify estimating to solve basic +, -, x, / one step word problems
- Simple equivalent fractions using models ($1/2 = 2/4 = 3/6$)
- Compare and order whole numbers and fractions with a model
- Decompose fractions ($3/4 = 1/4 + 1/4 + 1/4$)
- Read and write decimals to the tenths place
- Compare and order simple whole numbers and decimals
- Make changes with whole dollars
- Determine rule for a simple patten and extend
- Determine missing value of unknown
- Identify quads and simply polygons and their area of squares and rectangles with a grid
- Select appropriate unit of measurement
- Solve one step problem using data sets

Grade 5 Math

Borderline Advanced

- Recognize nets. SA with given nets
- Mean no remainders
- Graphics with fraction and decimal
- Single increments
- Represent remainder as a decimal
- Order decimals or fractions
- Any algebra with multi steps and expressions given

Grade 5 Math

Borderline Limited Knowledge

- Any algebra with a single operation including addition or subtraction
- Identify right or equilateral triangles. Identify cube/rectangular prism
- GM2 Find perimeter of regular polygons with given side lengths
- Basic angle identification, measure to nearest $\frac{1}{2}$ inch
- Read simple line or bar graphs

Grade 5 Math

Borderline Proficient

- Graph an ordered pair; find a single operation (all) rule from a table
- Two step order of operation (no dist prep), Single step with variables given, Single step inequalities
- Classify triangles by 1 descriptor; classify cubes and prism (rectangular)
- Volume with filled in cubes (by counting cubes)
- Measure angles with ray pointing to 0, to nearest 5 degree
- Measure with ruler starting at 0
- Nearest centimeter Nearest centimeter
- Choosing appropriate unit of measure
- Division: all division with basic algorithm with “r” represented as fraction
- Single step word problems all operations
- Range, mode, and median. Line and double bar graphs with whole numbers
- decimal \leftrightarrow fraction/mixed number $\frac{1}{10}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{2}$ with number lines in single intervals and labeled.
- Compare not order
- Read/write/represent numbers whole to thousandths without a zero place holder
- Add and subtract fractions <1 with one den a factor of the other (answer doesn't need to be reduced)
- Estimate +/- decimals 0.1, 0.01, 0.001, if all places are already established

Grade 6 Math

Borderline Advanced

- Multi-step unit conversion with length
- Use distance between points to prove congruency
- Analyze difference between two outcomes of simple experiments
- Cannot justify solutions

Grade 6 Math

Borderline Limited Knowledge

- Read and represent all rational numbers
- All Prime factorizations not represented with experience
- +/- a positive number from any integer
- Determine a ratio from a given situation
- Find equivalent fractions
- Multiply fractions: \times \div decimals
- Graph whole numbers in all quadrants
- Evaluate with positive whole numbers
- Solve equations with whole numbers
- Area of parallelograms and triangles with whole numbers
- Identify vertical angles
- Identify translation, reflection and rotation
- Identify lines of symmetry
- Identify sample space of simple experiments and identify possible outcomes

Grade 6 Math

Borderline Proficient

- Use equivalent fractions to solve ratio problems
- Unit rate should be a whole number
- Units need to be defined (example: 65 miles per 1 hour)
- Estimate (to nearest whole number) $x \div$ problems for fractions and mixed numbers using benchmark fraction
- Estimate (to nearest whole number) $x \div$ problems with decimal
- Limit exponents to squares in order of op
- Limit order of op to only include $+/-$ of fraction and decimals
- Limit evaluating an expression with a variable to all operations with decimals and $+/-$ with fractions
- Solve one step equations with nonnegative rational numbers
- Polygons can be decomposed into at most 2 simple shapes ($\square \triangle \square$)
- All necessary info is given to find area
- Apply the definition for vertical angle
- Given a simple triangle with angle measures for two of the angles, find missing angle
- Convert length in metric/customary system
- Predict translations and reflections
- Analyze lines of symmetry
- Identify minimum, maximum, and median for box-and-whisker plot
- Use “impossible” and “certain” to describe probability

Grade 7 Math

Borderline Advanced

- Interprets equations involving variables and rational numbers
- Make connections between circumference and area to solve problems involving full circles
- Analyze, apply and display the effect of dilations and mult. trans. on a coordinate plane
- Solve complex and non-routine real world problems

Grade 7 Math

Borderline Limited Knowledge

- Compare and order fractions or decimals in isolation
- Calculate problems involving rational numbers and exponents
- Identify a proportional relationship
- Solve and write simple equations
- Write a simple inequality
- Calculate area and circumference of circles in terms of pi or using 3.14

Grade 7 Math

Borderline Proficient

- Identify constant of proportionality and proportional relationships
- Identify the graph/table of inversely proper relationships
- Interpret simple theoretical probability using decimals, fractions or percents
- Solve problems using estimations of whole numbers and decimals or fractions
- Solve 2-step equations of real world problems
- Solve and graph one step inequalities
- Identify the unit rate on a graph when the y-intercept equals zero
- Define a transformation and apply a 1-step transformation

Grade 8 Math

Borderline Advanced

- Generate, simplify or evaluate complex equivalent expressions
- Compare the volume and surface area of different solids
- Describe the impact on central tendencies of a data set with one outlier
- Solve complex and non-routine real world problems and draw logical conclusions

Grade 8 Math

Borderline Limited Knowledge

- Interprets equations involving variables and rational numbers
- Make connections between circumference and area to solve problems involving full circles
- Analyze, apply and display the effect of dilations and mult. trans. on a coordinate plane
- Solve complex and non-routine real world problems

Grade 8 Math

Borderline Proficient

- Generate, simplify and evaluate simple equivalent expressions
- Classify rational and irrational
- Describe, analyze and represent linear functions with 2 variables using a graph or equation
- Successfully solve Pythagorean theorem in Pythagorean triple format
- Solve central tendency problems with one outlier affecting one measure of central tend. given all data and relevant information
- Interpret a scatterplot and determine rate of change
- Solve problems involving theoretical or experimental probability

Grade 10 Math

Borderline Advanced

- Applying radicals in real world
- Multiply polynomials
- Factor with GCF and coefficient of 1
- Items with multiple standards (algebra 1)
- Polygons
- Calculate experimental probabilities of multiple complex events

Grade 10 Math

Borderline Limited Knowledge

- Simplify numerical
- Square roots
- Add polynomials and multiply by constant
- Graph given slope (any info)
- Identify y-intercept from a graph or slope-intercept form
- Convert between graph and slope –intercept form
- Calculate simple probability and sample space
- Simplify simple linear, ABS, rational
- Solve linear equations and inequalities
- Extend both types of sequences
- Identify parallel lines
- Relation/function given table or graph

Grade 10 Math

Borderline Proficient

- Radicals (square roots not cube roots)
 - Simplify
 - Add/subtract
 - Multiply
- Polynomial expressions
 - Add, subtract, multiply, factor, mon
- Evaluate all expressions
- Transfer on linear only
- Add functions algebraically
- Represent equations not inequalities or absolute value; =, +, >, <
- Simple literal
- Recognize create interpret arithmetic sequence only
- Can translate various representations only slope-intercept form
- Identify form
- Identify line of best fit
- Apply simple probability
- Lines and angles

Grade 5 Science

Borderline Advanced

- Make predictions on a basic model
- Expand a basic model
- Modify a basic model
- Scale up and down models (basic)
- Analyze simple exchange/transfer of matter and energy between organisms and between ecosystems/spheres
- Analyze scale, proportion, quantity and pattern for data for understanding distribution of water, cons. of matter Earth's relationship with the sun, moon and stars
- Analyze or compare evidence, data or model to engage in argument to explain cause and effect relationships (Earth's gravity, apparent brightness of sun/stars, how plants use matter)
- Observe or measure phenom. to interpret or evaluate patterns that classify materials based on properties
- Describe cause-effect relationships when mixing substances in an investigation

Grade 5 Science

Borderline Limited Knowledge

- Identify most of the components within a system
 - Organization
 - Energy flow
- Identify structure/function
- Use provided data to support explanations and claims
 - Cycling of matter
 - Natural selection
 - Diversity
 - Structure and function
- Describe arguments based on evidence about stability and change
 - Ecosystem dynamics and adaptation
 - Social interaction

OR

- Identify explanations related to matter and energy cycling
- Describe, measure, classify phenomena at different scales for living systems
- Critique studies
- Critique solutions

Grade 5 Science

Borderline Proficient

- recognize/identify/use basic models
- transfer of energy (and matter) between organisms in a simple/familiar food web or a food chain
- simple description of biosphere
- will not be able to scale up or down or describe the outcomes
- recognize and apply simple scale, patterns, quantity
- recognize proportion
- know Earth's relationship to the sun, moon and stars
- limited knowledge of water on the Earth
- Can identify familiar/simple conservation of matter examples
- Can identify evidence but use only in a limited fashion to support argument
- Limited ability to identify cause and effect
- Identify patterns and classify matter based on simple physical properties (color, texture, size, shape, smell)
- In familiar contexts, make simple predictions

Grade 8 Science

Borderline Advanced

- Multiple scales
- Describe/explain evidence of relationships
- Evaluation of evidence of relationships without complex/in-depth reasoning
- Can synthesize a design solution with prompting
- Missing proper, relative weight for the “best” answer with multiple variables
- Inferences from cause and effect relationships
- Apply cause /effect to other simple scenarios
- Critique, improve and modify an investigate
- Applying ungiven principles to an investigation
- Given picture is not needed/can create mental picture
- Simple analysis but maybe con complex or multi-step
- Decipher importance of complex data consistently
- Grasp and use of higher and more frequent academic language
- Evaluate complex and revise simple models and design solutions
- Develop a model (create, build, etc.) with previous information provided
- Apply model to simpler concepts
- Make predictions either forward or backward using given data
- Dra conclusions from multiple sets of inferred data/patterns

Grade 8 Science

Borderline Limited Knowledge

- Identify basic invest. steps
- Can identify cause or effect only if given the other with a picture or diagram
- Pattern given linearly can agree/disagree
- Associate vocabulary to the topic but not connections between
- Require image stimulus but with misconceptions
- Agree/disagree with a description of a basic, provided argument/explanation
- Struggle with scale but can maybe work with single provided scale
- Understand some of the basic components in a model or design
- Can use a simple pre-identified pattern/relationship
- Can identify there was a change in a model
- Qualitative, not quantitative
- Use inappropriate descriptions
- Use single set of data/variable partially
- Cannot pick which data set to use
- Cannot apply vocabulary but can recognize

Grade 8 Science

Borderline Proficient

- Multiple scales
- Describe/explain evidence of relationships
- Evaluation of evidence of relationships without complex/in-depth reasoning
- Can synthesize a design solution with prompting
- Missing proper, relative weight for the “best” answer with multiple variables
- Inferences from cause and effect relationships
- Apply cause /effect to other simple scenarios
- Critique, improve and modify an investigate
- Applying ungiven principles to an investigation
- Given picture is not needed/can create mental picture
- Simple analysis but maybe con complex or multi-step
- Decipher importance of complex data consistently
- Grasp and use of higher and more frequent academic language
- Evaluate complex and revise simple models and design solutions
- Develop a model (create, build, etc.) with previous information provided
- Apply model to simpler concepts
- Make predictions either forward or backward using given data
- Draw conclusions from multiple sets of inferred data/patterns

Grade 10 Science

Borderline Advanced

- Develop and use models to interpret or evaluate components and relationships within complex systems
- Plan and conduct an investigation to produce accurate data
- Interpret complex data sets
- Support or defend arguments based on evidence
- Ask questions to analyze relationships
- Construct and evaluate based on valid and reliable evidence
- Evaluate explanations from evidence from more than 1 source
- Use alternative models to generate predictions or explanations
- Explain differences using evidence
- Compare risks and benefits on a global scale

Grade 10 Science

Borderline Limited Knowledge

- Identify most of the components within a system
 - Organization of matter
 - Energy flow
 - Identify structure/function
 - Use provided data to support explanation and claims
 - Cycling of matter
 - Natural selection
 - Diversity
 - Structure and function
 - Describe arguments based on evidence about stability and change in
 - Ecosystem dynamics and adaptation
 - Social interaction
 - Cause and effect
 - Identify basic relationships based on evidence of
 - Natural selection
 - Adaptation
- OR

Identify explanations and matter and energy cycling

- Describe, measure, classify phenomena at multiple scales for living systems
- Critique studies
- Critique solutions

Grade 10 Science

Borderline Proficient

- Use models but not develop models independently
 - Interpret provided data
 - Conduct investigations to produce reliable data
 - Interpret for patterns, trends
 - Plan investigations
 - Barely proficient – average = analysis
 - Determine patterns in data trends
 - Calculate averages, not density, expectations
 - Identify increasing or decreasing slope
 - Scale – inter/intra
 - Population vs. community level
 - Limiting factors – competition at different levels
 - Among species
 - Within speciesTerminology difference conceptually
 - Abstract – scale is difficult
 - Ecology is easiest – competition
 - Energy flow in food web
 - Revise explanations about organization/cycling/transferring of energy using evidence from sources
 - Recognize sources are valid and reliable
 - Revise explanation based on sources
 - Revise explanation about cause and effect – complex relationships (DNA -> protein)
 - Ask questions to clarify simple relationships about cause and effect about structure and function of inherited traits
- OR
- Evaluate arguments based on evidence (but not synthesize understanding)
- Demonstrate relationships (but not compare alternative models)
 - Recognize and control variables
 - Choose conclusions best supported by evidence
 - Compare risks and benefits on small scale

Grade 5 Science

Borderline Advanced

- Develop and use models to interpret or evaluate components and relationships within complex systems
- Plan and conduct investigations to produce accurate data
- Interpret complex data sets
- Support or defend arguments based on evidence
- Ask questions to analyze relationships
- Construct and evaluate explanations based on valid and reliable evidence
- Evaluate explanations from evidence from more than 1 source
- Use alternative models to generate predictions or explanations
- Explore differences using evidence
- Compare risks and benefits on a global scale

Grade 5 Science

Borderline Limited Knowledge

- Identify most of the components within a system
 - Organization
 - Energy flow
- Identify structure/function
- Use provided data to support explanations and claims
 - Cycling of matter
 - Natural selection
 - Diversity
 - Structure and function
- Describe arguments based on evidence about stability and change
 - Ecosystem dynamics and adaptation
 - Social interaction

OR

- Identify explanations related to matter and energy cycling
- Describe, measure, classify phenomena at different scales for living systems
- Critique studies
- Critique solutions

Grade 5 Science

Borderline Proficient

- Use (but not develop) models independently
- Interpret provided data (look for patterns, trends)
- Conduct, investigations to produce reliable data
- Plan investigations
- Determine patterns in data, trends
- Calculate averages
- Increasing or decreasing slope
- Scale: At conceptual level versus terminology; ecology, competition is easiest, energy flow in food web
- Revise explanations about organization/cycles transfer of energy using evidence from sources
- Recognize sources are valid and reliable
- Revise explanations based on sources
- Reuse explanations about cause and effect relations about structure and functions of inherited traits OR
evaluate arguments based on evidence (but not compare alternative models)
- Recognize and control variables
- Choose conclusions best supported by evidence
- Compare risks and benefits on a small scale

APPENDIX B—MEETING AGENDA

Oklahoma School Test Program Standard Setting

Panelists Agenda: Grades 3-8, 10

August 8 10, 2017

Day 1 (Tuesday, August 8) *All times are approximate. Breaks will take place as needed.*

Time	Activity/Presentation	Location	Presenter
8:00 am – 8:55 am	Registration & Breakfast 8:30 – Table Lead training	Room 14 & 15 The Native American Room	Karen Paavola and Matthew Gushta, Measured Progress
9:00 am – 9:20 am	Welcome and Introductions	Room 14 & 15	Superintendent Hofmeister Oklahoma State Department of Education, Measured Progress
9:20 am – 9:50 am	General Orientation Role of Panelists	Room 14 & 15	Craig Walker, Oklahoma State Department of Education
	Review Agenda and Materials	Room 14 & 15	Julie DiBona, Measured Progress
9:50 am – 10:50 am	Standard-Setting Process Overview	Room 14 & 15	Matthew Gushta, Measured Progress
10:50 am – 11:00 am	Break (transition to break-out rooms, refer to the Room Map for panel room assignments)		
11:00 am – 12:00 pm	Individual Group Introductions Review Performance Level Descriptors (for first grade level in multiple grade rooms[3, 5, or 7]) Performance Level Discussions	Room 1 – Math, Grades 3 and 4 Room 2 – Math, Grades 5 and 6 Room 3 – Math, Grades 7 and 8 Room 4 – Math, High School Room 5 – ELA, Grades 3 and 4 Room 7 – ELA, Grades 5 and 6 Room 8 – ELA, Grades 7 and 8 Room 9 – ELA, High School Room 10 – Science, Grade 5 Room 11 – Science, Grade 8 Room 12 – Science, High School	Measured Progress Facilitator
12:00 pm – 1:00 pm	Lunch	Room 14 & 15	
1:00 pm – 2:30 pm	Standard-Setting Process (for first grade level in multiple grade rooms [3, 5, or 7])	See above	Measured Progress Facilitator
2:30 pm – 2:45 pm	Break	Breakout Room Pre-Function Area	

2:45 pm – 5:00 pm	Continue Standard-Setting Process (for first grade level in multiple grade rooms [3, 5, or 7])	See above	Measured Progress Facilitator
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Day 2 (Wednesday, August 9) *All times are approximate. Breaks will take place as needed.*

Time	Activity/Presentation	Location	Presenter
8:00 am – 9:00 am	Breakfast	Room 14 & 15	
9:00 am – 12:00 pm	Standard-Setting Process Completed (for first grade level in multiple grade rooms [3, 5 or 7])	Room 1 – Math, Grades 3 and 4 Room 2 – Math, Grades 5 and 6 Room 3 – Math, Grades 7 and 8 Room 4 – Math, High School Room 5 – ELA, Grades 3 and 4 Room 7 – ELA, Grades 5 and 6 Room 8 – ELA, Grades 7 and 8 Room 9 – ELA, High School Room 10 – Science, Grade 5 Room 11 – Science, Grade 8 Room 12 – Science, High School	Measured Progress Facilitator
12:00 pm – 1:00 pm	Lunch	Room 14 & 15	
1:00 pm – 2:00 pm	Review Achievement Level Descriptors (for second grade level in multiple grade rooms [4,6, or 8]) Performance Level Discussions	See above	Measured Progress Facilitator
2:00 pm – 2:15 pm	Break	Breakout Room Pre-Function Area	
2:15 pm – 5:00 pm	Standard-Setting Process (for second grade level in multiple grade rooms [4, 6, or 8])	See above	Measured Progress Facilitator

Day 3 (Thursday, August 10) *All times are approximate. Breaks will take place as needed.*

Time	Activity/Presentation	Location	Presenter
8:00 am – 9:00 am	Breakfast	Room 15	
8:30 am – 12:00 pm	Standard-Setting Process (for second grade level in multiple grade rooms [4, 6, or 8])	Room 1 – Math, Grades 3 and 4 Room 2 – Math, Grades 5 and 6 Room 3 – Math, Grades 7 and 8 Room 5 – ELA, Grades 3 and 4 Room 7 – ELA, Grades 5 and 6 Room 8 – ELA, Grades 7 and 8	Measured Progress Facilitator
12:00 pm – 1:00 pm	Lunch	Room 15	
1:00 pm – 2:15 pm	Standard-Setting Process Completed (for second grade level in multiple grade rooms [4, 6, or 8])	See above	Measured Progress Facilitator
2:15 pm – 2:30 pm	Break	Breakout Room Pre-Function Area	

2:30 pm – 5:00 pm	Continue Standard-Setting Process Completed (for second grade level in multiple grade rooms [4, 6, or 8])	See above	Measured Progress Facilitator
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APPENDIX C—NONDISCLOSURE FORM

Nondisclosure Agreement

Grades 3-8 & HS State Assessment Standard Setting Meeting
August 8th – 11th

The undersigned is an employee, contractor, assessment committee member, or person otherwise authorized to view secure state assessment materials. The undersigned hereby agrees to be bound to the terms of this agreement restricting the disclosure of said materials.

It is essential to the integrity of this item development project and testing program that all test items remain secure. To maintain this security, only authorized persons are permitted to view the test questions. With the exception of materials released by the Oklahoma State Department of Education for informational purposes, all test questions (draft or final) in hardcopy or electronic format and associated materials must be regarded as secure documents. As a result, such materials may not be reproduced, electronically transmitted, discussed, used in classroom instruction, or in any way released or distributed to unauthorized persons. All materials including items and item drafts must be returned at the end of the meeting.

I understand that I am responsible for test materials security. By breaching test materials security as described here, I am breaching professional testing ethics.

Name: _____

Signature: _____

Date: _____

Grade _____

Content _____

APPENDIX D—SAMPLE ITEM LIST FORM

OSTP ELA Grade 5

Item Map

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		

OSTP ELA Grade 5

Item Map

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		

OSTP ELA Grade 5

Item Map

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		

OSTP ELA Grade 5

Item Map

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
52		
53		
54		
55		
56		
57		
58		

APPENDIX E—SAMPLE RATING FORM

OSTP Assessments Practice Rating Form

ID: _____

Practice Round

Limited Knowledge	
Ordered Item Numbers	
First	Last
1	_____

Directions: Please enter the range of ordered item numbers that fall into each criteria student status level category according to where you placed your bookmark.

Note: The ranges must be adjacent to each other. For example: Limited Knowledge: 1-5, Proficient: 6-10.

OSTP Assessments Rating Form

Content Area: _____

Grade: _____

ID Number: _____

Round 1

<p>Unsatisfactory</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>1 _____</p>	<p>Limited Knowledge</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>	<p>Proficient</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>	<p>Advanced</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>
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Round 2

<p>Unsatisfactory</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>1 _____</p>	<p>Limited Knowledge</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>	<p>Proficient</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>	<p>Advanced</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>
---	--	---	---

Round 3

<p>Unsatisfactory</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>1 _____</p>	<p>Limited Knowledge</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>	<p>Proficient</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>	<p>Advanced</p> <p>Ordered Item Numbers</p> <p>First Last</p> <p>_____ _____</p>
---	--	---	---

Directions: Please enter the range of ordered item numbers that fall into each criteria student status level category according to where you placed your bookmark.

Note: The ranges must be adjacent to each other. For example: Unsatisfactory 1-12, Limited Knowledge: 13-23, Proficient: 24-36, Advanced 37-50. The Advanced Last is the last page in the OIB.

APPENDIX F—EVALUATION FORM

Content Area: _____

Grade: _____

Standard Setting Practice Evaluation

The purpose of this evaluation form is to obtain your feedback about the training you have received through the Practice Round. Please complete the information below. **Do not put your name on the form.** We want your feedback to be confidential.

Please mark the appropriate box for each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understand the goals of the standard setting meeting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understand the procedures we are using to set standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understand how to use the standard setting materials.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understand the differences between the performance levels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understand how to make the bookmark placements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know what tasks to expect for the remainder of the meeting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am confident in my understanding of the standard setting task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am ready to proceed with the standard setting process.				<input type="checkbox"/> Yes	<input type="checkbox"/> No

Please indicate any areas in which you would like more information before you continue.

Please indicate any questions you may have about the remainder of the standard setting meeting.

Content Area: _____

Grade: _____

Standard Setting Procedural Evaluation

The purpose of this evaluation form is to obtain your feedback about the Standard Setting process. Please complete the information below. **Do not put your name on the form.** We want your feedback to be confidential.

Please mark the appropriate box for each statement:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understood how to make the bookmark placements.	<input type="checkbox"/>				
I understood how to use the materials provided.	<input type="checkbox"/>				
I understood how to record my judgments.	<input type="checkbox"/>				
I thought the procedures made sense.	<input type="checkbox"/>				
I was sufficiently familiar with the assessment.	<input type="checkbox"/>				
I understood the differences between the performance levels.	<input type="checkbox"/>				

Please rate the influence of the following when setting standards:

	Not at all influential	Somewhat not influential	Neutral	Somewhat influential	Extremely influential
The Performance Level Definitions.	<input type="checkbox"/>				
My expectations of students.	<input type="checkbox"/>				
The difficulty of the test materials.	<input type="checkbox"/>				
My experience in the field.	<input type="checkbox"/>				
Discussions with other participants.	<input type="checkbox"/>				
Decisions of other participants.	<input type="checkbox"/>				
Impact data.	<input type="checkbox"/>				

What materials, information, or procedures were most influential in your placement of the cut scores? Why?

Do you believe the final recommended cut score for the performance levels for this grade was Too Low, Somewhat Low, About Right, Somewhat High, or Too High?

	Too Low	Somewhat Low	About Right	Somewhat High	Too High
Advanced/Proficient	<input type="checkbox"/>				
Proficient/Limited Knowledge	<input type="checkbox"/>				
Limited Knowledge/Unsatisfactory	<input type="checkbox"/>				

Please provide any additional comments about the cut score placements for this grade.

Content Area: _____

Grade: _____

Standard Setting Final Evaluation

Please complete the information below. Your feedback will provide a basis for evaluating the training, methods, and materials. **Do not put your name on the form.** We want your feedback to be confidential.

Gender: Male Female

Race/ethnicity: White Black Hispanic Asian Pacific Islander American Indian

Years of experience in education: 0-5 6-10 11-15 More than 15

Area of Expertise (Check all that apply):

Students with Disabilities	<input type="checkbox"/>
Students with Limited English Proficiency	<input type="checkbox"/>
Economically Disadvantaged Students	<input type="checkbox"/>
Gifted and Talented Students	<input type="checkbox"/>
General Education	<input type="checkbox"/>

Please rate the usefulness of each of the following:

	Not at all useful	Somewhat not useful	Neutral	Somewhat useful	Extremely useful
The opening session.	<input type="checkbox"/>				
Completing the practice test.	<input type="checkbox"/>				
Completing the item map.	<input type="checkbox"/>				
Discussions with other participants.	<input type="checkbox"/>				
Impact data.	<input type="checkbox"/>				

Please mark the appropriate box for each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understood the goals of the standard setting meeting.	<input type="checkbox"/>				
The facilitator helped me understand the process.	<input type="checkbox"/>				
The materials contained the information needed to set standards.	<input type="checkbox"/>				
I understood how to use the impact data.	<input type="checkbox"/>				
I understood how the cut scores were calculated.	<input type="checkbox"/>				
The facilitator was able to provide answers to my questions.	<input type="checkbox"/>				
Sufficient time was allotted for training on the standard setting tasks.	<input type="checkbox"/>				
Sufficient time was allotted to complete the standard setting tasks.	<input type="checkbox"/>				
The facilitator helped the standard setting process run smoothly.	<input type="checkbox"/>				
Overall, the standard setting process produced credible results.	<input type="checkbox"/>				

Please provide any additional comments about the standard setting process or suggestions as to how the training and process could be improved.

Standard Setting Articulation Evaluation: Prior to Discussion

Content Area: _____

Think about the KSAs that each grade-content group came to consensus on for each performance level, the profiles, and your knowledge of the students and the content. When you look across all grades, do you judge the cut scores for each of the performance levels as too low, somewhat low, about right, somewhat high, or too high?

Grade		3	4	5	6	7	8	9	10
Advanced/ Proficient	Too Low	<input type="checkbox"/>							
	Somewhat Low	<input type="checkbox"/>							
	About Right	<input type="checkbox"/>							
	Somewhat High	<input type="checkbox"/>							
	Too High	<input type="checkbox"/>							
Proficient/ Limited Knowledge	Too Low	<input type="checkbox"/>							
	Somewhat Low	<input type="checkbox"/>							
	About Right	<input type="checkbox"/>							
	Somewhat High	<input type="checkbox"/>							
	Too High	<input type="checkbox"/>							
Limited Knowledge/ Unsatisfactory	Too Low	<input type="checkbox"/>							
	Somewhat Low	<input type="checkbox"/>							
	About Right	<input type="checkbox"/>							
	Somewhat High	<input type="checkbox"/>							
	Too High	<input type="checkbox"/>							

Please provide any additional comments about the cut score placements across grades.

Standard Setting Articulation Evaluation: Post Discussion

Content Area: _____

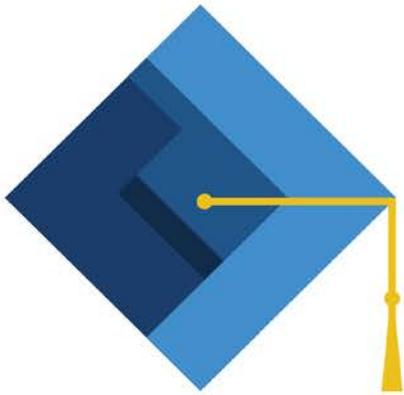
Think about the KSAs that each grade-content group came to consensus on for each performance level, the profiles, and your knowledge of the students and the content. When you look across all grades, do you judge the adjusted cut scores for each of the performance levels as too low, somewhat low, about right, somewhat high, or too high?

Grade		3	4	5	6	7	8	9	10
Advanced/ Proficient	Too Low	<input type="checkbox"/>							
	Somewhat Low	<input type="checkbox"/>							
	About Right	<input type="checkbox"/>							
	Somewhat High	<input type="checkbox"/>							
	Too High	<input type="checkbox"/>							
Proficient/ Limited Knowledge	Too Low	<input type="checkbox"/>							
	Somewhat Low	<input type="checkbox"/>							
	About Right	<input type="checkbox"/>							
	Somewhat High	<input type="checkbox"/>							
	Too High	<input type="checkbox"/>							
Limited Knowledge/ Unsatisfactory	Too Low	<input type="checkbox"/>							
	Somewhat Low	<input type="checkbox"/>							
	About Right	<input type="checkbox"/>							
	Somewhat High	<input type="checkbox"/>							
	Too High	<input type="checkbox"/>							

Please provide any additional comments about the cut score placements across grades.

APPENDIX G—POWERPOINT PRESENTATION

Welcome!



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —

Oklahoma State Testing Program
(OSTP)

Standard Setting
ELA (3-8 and 10), Math (3-8 and 10), and Science (5, 8 and 10)
August 8-11, 2017

Today's Agenda

1. Context and Policy Introduction
2. Georgetown Study: Providing Context
3. Standard Setting Process



Oklahoma State

Department of Education Staff

- Superintendent Joy Hofmeister
- Dr. Jeanene Barnett – Deputy Superintendent of Assessment & Accountability
- Craig Walker – Executive Director of State Assessments
- Maria Harris – Assistant Executive Director of State Assessments
- Elizabeth Warren – Director of ELPA
- Vacant – Director of Assessment & Data Literacy
- Sarah Owens – Math Assessment Specialist
- Cora James – Science Assessment Specialist
- Christy McCreary – ELA/Social Studies Assessment Specialist
- Rebecca Logan – Executive Director of NAEP
- Dr. Maridyth McBee – Assessment & Accountability Systems Consultant
- Dr. Marianne Perie – External Standard Setting Evaluator



Measured Progress Staff

- Margie McCaw – Vice President, Client Services
- Tammy Bullock – Director, Client Services
- Julie DiBona – Portfolio Manager, Client Services
- Matthew Gushta – Director, Psychometrics
- Xi Wang – Psychometrician
- Karen Paavola – Director, Content, Design and Development
- Jim Kroening – Manager, Content, Design, and Development: ELA, Social Studies, Alternate Assessments (also facilitator ELA Grade 10)
- David Harrison – STEM Manager, Content, Design and Development
- Sharman Lyons – Program Coordinator, Client Services
- Andrew Martin – Statistical Analyst
- Michelle Boazeman – Statistical Analyst



Measured Progress Staff - Facilitators

- Eva Villagrana – Math Grades 3 and 4
- Tim Pozdol – Math Grades 5 and 6
- Robert Hodgman – Math Grades 7 and 8
- Richard Sedillo – Math Grade 10
- Debbie Hamilton – ELA Grades 3 and 4
- Leslie Ruff – ELA Grades 5 and 6
- Lisa Jones Kennedy – ELA Grades 7 and 8
- Nandita Dangoria – Science Grade 5
- Paul Ritchie – Science Grade 8
- Veronica Zonick – Science Grade 10



Oklahoma Statute on Performance Levels

- The Commission for Educational Quality and Accountability shall determine and adopt a series of student **performance levels** and the corresponding cut scores pursuant to the Oklahoma School Testing Program Act.
- The Commission for Educational Quality and Accountability shall have the authority to set cut scores using any method which the State Board of Education was authorized to use in setting cut scores prior to July 1, 2013.



Oklahoma Statute on Performance Levels

- The **performance levels** shall be set by a method that indicates students are ready for the next grade, course, or level of education, as applicable.
- The Commission for Educational Quality and Accountability shall establish panels to review and revise the **performance level** descriptors for each subject and grade level. The Commission shall ensure that the criterion-referenced tests developed and administered by the State Board of Education pursuant to the Oklahoma School Testing Program Act in grades three through eight and the tests administered at the high school level are vertically aligned by content across grade levels to ensure consistency, continuity, alignment and clarity.



Transitioning to Oklahoma Academic Standards (OAS)

- Oklahoma is transitioning to more challenging standards and assessments
- This transition provides Oklahoma with an **opportunity** to ensure our students are College and Career Ready
- *Why* is this transition needed?



Oklahoma 2017 CCRA Results

ACT

English:

- 46% met benchmark (18)

Mathematics

- 25% met benchmark (22)

Reading

- 37% met benchmark (22)

SAT

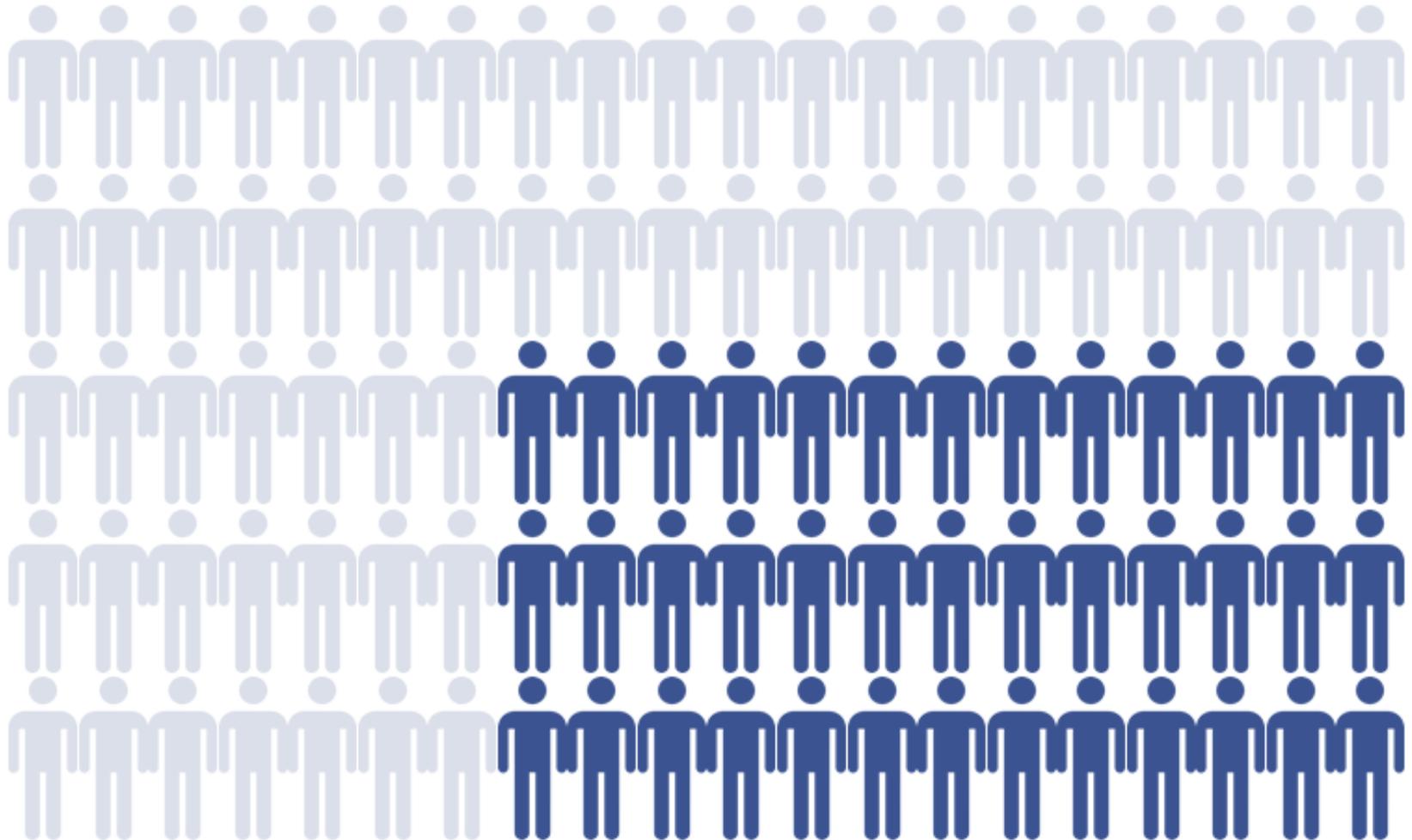
Reading & Writing:

- 45% met benchmark (480)

Mathematics

- 23% met benchmark (530)

39% of 2015 High School Graduates had to Take College Remediation Classes

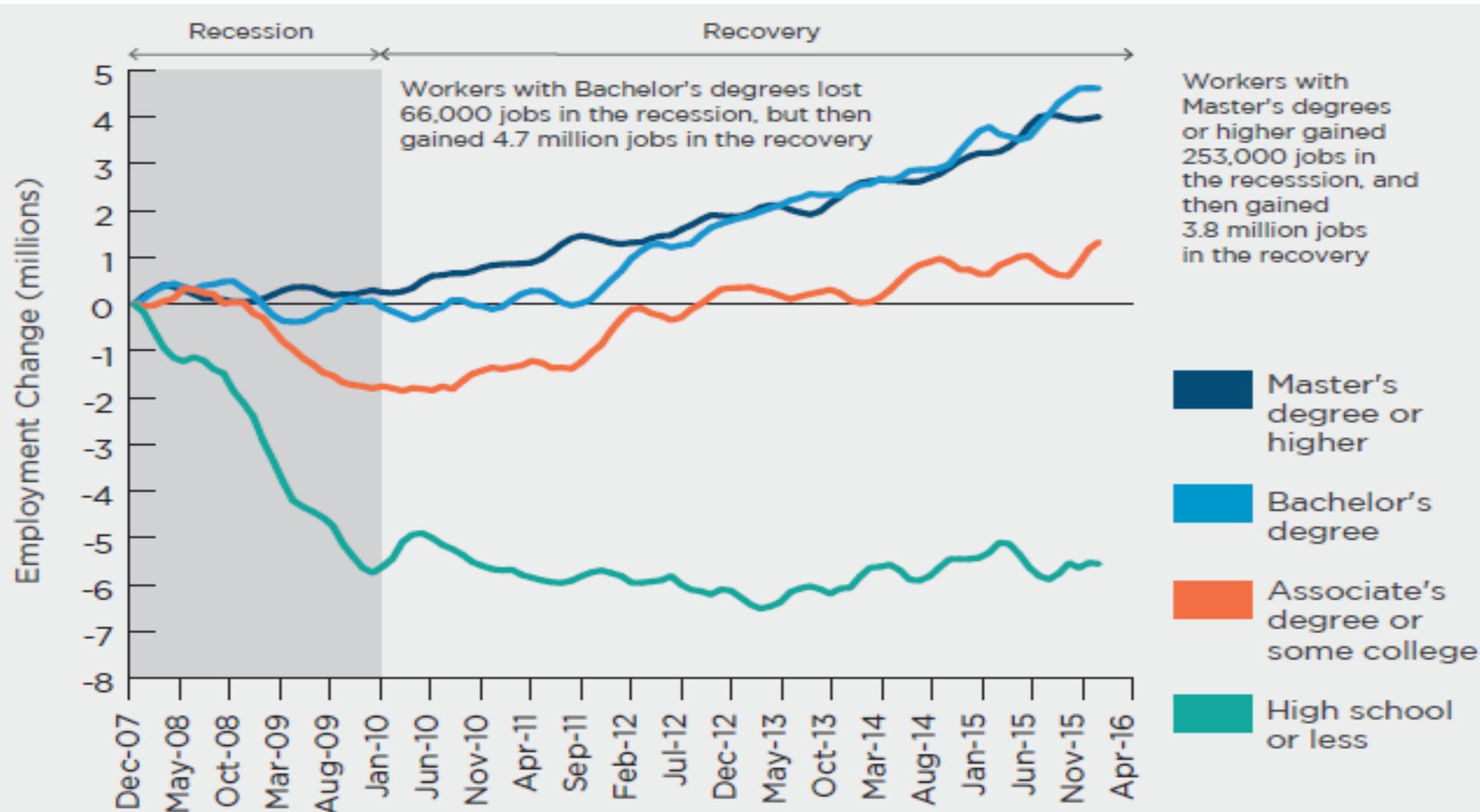


Remediation Courses Impact Student Success

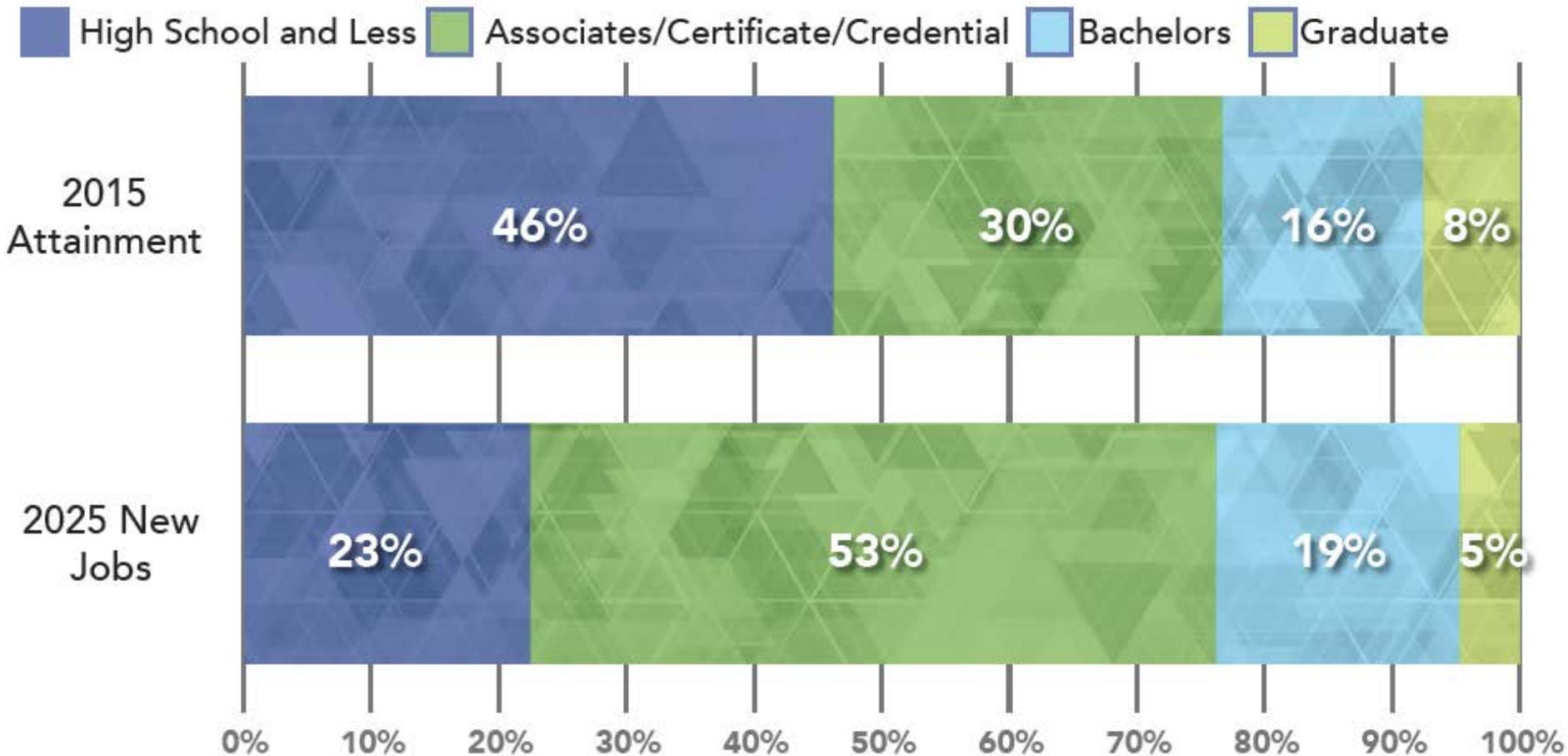
- **Eighty-one percent** of Oklahoma *community college* students who are required to take a math remediation class **fail to graduate** within three years. Around 70 percent of students who take a math remediation class at a four-year university fail to graduate within six years.
- Remediation courses costs students tuition — **\$22.2 million** annually in Oklahoma — but do not go toward college credit.



Post Great Recession Workforce Trends



Oklahoma's Workforce Gap



Source: OK Office of Workforce Development EMSI Q2, 2015



Assessment Report 2017

Oklahoma Legislature directed the State Board of Education:

- to evaluate Oklahoma's current state assessment system, and
- make recommendations for its future.

As a result, Oklahoma State Department of Education:

- held regional meetings across the state to determine stakeholder concerns
- convened the Oklahoma Assessment & Accountability Task Force to develop recommendations
- followed the federal requirements and rules as described in ESSA



Recommendations from the Task Force

Assessments in Grades 3-8

- Score Interpretation
 - Provide a measure of performance indicative of being on track to College and Career Readiness (CCR).
- Reporting and State Comparability
 - Utilize the existing National Assessment of Educational Progress (NAEP) data to establish statewide comparisons at grades 4 and 8. NAEP data should also be used during standard-setting activities to ensure the CCR cut score is set using national and other state data.



Goals for Oklahoma Schools

- Focus on college and career readiness:
College and career ready means that students graduate from high school prepared to enter and succeed in postsecondary opportunities whether college or career.
- Students should graduate high school ready for postsecondary success and need to demonstrate they are on-track towards that goal in grades 3–8.



Rigor of State Proficiency Standards

- Since 2011, **45 states** have raised their standards for student proficiency in reading and math, with the greatest gains between 2013 and 2015.
- Most states set only mediocre expectations for students for nearly 10 years after the passage of the federal No Child Left Behind Act (2001).



Rigor of State Proficiency Standards (Table 1)

Standards have strengthened in the majority of states over time, and roughly half of the states received a grade of "A" for their standards in 2015.

The differences between state and NAEP proficiency rates

Rank	State	Strength of state proficiency standards 2015				Overall averages by year						
		4th grade		8th grade		2003	2005	2007	2009	2011	2013	2015
		Math	Reading	Math	Reading							
1	Rhode Island	A	A	A	A	B	C+	C	C	C	C	A
2	Colorado	A	A	A	A	D	D-	C+	C+	B-	B-	A
3	Maryland	A	A	A	A	B-	C-	C-	D+	C-	C	A
4	New Mexico	A	A	A	A	C+	C+	C	C+	C+	C+	A
5	Arkansas	A	A	A	A	C+	B-	C	D+	D	D	A
6	New Jersey	A	A	A	A	C	C-	C	C	C	C+	A
7	Kansas	A	B	A	A	C	D+	C-	D	D	D+	A
8	North Dakota	A	A	A	A	C	C-	C-	C-	C-	C	A

Rank	State	Strength of state proficiency standards 2015				Overall averages by year						
		4th grade		8th grade		2003	2005	2007	2009	2011	2013	2015
		Math	Reading	Math	Reading							
9	New York											
10	District of Columbia											
11	Illinois											
12	Montana											
13	Alaska											
14	Vermont											
15	Utah											
16	Mississippi											
17	New Hampshire											
18	Arizona											
19	Maine											
20	Georgia											
21	Connecticut											
22	Pennsylvania											
23	South Dakota											
24	Idaho											
25	Nevada											
26	West Virginia											
27	California											
28	Massachusetts	A	A	B	C	A	A	A	A	A	A	B+
29	Michigan	B+	B	B+	B+	C	D+	D	D-	D-	B-	B+
30	Louisiana	A	A	B-	B+	C-	C-	D+	D	D	D	B+
31	Washington	B+	B+	B+	B+	C+	C	C+	C+	C+	B-	B+
32	Wyoming	A	B	B-	B+	A	A	C-	C	D+	C-	B+
33	Delaware	B	B+	B+	B+	C	C-	D+	D+	C	C-	B+
34	Oregon	B+	B+	B	B	C	C-	D+	C-	C	C	B
35	Kentucky	B+	A	C+	B+	B-	C+	C	C	C	B+	B
36	Tennessee	B	B	C+	B+	F	F	F	F	B	B	B
37	Alabama	C+	A	B	B	D-	D-	F	F	F	F	B
38	Hawaii	B	B	B	B	B+	B	B	C	C	C	B
39	Minnesota	B-	B	B	B+	C+	C+	C+	C+	C+	C+	B
40	Missouri	B	B	B	B	A	A	B+	B+	B	B	B
41	North Carolina	B	B	B	B-	D-	F	D	C-	D+	A	B
42	Indiana	B-	C+	B-	C+	C	C-	C-	C-	D+	D+	C+
43	South Carolina	B	C	B+	D+	A	A	A	D+	D+	D+	C+
44	Ohio	C+	C	B-	C	C	C-	C-	D+	D+	D+	C+
45	Nebraska	C-	C-	C-	C-	C-	D-	F	F	C	C-	C-
46	Virginia	D+	C	D+	C-	D-	D	D	D-	D	C	C-
47	Oklahoma	C-	C	D+	D+	D-	D-	F	C-	D+	D	C-
48	Iowa	C-	C	D+	C-		D+	D+	D+	D	C	C-
49	Texas	C	C-	D	D	F	D-	F	F	F	D+	D+
	Florida					C	C	C	C	C	C	B-
	Wisconsin					D	D+	D+	D	D+	A	A

*2005 data are missing; change is calculated from 2007.

NOTE: A positive number indicates narrowing the difference between the NAEP and state exams.

SOURCE: Authors' calculations based on NAEP and state exams



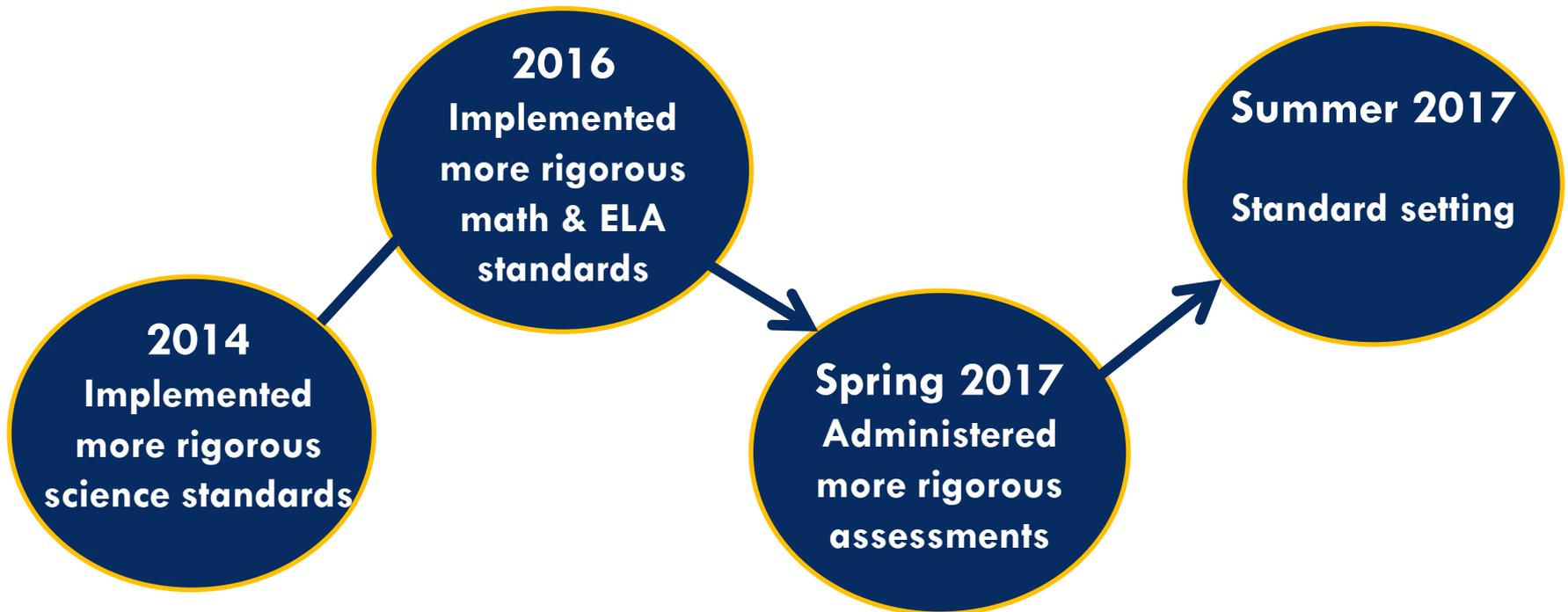
Understanding NAEP

- First administered in 1969, the **National Assessment of Educational Progress (NAEP)** also known as the *Nation's Report Card*, is the largest nationally representative and continuing assessment of what America's students know and can do in various subjects areas such as, math, reading, science, and writing.
- Elected officials, policymakers, educators, and researchers all use NAEP resources and results to develop ways to improve education in the United States.



Transition to Oklahoma Academic Standards

Ensure our Students are College & Career Ready



What is Depth of Knowledge (DOK)?

- DOK **measures** the degree to which knowledge is elicited from students.
- DOK is a common language educators use to describe the **complexity of learning tasks** and test items.



What is Depth of Knowledge (DOK)

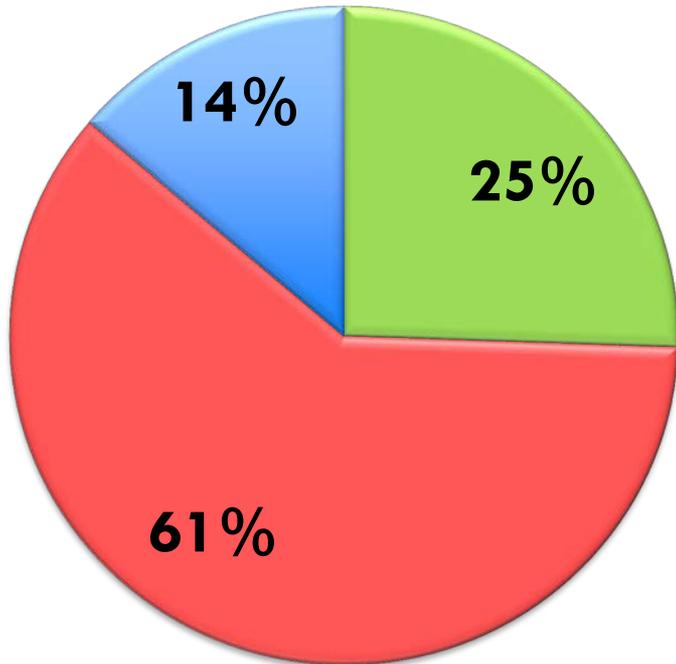
DOK is About Complexity

- **Level 1** requires students to use simple skills or abilities.
- **Level 2** includes the engagement of some mental processing beyond recalling.
- **Level 3** requires some higher level mental processing like reasoning, planning, and using evidence.
- **Level 4** requires complex reasoning, planning, developing, and thinking over an extended period of time.



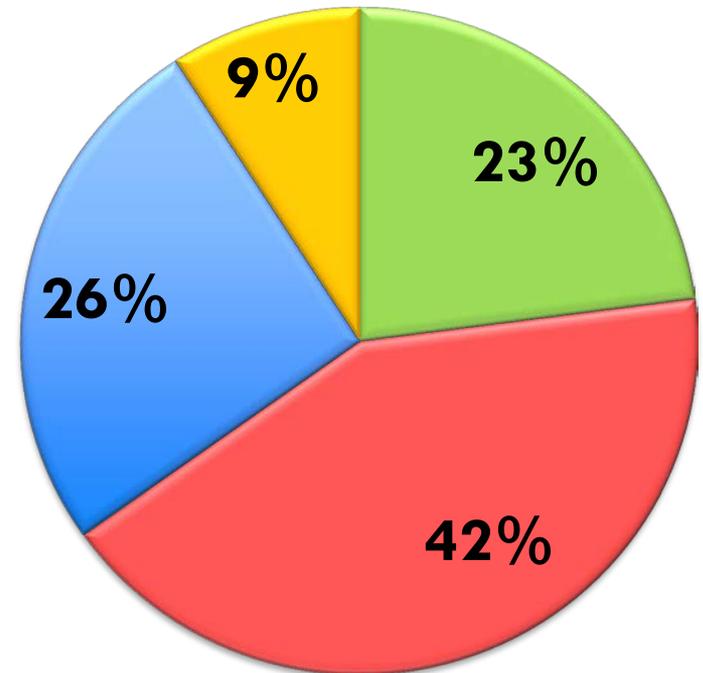
DOK Distribution for Assessed ELA Standards

PASS

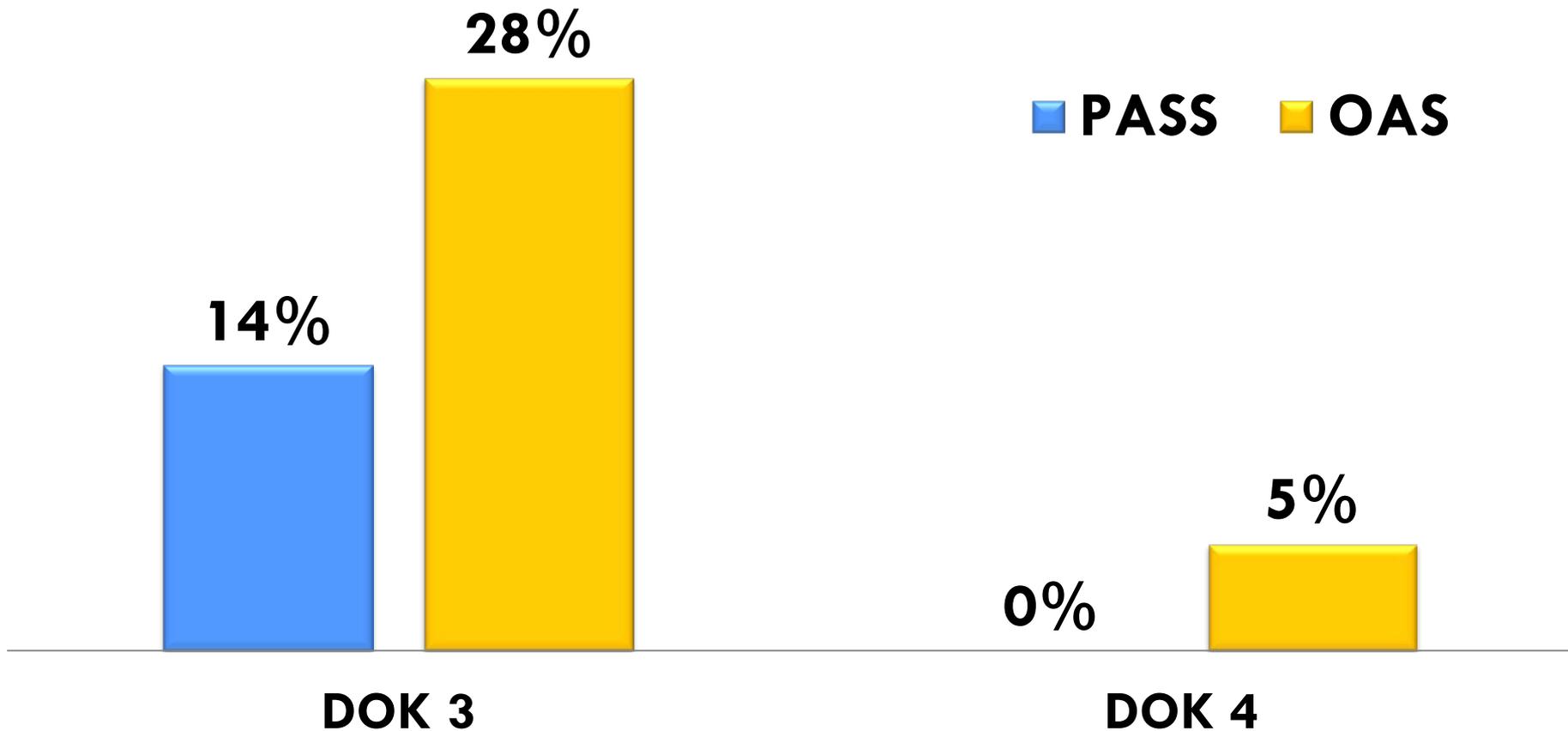


- DOK 1
- DOK 2
- DOK 3
- DOK 4

OAS



DOK Distribution for ALL Assessed Standards (3-8)



The Standard Setting Process

Content Standards vs. Performance Standards

- Content standards = “What”
 - Describe the knowledge and skills students are expected to demonstrate by content area and grade
- Performance standards = “How well”
 - Describe attributes of student performance based on Performance Level descriptors

What is Your Job?

- To recommend cut scores for each of the performance levels that will be used to report results:
 - *Unsatisfactory* ←———— Cut Score
 - *Limited Knowledge* ←———— Cut Score
 - *Proficient* ←———— Cut Score
 - *Advanced*

We are Trying to Determine?

- What knowledge, skills, and abilities (KSAs) need to be demonstrated to be classified in each Performance Level?

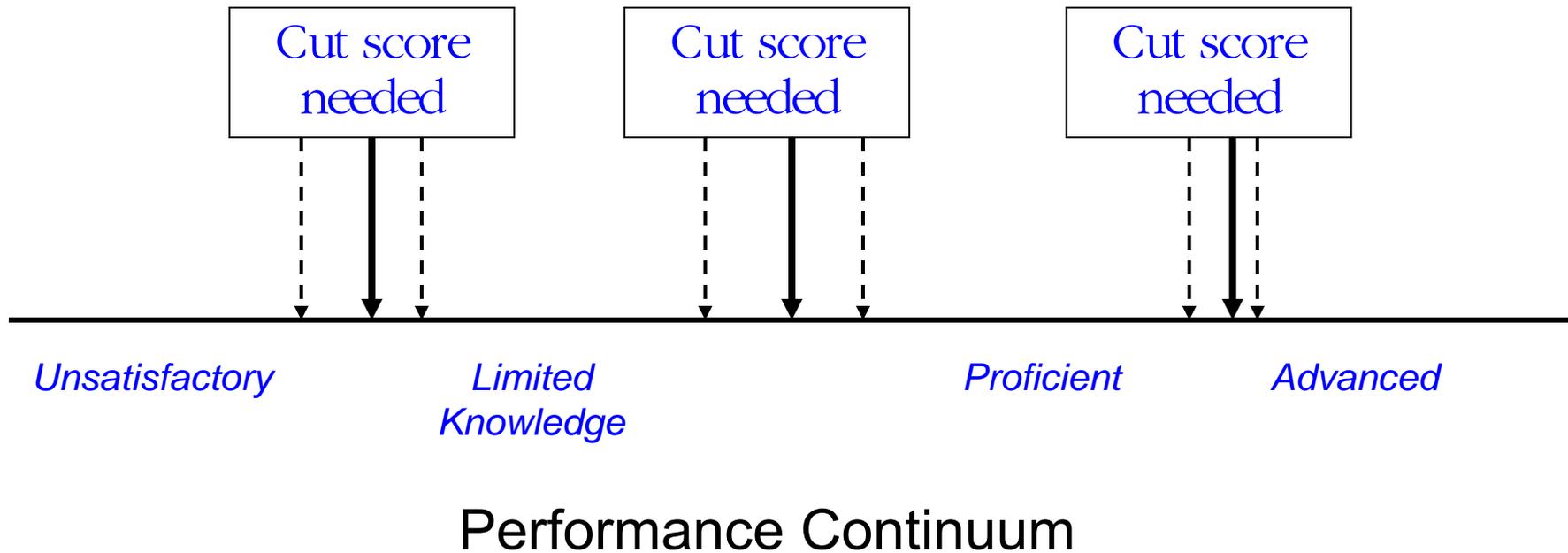
- How much is enough?

- What test performance corresponds to:
 - Unsatisfactory
 - Limited Knowledge
 - Proficient
 - Advanced

Performance Continuum



Based on Proficiency Levels, You will Recommend a Cut Score...



General Phases of Standard Setting

Data-collection 

Policy-making/Decision-making

Final Recommendations

- Your recommendations will be reviewed and presented to the policy makers, responsible for final adoption of the cut scores.
- The recommendations may be accepted, rejected, or modified by the Commission for Educational Quality and Accountability (CEQA).

Overview of Standard Setting Method

- We will cover
 - Implementation of the Bookmark procedure
- Note
 - This session is intended to be an overview
 - Your facilitator will give you more details and guide you through the process step by step

Factors that Influence Selection of Standard-Setting Method

- Prior usage/history
- Recommendation/requirement by policy-making authority
- Type of assessments



Bookmark method chosen

What is the Bookmark Method and How Does It Work?

- A collection of test items is ordered in an ordered item book from easiest to most difficult.
- Panelists place one or more “bookmarks” in that book of items.

Important Terms to Know

- Performance Levels
- Test items
- “Borderline” students
- Knowledge, skills, and abilities (KSAs) needed to answer each test question
- Cut scores

Performance Levels

- Individual review of Performance Levels
- Group Discussion of what student performance in each Performance Level looks like.
- Focus on the “borderline” students, i.e., students who just barely make it into Performance Level.

Review Performance Levels and Develop Borderline Descriptions

- Create bulleted lists of
 - the **knowledge, skills, and abilities** a student must demonstrate to be classified in each Performance Level, and
 - the **knowledge, skills, and abilities** that distinguish one Performance Level from another.
- You must reach consensus as a group about the KSAs that define borderline student performance.

How to Place a Bookmark

- Start at the beginning of the ordered item booklet.
- Evaluate whether at least two thirds of the students who demonstrate knowledge and skills at the borderline of Proficient would correctly answer the item: If Yes, move on to the next item.
- Place the bookmark where you think at least two thirds of the Proficient “borderline” students would no longer correctly answer the item.

How to Place a Bookmark

Item Number	Would at least two-thirds of the students who demonstrate skills at the <i>Does Not Limited Knowledge– Proficient</i> “borderline” correctly answer this item?
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	No
7	Yes
8	Yes
9	No
10	No
11	No
12	No
13	No
14	No
15	No
...	No

How to Place a Bookmark

- In this example, the bookmark would go between items 8 and 9.
- You will have opportunities to discuss your bookmark placements and change them, if desired.
- Place one bookmark for each cut score (between the Performance Levels).

Before You Place the Bookmarks...

- **Take the test** to familiarize yourself with the test taking experience.
- Review the ordered item book.
- Complete the **item map form**, involves identifying the knowledge, skills, and abilities specific to each item.

Item Map

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
1		
2		
3		
4		
5		
6		
7		
8		

- Review and discuss **Performance Levels**.
- Develop **definition of “borderline”** for Limited Knowledge, Proficient, and Advanced.

Bookmarking the Ordered Item Booklet: Practice Round

- Before the actual rating rounds occur you will have an opportunity to practice the bookmark method with a set of practice items.
- You will be given a ordered item book with approximately 10 items to **practice** the bookmark placement for the cut point between Limited Knowledge and Proficient.

Check for Understanding

- Your facilitator will check with you for understanding and answer any questions you may have during and after the practice round.
- You will then complete a training evaluation form.
- This evaluation form will be used as a check for readiness before proceeding.

Actual Bookmarking: Three Rounds

- Round 1 (Without Discussion)
 - Work through the ordered item booklet.
 - Place bookmarks between the items as appropriate.
- Round 2 (With Group Discussion)
 - Discuss the first-round bookmark placements (focus on the KSAs).
 - Examine your cut points in relation to the group results.
 - Review and revise placement of bookmarks as appropriate.
- Round 3 (With Group Discussion)
 - Discuss the second-round bookmark placements (focus on the KSAs).
 - Examine your cut points in relation to the group results and impact data.
 - Review and revise placement of bookmarks as appropriate.

External Assessment Data

- Comparability to external assessments important as validity check.
- External benchmark data will be included as follows:

Subject	Grade	External Benchmark Data
Math	3-8	NAEP Proficiency
Math	10	ACT National College Readiness Benchmark
ELA	3-8	NAEP Proficiency
ELA	10	ACT National College Readiness Benchmark (Reading)
Science	5	NAEP Grade 4 Proficiency
Science	8	NAEP Grade 8 Proficiency
Science	10	ACT National College Readiness Benchmark

External Assessment Data

- For each grade, a region will be shaded in the item map that corresponds to NAEP proficiency or ACT college readiness with a range of +/- 2SEMs around that point.
- For NAEP Proficiency, a linear relationship was determined between grades 4 and 8 and extended to other grades 3-8.
- Within this region is where the Proficient bookmark will be placed.
- Your facilitator will give additional training and guidance on the usage of this data.

External Assessment Data

Example Item Map with Shading

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		

Role of the Facilitator

- Lead and keep the group on track.
- Ensure that all panelists clearly understand the procedures.
- Ensure that the evaluation forms are completed.
 - Your honest feedback is important!

A Few Reminders

- It is **not** necessary for panelists to reach consensus as to how the items should be categorized.
- You should be open-minded when listening to your colleagues' rationales for their ratings.
- You may or may not change your mind as a result of the discussions.
- We want each panelist to use his or her own **best judgment** in each round of rating.

Ground Rules

- Process is focused solely on recommending performance labels (cut scores).
- Role of facilitator is to lead and keep the group on track.
- The Performance Levels and their definitions are not open for debate.
- Panelists' recommendations are vital, but final cut score decisions will be made by the Commission of Educational Quality and Accountability.
- Each panelist must complete an evaluation form at the end of the process.
- Each panelist must participate in the entire process or his/her judgments will be discounted.
- No cell phone use except during breaks.
- Please be sure to arrive on time each day.

What's Next?

- Take the Test
- Discuss the Performance Levels
- Complete Item Map Form
- Practice Round
- Round 1
- Round 2
- Round 3
- Evaluation

Any Questions?

Housekeeping

- Folder review
 - Content material
 - Administrative forms
- Secure materials
 - Signing out
 - No electronics
- Signing in for the remainder of the week
- Varied end times
- Importance of attendance

Thank you.

APPENDIX H—INSTRUCTIONS FOR FACILITATORS

GENERAL INSTRUCTIONS FOR OSTP ASSESSMENTS STANDARD SETTING GROUP FACILITATORS

**ELA and Math 3-8
August 8-11, 2017**

The Standard Setting activities begin with all panelists in one large group, facilitated by one facilitator.

Preliminaries

Introductions:

1. Welcome group, introduce yourself (name, affiliation, a little selected background information).
2. Have each participant introduce him/herself.
3. Ask each participant to sign a nondisclosure form. Do not proceed until a signed nondisclosure form has been collected from each participant.
4. Note that while panelists are making their recommendation for the cut scores, the Commission for Education Quality and Accountability make the final cut decision. The decision is almost always within a range around the recommended cut.

Take the Test

Overview: In order to establish an understanding of the test items and for panelists to gain an understanding of the experience of the students who take the test, each participant will take the test. Panelists may wish to discuss or take issue with the items in the test. Tell them we will gladly take their feedback to the SDE. However, this is the actual assessment that students took and it is the set of items on which we must set standards.

Activities:

- 1) Introduce the assessment and convey/do each of the following:
 - a. Tell panelists that they are about to take an actual OSTP assessment.
 - b. The purpose of the exercise is to help them establish a good understanding of the test items and to gain an understanding of the experience of the students who take the assessment.
- 2) Give each panelist a test booklet.
- 3) Tell panelists to try to take on the perspective of a student as they complete the test.
- 4) When the majority of the panelists have finished, pass out the answer key/scoring rubrics.

Discuss Performance Definitions and Describe Characteristics of the “Borderline” Student

Overview: In order to establish an understanding of the expected performance of borderline students on the test, panelists must have a clear understanding of:

- 1) The definition of the four performance levels, and
- 2) Characteristics of students who are “just able enough” to be classified into each level above Unsatisfactory. These students will be referred to as borderline students, since they are right on the border between levels.

The purpose of this activity is for the panelists to obtain an understanding of the Performance Definitions with an emphasis on characteristics that describe students at the borderline -- both what these students can and cannot do.

This activity is critical since the ratings panelists will be making will be based on these understandings.

Preparation:

1. Use 3 sheets of chart paper and label the top of each one: Borderline Limited Knowledge, Borderline Proficient and Borderline Advanced.

Activities:

- 1) Introduce the task. In this activity they will:
 - a. individually review the Performance Level Descriptors again as needed;
 - b. generate group descriptions of borderline Limited Knowledge, Proficient and Advanced students.

The facilitator should compile the descriptions as bulleted lists on chart paper; the chart paper will then be posted so the panelists can refer to the lists as they go through the bookmark process.

- 2) Check to see if panelists want to discuss the performance levels again. Once they have a solid understanding of the PLDs, have them focus their discussion on the knowledge, skills, and abilities of students who are in the Proficient category, but just barely. The focus should be on those characteristics and KSAs that best describe the lowest level of performance necessary to warrant Proficient classification.
- 3) After discussing Proficient, have the panelists discuss characteristics of the borderline Limited Knowledge student and then characteristics of the borderline Advanced student. Panelists should be made aware of the importance of the Proficient cut. This is the cut from non- proficient to just barely proficient.
- 4) Using chart paper, generate a bulleted list of characteristics for each of the levels. Post these on the wall of the room. Make sure that panelists agree on the bulleted characteristics and have a common understanding.

Fill Out Item Map Form

Overview: The primary purpose of this activity is for panelists to think about what knowledge, skills and abilities (KSAs) are measured by each item as well as what makes one question harder or easier than another. The notes panelists take here will be useful in helping them place their bookmarks and in discussions during the rounds of ratings.

On the item map form there is a shaded region comparable to NAEP proficiency. This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to NAEP proficiency with a range of +/- 2 SEMs around that point.

Activities:

1. Pass out the following materials:
 - a. Item map form
 - b. Ordered item book
2. Review the ordered item book and item map form with the panelists. Explain what each is, and point out the correspondence of the ordered items between the two. Explain that the items are statistically ordered from easiest to hardest, based on student performance from the most recent administration of the assessment.
3. Tell panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range.
4. Tell panelists they will work individually at first. After they have completed the item map form, they will then discuss it as a group.
5. Starting with the first item, they will record for each item:
 - a. The knowledge, skills and abilities (KSAs) the item measures, and
 - b. their thoughts about what makes that question harder than the previous question.
6. Panelists should not agonize over these decisions. It may be that the second item is only slightly harder than the first. Panelists should keep in mind that the purpose of the task is to record notes that will be useful to them in completing their ratings and not necessarily to fill in every space on the form.
7. Once panelists have completed the item map form, they should discuss them as a group.
8. Based on the group discussion, the panelists should modify their own item map form (make additional notes, cross things out, etc..)

Practice Round (FIRST GRADE ONLY)

Overview of Practice Round: The primary purpose of the Practice Round is for panelists to become familiar with the task of placing the bookmarks. The facilitator will walk the panelists through the Proficient bookmark placement on the practice set, engage the panelists in a readiness discussion and check for understanding. If any of the panelists indicate an incomplete understanding of the practice rating task, then the facilitator will continue to work with the panelists to clarify any misconceptions before proceeding to Round 1.

Activities:

1. Make sure panelists have the following materials:
 - a. Practice ordered item set
 - b. Performance Definitions
2. Orient panelists to the practice ordered item set. Point out the following:
 - a. Items are organized by difficulty from easiest to hardest;
 - b. The items represent the full range of difficulty included on the test.
 - c. Identify the items on the item map form that correspond to the practice ordered item set. Panelists can note this on the Item Map Form as desired.
3. Give the panelists a few minutes to read through the items.
4. The facilitator leads the group through a discussion of the Proficient bookmark placement in the practice OIB.
 - a. Referring to the ten ordered items in the practice set, the Performance Definitions, and the bulleted lists of characteristics posted on chart paper, the facilitator will lead a discussion about the placement of the Proficient bookmark.
 - b. Panelists should consider the question: would at least two-thirds of the students performing at the borderline of Proficient answer the item correctly?
 - c. Where the answer changes from yes to no is where the bookmark should be placed.
 - d. Panelists should answer question for all items to check for anomalies.
 - e. Using a show of hands, indicate on chart paper where each panelist placed their bookmark. Have a discussion of their ratings in the context of the ratings made by other members of their group. The panelists with the highest and lowest ratings should comment on why they gave the ratings they did. The group should get a sense of how much variation there is in the ratings.

Readiness Discussion (FIRST GRADE ONLY)

After the panelists have placed bookmarks in the practice ordered item set, lead a readiness discussion by posing the following seven questions.

The purpose of this discussion is to determine how well each panelist understands the bookmark task, to correct any misunderstandings, and if necessary, to identify panelists whose ratings should be excluded from the standard setting if their understanding doesn't improve.

The "correct" answers for each of the questions are listed directly under each question. Some common misunderstandings are also listed for questions one and two. Please watch for these typical misunderstandings and if they arise, redirect the panelists to the correct responses.

Make sure any questions or concerns are resolved prior to moving on.

1. What questions should you ask for each item?
 - Would at least two-thirds of the borderline students get this item correct?
 - Would at least two-thirds of the students who just barely fall in the criteria level of interest get this item correct?Please watch for and correct the following misconceptions.
 - Omission of two-thirds (stating all students is also incorrect)
 - Omission of borderline (stating all students, or all students in the criteria level of interest is also incorrect)
2. What is meant by the "at least two-thirds" rule?
 - At least two-thirds of the borderline students would get items like this correctPlease watch for and correct the following misconceptions.
 - All students falling in the criteria level of interest have a one out of two chance of getting this item correct.
3. What population of students should you consider for each item?
 - Borderline students
 - Students who just barely fall in the performance level of interest
 - a. Does the target population of borderline students change as I progress through the items for the first bookmark? (NO)
 - b. Does the target population change as I progress to the next bookmark? (YES)
4. As you approach a bookmark, how do answers change?
 - The answer to "Would at least two-thirds of the borderline students get this item correct" should change from a "yes" to a "no"
 - The confidence the panelist has in the yes/no answer will decrease as he/she approaches the bookmark placement
5. How should your confidence in the answers affect your bookmark placement?
 - As you become less confident in a "yes" answer, the bookmark placement should be approaching.
 - Where you are least confident in your answers is typically where the bookmark will be placed.

6. Does placing a bookmark after a certain page mean the student needs to get that many items correct on the assessment? (NO. The OIB page number is only an ordered index, and does not correspond to the number correct).
7. Should the population you are thinking about be the students in your classroom or school? (NO. You should be thinking about all of the students in the state)

NOTE: Make sure you collect all of the 'training' OIBs!

Standard Setting Practice Evaluation (FIRST GRADE ONLY)

After the panelists have placed bookmarks in the practice ordered item set and you've completed the readiness discussion and answered any questions, have panelists fill out the training evaluation form. Before you start the Round 1 activities, scan the completed evaluations to see if there are any problems or concerns that need to be addressed before proceeding. **Make sure any questions or concerns are resolved prior to moving on.** Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Round 1

Overview of Round 1: The primary purpose of Round 1 is to ask the panelists to make their initial judgments as to where the bookmark should be placed for each cut. For this round, panelists will work individually, without consulting with their colleagues. Beginning with the first ordered item in the OIB, panelists will evaluate each item in turn. The panelists will gauge the level of difficulty of each of the items for those students who barely meet the definition of Proficient. The task that panelists are asked to do is to estimate whether a student performing at the borderline of Proficient, would answer each question correctly. More specifically, panelists should answer:

- Would *at least* two-thirds of the students performing at the borderline of Proficient answer the question correctly?

On the item map form there is a shaded region comparable to NAEP proficiency.

This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to NAEP proficiency with a range of +/- 2 SEMs around that point.

The Proficient bookmark placement must be between two shaded items.

The same process is then repeated for the [Unsatisfactory/Limited Knowledge] and [Proficient/Advanced] cuts.

Activities:

1. Panelists should have their ordered item booklets, item map forms, and Performance Definitions. Pass out one rating form to each panelist.
2. Have panelists write their Content area, grade, and ID number on the rating form. The ID number is on the back of their name tags.
3. Provide an overview of Round 1, covering each of the following:
 - a. Orient panelists to the ordered-item book. Remind them that the items are presented in order of difficulty, from easiest to hardest.
 - b. Remind panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
 - c. The primary purpose of this activity is for the panelists to make their initial determination as to whether students whose performance is barely Proficient would correctly answer each item, and to place their bookmark where they believe the answer of 'yes' turns to 'no'. Remind panelists that they should be thinking about at least two-thirds of the borderline students. Once they have completed the process for the [Limited Knowledge/Proficient] cut, they will

proceed to the remaining two cut points starting with [Unsatisfactory/Limited Knowledge] and then the [Proficient/Advanced] cut.

- d. Each panelist needs to base his/her judgments on his/her experience with the content, understanding of students, and the definitions of the borderline students generated previously.
 - e. One bookmark will be placed for each cut point. For OSTP assessments there are 3 cut points and, therefore, three bookmarks will be placed.
 - f. If panelists are struggling with placing a particular bookmark, they should use their best judgment and move on. They will have an opportunity to discuss their ratings and make revisions in Rounds 2 and 3.
4. Tell panelists that they will be discussing each cut point with the other panelists during Round 2 but that they will be placing the bookmarks individually. **It is not necessary for the panelists to come to consensus about where the bookmarks should be placed.**
 5. Go over the rating form with panelists.
 - a. Lead panelists through a step-by-step demonstration of how to fill in the rating form.
 - b. Answer questions the panelists may have about the work in Round 1.
 - c. Once everyone understands what they are to do in Round 1, tell them to begin.
 6. Starting with the first ordered item in the OIB and the cut between Limited Knowledge and Proficient, the panelists will work through the OIB item by item and make their initial bookmark placements. Have panelists examine five items past their placement to check for anomalies.
 7. As panelists complete the task, ask them to carefully inspect their rating forms to ensure they are filled out properly.
 - a. **The Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. **The Proficient bookmark placement must be between two shaded items on the item map form.**
 - d. Check each panelist's rating form before you allow them to leave for a short break.
 - e. When all the rating forms have been collected, the group will take a break. Order the rating forms by ID number and immediately bring the rating forms to the data analysis work room for tabulation.

Tabulation of Round 1 Results

Tabulation of Round 1 results will be completed by the data analysis team as quickly as possible after receipt of the rating forms.

Round 2

Overview of Round 2: In Round 2, the panelists will discuss their Round 1 placements as a group and then revise their ratings on the basis of that discussion. They will discuss their ratings in the context of the ratings made by other members of their group. The panelists with the highest and lowest ratings should comment on why they gave the ratings they did. The group should get a sense of how much variation there is in the ratings. Panelists should also consider the question, “How tough or easy a rater are you?” The purpose here is to allow panelists to examine their individual expectations (in terms of their experiences) and to share these expectations and experiences in order to attain a better understanding of how their experiences impact their decision-making.

To aid with the discussion, the panelists will be provided with the median Round 1 bookmark placements for their group.

Once panelists have reviewed and discussed their bookmark placements, they will be given the opportunity to change or revise their Round 1 ratings.

Activities:

1. Make sure the panelists have their ordered item booklets, item map forms, and Performance Definitions. Return the rating form to each panelist.
2. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
3. Provide an overview of Round 2. Remind panelists of the following:
 - a. As in Round 1, the primary purpose is to place bookmarks where you feel the criteria levels are best distinguished, considering the additional information and discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities (KSAs) required to answer each item.
4. The panelists will discuss their Round 1 ratings as a group, beginning with the Proficient cut point and followed by the Limited Knowledge and Advanced cuts.
 - a. The discussion should focus on differences in where individual panelists in the group placed their bookmarks.
 - b. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.

- c. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
- d. On the basis of the discussions, panelists should make a second round of ratings.
- e. Remind panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
- f. When placing their Round 2 bookmarks, panelists should not feel compelled to change their ratings.
- g. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.

Encourage the panelists to use the discussion and feedback to assess how stringent or lenient a judge they are. If a panelist is consistently higher or lower than the group, they may have a different understanding of the borderline student than the rest of the group, or a different understanding of the Performance Definitions, or both. **It is O.K. for panelists to disagree, but that disagreement should be based on a common understanding of the Performance Definitions.**

- 5. As the group is conducting their discussions, circulate around the room to ensure that the discussions are staying on topic, the panelists understand the task, and that all panelists are participating appropriately in the discussion.
- 6. When all panelists at each group have completed their second ratings, collect the rating forms. When you collect the rating forms **carefully inspect them** to ensure they are filled out properly.
 - a. **The Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. **The Proficient bookmark placement must be between two shaded items on the item map form.**
 - d. Check each panelist's rating form before you allow them to leave for a short break.
 - e. When all the rating forms have been collected, the group will take a break. Sort rating forms by ID number, and immediately bring the rating forms to the data analysis work room for tabulation.

Round 3

Overview of Round 3: The primary purpose of Round 3 is to ask the panelists to discuss their Round 2 placements as a group and to give them one last opportunity to revise their ratings on the basis of that discussion. As in Round 2, they will discuss their ratings in the context of the ratings made by other members of the group.

To aid with the discussion, a psychometrician will present the following information to the panelists:

1. The group median Round 2 bookmark placements, and
2. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements from Round 2.
3. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms.

Once panelists have reviewed and discussed their bookmark placements and the impact data, they will be given the opportunity to change or revise their Round 2 ratings.

Activities:

4. Make sure the panelists have their ordered item booklets, item map forms, and Performance Definitions. Return the rating form to each panelist.
5. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
 - b. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements. Panelists will use this information as a “reasonableness check.” In other words, they will discuss whether the percentages in each level seem reasonable, based on their knowledge of the test and the current status of students across the state relative to the Performance Definitions. If the answer is no, panelists may choose to make adjustments to one or more of their bookmark placements.
 - c. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms. Both Median Absolute Deviation (How much disagreement among panelists) and Conditional Standard Error (Measure of error in assessment) data will be provided. A range of impact data for each cut will be determined for +/-1 SE around the cut score for each of these.

6. Provide an overview of Round 3. Remind panelists of the following:
 - a. As in Round 2, the primary purpose is to place bookmarks where you feel the performance levels are best distinguished, considering the additional information and further discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities required to answer each item.
 - a. The panelists will discuss their Round 2 ratings, beginning with the Proficient cut point and followed by the Limited Knowledge and Advanced cuts.
 - b. The discussion should focus on differences in where individual panelists placed their bookmarks.
 - c. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
 - d. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
 - e. On the basis of the discussions, panelists should make a third round of ratings.
 - f. Remind panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
 - g. When placing their Round 3 bookmarks, panelists should not feel compelled to change their ratings.
 - h. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.
 - i. Write brief notes on any notable discussions of the process, any particular sticking points or issues, or key rationales had in their judgments. These do not need to be formal, but will be useful if the client has questions regarding the process.
7. When the group has completed their final ratings, collect the rating forms. When you collect the rating forms **carefully inspect them** to ensure they are filled out properly.
 - a. **The panelist Content area, grade, and ID number must be filled in.**

- b. **The item numbers identifying each cut score must be adjacent.**
- c. The Proficient bookmark placement must be between two shaded items on the item map form.
- d. Sort rating forms by ID number, and immediately provide the completed rating forms to the data analysis team.

Complete Procedural Evaluation Form for the Grade

Make sure panelists fill out the procedural evaluation for the grade. Emphasize that their honest feedback is important. Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Collect the materials from the grade and mark them off on the Materials Tracking sheet.

Complete Second Grade Standard Setting Activities

Begin the standard setting process for the second grade assigned to the panel. Follow the same steps with the exception of the Practice Round, Readiness Discussion, and Practice Evaluation steps.

Complete Final Evaluation Forms

Make sure panelists fill out the final evaluations before they leave. Emphasize that their honest feedback is important.

GENERAL INSTRUCTIONS FOR OSTP ASSESSMENTS STANDARD SETTING GROUP FACILITATORS

ELA 10 and Math 10 August 8-11, 2017

The Standard Setting activities begin with all panelists in one large group, facilitated by one facilitator.

Preliminaries

Introductions:

1. Welcome group, introduce yourself (name, affiliation, a little selected background information).
2. Have each participant introduce him/herself.
3. Ask each participant to sign a nondisclosure form. Do not proceed until a signed nondisclosure form has been collected from each participant.
4. Note that while panelists are making their recommendation for the cut scores, the Commission for Education Quality and Accountability make the final cut decision. The decision is almost always within a range around the recommended cut.

Take the Test

Overview: In order to establish an understanding of the test items and for panelists to gain an understanding of the experience of the students who take the test, each participant will take the test. Panelists may wish to discuss or take issue with the items in the test. Tell them we will gladly take their feedback to the SDE. However, this is the actual assessment that students took and it is the set of items on which we must set standards.

Activities:

- 1) Introduce the assessment and convey/do each of the following:
 - a. Tell panelists that they are about to take an actual OSTP assessment.
 - b. The purpose of the exercise is to help them establish a good understanding of the test items and to gain an understanding of the experience of the students who take the assessment.
- 2) Give each panelist a test booklet.
- 3) Tell panelists to try to take on the perspective of a student as they complete the test.
- 4) When the majority of the panelists have finished, pass out the answer key/scoring rubrics.

Discuss Performance Definitions and Describe Characteristics of the “Borderline” Student

Overview: In order to establish an understanding of the expected performance of borderline students on the test, panelists must have a clear understanding of:

- 1) The definition of the four performance levels, and
- 2) Characteristics of students who are “just able enough” to be classified into each level above Unsatisfactory. These students will be referred to as borderline students, since they are right on the border between levels.

The purpose of this activity is for the panelists to obtain an understanding of the Performance Definitions with an emphasis on characteristics that describe students at the borderline -- both what these students can and cannot do.

This activity is critical since the ratings panelists will be making will be based on these understandings.

Preparation:

1. Use 3 sheets of chart paper and label the top of each one: Borderline Limited Knowledge, Borderline Proficient and Borderline Advanced.

Activities:

- 1) Introduce the task. In this activity they will:
 - a. individually review the Performance Level Descriptors again as needed;
 - b. generate group descriptions of borderline Limited Knowledge, Proficient and Advanced students.

The facilitator should compile the descriptions as bulleted lists on chart paper; the chart paper will then be posted so the panelists can refer to the lists as they go through the bookmark process.

- 2) Check to see if panelists want to discuss the performance levels again. Once they have a solid understanding of the PLDs, have them focus their discussion on the knowledge, skills, and abilities of students who are in the Proficient category, but just barely. The focus should be on those characteristics and KSAs that best describe the lowest level of performance necessary to warrant Proficient classification.
- 3) After discussing Proficient, have the panelists discuss characteristics of the borderline Limited Knowledge student and then characteristics of the borderline Advanced student. Panelists should be made aware of the importance of the Proficient cut. This is the cut from non- proficient to just barely proficient.
- 4) Using chart paper, generate a bulleted list of characteristics for each of the levels. Post these on the wall of the room. Make sure that panelists agree on the bulleted characteristics and have a common understanding.

Fill Out Item Map Form

Overview: The primary purpose of this activity is for panelists to think about what knowledge, skills and abilities (KSAs) are measured by each item as well as what makes one question harder or easier than another. The notes panelists take here will be useful in helping them place their bookmarks and in discussions during the rounds of ratings.

On the item map form there is a shaded region comparable to the ACT college readiness benchmark. This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to the ACT college readiness benchmark with a range of ± 2 SEMs around that point.

Activities:

1. Pass out the following materials:
 - a. Item map form
 - b. Ordered item book
2. Review the ordered item book and item map form with the panelists. Explain what each is, and point out the correspondence of the ordered items between the two. Explain that the items are statistically ordered from easiest to hardest, based on student performance from the most recent administration of the assessment.
3. Tell panelists that the shaded region is comparable to the ACT college readiness benchmark, and that the Proficient bookmark placement will be set in this range.
4. Tell panelists they will work individually at first. After they have completed the item map form, they will then discuss it as a group.
5. Starting with the first item, they will record for each item:
 - a. The knowledge, skills and abilities (KSAs) the item measures, and
 - b. their thoughts about what makes that question harder than the previous question.
6. Panelists should not agonize over these decisions. It may be that the second item is only slightly harder than the first. Panelists should keep in mind that the purpose of the task is to record notes that will be useful to them in completing their ratings and not necessarily to fill in every space on the form.
7. Once panelists have completed the item map form, they should discuss them as a group.
8. Based on the group discussion, the panelists should modify their own item map form (make additional notes, cross things out, etc..)

Practice Round

Overview of Practice Round: The primary purpose of the Practice Round is for panelists to become familiar with the task of placing the bookmarks. The facilitator will walk the panelists through the Proficient bookmark placement on the practice set, engage the panelists in a readiness discussion and check for understanding. If any of the panelists indicate an incomplete understanding of the practice rating task, then the facilitator will continue to work with the panelists to clarify any misconceptions before proceeding to Round 1.

Activities:

1. Make sure panelists have the following materials:
 - a. Practice ordered item set
 - b. Performance Definitions
2. Orient panelists to the practice ordered item set. Point out the following:
 - a. Items are organized by difficulty from easiest to hardest;
 - b. The items represent the full range of difficulty included on the test.
 - c. Identify the items on the item map form that correspond to the practice ordered item set. Panelists can note this on the Item Map Form as desired.
3. Give the panelists a few minutes to read through the items.
4. The facilitator leads the group through a discussion of the Proficient bookmark placement in the practice OIB.
 - a. Referring to the ten ordered items in the practice set, the Performance Definitions, and the bulleted lists of characteristics posted on chart paper, the facilitator will lead a discussion about the placement of the Proficient bookmark.
 - b. Panelists should consider the question: would at least two-thirds of the students performing at the borderline of Proficient answer the item correctly?
 - c. Where the answer changes from yes to no is where the bookmark should be placed.
 - d. Panelists should answer question for all items to check for anomalies.
 - e. Using a show of hands, indicate on chart paper where each panelist placed their bookmark. Have a discussion of their ratings in the context of the ratings made by other members of their group. The panelists with the highest and lowest ratings should comment on why they gave the ratings they did. The group should get a sense of how much variation there is in the ratings.

Readiness Discussion

After the panelists have placed bookmarks in the practice ordered item set, lead a readiness discussion by posing the following seven questions.

The purpose of this discussion is to determine how well each panelist understands the bookmark task, to correct any misunderstandings, and if necessary, to identify panelists whose ratings should be excluded from the standard setting if their understanding doesn't improve.

The "correct" answers for each of the questions are listed directly under each question. Some common misunderstandings are also listed for questions one and two. Please watch for these typical misunderstandings and if they arise, redirect the panelists to the correct responses.

Make sure any questions or concerns are resolved prior to moving on.

1. What questions should you ask for each item?

- Would at least two-thirds of the borderline students get this item correct?
- Would at least two-thirds of the students who just barely fall in the criteria level of interest get this item correct?

Please watch for and correct the following misconceptions.

- Omission of two-thirds (stating all students is also incorrect)
- Omission of borderline (stating all students, or all students in the criteria level of interest is also incorrect)

2. What is meant by the "at least two-thirds" rule?

- At least two-thirds of the borderline students would get items like this correct

Please watch for and correct the following misconceptions.

- All students falling in the criteria level of interest have a one out of two chance of getting this item correct.

3. What population of students should you consider for each item?

- Borderline students
- Students who just barely fall in the performance level of interest

a. Does the target population of borderline students change as I progress through the items for the first bookmark? (NO)

b. Does the target population change as I progress to the next bookmark? (YES)

4. As you approach a bookmark, how do answers change?

- The answer to "Would at least two-thirds of the borderline students get this item correct" should change from a "yes" to a "no"
- The confidence the panelist has in the yes/no answer will decrease as he/she approaches the bookmark placement

5. How should your confidence in the answers affect your bookmark placement?

- As you become less confident in a "yes" answer, the bookmark placement should be approaching.
- Where you are least confident in your answers is typically where the bookmark will be placed.

6. Does placing a bookmark after a certain page mean the student needs to get that many items correct on the assessment? (NO. The OIB page number is only an ordered index, and does not correspond to the number correct).
7. Should the population you are thinking about be the students in your classroom or school? (NO. You should be thinking about all of the students in the state)

NOTE: Make sure you collect all of the 'training' OIBs!

Standard Setting Practice Evaluation

After the panelists have placed bookmarks in the practice ordered item set and you've completed the readiness discussion and answered any questions, have panelists fill out the training evaluation form. Before you start the Round 1 activities, scan the completed evaluations to see if there are any problems or concerns that need to be addressed before proceeding. **Make sure any questions or concerns are resolved prior to moving on.** Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Round 1

Overview of Round 1: The primary purpose of Round 1 is to ask the panelists to make their initial judgments as to where the bookmark should be placed for each cut. For this round, panelists will work individually, without consulting with their colleagues. Beginning with the first ordered item in the OIB, panelists will evaluate each item in turn. The panelists will gauge the level of difficulty of each of the items for those students who barely meet the definition of Proficient. The task that panelists are asked to do is to estimate whether a student performing at the borderline of Proficient, would answer each question correctly. More specifically, panelists should answer:

- Would *at least* two-thirds of the students performing at the borderline of Proficient answer the question correctly?

On the item map form there is a shaded region comparable to the ACT college readiness benchmark. This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to the ACT college readiness benchmark with a range of +/- 2 SEMs around that point.

The Proficient bookmark placement must be between two shaded items.

The same process is then repeated for the [Unsatisfactory/Limited Knowledge] and [Proficient/Advanced] cuts.

Activities:

1. Panelists should have their ordered item booklets, item map forms, and Performance Definitions. Pass out one rating form to each panelist.
2. Have panelists write their Content area, grade, and ID number on the rating form. The ID number is on the back of their name tags.
3. Provide an overview of Round 1, covering each of the following:
 - a. Orient panelists to the ordered-item book. Remind them that the items are presented in order of difficulty, from easiest to hardest.
 - b. Remind panelists that the shaded region is comparable to the ACT college readiness benchmark, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
 - c. The primary purpose of this activity is for the panelists to make their initial determination as to whether students whose performance is barely Proficient would correctly answer each item, and to place their bookmark where they believe the answer of 'yes' turns to 'no'. Remind panelists that they should be thinking about at least two-thirds of the borderline students. Once they have

completed the process for the [Limited Knowledge/Proficient] cut, they will proceed to the remaining two cut points starting with [Unsatisfactory/Limited Knowledge] and then the [Proficient/Advanced] cut.

- d. Each panelist needs to base his/her judgments on his/her experience with the content, understanding of students, and the definitions of the borderline students generated previously.
 - e. One bookmark will be placed for each cut point. For OSTP assessments there are 3 cut points and, therefore, three bookmarks will be placed.
 - f. If panelists are struggling with placing a particular bookmark, they should use their best judgment and move on. They will have an opportunity to discuss their ratings and make revisions in Rounds 2 and 3.
4. Tell panelists that they will be discussing each cut point with the other panelists during Round 2 but that they will be placing the bookmarks individually. **It is not necessary for the panelists to come to consensus about where the bookmarks should be placed.**
 5. Go over the rating form with panelists.
 - a. Lead panelists through a step-by-step demonstration of how to fill in the rating form.
 - b. Answer questions the panelists may have about the work in Round 1.
 - c. Once everyone understands what they are to do in Round 1, tell them to begin.
 6. Starting with the first ordered item in the OIB and the cut between Limited Knowledge and Proficient, the panelists will work through the OIB item by item and make their initial bookmark placements. Have panelists examine five items past their placement to check for anomalies.
 7. As panelists complete the task, ask them to carefully inspect their rating forms to ensure they are filled out properly.
 - a. **The Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. **The Proficient bookmark placement must be between two shaded items on the item map form.**
 - d. Check each panelist's rating form before you allow them to leave for a short break.
 - e. When all the rating forms have been collected, the group will take a break. Order the rating forms by ID number and immediately bring the rating forms to the data analysis work room for tabulation.

Tabulation of Round 1 Results

Tabulation of Round 1 results will be completed by the data analysis team as quickly as possible after receipt of the rating forms.

Round 2

Overview of Round 2: In Round 2, the panelists will discuss their Round 1 placements as a group and then revise their ratings on the basis of that discussion. They will discuss their ratings in the context of the ratings made by other members of their group. The panelists with the highest and lowest ratings should comment on why they gave the ratings they did. The group should get a sense of how much variation there is in the ratings. Panelists should also consider the question, "How tough or easy a rater are you?" The purpose here is to allow panelists to examine their individual expectations (in terms of their experiences) and to share these expectations and experiences in order to attain a better understanding of how their experiences impact their decision-making.

To aid with the discussion, the panelists will be provided with the median Round 1 bookmark placements for their group.

Once panelists have reviewed and discussed their bookmark placements, they will be given the opportunity to change or revise their Round 1 ratings.

Activities:

1. Make sure the panelists have their ordered item booklets, item map forms, and Performance Definitions. Return the rating form to each panelist.
2. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
3. Provide an overview of Round 2. Remind panelists of the following:
 - a. As in Round 1, the primary purpose is to place bookmarks where you feel the criteria levels are best distinguished, considering the additional information and discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities (KSAs) required to answer each item.
4. The panelists will discuss their Round 1 ratings as a group, beginning with the Proficient cut point and followed by the Limited Knowledge and Advanced cuts.
 - a. The discussion should focus on differences in where individual panelists in the group placed their bookmarks.

- b. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
- c. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
- d. On the basis of the discussions, panelists should make a second round of ratings.
- e. Remind panelists that the shaded region is comparable to the ACT college readiness benchmark, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
- f. When placing their Round 2 bookmarks, panelists should not feel compelled to change their ratings.
- g. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.

Encourage the panelists to use the discussion and feedback to assess how stringent or lenient a judge they are. If a panelist is consistently higher or lower than the group, they may have a different understanding of the borderline student than the rest of the group, or a different understanding of the Performance Definitions, or both. **It is O.K. for panelists to disagree, but that disagreement should be based on a common understanding of the Performance Definitions.**

- 5. As the group is conducting their discussions, circulate around the room to ensure that the discussions are staying on topic, the panelists understand the task, and that all panelists are participating appropriately in the discussion.
- 6. When all panelists at each group have completed their second ratings, collect the rating forms. When you collect the rating forms **carefully inspect them** to ensure they are filled out properly.
 - a. **The Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. **The Proficient bookmark placement must be between two shaded items on the item map form.**
 - d. Check each panelist's rating form before you allow them to leave for a short break.

- e. When all the rating forms have been collected, the group will take a break. Sort rating forms by ID number, and immediately bring the rating forms to the data analysis work room for tabulation.

Round 3

Overview of Round 3: The primary purpose of Round 3 is to ask the panelists to discuss their Round 2 placements as a group and to give them one last opportunity to revise their ratings on the basis of that discussion. As in Round 2, they will discuss their ratings in the context of the ratings made by other members of the group.

To aid with the discussion, a psychometrician will present the following information to the panelists:

1. The group median Round 2 bookmark placements, and
2. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements from Round 2.
3. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms.
4. Remediation Data, this will show percentage of college students requiring remediation in appropriate subjects.

Once panelists have reviewed and discussed their bookmark placements and the impact data, they will be given the opportunity to change or revise their Round 2 ratings.

Activities:

5. Make sure the panelists have their ordered item booklets, item map forms, and Performance Definitions. Return the rating form to each panelist.
6. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
 - b. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements. Panelists will use this information as a “reasonableness check.” In other words, they will discuss whether the percentages in each level seem reasonable, based on their knowledge of the test and the current status of students across the state relative to the Performance Definitions. If the answer is no, panelists may choose to make adjustments to one or more of their bookmark placements.
 - c. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms. Both Median Absolute Deviation (How much disagreement among panelists) and Conditional Standard Error (Measure of error in assessment) data will be provided. A range

of impact data for each cut will be determined for +/-1 SE around the cut score for each of these.

- d. Remediation Data, this will show percentage of Oklahoma college students requiring remediation in appropriate subjects.
7. Provide an overview of Round 3. Remind panelists of the following:
- a. As in Round 2, the primary purpose is to place bookmarks where you feel the performance levels are best distinguished, considering the additional information and further discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities required to answer each item.
 - a. The panelists will discuss their Round 2 ratings, beginning with the Proficient cut point and followed by the Limited Knowledge and Advanced cuts.
 - b. The discussion should focus on differences in where individual panelists placed their bookmarks.
 - c. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
 - d. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
 - e. On the basis of the discussions, panelists should make a third round of ratings.
 - f. Remind panelists that the shaded region is comparable to the ACT college readiness benchmark, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
 - g. When placing their Round 3 bookmarks, panelists should not feel compelled to change their ratings.
 - h. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.
 - i. Write brief notes on any notable discussions of the process, any particular sticking points or issues, or key rationales had in their judgments. These do not need to be formal, but will be useful if the client has questions regarding the process.

8. When the group has completed their final ratings, collect the rating forms. When you collect the rating forms **carefully inspect them** to ensure they are filled out properly.
 - a. **The panelist Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. The Proficient bookmark placement must be between two shaded items on the item map form.
 - d. Sort rating forms by ID number, and immediately provide the completed rating forms to the data analysis team.

Complete Procedural Evaluation Form

Make sure panelists fill out the procedural evaluation for the grade. Emphasize that their honest feedback is important. Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Collect the materials from the grade and mark them off on the Materials Tracking sheet.

Complete Final Evaluation Forms

Make sure panelists fill out the final evaluations before they leave. Emphasize that their honest feedback is important.

GENERAL INSTRUCTIONS FOR OSTP ASSESSMENTS STANDARD SETTING GROUP FACILITATORS

**Science 5, 8, and 10
August 8-11, 2017**

The Standard Setting activities begin with all panelists in one large group, facilitated by one facilitator.

Preliminaries

Introductions:

1. Welcome group, introduce yourself (name, affiliation, a little selected background information).
2. Have each participant introduce him/herself.
3. Ask each participant to sign a nondisclosure form. Do not proceed until a signed nondisclosure form has been collected from each participant.
4. Note that while panelists are making their recommendation for the cut scores, the Commission for Education Quality and Accountability make the final cut decision. The decision is almost always within a range around the recommended cut.

Take the Test

Overview: In order to establish an understanding of the test items and for panelists to gain an understanding of the experience of the students who take the test, each participant will take the test. Panelists may wish to discuss or take issue with the items in the test. Tell them we will gladly take their feedback to the SDE. However, this is the actual assessment that students took and it is the set of items on which we must set standards.

Activities:

- 1) Introduce the assessment and convey/do each of the following:
 - a. Tell panelists that they are about to take an actual OSTP assessment.
 - b. The purpose of the exercise is to help them establish a good understanding of the test items and to gain an understanding of the experience of the students who take the assessment.
- 2) Give each panelist a test booklet.
- 3) Tell panelists to try to take on the perspective of a student as they complete the test.
- 4) When the majority of the panelists have finished, pass out the answer key/scoring rubrics.

Discuss Performance Definitions and Describe Characteristics of the “Borderline” Student

Overview: In order to establish an understanding of the expected performance of borderline students on the test, panelists must have a clear understanding of:

- 1) The definition of the four performance levels, and
- 2) Characteristics of students who are “just able enough” to be classified into each level above Unsatisfactory. These students will be referred to as borderline students, since they are right on the border between levels.

The purpose of this activity is for the panelists to obtain an understanding of the Performance Definitions with an emphasis on characteristics that describe students at the borderline -- both what these students can and cannot do.

This activity is critical since the ratings panelists will be making will be based on these understandings.

Preparation:

1. Use 3 sheets of chart paper and label the top of each one: Borderline Limited Knowledge, Borderline Proficient and Borderline Advanced.

Activities:

- 1) Introduce the task. In this activity they will:
 - a. individually review the Performance Level Descriptors again as needed;
 - b. generate group descriptions of borderline Limited Knowledge, Proficient and Advanced students.

The facilitator should compile the descriptions as bulleted lists on chart paper; the chart paper will then be posted so the panelists can refer to the lists as they go through the bookmark process.

- 2) Check to see if panelists want to discuss the performance levels again. Once they have a solid understanding of the PLDs, have them focus their discussion on the knowledge, skills, and abilities of students who are in the Proficient category, but just barely. The focus should be on those characteristics and KSAs that best describe the lowest level of performance necessary to warrant Proficient classification.
- 3) After discussing Proficient, have the panelists discuss characteristics of the borderline Limited Knowledge student and then characteristics of the borderline Advanced student. Panelists should be made aware of the importance of the Proficient cut. This is the cut from non- proficient to just barely proficient.
- 4) Using chart paper, generate a bulleted list of characteristics for each of the levels. Post these on the wall of the room. Make sure that panelists agree on the bulleted characteristics and have a common understanding.

Fill Out Item Map Form

Overview: The primary purpose of this activity is for panelists to think about what knowledge, skills and abilities (KSAs) are measured by each item as well as what makes one question harder or easier than another. The notes panelists take here will be useful in helping them place their bookmarks and in discussions during the rounds of ratings.

On the item map form there is a shaded region comparable to NAEP proficiency. This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to NAEP proficiency with a range of +/- 2 SEMs around that point.

Activities:

1. Pass out the following materials:
 - a. Item map form
 - b. Ordered item book
2. Review the ordered item book and item map form with the panelists. Explain what each is, and point out the correspondence of the ordered items between the two. Explain that the items are statistically ordered from easiest to hardest, based on student performance from the most recent administration of the assessment.
3. Tell panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range.
4. Tell panelists they will work individually at first. After they have completed the item map form, they will then discuss it as a group.
5. Starting with the first item, they will record for each item:
 - a. The knowledge, skills and abilities (KSAs) the item measures, and
 - b. their thoughts about what makes that question harder than the previous question.
6. Panelists should not agonize over these decisions. It may be that the second item is only slightly harder than the first. Panelists should keep in mind that the purpose of the task is to record notes that will be useful to them in completing their ratings and not necessarily to fill in every space on the form.
7. Once panelists have completed the item map form, they should discuss them as a group.
8. Based on the group discussion, the panelists should modify their own item map form (make additional notes, cross things out, etc..)

Practice Round

Overview of Practice Round: The primary purpose of the Practice Round is for panelists to become familiar with the task of placing the bookmarks. The facilitator will walk the panelists through the Proficient bookmark placement on the practice set, engage the panelists in a readiness discussion and check for understanding. If any of the panelists indicate an incomplete understanding of the practice rating task, then the facilitator will continue to work with the panelists to clarify any misconceptions before proceeding to Round 1.

Activities:

1. Make sure panelists have the following materials:
 - a. Practice ordered item set
 - b. Performance Definitions
2. Orient panelists to the practice ordered item set. Point out the following:
 - a. Items are organized by difficulty from easiest to hardest;
 - b. The items represent the full range of difficulty included on the test.
 - c. Identify the items on the item map form that correspond to the practice ordered item set. Panelists can note this on the Item Map Form as desired.
3. Give the panelists a few minutes to read through the items.
4. The facilitator leads the group through a discussion of the Proficient bookmark placement in the practice OIB.
 - a. Referring to the ten ordered items in the practice set, the Performance Definitions, and the bulleted lists of characteristics posted on chart paper, the facilitator will lead a discussion about the placement of the Proficient bookmark.
 - b. Panelists should consider the question: would at least two-thirds of the students performing at the borderline of Proficient answer the item correctly?
 - c. Where the answer changes from yes to no is where the bookmark should be placed.
 - d. Panelists should answer question for all items to check for anomalies.
 - e. Using a show of hands, indicate on chart paper where each panelist placed their bookmark. Have a discussion of their ratings in the context of the ratings made by other members of their group. The panelists with the highest and lowest ratings should comment on why they gave the ratings they did. The group should get a sense of how much variation there is in the ratings.

Readiness Discussion

After the panelists have placed bookmarks in the practice ordered item set, lead a readiness discussion by posing the following seven questions.

The purpose of this discussion is to determine how well each panelist understands the bookmark task, to correct any misunderstandings, and if necessary, to identify panelists whose ratings should be excluded from the standard setting if their understanding doesn't improve.

The "correct" answers for each of the questions are listed directly under each question. Some common misunderstandings are also listed for questions one and two. Please watch for these typical misunderstandings and if they arise, redirect the panelists to the correct responses. **Make sure any questions or concerns are resolved prior to moving on.**

1. What questions should you ask for each item?
 - Would at least two-thirds of the borderline students get this item correct?
 - Would at least two-thirds of the students who just barely fall in the criteria level of interest get this item correct?Please watch for and correct the following misconceptions.
 - Omission of two-thirds (stating all students is also incorrect)
 - Omission of borderline (stating all students, or all students in the criteria level of interest is also incorrect)
2. What is meant by the "at least two-thirds" rule?
 - At least two-thirds of the borderline students would get items like this correctPlease watch for and correct the following misconceptions.
 - All students falling in the criteria level of interest have a one out of two chance of getting this item correct.
3. What population of students should you consider for each item?
 - Borderline students
 - Students who just barely fall in the performance level of interest
 - a. Does the target population of borderline students change as I progress through the items for the first bookmark? (NO)
 - b. Does the target population change as I progress to the next bookmark? (YES)
4. As you approach a bookmark, how do answers change?
 - The answer to "Would at least two-thirds of the borderline students get this item correct" should change from a "yes" to a "no"
 - The confidence the panelist has in the yes/no answer will decrease as he/she approaches the bookmark placement
5. How should your confidence in the answers affect your bookmark placement?
 - As you become less confident in a "yes" answer, the bookmark placement should be approaching.
 - Where you are least confident in your answers is typically where the bookmark will be placed.

6. Does placing a bookmark after a certain page mean the student needs to get that many items correct on the assessment? (NO. The OIB page number is only an ordered index, and does not correspond to the number correct).
7. Should the population you are thinking about be the students in your classroom or school? (NO. You should be thinking about all of the students in the state)

NOTE: Make sure you collect all of the 'training' OIBs!

Standard Setting Practice Evaluation

After the panelists have placed bookmarks in the practice ordered item set and you've completed the readiness discussion and answered any questions, have panelists fill out the training evaluation form. Before you start the Round 1 activities, scan the completed evaluations to see if there are any problems or concerns that need to be addressed before proceeding. **Make sure any questions or concerns are resolved prior to moving on.** Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Round 1

Overview of Round 1: The primary purpose of Round 1 is to ask the panelists to make their initial judgments as to where the bookmark should be placed for each cut. For this round, panelists will work individually, without consulting with their colleagues. Beginning with the first ordered item in the OIB, panelists will evaluate each item in turn. The panelists will gauge the level of difficulty of each of the items for those students who barely meet the definition of Proficient. The task that panelists are asked to do is to estimate whether a student performing at the borderline of Proficient, would answer each question correctly. More specifically, panelists should answer:

- Would *at least* two-thirds of the students performing at the borderline of Proficient answer the question correctly?

On the item map form there is a shaded region comparable to NAEP proficiency.

This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to NAEP proficiency with a range of +/- 2 SEMs around that point.

The Proficient bookmark placement must be between two shaded items.

The same process is then repeated for the [Unsatisfactory/Limited Knowledge] and [Proficient/Advanced] cuts.

Activities:

1. Panelists should have their ordered item booklets, item map forms, and Performance Definitions. Pass out one rating form to each panelist.
2. Have panelists write their Content area, grade, and ID number on the rating form. The ID number is on the back of their name tags.
3. Provide an overview of Round 1, covering each of the following:
 - a. Orient panelists to the ordered-item book. Remind them that the items are presented in order of difficulty, from easiest to hardest.
 - b. Remind panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
 - c. The primary purpose of this activity is for the panelists to make their initial determination as to whether students whose performance is barely Proficient would correctly answer each item, and to place their bookmark where they believe the answer of 'yes' turns to 'no'. Remind panelists that they should be thinking about at least two-thirds of the borderline students. Once they have completed the process for the [Limited Knowledge/Proficient] cut, they will

proceed to the remaining two cut points starting with [Unsatisfactory/Limited Knowledge] and then the [Proficient/Advanced] cut.

- d. Each panelist needs to base his/her judgments on his/her experience with the content, understanding of students, and the definitions of the borderline students generated previously.
 - e. One bookmark will be placed for each cut point. For OSTP assessments there are 3 cut points and, therefore, three bookmarks will be placed.
 - f. If panelists are struggling with placing a particular bookmark, they should use their best judgment and move on. They will have an opportunity to discuss their ratings and make revisions in Rounds 2 and 3.
4. Tell panelists that they will be discussing each cut point with the other panelists during Round 2 but that they will be placing the bookmarks individually. **It is not necessary for the panelists to come to consensus about where the bookmarks should be placed.**
 5. Go over the rating form with panelists.
 - a. Lead panelists through a step-by-step demonstration of how to fill in the rating form.
 - b. Answer questions the panelists may have about the work in Round 1.
 - c. Once everyone understands what they are to do in Round 1, tell them to begin.
 6. Starting with the first ordered item in the OIB and the cut between Limited Knowledge and Proficient, the panelists will work through the OIB item by item and make their initial bookmark placements. Have panelists examine five items past their placement to check for anomalies.
 7. As panelists complete the task, ask them to carefully inspect their rating forms to ensure they are filled out properly.
 - a. **The Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. **The Proficient bookmark placement must be between two shaded items on the item map form.**
 - d. Check each panelist's rating form before you allow them to leave for a short break.
 - e. When all the rating forms have been collected, the group will take a break. Order the rating forms by ID number and immediately bring the rating forms to the data analysis work room for tabulation.

Tabulation of Round 1 Results

Tabulation of Round 1 results will be completed by the data analysis team as quickly as possible after receipt of the rating forms.

Round 2

Overview of Round 2: In Round 2, the panelists will discuss their Round 1 placements as a group and then revise their ratings on the basis of that discussion. They will discuss their ratings in the context of the ratings made by other members of their group. The panelists with the highest and lowest ratings should comment on why they gave the ratings they did. The group should get a sense of how much variation there is in the ratings. Panelists should also consider the question, "How tough or easy a rater are you?" The purpose here is to allow panelists to examine their individual expectations (in terms of their experiences) and to share these expectations and experiences in order to attain a better understanding of how their experiences impact their decision-making.

To aid with the discussion, the panelists will be provided with the median Round 1 bookmark placements for their group.

Once panelists have reviewed and discussed their bookmark placements, they will be given the opportunity to change or revise their Round 1 ratings.

Activities:

1. Make sure the panelists have their ordered item booklets, item map forms, and Performance Definitions. Return the rating form to each panelist.
2. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
3. Provide an overview of Round 2. Remind panelists of the following:
 - a. As in Round 1, the primary purpose is to place bookmarks where you feel the criteria levels are best distinguished, considering the additional information and discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities (KSAs) required to answer each item.
4. The panelists will discuss their Round 1 ratings as a group, beginning with the Proficient cut point and followed by the Limited Knowledge and Advanced cuts.
 - a. The discussion should focus on differences in where individual panelists in the group placed their bookmarks.

- b. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
- c. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
- d. On the basis of the discussions, panelists should make a second round of ratings.
- e. Remind panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
- f. When placing their Round 2 bookmarks, panelists should not feel compelled to change their ratings.
- g. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.

Encourage the panelists to use the discussion and feedback to assess how stringent or lenient a judge they are. If a panelist is consistently higher or lower than the group, they may have a different understanding of the borderline student than the rest of the group, or a different understanding of the Performance Definitions, or both. **It is O.K. for panelists to disagree, but that disagreement should be based on a common understanding of the Performance Definitions.**

- 5. As the group is conducting their discussions, circulate around the room to ensure that the discussions are staying on topic, the panelists understand the task, and that all panelists are participating appropriately in the discussion.
- 6. When all panelists at each group have completed their second ratings, collect the rating forms. When you collect the rating forms **carefully inspect them** to ensure they are filled out properly.
 - a. **The Content area, grade, and ID number must be filled in.**
 - b. **The item numbers identifying each cut score must be adjacent.**
 - c. **The Proficient bookmark placement must be between two shaded items on the item map form.**
 - d. Check each panelist's rating form before you allow them to leave for a short break.

- e. When all the rating forms have been collected, the group will take a break. Sort rating forms by ID number, and immediately bring the rating forms to the data analysis work room for tabulation.

Round 3

Overview of Round 3: The primary purpose of Round 3 is to ask the panelists to discuss their Round 2 placements as a group and to give them one last opportunity to revise their ratings on the basis of that discussion. As in Round 2, they will discuss their ratings in the context of the ratings made by other members of the group.

To aid with the discussion, a psychometrician will present the following information to the panelists:

1. The group median Round 2 bookmark placements, and
2. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements from Round 2.
3. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms.

Once panelists have reviewed and discussed their bookmark placements and the impact data, they will be given the opportunity to change or revise their Round 2 ratings.

Activities:

4. Make sure the panelists have their ordered item booklets, item map forms, and Performance Definitions. Return the rating form to each panelist.
5. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
 - b. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements. Panelists will use this information as a “reasonableness check.” In other words, they will discuss whether the percentages in each level seem reasonable, based on their knowledge of the test and the current status of students across the state relative to the Performance Definitions. If the answer is no, panelists may choose to make adjustments to one or more of their bookmark placements.
 - c. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms. Both Median Absolute Deviation (How much disagreement among panelists) and Conditional Standard Error (Measure of error in assessment) data will be provided. A range of impact data for each cut will be determined for +/-1 SE around the cut score for each of these.

6. Provide an overview of Round 3. Remind panelists of the following:
 - a. As in Round 2, the primary purpose is to place bookmarks where you feel the performance levels are best distinguished, considering the additional information and further discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities required to answer each item.
 - a. The panelists will discuss their Round 2 ratings, beginning with the Proficient cut point and followed by the Limited Knowledge and Advanced cuts.
 - b. The discussion should focus on differences in where individual panelists placed their bookmarks.
 - c. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
 - d. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
 - e. On the basis of the discussions, panelists should make a third round of ratings.
 - f. Remind panelists that the shaded region is comparable to NAEP proficiency, and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items.
 - g. When placing their Round 3 bookmarks, panelists should not feel compelled to change their ratings.
 - h. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.
 - i. Write brief notes on any notable discussions of the process, any particular sticking points or issues, or key rationales had in their judgments. These do not need to be formal, but will be useful if the client has questions regarding the process.
7. When the group has completed their final ratings, collect the rating forms. When you collect the rating forms **carefully inspect them** to ensure they are filled out properly.
 - a. **The panelist Content area, grade, and ID number must be filled in.**

- b. **The item numbers identifying each cut score must be adjacent.**
- c. The Proficient bookmark placement must be between two shaded items on the item map form.
- d. Sort rating forms by ID number, and immediately provide the completed rating forms to the data analysis team.

Complete Procedural Evaluation Form

Make sure panelists fill out the procedural evaluation for the grade. Emphasize that their honest feedback is important. Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Collect the materials from the grade and mark them off on the Materials Tracking sheet.

Complete Final Evaluation Forms

Make sure panelists fill out the final evaluations before they leave. Emphasize that their honest feedback is important.

APPENDIX I—PANELISTS

Panelists

Grade 3 and 4 English Language Arts

Jackaline Chapman
Andrea Cook
Charity Covey
Kristen Jones

Jordan Shaff
Penny Dilg
Trier Davenport
Sarah Price

Angela McElhiney
Jennifer McLemore
Danny Sipes

Grade 3 and 4 Mathematics

Amy Wingard
Amy Schachle
Andrea Andrade
Shannon Ashong

Codi Barnett
Mendy Shepard
Candice Raines
Sandra Garner

Annabelle Randall
Lauren Coleman
Mindy Englett

Grade 5 and 6 English Language Arts

Delaney Chidester
Carnie Cullen
Kay Williams
Allie Nobles

Lezlie Kropf
Ray Robinson
Bobbie Reeves

Charolette Uzzel
Tammie Richardson
Gina Taylor
Audra Plummer

Grade 5 and 6 Mathematics

Jamie Schulze
Holly Crawford
Sondra Hardin

Betsie Polk
Bobbi Peery

Jennifer Nestelroad
Paula Stewart
Meagan Habluetzel

Grade 5 Science

Angela Ervin
Alecia Jarvis
Teresa Johnson
Rachel Magaw

Karla White
Lisa Pitts
Susan Wray
Theresa Balan

Toni Humphrey
Megan Veldhuizen

Grade 7 and 8 English Language Arts

Jennie Lowther
Christy Teel
Vanessa Stice

Jamie Cargill
Erica Nail
Classie Nolan

Ashley Pierson
Becky Tivis
Vicki Donley

Grade 7 and 8 Mathematics

Brooke Alley
Sandra Brierton
Angela Farris

Katie Brown
Sara Hyde
Mary Kendrick
Michael Rohler

Brenda Reading
Emily Seymour
Abbie Wasson
Angela Bilyeu

Grade 8 Science

Danielle Ebert
Teri Kimble
Theresa Miller
Ashleigh Morton

Susan O'Dell
Andrea Farriester
Amie Sellers
Leiha Chaisson

Tishina Mindemann
Wes Ankrom

Grade 10 English Language Arts

Michelle Baldwin
Katherine Boydston
Denise Clark

Jacy Goostree
Dana Turpin
Barbara Scherich
Debby Yarbrough

Lauren Pena
Shona Willis
Sheena Walker

Grade 10 Mathematics

Angela Archer
Tricia Compton
Barbara Aylworth

Stephanie Garis
Nita Cochran
Donna Hogan
Courtney Keck

Kari Smith
Rebecca Welch
Melinda Wallace

Grade 10 Science

Cheryl Fentress
Nathan Friesen
Zach Murray
Bob Melton

Kristi Nelson
Chanda Peters
Erin Regier

Lori Pettijohn
Kurtis Rowan
Jennifer Ellis

APPENDIX J—EVALUATION RESULTS

Training Evaluation Results – ELA

Grades 3-4

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	11	4.55	0%	0%	0%	45%	55%
I understand the procedures we are using to set standards	11	4.36	0%	0%	0%	64%	36%
I understand how to use the standard setting material	11	4.45	0%	0%	0%	55%	45%
I understand the differences between the performance levels	11	4.55	0%	0%	0%	45%	55%
I understand how to make bookmark placements	11	4.36	0%	0%	0%	64%	36%
I know what tasks to expect for the remainder of the meeting	11	3.91	0%	9%	18%	45%	27%
I am confident in my understanding of the standard setting task	11	4.36	0%	0%	0%	64%	36%
I am ready to proceed with the standard setting process	11						100%

Grades 5-6

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	11	4.64	0%	0%	0%	36%	64%
I understand the procedures we are using to set standards	11	4.45	0%	0%	0%	55%	45%
I understand how to use the standard setting material	11	4.45	0%	0%	0%	55%	45%
I understand the differences between the performance levels	11	4.55	0%	0%	0%	45%	55%
I understand how to make bookmark placements	11	4.64	0%	0%	0%	36%	64%
I know what tasks to expect for the remainder of the meeting	11	4.64	0%	0%	0%	36%	64%
I am confident in my understanding of the standard setting task	11	4.64	0%	0%	0%	36%	64%
I am ready to proceed with the standard setting process	11						100%

Grades 7-8

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	9	5.00	0%	0%	0%	0%	100%
I understand the procedures we are using to set standards	9	4.89	0%	0%	0%	11%	89%
I understand how to use the standard setting material	9	4.89	0%	0%	0%	11%	89%
I understand the differences between the performance levels	9	4.89	0%	0%	0%	11%	89%
I understand how to make bookmark placements	9	4.89	0%	0%	0%	11%	89%
I know what tasks to expect for the remainder of the meeting	9	4.67	0%	0%	11%	11%	78%
I am confident in my understanding of the standard setting task	9	4.78	0%	0%	0%	22%	78%
I am ready to proceed with the standard setting process	9						100%

Grade 10

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	10	4.90	0%	0%	0%	10%	90%
I understand the procedures we are using to set standards	10	4.90	0%	0%	0%	10%	90%
I understand how to use the standard setting material	10	4.90	0%	0%	0%	10%	90%
I understand the differences between the performance levels	10	4.90	0%	0%	0%	10%	90%
I understand how to make bookmark placements	10	4.90	0%	0%	0%	10%	90%
I know what tasks to expect for the remainder of the meeting	10	4.80	0%	0%	0%	20%	80%
I am confident in my understanding of the standard setting task	10	5.00	0%	0%	0%	0%	100%
I am ready to proceed with the standard setting process	10					100%	

Training Evaluation Results – Math

Grades 3-4

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	11	4.45	0%	0%	0%	55%	45%
I understand the procedures we are using to set standards	11	4.64	0%	0%	0%	36%	64%
I understand how to use the standard setting material	11	4.64	0%	0%	0%	36%	64%
I understand the differences between the performance levels	11	4.55	0%	0%	0%	45%	55%
I understand how to make bookmark placements	11	4.64	0%	0%	0%	36%	64%
I know what tasks to expect for the remainder of the meeting	11	4.64	0%	0%	0%	36%	64%
I am confident in my understanding of the standard setting task	11	4.64	0%	0%	0%	36%	64%
I am ready to proceed with the standard setting process	11					100%	

Grades 5-6

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	9	4.78	0%	0%	0%	22%	78%
I understand the procedures we are using to set standards	9	4.78	0%	0%	0%	22%	78%
I understand how to use the standard setting material	9	4.78	0%	0%	0%	22%	78%
I understand the differences between the performance levels	9	4.78	0%	0%	0%	22%	78%
I understand how to make bookmark placements	9	4.56	0%	0%	0%	44%	56%
I know what tasks to expect for the remainder of the meeting	9	4.78	0%	0%	0%	22%	78%
I am confident in my understanding of the standard setting task	9	4.67	0%	0%	0%	33%	67%
I am ready to proceed with the standard setting process	9					100%	

Grades 7-8

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	11	4.64	9%	0%	0%	0%	91%
I understand the procedures we are using to set standards	11	4.64	9%	0%	0%	0%	91%
I understand how to use the standard setting material	11	4.64	9%	0%	0%	0%	91%
I understand the differences between the performance levels	11	4.64	9%	0%	0%	0%	91%
I understand how to make bookmark placements	11	4.64	9%	0%	0%	0%	91%
I know what tasks to expect for the remainder of the meeting	11	4.45	9%	0%	0%	18%	73%
I am confident in my understanding of the standard setting task	11	4.55	9%	0%	0%	9%	82%
I am ready to proceed with the standard setting process	11					100%	

Grade 10

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	10	5.00	0%	0%	0%	0%	100%
I understand the procedures we are using to set standards	10	5.00	0%	0%	0%	0%	100%
I understand how to use the standard setting material	10	5.00	0%	0%	0%	0%	100%
I understand the differences between the performance levels	10	5.00	0%	0%	0%	0%	100%
I understand how to make bookmark placements	10	5.00	0%	0%	0%	0%	100%
I know what tasks to expect for the remainder of the meeting	10	5.00	0%	0%	0%	0%	100%
I am confident in my understanding of the standard setting task	10	5.00	0%	0%	0%	0%	100%
I am ready to proceed with the standard setting process	10						100%

Training Evaluation Results – Science

Grade 5

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	10	4.80	0%	0%	0%	20%	80%
I understand the procedures we are using to set standards	10	4.80	0%	0%	0%	20%	80%
I understand how to use the standard setting material	10	4.80	0%	0%	0%	20%	80%
I understand the differences between the performance levels	10	4.80	0%	0%	0%	20%	80%
I understand how to make bookmark placements	10	4.90	0%	0%	0%	10%	90%
I know what tasks to expect for the remainder of the meeting	10	4.90	0%	0%	0%	10%	90%
I am confident in my understanding of the standard setting task	10	4.80	0%	0%	0%	20%	80%
I am ready to proceed with the standard setting process	10						100%

Grade 8

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	9	4.89	0%	0%	0%	11%	89%
I understand the procedures we are using to set standards	9	5.00	0%	0%	0%	0%	100%
I understand how to use the standard setting material	9	5.00	0%	0%	0%	0%	100%
I understand the differences between the performance levels	9	4.89	0%	0%	0%	11%	89%
I understand how to make bookmark placements	9	5.00	0%	0%	0%	0%	100%
I know what tasks to expect for the remainder of the meeting	9	4.78	0%	0%	0%	22%	78%
I am confident in my understanding of the standard setting task	9	4.89	0%	0%	0%	11%	89%
I am ready to proceed with the standard setting process	9						100%

Grade 10

	<i>N</i>	<i>Average</i>	<i>%SD</i>	<i>%D</i>	<i>%N</i>	<i>%A</i>	<i>%SA</i>
I understand the goals of the standard setting meeting	10	4.70	0%	0%	0%	30%	70%
I understand the procedures we are using to set standards	10	4.70	0%	0%	0%	30%	70%
I understand how to use the standard setting material	10	4.80	0%	0%	0%	20%	80%
I understand the differences between the performance levels	10	4.60	0%	0%	0%	40%	60%
I understand how to make bookmark placements	10	4.80	0%	0%	0%	20%	80%
I know what tasks to expect for the remainder of the meeting	10	4.70	0%	0%	0%	30%	70%
I am confident in my understanding of the standard setting task	10	4.80	0%	0%	0%	20%	80%
I am ready to proceed with the standard setting process	10						100%

Procedural Evaluation Results – ELA

Grade 3

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how to use the materials provided.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how to record my judgments.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I think the procedures make sense.	11	4.55	0.00%	0.00%	9.09%	27.27%	63.64%
I am sufficiently familiar with the assessment.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understand the differences between the criteria student status levels.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.73	0.00%	0.00%	9.09%	9.09%	81.82%
My expectations of students.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
The difficulty of the test materials.	11	4.27	0.00%	0.00%	18.18%	36.36%	45.45%
My experience in the field.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%

continued

Discussions with other participants.	11	4.45	0.00%	0.00%	0.00%	54.55%	45.45%
Decisions of other participants.	11	3.55	0.00%	27.27%	18.18%	27.27%	27.27%
Impact data.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	11	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	11	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Limited Knowledge/Unsatisfactory	11	3.09	0.00%	0.00%	90.91%	9.09%	0.00%

Grade 4

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to use the materials provided.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to record my judgments.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I think the procedures make sense.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I am sufficiently familiar with the assessment.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understand the differences between the criteria student status levels.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
My expectations of students.	11	4.36	0.00%	0.00%	9.09%	45.45%	45.45%
The difficulty of the test materials.	11	4.27	0.00%	0.00%	9.09%	54.55%	36.36%
My experience in the field.	11	4.45	0.00%	0.00%	0.00%	54.55%	45.45%
Discussions with other participants.	11	4.36	0.00%	0.00%	0.00%	63.64%	36.36%
Decisions of other participants.	11	3.73	0.00%	18.18%	18.18%	36.36%	27.27%
Impact data.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	9	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	9	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Limited Knowledge/Unsatisfactory	9	3.11	0.00%	0.00%	88.89%	11.11%	0.00%

Grade 5

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	10	4.50	0.00%	0.00%	0.00%	50.00%	50.00%
I understood how to use the materials provided.	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%
I understood how to record my judgments.	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%
I think the procedures make sense.	10	4.50	0.00%	0.00%	10.00%	30.00%	60.00%
I am sufficiently familiar with the assessment.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
I understand the differences between the criteria student status levels.	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	10	4.60	0.00%	10.00%	0.00%	10.00%	80.00%
My expectations of students.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
The difficulty of the test materials.	10	4.40	0.00%	0.00%	0.00%	60.00%	40.00%
My experience in the field.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
Discussions with other participants.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
Decisions of other participants.	10	4.20	0.00%	10.00%	10.00%	30.00%	50.00%
Impact data.	10	4.10	0.00%	10.00%	10.00%	40.00%	40.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	10	3.05	0.00%	0.00%	90.00%	0.00%	0.00%
Proficient/Limited Knowledge	10	3.50	0.00%	0.00%	50.00%	50.00%	0.00%
Limited Knowledge/Unsatisfactory	10	3.20	0.00%	0.00%	80.00%	20.00%	0.00%

Grade 6

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
I understood how to use the materials provided.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
I understood how to record my judgments.	11	4.73	0.00%	0.00%	9.09%	9.09%	81.82%
I think the procedures make sense.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
I am sufficiently familiar with the assessment.	11	4.64	0.00%	0.00%	9.09%	18.18%	72.73%
I understand the differences between the criteria student status levels.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
My expectations of students.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
The difficulty of the test materials.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
My experience in the field.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
Discussions with other participants.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Decisions of other participants.	10	4.50	0.00%	0.00%	0.00%	50.00%	50.00%
Impact data.	10	4.50	0.00%	0.00%	10.00%	30.00%	60.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	10	3.70	0.00%	0.00%	50.00%	30.00%	20.00%
Proficient/Limited Knowledge	10	3.50	0.00%	0.00%	70.00%	10.00%	20.00%
Limited Knowledge/Unsatisfactory	10	3.40	0.00%	0.00%	70.00%	20.00%	10.00%

Grade 7

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I understood how to use the materials provided.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to record my judgments.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I think the procedures make sense.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
I am sufficiently familiar with the assessment.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understand the differences between the criteria student status levels.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
My expectations of students.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
The difficulty of the test materials.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
My experience in the field.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
Discussions with other participants.	9	4.44	0.00%	0.00%	11.11%	33.33%	55.56%
Decisions of other participants.	9	3.56	0.00%	11.11%	33.33%	44.44%	11.11%
Impact data.	9	3.89	0.00%	11.11%	22.22%	33.33%	33.33%

Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	9	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	9	3.11	0.00%	11.11%	66.67%	22.22%	0.00%
Limited Knowledge/Unsatisfactory	9	3.33	0.00%	11.11%	44.44%	44.44%	0.00%

Grade 8

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to use the materials provided.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to record my judgments.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I think the procedures make sense.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I am sufficiently familiar with the assessment.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understand the differences between the criteria student status levels.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
My expectations of students.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
The difficulty of the test materials.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
My experience in the field.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Discussions with other participants.	9	4.44	0.00%	0.00%	11.11%	33.33%	55.56%
Decisions of other participants.	9	4.11	0.00%	0.00%	33.33%	22.22%	44.44%
Impact data.	9	4.56	0.00%	0.00%	22.22%	0.00%	77.78%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	9	3.33	0.00%	0.00%	66.67%	33.33%	0.00%
Proficient/Limited Knowledge	9	3.44	0.00%	11.11%	55.56%	11.11%	22.22%
Limited Knowledge/Unsatisfactory	9	3.00	0.00%	0.00%	100.00%	0.00%	0.00%

Grade 10

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understood how to use the materials provided.	10	4.50	0.00%	10.00%	0.00%	20.00%	70.00%
I understood how to record my judgments.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I think the procedures make sense.	10	4.10	0.00%	10.00%	10.00%	40.00%	40.00%
I am sufficiently familiar with the assessment.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I understand the differences between the criteria student status levels.	10	4.50	10.00%	0.00%	0.00%	10.00%	80.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	10	4.40	10.00%	0.00%	10.00%	0.00%	80.00%
My expectations of students.	10	4.30	0.00%	0.00%	10.00%	50.00%	40.00%
The difficulty of the test materials.	10	4.30	0.00%	0.00%	10.00%	50.00%	40.00%
My experience in the field.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Discussions with other participants.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Decisions of other participants.	10	4.00	0.00%	0.00%	20.00%	60.00%	20.00%
Impact data.	10	3.60	0.00%	20.00%	20.00%	40.00%	20.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	10	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	10	2.90	0.00%	10.00%	90.00%	0.00%	0.00%
Limited Knowledge/Unsatisfactory	10	3.10	0.00%	0.00%	90.00%	10.00%	0.00%

Procedural Evaluation Results – Math

Grade 3

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how to use the materials provided.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
I understood how to record my judgments.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
I think the procedures make sense.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I am sufficiently familiar with the assessment.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understand the differences between the criteria student status levels.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
My expectations of students.	11	4.55	0.00%	0.00%	0.00%	45.45%	54.55%
The difficulty of the test materials.	11	4.36	0.00%	0.00%	18.18%	27.27%	54.55%
My experience in the field.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
Discussions with other participants.	11	4.55	0.00%	0.00%	9.09%	27.27%	63.64%
Decisions of other participants.	11	3.91	0.00%	9.09%	18.18%	45.45%	27.27%
Impact data.	11	4.55	0.00%	0.00%	0.00%	45.45%	54.55%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	11	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	11	3.00	0.00%	9.09%	81.82%	9.09%	0.00%
Limited Knowledge/Unsatisfactory	11	3.09	0.00%	0.00%	90.91%	9.09%	0.00%

Grade 4

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how to use the materials provided.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
I understood how to record my judgments.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I think the procedures make sense.	11	4.55	0.00%	0.00%	0.00%	45.45%	54.55%
I am sufficiently familiar with the assessment.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understand the differences between the criteria student status levels.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
My expectations of students.	11	4.27	0.00%	9.09%	9.09%	27.27%	54.55%
The difficulty of the test materials.	11	4.45	0.00%	0.00%	18.18%	18.18%	63.64%
My experience in the field.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Discussions with other participants.	11	4.73	0.00%	0.00%	9.09%	9.09%	81.82%
Decisions of other participants.	11	4.09	0.00%	0.00%	27.27%	36.36%	36.36%
Impact data.	11	4.45	0.00%	0.00%	0.00%	54.55%	45.45%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	11	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	11	2.82	0.00%	18.18%	81.82%	0.00%	0.00%
Limited Knowledge/Unsatisfactory	11	3.45	0.00%	0.00%	54.55%	45.45%	0.00%

Grade 5

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to use the materials provided.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I understood how to record my judgments.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I think the procedures make sense.	9	4.56	0.00%	0.00%	0.00%	44.44%	55.56%
I am sufficiently familiar with the assessment.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
I understand the differences between the criteria student status levels.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
My expectations of students.	9	4.33	0.00%	0.00%	11.11%	44.44%	44.44%
The difficulty of the test materials.	9	4.00	0.00%	0.00%	33.33%	33.33%	33.33%
My experience in the field.	9	4.44	0.00%	0.00%	0.00%	55.56%	44.44%
Discussions with other participants.	9	4.11	0.00%	0.00%	22.22%	44.44%	33.33%
Decisions of other participants.	9	2.78	11.11%	33.33%	22.22%	33.33%	0.00%
Impact data.	9	3.33	11.11%	11.11%	33.33%	22.22%	22.22%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	9	2.28	22.22%	11.11%	55.56%	0.00%	0.00%
Proficient/Limited Knowledge	9	3.00	11.11%	11.11%	55.56%	11.11%	11.11%
Limited Knowledge/Unsatisfactory	9	3.11	0.00%	0.00%	88.89%	11.11%	0.00%

Grade 6

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I understood how to use the materials provided.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
I understood how to record my judgments.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I think the procedures make sense.	9	4.56	0.00%	0.00%	0.00%	44.44%	55.56%
I am sufficiently familiar with the assessment.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
I understand the differences between the criteria student status levels.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
My expectations of students.	9	4.44	0.00%	0.00%	11.11%	33.33%	55.56%
The difficulty of the test materials.	9	3.89	0.00%	0.00%	33.33%	44.44%	22.22%
My experience in the field.	9	4.33	0.00%	0.00%	11.11%	44.44%	44.44%
Discussions with other participants.	9	4.56	0.00%	0.00%	0.00%	44.44%	55.56%
Decisions of other participants.	9	3.00	11.11%	22.22%	22.22%	44.44%	0.00%
Impact data.	9	3.56	0.00%	0.00%	55.56%	33.33%	11.11%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	9	2.89	0.00%	11.11%	88.89%	0.00%	0.00%
Proficient/Limited Knowledge	9	3.56	0.00%	11.11%	33.33%	44.44%	11.11%
Limited Knowledge/Unsatisfactory	9	2.67	11.11%	11.11%	77.78%	0.00%	0.00%

Grade 7

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
I understood how to use the materials provided.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to record my judgments.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
I think the procedures make sense.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
I am sufficiently familiar with the assessment.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understand the differences between the criteria student status levels.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
My expectations of students.	11	4.45	0.00%	0.00%	9.09%	36.36%	54.55%
The difficulty of the test materials.	11	4.18	0.00%	0.00%	36.36%	9.09%	54.55%
My experience in the field.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
Discussions with other participants.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
Decisions of other participants.	11	3.73	9.09%	0.00%	27.27%	36.36%	27.27%
Impact data.	11	3.82	0.00%	9.09%	27.27%	36.36%	27.27%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	11	3.18	9.09%	9.09%	36.36%	45.45%	0.00%
Proficient/Limited Knowledge	11	3.00	0.00%	9.09%	81.82%	9.09%	0.00%
Limited Knowledge/Unsatisfactory	11	3.18	0.00%	0.00%	81.82%	18.18%	0.00%

Grade 8

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
I understood how to use the materials provided.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to record my judgments.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I think the procedures make sense.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I am sufficiently familiar with the assessment.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understand the differences between the criteria student status levels.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
My expectations of students.	11	4.45	0.00%	0.00%	9.09%	36.36%	54.55%
The difficulty of the test materials.	11	4.09	0.00%	0.00%	36.36%	18.18%	45.45%
My experience in the field.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
Discussions with other participants.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
Decisions of other participants.	11	4.00	9.09%	0.00%	9.09%	45.45%	36.36%
Impact data.	11	4.00	0.00%	9.09%	18.18%	36.36%	36.36%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	11	3.09	0.00%	18.18%	63.64%	9.09%	9.09%
Proficient/Limited Knowledge	11	2.91	9.09%	9.09%	63.64%	18.18%	0.00%
Limited Knowledge/Unsatisfactory	11	3.18	0.00%	0.00%	81.82%	18.18%	0.00%

Grade 10

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I understood how to use the materials provided.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I understood how to record my judgments.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I think the procedures make sense.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I am sufficiently familiar with the assessment.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understand the differences between the criteria student status levels.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
My expectations of students.	10	4.70	0.00%	0.00%	10.00%	10.00%	80.00%
The difficulty of the test materials.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
My experience in the field.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
Discussions with other participants.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
Decisions of other participants.	10	4.50	0.00%	0.00%	10.00%	30.00%	60.00%
Impact data.	10	4.20	0.00%	0.00%	20.00%	40.00%	40.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	9	3.00	0.00%	11.11%	77.78%	11.11%	0.00%
Proficient/Limited Knowledge	10	3.00	0.00%	20.00%	60.00%	20.00%	0.00%
Limited Knowledge/Unsatisfactory	10	2.90	0.00%	20.00%	70.00%	10.00%	0.00%

Procedural Evaluation Results – Science

Grade 5

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understood how to use the materials provided.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understood how to record my judgments.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
I think the procedures make sense.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I am sufficiently familiar with the assessment.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understand the differences between the criteria student status levels.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
My expectations of students.	9	4.22	0.00%	0.00%	22.22%	33.33%	44.44%
The difficulty of the test materials.	10	4.40	0.00%	0.00%	0.00%	60.00%	40.00%
My experience in the field.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
Discussions with other participants.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Decisions of other participants.	10	3.75	10.00%	0.00%	20.00%	30.00%	30.00%
Impact data.	10	3.95	10.00%	0.00%	0.00%	50.00%	30.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	10	3.00	0.00%	10.00%	80.00%	10.00%	0.00%
Proficient/Limited Knowledge	10	3.10	0.00%	0.00%	90.00%	10.00%	0.00%
Limited Knowledge/Unsatisfactory	10	3.00	0.00%	0.00%	100.00%	0.00%	0.00%

Grade 8

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
I understood how to use the materials provided.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I understood how to record my judgments.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
I think the procedures make sense.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
I am sufficiently familiar with the assessment.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
I understand the differences between the criteria student status levels.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	9	4.56	0.00%	11.11%	0.00%	11.11%	77.78%
My expectations of students.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
The difficulty of the test materials.	9	4.44	0.00%	0.00%	0.00%	55.56%	44.44%
My experience in the field.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
Discussions with other participants.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
Decisions of other participants.	9	4.00	0.00%	11.11%	11.11%	44.44%	33.33%
Impact data.	8	4.25	0.00%	0.00%	25.00%	25.00%	50.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	8	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	8	3.13	0.00%	12.50%	62.50%	25.00%	0.00%
Limited Knowledge/Unsatisfactory	8	3.13	0.00%	12.50%	62.50%	25.00%	0.00%

Grade 10

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood how to make the bookmark placements.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I understood how to use the materials provided.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understood how to record my judgments.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I think the procedures make sense.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I am sufficiently familiar with the assessment.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understand the differences between the criteria student status levels.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%

<i>Please rate the influence of the following when setting standards.</i>	<i>N</i>	<i>Mean</i>	<i>Not at all Influential-1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Influential-5</i>
The Criteria Student Status Defintions.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
My expectations of students.	10	4.30	0.00%	0.00%	0.00%	70.00%	30.00%
The difficulty of the test materials.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
My experience in the field.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Discussions with other participants.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
Decisions of other participants.	10	3.90	0.00%	0.00%	20.00%	70.00%	10.00%
Impact data.	10	4.20	0.00%	0.00%	20.00%	40.00%	40.00%

<i>Do you believe the final recommended cut score for each of the achievement levels is too low, about right, or too high?</i>	<i>N</i>	<i>Mean</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	10	3.00	0.00%	0.00%	100.00%	0.00%	0.00%
Proficient/Limited Knowledge	10	2.90	0.00%	10.00%	90.00%	0.00%	0.00%
Limited Knowledge/Unsatisfactory	10	2.90	0.00%	10.00%	90.00%	0.00%	0.00%

Final Evaluation Results – ELA

Grades 3/4

<i>Panelist Demographics</i>	<i>Count (N=11)</i>	<i>%</i>
Gender:		
Male	1	9.09%
Female	10	90.91%
Race/Ethnicity:		
White	9	81.82%
Black	0	0.00%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	2	18.18%
Years of Experience:		
0-5	0	0.00%
5-10	2	18.18%
10-15	6	54.55%
More than 15	2	18.18%
Professional Experience:		
Students with Disabilities	5	45.45%
Students with Limited English Proficiency	3	27.27%
Economically Disadvantaged Students	9	81.82%
Gifted and Talented Students	4	36.36%
General Education	10	90.91%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at</i>				<i>Extremely Useful</i>
			<i>All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	
The opening session.	11	4.09	0.00%	0.00%	9.09%	72.73%	18.18%
Completing the practice test	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
Completing the item map	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Discussions with other participants.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
Impact data.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	11	4.73	0.00%	0.00%	9.09%	9.09%	81.82%
The facilitator helped me understand the process.	11	4.27	0.00%	0.00%	18.18%	36.36%	45.45%
The materials contained the information needed to set standards.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how to use the impact data.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how the cut scores were calculated.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
The facilitator was able to provide answers to my questions.	11	4.27	0.00%	0.00%	18.18%	36.36%	45.45%
Sufficient time was allotted for training on the standard setting tasks.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
Sufficient time was allotted to complete the standard setting tasks.	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
The facilitator helped the standard setting process run smoothly.	11	4.18	0.00%	9.09%	18.18%	18.18%	54.55%
Overall the standard setting process produced credible results.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%

Grades 5/6

<i>Panelist Demographics</i>	<i>Count (N=11)</i>	<i>%</i>
Gender:		
Male	1	9.09%
Female	10	90.91%
Race/Ethnicity:		
White	10	90.91%
Black	0	0.00%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	0	0.00%
Years of Experience:		
0-5	1	9.09%
5-10	3	27.27%
10-15	1	9.09%
More than 15	4	36.36%
Professional Experience:		
Students with Disabilities	4	36.36%
Students with Limited English Proficiency	2	18.18%
Economically Disadvantaged Students	3	27.27%
Gifted and Talented Students	6	54.55%
General Education	11	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	11	3.64	0.00%	18.18%	27.27%	27.27%	27.27%
Completing the practice test	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Completing the item map	11	3.45	9.09%	27.27%	9.09%	18.18%	36.36%
Discussions with other participants.	11	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Impact data.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	11	4.55	0.00%	0.00%	0.00%	45.45%	54.55%
The facilitator helped me understand the process.	11	4.45	0.00%	0.00%	0.00%	54.55%	45.45%
The materials contained the information needed to set standards.	11	4.45	0.00%	0.00%	0.00%	54.55%	45.45%
I understood how to use the impact data.	11	4.45	0.00%	0.00%	0.00%	54.55%	45.45%
I understood how the cut scores were calculated.	11	4.27	0.00%	0.00%	9.09%	54.55%	36.36%
The facilitator was able to provide answers to my questions.	11	4.55	0.00%	0.00%	9.09%	27.27%	63.64%
Sufficient time was allotted for training on the standard setting tasks.	11	4.45	0.00%	0.00%	9.09%	36.36%	54.55%
Sufficient time was allotted to complete the standard setting tasks.	11	4.45	0.00%	0.00%	9.09%	36.36%	54.55%
The facilitator helped the standard setting process run smoothly.	11	4.45	0.00%	0.00%	9.09%	36.36%	54.55%
Overall the standard setting process produced credible results.	11	4.09	0.00%	0.00%	27.27%	36.36%	36.36%

Grades 7/8

<i>Panelist Demographics</i>	<i>Count (N=9)</i>	<i>%</i>
Gender:		
Male	0	0.00%
Female	9	100.00%
Race/Ethnicity:		
White	9	100.00%
Black	1	11.11%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	0	0.00%
Years of Experience:		
0-5	1	11.11%
5-10	2	22.22%
10-15	1	11.11%
More than 15	4	44.44%
Professional Experience:		
Students with Disabilities	2	22.22%
Students with Limited English Proficiency	3	33.33%
Economically Disadvantaged Students	7	77.78%
Gifted and Talented Students	5	55.56%
General Education	9	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	9	4.00	11.11%	0.00%	11.11%	33.33%	44.44%
Completing the practice test	9	4.22	0.00%	11.11%	11.11%	22.22%	55.56%
Completing the item map	9	4.78	0.00%	0.00%	11.11%	0.00%	88.89%
Discussions with other participants.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
Impact data.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
The facilitator helped me understand the process.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
The materials contained the information needed to set standards.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
I understood how to use the impact data.	9	4.78	0.00%	0.00%	11.11%	0.00%	88.89%
I understood how the cut scores were calculated.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
The facilitator was able to provide answers to my questions.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Sufficient time was allotted for training on the standard setting tasks.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Sufficient time was allotted to complete the standard setting tasks.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
The facilitator helped the standard setting process run smoothly.	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Overall the standard setting process produced credible results.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%

Grade 10

Panelist Demographics	Count (N=10)	%
Gender:		
Male	0	0.00%
Female	10	100.00%
Race/Ethnicity:		
White	10	100.00%
Black	0	0.00%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	0	0.00%
Years of Experience:		
0-5	2	20.00%
5-10	1	10.00%
10-15	3	30.00%
More than 15	4	40.00%
Professional Experience:		
Students with Disabilities	2	20.00%
Students with Limited English Proficiency	3	30.00%
Economically Disadvantaged Students	5	50.00%
Gifted and Talented Students	4	40.00%
General Education	10	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	10	4.00	0.00%	10.00%	10.00%	50.00%	30.00%
Completing the practice test	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
Completing the item map	10	3.50	10.00%	20.00%	10.00%	30.00%	30.00%
Discussions with other participants.	10	4.80	0.00%	0.00%	10.00%	0.00%	90.00%
Impact data.	10	4.30	0.00%	10.00%	0.00%	40.00%	50.00%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
The facilitator helped me understand the process.	10	4.20	10.00%	0.00%	10.00%	20.00%	60.00%
The materials contained the information needed to set standards.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
I understood how to use the impact data.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
I understood how the cut scores were calculated.	10	4.40	0.00%	0.00%	0.00%	60.00%	40.00%
The facilitator was able to provide answers to my questions.	10	4.30	10.00%	0.00%	0.00%	30.00%	60.00%
Sufficient time was allotted for training on the standard setting tasks.	10	4.50	0.00%	0.00%	0.00%	50.00%	50.00%
Sufficient time was allotted to complete the standard setting tasks.	10	4.40	0.00%	10.00%	0.00%	30.00%	60.00%
The facilitator helped the standard setting process run smoothly.	10	4.20	10.00%	0.00%	0.00%	40.00%	50.00%
Overall the standard setting process produced credible results.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%

Final Evaluation Results – Math

Grades 3/4

<i>Panelist Demographics</i>	<i>Count (N=11)</i>	<i>%</i>
Gender:		
Male	0	0.00%
Female	11	100.00%
Race/Ethnicity:		
White	8	72.73%
Black	1	9.09%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	3	27.27%
Years of Experience:		
0-5	2	18.18%
5-10	4	36.36%
10-15	3	27.27%
More than 15	2	18.18%
Professional Experience:		
Students with Disabilities	5	45.45%
Students with Limited English Proficiency	3	27.27%
Economically Disadvantaged Students	7	63.64%
Gifted and Talented Students	5	45.45%
General Education	11	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	11	4.09	0.00%	0.00%	18.18%	54.55%	27.27%
Completing the practice test	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
Completing the item map	11	4.27	0.00%	0.00%	18.18%	36.36%	45.45%
Discussions with other participants.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Impact data.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	11	4.55	0.00%	0.00%	0.00%	45.45%	54.55%
The facilitator helped me understand the process.	11	4.45	0.00%	0.00%	9.09%	36.36%	54.55%
The materials contained the information needed to set standards.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
I understood how to use the impact data.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
I understood how the cut scores were calculated.	11	4.27	9.09%	0.00%	0.00%	36.36%	54.55%
The facilitator was able to provide answers to my questions.	11	4.55	0.00%	9.09%	0.00%	18.18%	72.73%
Sufficient time was allotted for training on the standard setting tasks.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Sufficient time was allotted to complete the standard setting tasks.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
The facilitator helped the standard setting process run smoothly.	11	4.73	0.00%	0.00%	0.00%	27.27%	72.73%
Overall the standard setting process produced credible results.	11	4.27	0.00%	9.09%	0.00%	45.45%	45.45%

Grades 5/6

<i>Panelist Demographics</i>	<i>Count (N=9)</i>	<i>%</i>
Gender:		
Male	0	0.00%
Female	9	100.00%
Race/Ethnicity:		
White	8	88.89%
Black	0	0.00%
Hispanic	1	11.11%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	0	0.00%
Years of Experience:		
0-5	1	11.11%
5-10	2	22.22%
10-15	3	33.33%
More than 15	3	33.33%
Professional Experience:		
Students with Disabilities	2	22.22%
Students with Limited English Proficiency	3	33.33%
Economically Disadvantaged Students	4	44.44%
Gifted and Talented Students	4	44.44%
General Education	9	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	9	2.56	11.11%	33.33%	44.44%	11.11%	0.00%
Completing the practice test	9	4.33	0.00%	11.11%	0.00%	33.33%	55.56%
Completing the item map	9	4.22	0.00%	0.00%	11.11%	55.56%	33.33%
Discussions with other participants.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
Impact data.	9	4.33	0.00%	0.00%	11.11%	44.44%	44.44%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
The facilitator helped me understand the process.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
The materials contained the information needed to set standards.	9	4.33	0.00%	11.11%	0.00%	33.33%	55.56%
I understood how to use the impact data.	9	4.56	0.00%	0.00%	11.11%	22.22%	66.67%
I understood how the cut scores were calculated.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
The facilitator was able to provide answers to my questions.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
Sufficient time was allotted for training on the standard setting tasks.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
Sufficient time was allotted to complete the standard setting tasks.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
The facilitator helped the standard setting process run smoothly.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
Overall the standard setting process produced credible results.	9	4.33	0.00%	0.00%	11.11%	44.44%	44.44%

Grades 7/8

<i>Panelist Demographics</i>	<i>Count (N=11)</i>	<i>%</i>
Gender:		
Male	1.1	10.00%
Female	9.9	90.00%
Race/Ethnicity:		
White	9	81.82%
Black	0	0.00%
Hispanic	0	0.00%
Asian	1	9.09%
Pacific Islander	0	0.00%
American Indian	2	18.18%
Years of Experience:		
0-5	1	9.09%
5-10	2	18.18%
10-15	4	36.36%
More than 15	4	36.36%
Professional Experience:		
Students with Disabilities	6	54.55%
Students with Limited English Proficiency	3	27.27%
Economically Disadvantaged Students	8	72.73%
Gifted and Talented Students	8	72.73%
General Education	11	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	11	3.91	0.00%	9.09%	18.18%	45.45%	27.27%
Completing the practice test	11	4.09	18.18%	0.00%	0.00%	18.18%	63.64%
Completing the item map	11	4.64	0.00%	0.00%	0.00%	36.36%	63.64%
Discussions with other participants.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Impact data.	11	4.36	0.00%	0.00%	18.18%	27.27%	54.55%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
The facilitator helped me understand the process.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
The materials contained the information needed to set standards.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
I understood how to use the impact data.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
I understood how the cut scores were calculated.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
The facilitator was able to provide answers to my questions.	11	4.91	0.00%	0.00%	0.00%	9.09%	90.91%
Sufficient time was allotted for training on the standard setting tasks.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
Sufficient time was allotted to complete the standard setting tasks.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
The facilitator helped the standard setting process run smoothly.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%
Overall the standard setting process produced credible results.	11	4.82	0.00%	0.00%	0.00%	18.18%	81.82%

Grade 10

<i>Panelist Demographics</i>	<i>Count (N=10)</i>	<i>%</i>
Gender:		
Male	0	0.00%
Female	10	100.00%
Race/Ethnicity:		
White	8	80.00%
Black	0	0.00%
Hispanic	1	10.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	1	10.00%
Years of Experience:		
0-5	0	0.00%
5-10	1	10.00%
10-15	4	40.00%
More than 15	5	50.00%
Professional Experience:		
Students with Disabilities	2	20.00%
Students with Limited English Proficiency	4	40.00%
Economically Disadvantaged Students	3	30.00%
Gifted and Talented Students	3	30.00%
General Education	9	90.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	10	4.40	0.00%	0.00%	10.00%	40.00%	50.00%
Completing the practice test	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
Completing the item map	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Discussions with other participants.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
Impact data.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	8	4.88	0.00%	0.00%	0.00%	12.50%	87.50%
The facilitator helped me understand the process.	8	4.63	0.00%	0.00%	0.00%	37.50%	62.50%
The materials contained the information needed to set standards.	8	4.75	0.00%	0.00%	0.00%	25.00%	75.00%
I understood how to use the impact data.	8	4.75	0.00%	0.00%	0.00%	25.00%	75.00%
I understood how the cut scores were calculated.	8	4.88	0.00%	0.00%	0.00%	12.50%	87.50%
The facilitator was able to provide answers to my questions.	8	4.63	0.00%	0.00%	0.00%	37.50%	62.50%
Sufficient time was allotted for training on the standard setting tasks.	8	4.63	0.00%	0.00%	0.00%	37.50%	62.50%
Sufficient time was allotted to complete the standard setting tasks.	8	4.75	0.00%	0.00%	0.00%	25.00%	75.00%
The facilitator helped the standard setting process run smoothly.	8	4.75	0.00%	0.00%	0.00%	25.00%	75.00%
Overall the standard setting process produced credible results.	8	4.75	0.00%	0.00%	0.00%	25.00%	75.00%

Final Evaluation Results – Science

Grade 5

<i>Panelist Demographics</i>	<i>Count (N=10)</i>	<i>%</i>
Gender:		
Male	0	0.00%
Female	10	100.00%
Race/Ethnicity:		
White	9	90.00%
Black	0	0.00%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	1	10.00%
Years of Experience:		
0-5	1	10.00%
5-10	3	30.00%
10-15	1	10.00%
More than 15	5	50.00%
Professional Experience:		
Students with Disabilities	3	30.00%
Students with Limited English Proficiency	3	30.00%
Economically Disadvantaged Students	5	50.00%
Gifted and Talented Students	2	20.00%
General Education	10	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	10	4.40	0.00%	0.00%	10.00%	40.00%	50.00%
Completing the practice test	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Completing the item map	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Discussions with other participants.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Impact data.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
The facilitator helped me understand the process.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
The materials contained the information needed to set standards.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I understood how to use the impact data.	10	4.70	0.00%	0.00%	10.00%	10.00%	80.00%
I understood how the cut scores were calculated.	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%
The facilitator was able to provide answers to my questions.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Sufficient time was allotted for training on the standard setting tasks.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
Sufficient time was allotted to complete the standard setting tasks.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
The facilitator helped the standard setting process run smoothly.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Overall the standard setting process produced credible results.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%

Grade 8

<i>Panelist Demographics</i>	<i>Count (N=9)</i>	<i>%</i>
Gender:		
Male	1	11.11%
Female	8	88.89%
Race/Ethnicity:		
White	8	88.89%
Black	0	0.00%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	1	11.11%
Years of Experience:		
0-5	2	22.22%
5-10	4	44.44%
10-15	0	0.00%
More than 15	3	33.33%
Professional Experience:		
Students with Disabilities	3	33.33%
Students with Limited English Proficiency	3	33.33%
Economically Disadvantaged Students	6	66.67%
Gifted and Talented Students	5	55.56%
General Education	7	77.78%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	9	3.33	22.22%	11.11%	22.22%	0.00%	44.44%
Completing the practice test	9	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Completing the item map	9	4.44	0.00%	0.00%	0.00%	55.56%	44.44%
Discussions with other participants.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
Impact data.	8	4.63	0.00%	0.00%	0.00%	37.50%	62.50%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	9	4.89	0.00%	0.00%	0.00%	11.11%	88.89%
The facilitator helped me understand the process.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
The materials contained the information needed to set standards.	9	4.67	0.00%	0.00%	11.11%	11.11%	77.78%
I understood how to use the impact data.	9	4.56	0.00%	0.00%	0.00%	44.44%	55.56%
I understood how the cut scores were calculated.	9	4.22	0.00%	0.00%	11.11%	55.56%	33.33%
The facilitator was able to provide answers to my questions.	9	4.67	0.00%	0.00%	11.11%	11.11%	77.78%
Sufficient time was allotted for training on the standard setting tasks.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
Sufficient time was allotted to complete the standard setting tasks.	9	4.67	0.00%	0.00%	0.00%	33.33%	66.67%
The facilitator helped the standard setting process run smoothly.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%
Overall the standard setting process produced credible results.	9	4.78	0.00%	0.00%	0.00%	22.22%	77.78%

Grade 10

<i>Panelist Demographics</i>	<i>Count (N=10)</i>	<i>%</i>
Gender:		
Male	4	40.00%
Female	6	60.00%
Race/Ethnicity:		
White	10	100.00%
Black	0	0.00%
Hispanic	0	0.00%
Asian	0	0.00%
Pacific Islander	0	0.00%
American Indian	0	0.00%
Years of Experience:		
0-5	0	0.00%
5-10	2	20.00%
10-15	3	30.00%
More than 15	5	50.00%
Professional Experience:		
Students with Disabilities	4	40.00%
Students with Limited English Proficiency	2	20.00%
Economically Disadvantaged Students	5	50.00%
Gifted and Talented Students	6	60.00%
General Education	10	100.00%

<i>Please rate the usefulness of each of the following:</i>	<i>N</i>	<i>Mean</i>	<i>Not Useful at All 1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Extremely Useful 5</i>
The opening session.	10	3.60	0.00%	10.00%	30.00%	50.00%	10.00%
Completing the practice test	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Completing the item map	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%
Discussions with other participants.	10	5.00	0.00%	0.00%	0.00%	0.00%	100.00%
Impact data.	10	4.10	0.00%	0.00%	10.00%	70.00%	20.00%

<i>Please mark the appropriate box for each statement.</i>	<i>N</i>	<i>Mean</i>	<i>% SD</i>	<i>% D</i>	<i>% N</i>	<i>% A</i>	<i>% SA</i>
I understood the goals of the standard setting meeting.	10	4.80	0.00%	0.00%	0.00%	20.00%	80.00%
The facilitator helped me understand the process.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%
The materials contained the information needed to set standards.	10	4.90	0.00%	0.00%	0.00%	10.00%	90.00%
I understood how to use the impact data.	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%
I understood how the cut scores were calculated.	10	4.60	0.00%	0.00%	0.00%	40.00%	60.00%
The facilitator was able to provide answers to my questions.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Sufficient time was allotted for training on the standard setting tasks.	10	4.50	0.00%	10.00%	0.00%	20.00%	70.00%
Sufficient time was allotted to complete the standard setting tasks.	10	4.50	0.00%	10.00%	0.00%	20.00%	70.00%
The facilitator helped the standard setting process run smoothly.	10	4.60	0.00%	0.00%	10.00%	20.00%	70.00%
Overall the standard setting process produced credible results.	10	4.70	0.00%	0.00%	0.00%	30.00%	70.00%

Vertical Articulation Evaluation - ELA

Pre-Articulation

<i>Do you believe the final recommended cut score for each of the performance levels is too low, about right, or too high?</i>	<i>Grade</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced Proficient	3	0%	0%	88%	13%	0%
	4	0%	0%	75%	25%	0%
	5	0%	13%	63%	25%	0%
	6	0%	0%	88%	13%	0%
	7	0%	38%	50%	13%	0%
	8	0%	13%	88%	0%	0%
	10	0%	0%	63%	38%	0%
Proficient/Knowledge	3	0%	50%	25%	25%	0%
	4	0%	63%	13%	25%	0%
	5	0%	38%	38%	25%	0%
	6	13%	63%	0%	25%	0%
	7	25%	38%	13%	25%	0%
	8	0%	50%	13%	38%	0%
	10	75%	0%	0%	25%	0%
Limited Knowledge/Unsatisfactory	3	0%	0%	63%	38%	0%
	4	0%	0%	63%	38%	0%
	5	0%	25%	75%	0%	0%
	6	13%	25%	50%	13%	0%
	7	0%	0%	75%	25%	0%
	8	0%	25%	38%	38%	0%
	10	38%	50%	13%	0%	0%

Post-Articulation

<i>Do you believe the final recommended cut score for each of the performance levels is too low, about right, or too high?</i>	<i>Grade</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced/Proficient	3	0%	0%	100%	0%	0%
	4	0%	0%	100%	0%	0%
	5	0%	0%	100%	0%	0%
	6	0%	0%	100%	0%	0%

continued

	7	0%	0%	100%	0%	0%
	8	0%	0%	100%	0%	0%
	10	13%	0%	88%	0%	0%
Proficient/Limited Knowledge	3	0%	0%	100%	0%	0%
	4	0%	0%	100%	0%	0%
	5	0%	0%	100%	0%	0%
	6	0%	0%	100%	0%	0%
	7	0%	63%	38%	0%	0%
	8	0%	0%	100%	0%	0%
	10	63%	0%	38%	0%	0%
Limited Knowledge/Unsatisfactory	3	0%	0%	100%	0%	0%
	4	0%	0%	100%	0%	0%
	5	0%	0%	100%	0%	0%
	6	0%	0%	88%	13%	0%
	7	0%	13%	88%	0%	0%
	8	0%	0%	100%	0%	0%
	10	0%	0%	100%	0%	0%

Vertical Articulation Evaluation – Math

Pre-Articulation

<i>Do you believe the final recommended cut score for each of the performance levels is too low, about right, or too high?</i>	<i>Grade</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced Proficient	3	0%	33%	50%	17%	0%
	4	17%	33%	33%	17%	0%
	5	0%	20%	80%	0%	0%
	6	0%	33%	67%	0%	0%
	7	0%	40%	40%	20%	0%
	8	0%	0%	100%	0%	0%
	10	0%	0%	83%	17%	0%
Proficient/Knowledge	3	17%	50%	33%	0%	0%
	4	17%	50%	33%	0%	0%
	5	0%	67%	33%	0%	0%
	6	0%	33%	67%	0%	0%
	7	0%	33%	67%	0%	0%
	8	0%	17%	67%	17%	0%
	10	0%	0%	83%	17%	0%
Limited Knowledge/Unsatisfactory	3	0%	50%	33%	0%	17%
	4	0%	33%	50%	0%	17%
	5	0%	50%	33%	0%	17%
	6	33%	17%	17%	17%	17%
	7	17%	33%	17%	33%	0%
	8	17%	17%	50%	17%	0%
	10	17%	17%	33%	33%	0%

Post-Articulation

<i>Do you believe the final recommended cut score for each of the performance levels is too low, about right, or too high?</i>	<i>Grade</i>	<i>Too Low -1</i>	<i>Somewhat Low</i>	<i>About Right</i>	<i>Somewhat High</i>	<i>Too High -5</i>
Advanced Proficient	3	0%	0%	75%	13%	13%
	4	0%	0%	75%	13%	13%
	5	0%	13%	63%	25%	0%
	6	0%	13%	88%	0%	0%
	7	0%	13%	88%	0%	0%
	8	0%	25%	50%	25%	0%

continued

	10	0%	13%	75%	13%	0%
Proficient/Knowledge	3	0%	0%	88%	13%	0%
	4	0%	0%	100%	0%	0%
	5	0%	0%	88%	13%	0%
	6	0%	0%	100%	0%	0%
	7	0%	0%	100%	0%	0%
	8	0%	0%	100%	0%	0%
	10	0%	0%	100%	0%	0%
Limited Knowledge/Unsatisfactory	3	0%	0%	88%	13%	0%
	4	0%	0%	88%	13%	0%
	5	0%	13%	63%	25%	0%
	6	0%	13%	63%	25%	0%
	7	0%	0%	100%	0%	0%
	8	0%	13%	88%	0%	0%
	10	0%	0%	100%	0%	0%

APPENDIX K—DISAGGREGATED IMPACT DATA

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 03									
Military	232	38	16.4	23	9.9	115	49.6	56	24.1
Non-Military	51,828	13,871	26.8	7,897	15.2	22,721	43.8	7,339	14.2
Foster									
Foster	390	136	34.9	74	19.0	155	39.7	25	6.4
Non-Foster	51,670	13,773	26.7	7,846	15.2	22,681	43.9	7,370	14.3

CONFIDENTIAL

Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
English Language Arts - Grade 04									
Total									
All	50,512	13,485	26.7	14,434	28.6	19,228	38.1	3,365	6.7
Form									
Form 1	16,954	4,524	26.7	4,851	28.6	6,549	38.6	1,030	6.1
Form 2	16,758	4,629	27.6	4,782	28.5	6,163	36.8	1,184	7.1
Form 3	16,800	4,332	25.8	4,801	28.6	6,516	38.8	1,151	6.9
Ethnicity									
Hispanic or Latino	9,168	3,541	38.6	2,879	31.4	2,474	27.0	274	3.0
Race									
American Indian/:Alaskan Native	6,650	1,835	27.6	2,057	30.9	2,431	36.6	327	4.9
Asian	960	170	17.7	217	22.6	433	45.1	140	14.6
Black/:African American	4,344	1,922	44.2	1,285	29.6	1,050	24.2	87	2.0
Pacific Islander	164	67	40.9	49	29.9	45	27.4	3	1.8
White/:Caucasian	24,207	4,713	19.5	6,469	26.7	10,818	44.7	2,207	9.1
Two or More Races	5,019	1,237	24.7	1,478	29.5	1,977	39.4	327	6.5
Gender									
Female	24,786	5,908	23.8	7,133	28.8	9,866	39.8	1,879	7.6
Male	25,691	7,558	29.4	7,292	28.4	9,355	36.4	1,486	5.8
Not Indicated	35	19	54.3	9	25.7	7	20.0	0	0.0
Other									
ELL 1st Yr: Proficient	1,799	409	22.7	778	43.3	568	31.6	44	2.5
ELL 2nd Yr: Proficient	584	50	8.6	194	33.2	298	51.0	42	7.2
Econ. Disadv.	31,744	10,544	33.2	9,942	31.3	10,128	31.9	1,130	3.6
Non-Econ. Disadv.	18,768	2,941	15.7	4,492	23.9	9,100	48.5	2,235	11.9
Migrant	29	13	44.8	8	27.6	8	27.6	0	0.0
Non-Migrant	50,483	13,472	26.7	14,426	28.6	19,220	38.1	3,365	6.7
Individualized Education Plan (IEP)									
IEP	8,795	5,390	61.3	1,939	22.1	1,312	14.9	154	1.8
IEP w/ Accom.	5,296	3,849	72.7	1,023	19.3	405	7.7	19	0.4
IEP w/o Accom.	3,499	1,541	44.0	916	26.2	907	25.9	135	3.9
Plan 504	965	257	26.6	307	31.8	356	36.9	45	4.7
Plan 504 w/ Accom.	471	136	28.9	152	32.3	169	35.9	14	3.0
Plan 504 w/o Accom.	494	121	24.5	155	31.4	187	37.9	31	6.3
English Language Learners (ELL)									
ELL	4,027	2,526	62.7	1,086	27.0	399	9.9	16	0.4
ELL w/ Accom.	1,260	903	71.7	287	22.8	69	5.5	1	0.1
ELL w/o Accom.	2,767	1,623	58.7	799	28.9	330	11.9	15	0.5
Non-English Language Learners (Non-ELL)									
Non-ELL	46,485	10,959	23.6	13,348	28.7	18,829	40.5	3,349	7.2

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 04									
Military									
Military	253	36	14.2	67	26.5	121	47.8	29	11.5
Non-Military	50,259	13,449	26.8	14,367	28.6	19,107	38.0	3,336	6.6
Foster									
Foster	362	140	38.7	109	30.1	102	28.2	11	3.0
Non-Foster	50,150	13,345	26.6	14,325	28.6	19,126	38.1	3,354	6.7

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English Language Arts - Grade 05	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,449	9,260	19.1	13,920	28.7	19,359	40.0	5,910	12.2
Form									
Form 1	16,248	3,154	19.4	4,832	29.7	6,429	39.6	1,833	11.3
Form 2	16,143	3,127	19.4	4,472	27.7	6,712	41.6	1,832	11.4
Form 3	16,058	2,979	18.6	4,616	28.8	6,218	38.7	2,245	14.0
Ethnicity									
Hispanic or Latino	8,678	2,327	26.8	2,912	33.6	2,886	33.3	553	6.4
Race									
American Indian/:Alaskan Native	6,657	1,279	19.2	2,078	31.2	2,618	39.3	682	10.2
Asian	917	104	11.3	210	22.9	372	40.6	231	25.2
Black/:African American	4,253	1,419	33.4	1,487	35.0	1,139	26.8	208	4.9
Pacific Islander	159	49	30.8	54	34.0	44	27.7	12	7.6
White/:Caucasian	23,316	3,276	14.1	5,930	25.4	10,416	44.7	3,694	15.8
Two or More Races	4,469	806	18.0	1,249	28.0	1,884	42.2	530	11.9
Gender									
Female	23,909	3,806	15.9	6,850	28.7	10,001	41.8	3,252	13.6
Male	24,497	5,439	22.2	7,051	28.8	9,349	38.2	2,658	10.9
Not Indicated	43	15	34.9	19	44.2	9	20.9	0	0.0
Other									
ELL 1st Yr: Proficient	1,417	267	18.8	616	43.5	494	34.9	40	2.8
ELL 2nd Yr: Proficient	1,715	258	15.0	695	40.5	678	39.5	84	4.9
Econ. Disadv.	30,004	7,373	24.6	9,811	32.7	10,667	35.6	2,153	7.2
Non-Econ. Disadv.	18,445	1,887	10.2	4,109	22.3	8,692	47.1	3,757	20.4
Migrant	31	6	19.4	10	32.3	14	45.2	1	3.2
Non-Migrant	48,418	9,254	19.1	13,910	28.7	19,345	40.0	5,909	12.2
Individualized Education Plan (IEP)									
IEP	8,316	4,498	54.1	2,286	27.5	1,320	15.9	212	2.6
IEP w/ Accom.	5,301	3,327	62.8	1,388	26.2	536	10.1	50	0.9
IEP w/o Accom.	3,015	1,171	38.8	898	29.8	784	26.0	162	5.4
Plan 504	1,061	186	17.5	333	31.4	445	41.9	97	9.1
Plan 504 w/ Accom.	520	119	22.9	168	32.3	201	38.7	32	6.2
Plan 504 w/o Accom.	541	67	12.4	165	30.5	244	45.1	65	12.0
English Language Learners (ELL)									
ELL	2,462	1,380	56.1	779	31.6	270	11.0	33	1.3
ELL w/ Accom.	746	483	64.8	216	29.0	45	6.0	2	0.3
ELL w/o Accom.	1,716	897	52.3	563	32.8	225	13.1	31	1.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,987	7,880	17.1	13,141	28.6	19,089	41.5	5,877	12.8

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 05									
Military									
Military	247	24	9.7	50	20.2	111	44.9	62	25.1
Non-Military	48,202	9,236	19.2	13,870	28.8	19,248	39.9	5,848	12.1
Foster									
Foster	299	86	28.8	114	38.1	85	28.4	14	4.7
Non-Foster	48,150	9,174	19.1	13,806	28.7	19,274	40.0	5,896	12.3

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English Language Arts - Grade 06	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	46,499	8,461	18.2	18,606	40.0	13,345	28.7	6,087	13.1
Form									
Form 1	15,973	3,207	20.1	6,263	39.2	4,265	26.7	2,238	14.0
Form 2	15,254	2,683	17.6	5,860	38.4	4,759	31.2	1,952	12.8
Form 3	15,272	2,571	16.8	6,483	42.5	4,321	28.3	1,897	12.4
Ethnicity									
Hispanic or Latino	7,593	1,910	25.2	3,398	44.8	1,730	22.8	555	7.3
Race									
American Indian/:Alaskan Native	6,745	1,324	19.6	2,870	42.6	1,821	27.0	730	10.8
Asian	871	92	10.6	250	28.7	272	31.2	257	29.5
Black/:African American	3,837	1,117	29.1	1,743	45.4	765	19.9	212	5.5
Pacific Islander	139	42	30.2	59	42.5	31	22.3	7	5.0
White/:Caucasian	23,366	3,279	14.0	8,776	37.6	7,525	32.2	3,786	16.2
Two or More Races	3,948	697	17.7	1,510	38.3	1,201	30.4	540	13.7
Gender									
Female	22,695	3,484	15.4	9,198	40.5	6,777	29.9	3,236	14.3
Male	23,726	4,945	20.8	9,382	39.5	6,552	27.6	2,847	12.0
Not Indicated	78	32	41.0	26	33.3	16	20.5	4	5.1
Other									
ELL 1st Yr: Proficient	638	122	19.1	384	60.2	110	17.2	22	3.5
ELL 2nd Yr: Proficient	916	177	19.3	508	55.5	188	20.5	43	4.7
Econ. Disadv.	28,339	6,744	23.8	12,406	43.8	6,846	24.2	2,343	8.3
Non-Econ. Disadv.	18,160	1,717	9.5	6,200	34.1	6,499	35.8	3,744	20.6
Migrant	28	12	42.9	12	42.9	3	10.7	1	3.6
Non-Migrant	46,471	8,449	18.2	18,594	40.0	13,342	28.7	6,086	13.1
Individualized Education Plan (IEP)									
IEP	7,443	4,101	55.1	2,431	32.7	718	9.7	193	2.6
IEP w/ Accom.	4,019	2,467	61.4	1,264	31.5	246	6.1	42	1.1
IEP w/o Accom.	3,424	1,634	47.7	1,167	34.1	472	13.8	151	4.4
Plan 504	1,091	168	15.4	504	46.2	304	27.9	115	10.5
Plan 504 w/ Accom.	332	67	20.2	161	48.5	78	23.5	26	7.8
Plan 504 w/o Accom.	759	101	13.3	343	45.2	226	29.8	89	11.7
English Language Learners (ELL)									
ELL	1,658	1,025	61.8	513	30.9	101	6.1	19	1.2
ELL w/ Accom.	293	220	75.1	66	22.5	7	2.4	0	0.0
ELL w/o Accom.	1,365	805	59.0	447	32.8	94	6.9	19	1.4
Non-English Language Learners (Non-ELL)									
Non-ELL	44,841	7,436	16.6	18,093	40.4	13,244	29.5	6,068	13.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 06									
Military									
Military	260	27	10.4	88	33.9	91	35.0	54	20.8
Non-Military	46,239	8,434	18.2	18,518	40.1	13,254	28.7	6,033	13.1
Foster									
Foster	279	81	29.0	132	47.3	50	17.9	16	5.7
Non-Foster	46,220	8,380	18.1	18,474	40.0	13,295	28.8	6,071	13.1

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English Language Arts - Grade 07	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Total									
All	48,035	13,581	28.3	11,849	24.7	15,653	32.6	6,952	14.5
Form									
Form 1	16,436	4,978	30.3	3,770	22.9	5,291	32.2	2,397	14.6
Form 2	15,795	4,386	27.8	3,874	24.5	5,191	32.9	2,344	14.8
Form 3	15,804	4,217	26.7	4,205	26.6	5,171	32.7	2,211	14.0
Ethnicity									
Hispanic or Latino	8,086	3,175	39.3	2,149	26.6	2,119	26.2	643	8.0
Race									
American Indian/:Alaskan Native	7,027	2,067	29.4	1,861	26.5	2,210	31.5	889	12.7
Asian	997	167	16.8	203	20.4	328	32.9	299	30.0
Black/:African American	4,178	1,940	46.4	1,044	25.0	931	22.3	263	6.3
Pacific Islander	146	67	45.9	35	24.0	36	24.7	8	5.5
White/:Caucasian	23,684	5,099	21.5	5,555	23.5	8,716	36.8	4,314	18.2
Two or More Races	3,917	1,066	27.2	1,002	25.6	1,313	33.5	536	13.7
Gender									
Female	23,357	5,767	24.7	5,808	24.9	8,069	34.6	3,713	15.9
Male	24,622	7,784	31.6	6,030	24.5	7,572	30.8	3,236	13.1
Not Indicated	56	30	53.6	11	19.6	12	21.4	3	5.4
Other									
ELL 1st Yr: Proficient	200	58	29.0	73	36.5	58	29.0	11	5.5
ELL 2nd Yr: Proficient	440	150	34.1	164	37.3	109	24.8	17	3.9
Econ. Disadv.	29,593	10,779	36.4	7,871	26.6	8,227	27.8	2,716	9.2
Non-Econ. Disadv.	18,442	2,802	15.2	3,978	21.6	7,426	40.3	4,236	23.0
Migrant	32	18	56.3	4	12.5	7	21.9	3	9.4
Non-Migrant	48,003	13,563	28.3	11,845	24.7	15,646	32.6	6,949	14.5
Individualized Education Plan (IEP)									
IEP	8,153	5,640	69.2	1,403	17.2	878	10.8	232	2.9
IEP w/ Accom.	4,211	3,167	75.2	641	15.2	321	7.6	82	2.0
IEP w/o Accom.	3,942	2,473	62.7	762	19.3	557	14.1	150	3.8
Plan 504	1,009	257	25.5	256	25.4	361	35.8	135	13.4
Plan 504 w/ Accom.	233	76	32.6	65	27.9	68	29.2	24	10.3
Plan 504 w/o Accom.	776	181	23.3	191	24.6	293	37.8	111	14.3
English Language Learners (ELL)									
ELL	2,173	1,689	77.7	349	16.1	119	5.5	16	0.7
ELL w/ Accom.	287	256	89.2	25	8.7	6	2.1	0	0.0
ELL w/o Accom.	1,886	1,433	76.0	324	17.2	113	6.0	16	0.9
Non-English Language Learners (Non-ELL)									
Non-ELL	45,862	11,892	25.9	11,500	25.1	15,534	33.9	6,936	15.1

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 07									
Military									
Military	228	40	17.5	59	25.9	82	36.0	47	20.6
Non-Military	47,807	13,541	28.3	11,790	24.7	15,571	32.6	6,905	14.4
Foster									
Foster	260	114	43.9	64	24.6	51	19.6	31	11.9
Non-Foster	47,775	13,467	28.2	11,785	24.7	15,602	32.7	6,921	14.5

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English Language Arts - Grade 08	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	47,893	9,972	20.8	16,338	34.1	16,038	33.5	5,545	11.6
Form									
Form 1	16,470	3,786	23.0	5,599	34.0	5,300	32.2	1,785	10.8
Form 2	15,698	3,256	20.7	5,472	34.9	5,311	33.8	1,659	10.6
Form 3	15,725	2,930	18.6	5,267	33.5	5,427	34.5	2,101	13.4
Ethnicity									
Hispanic or Latino	7,816	2,353	30.1	2,943	37.7	2,019	25.8	501	6.4
Race									
American Indian/:Alaskan Native	6,990	1,470	21.0	2,570	36.8	2,292	32.8	658	9.4
Asian	943	124	13.2	220	23.3	351	37.2	248	26.3
Black/:African American	4,196	1,569	37.4	1,496	35.7	936	22.3	195	4.7
Pacific Islander	167	62	37.1	50	29.9	48	28.7	7	4.2
White/:Caucasian	24,041	3,662	15.2	7,751	32.2	9,120	37.9	3,508	14.6
Two or More Races	3,740	732	19.6	1,308	35.0	1,272	34.0	428	11.4
Gender									
Female	23,511	3,864	16.4	7,789	33.1	8,479	36.1	3,379	14.4
Male	24,312	6,072	25.0	8,520	35.0	7,556	31.1	2,164	8.9
Not Indicated	70	36	51.4	29	41.4	3	4.3	2	2.9
Other									
ELL 1st Yr: Proficient	183	27	14.8	100	54.6	50	27.3	6	3.3
ELL 2nd Yr: Proficient	242	23	9.5	115	47.5	83	34.3	21	8.7
Econ. Disadv.	29,058	8,035	27.7	10,903	37.5	8,207	28.2	1,913	6.6
Non-Econ. Disadv.	18,835	1,937	10.3	5,435	28.9	7,831	41.6	3,632	19.3
Migrant	37	18	48.7	8	21.6	8	21.6	3	8.1
Non-Migrant	47,856	9,954	20.8	16,330	34.1	16,030	33.5	5,542	11.6
Individualized Education Plan (IEP)									
IEP	7,713	4,697	60.9	2,185	28.3	718	9.3	113	1.5
IEP w/ Accom.	4,247	2,870	67.6	1,044	24.6	302	7.1	31	0.7
IEP w/o Accom.	3,466	1,827	52.7	1,141	32.9	416	12.0	82	2.4
Plan 504	986	161	16.3	385	39.1	335	34.0	105	10.7
Plan 504 w/ Accom.	211	42	19.9	90	42.7	63	29.9	16	7.6
Plan 504 w/o Accom.	775	119	15.4	295	38.1	272	35.1	89	11.5
English Language Learners (ELL)									
ELL	2,127	1,460	68.6	529	24.9	124	5.8	14	0.7
ELL w/ Accom.	360	296	82.2	53	14.7	11	3.1	0	0.0
ELL w/o Accom.	1,767	1,164	65.9	476	26.9	113	6.4	14	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,766	8,512	18.6	15,809	34.5	15,914	34.8	5,531	12.1

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 08									
Military									
Military	226	29	12.8	74	32.7	88	38.9	35	15.5
Non-Military	47,667	9,943	20.9	16,264	34.1	15,950	33.5	5,510	11.6
Foster									
Foster	241	91	37.8	102	42.3	42	17.4	6	2.5
Non-Foster	47,652	9,881	20.7	16,236	34.1	15,996	33.6	5,539	11.6

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English Language Arts - Grade 10	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	45,802	5,938	13.0	14,440	31.5	15,156	33.1	10,268	22.4
Form									
Form 1	15,658	2,125	13.6	5,022	32.1	5,136	32.8	3,375	21.6
Form 2	15,095	1,863	12.3	4,752	31.5	5,332	35.3	3,148	20.9
Form 3	15,049	1,950	13.0	4,666	31.0	4,688	31.2	3,745	24.9
Ethnicity									
Hispanic or Latino	6,942	1,258	18.1	2,588	37.3	2,096	30.2	1,000	14.4
Race									
American Indian/:Alaskan Native	6,809	921	13.5	2,314	34.0	2,326	34.2	1,248	18.3
Asian	1,073	118	11.0	238	22.2	311	29.0	406	37.8
Black/:African American	3,981	952	23.9	1,604	40.3	1,023	25.7	402	10.1
Pacific Islander	149	24	16.1	60	40.3	42	28.2	23	15.4
White/:Caucasian	23,604	2,267	9.6	6,627	28.1	8,240	34.9	6,470	27.4
Two or More Races	3,244	398	12.3	1,009	31.1	1,118	34.5	719	22.2
Gender									
Female	22,529	2,004	8.9	6,770	30.1	7,857	34.9	5,898	26.2
Male	23,246	3,927	16.9	7,662	33.0	7,290	31.4	4,367	18.8
Not Indicated	27	7	25.9	8	29.6	9	33.3	3	11.1
Other									
ELL 1st Yr: Proficient	581	81	13.9	318	54.7	159	27.4	23	4.0
ELL 2nd Yr: Proficient	212	29	13.7	85	40.1	75	35.4	23	10.9
Econ. Disadv.	25,078	4,410	17.6	9,380	37.4	7,700	30.7	3,588	14.3
Non-Econ. Disadv.	20,724	1,528	7.4	5,060	24.4	7,456	36.0	6,680	32.2
Migrant	32	5	15.6	10	31.3	10	31.3	7	21.9
Non-Migrant	45,770	5,933	13.0	14,430	31.5	15,146	33.1	10,261	22.4
Individualized Education Plan (IEP)									
IEP	6,868	2,878	41.9	2,924	42.6	898	13.1	168	2.5
IEP w/ Accom.	2,369	1,057	44.6	992	41.9	282	11.9	38	1.6
IEP w/o Accom.	4,499	1,821	40.5	1,932	42.9	616	13.7	130	2.9
Plan 504	898	98	10.9	308	34.3	314	35.0	178	19.8
Plan 504 w/ Accom.	80	7	8.8	35	43.8	23	28.8	15	18.8
Plan 504 w/o Accom.	818	91	11.1	273	33.4	291	35.6	163	19.9
English Language Learners (ELL)									
ELL	1,601	851	53.2	602	37.6	112	7.0	36	2.3
ELL w/ Accom.	262	162	61.8	86	32.8	13	5.0	1	0.4
ELL w/o Accom.	1,339	689	51.5	516	38.5	99	7.4	35	2.6
Non-English Language Learners (Non-ELL)									
Non-ELL	44,201	5,087	11.5	13,838	31.3	15,044	34.0	10,232	23.2

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
English Language Arts - Grade 10	N	N	%	N	%	N	%	N	%
Military									
Military	131	10	7.6	29	22.1	56	42.8	36	27.5
Non-Military	45,671	5,928	13.0	14,411	31.6	15,100	33.1	10,232	22.4
Foster									
Foster	194	43	22.2	79	40.7	52	26.8	20	10.3
Non-Foster	45,608	5,895	12.9	14,361	31.5	15,104	33.1	10,248	22.5

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 03									
Military	232	38	16.4	23	9.9	126	54.3	45	19.4
Non-Military	51,828	13,871	26.8	7,897	15.2	23,893	46.1	6,167	11.9
Foster									
Foster	390	136	34.9	74	19.0	163	41.8	17	4.4
Non-Foster	51,670	13,773	26.7	7,846	15.2	23,856	46.2	6,195	12.0

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
English Language Arts - Grade 04									
Total									
All	50,512	14,564	28.8	13,355	26.4	19,228	38.1	3,365	6.7
Form									
Form 1	16,954	4,994	29.5	4,381	25.8	6,549	38.6	1,030	6.1
Form 2	16,758	4,629	27.6	4,782	28.5	6,163	36.8	1,184	7.1
Form 3	16,800	4,941	29.4	4,192	25.0	6,516	38.8	1,151	6.9
Ethnicity									
Hispanic or Latino	9,168	3,802	41.5	2,618	28.6	2,474	27.0	274	3.0
Race									
American Indian/:Alaskan Native	6,650	2,006	30.2	1,886	28.4	2,431	36.6	327	4.9
Asian	960	185	19.3	202	21.0	433	45.1	140	14.6
Black/:African American	4,344	2,037	46.9	1,170	26.9	1,050	24.2	87	2.0
Pacific Islander	164	71	43.3	45	27.4	45	27.4	3	1.8
White/:Caucasian	24,207	5,132	21.2	6,050	25.0	10,818	44.7	2,207	9.1
Two or More Races	5,019	1,331	26.5	1,384	27.6	1,977	39.4	327	6.5
Gender									
Female	24,786	6,420	25.9	6,621	26.7	9,866	39.8	1,879	7.6
Male	25,691	8,125	31.6	6,725	26.2	9,355	36.4	1,486	5.8
Not Indicated	35	19	54.3	9	25.7	7	20.0	0	0.0
Other									
ELL 1st Yr: Proficient	1,799	464	25.8	723	40.2	568	31.6	44	2.5
ELL 2nd Yr: Proficient	584	62	10.6	182	31.2	298	51.0	42	7.2
Econ. Disadv.	31,744	11,342	35.7	9,144	28.8	10,128	31.9	1,130	3.6
Non-Econ. Disadv.	18,768	3,222	17.2	4,211	22.4	9,100	48.5	2,235	11.9
Migrant	29	14	48.3	7	24.1	8	27.6	0	0.0
Non-Migrant	50,483	14,550	28.8	13,348	26.4	19,220	38.1	3,365	6.7
Individualized Education Plan (IEP)									
IEP	8,795	5,614	63.8	1,715	19.5	1,312	14.9	154	1.8
IEP w/ Accom.	5,296	3,992	75.4	880	16.6	405	7.7	19	0.4
IEP w/o Accom.	3,499	1,622	46.4	835	23.9	907	25.9	135	3.9
Plan 504	965	290	30.1	274	28.4	356	36.9	45	4.7
Plan 504 w/ Accom.	471	153	32.5	135	28.7	169	35.9	14	3.0
Plan 504 w/o Accom.	494	137	27.7	139	28.1	187	37.9	31	6.3
English Language Learners (ELL)									
ELL	4,027	2,651	65.8	961	23.9	399	9.9	16	0.4
ELL w/ Accom.	1,260	936	74.3	254	20.2	69	5.5	1	0.1
ELL w/o Accom.	2,767	1,715	62.0	707	25.6	330	11.9	15	0.5
Non-English Language Learners (Non-ELL)									
Non-ELL	46,485	11,913	25.6	12,394	26.7	18,829	40.5	3,349	7.2

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 04									
Military									
Military	253	41	16.2	62	24.5	121	47.8	29	11.5
Non-Military	50,259	14,523	28.9	13,293	26.5	19,107	38.0	3,336	6.6
Foster									
Foster	362	147	40.6	102	28.2	102	28.2	11	3.0
Non-Foster	50,150	14,417	28.8	13,253	26.4	19,126	38.1	3,354	6.7

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English Language Arts - Grade 05	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,449	7,966	16.4	15,214	31.4	19,359	40.0	5,910	12.2
Form									
Form 1	16,248	2,857	17.6	5,129	31.6	6,429	39.6	1,833	11.3
Form 2	16,143	2,475	15.3	5,124	31.7	6,712	41.6	1,832	11.4
Form 3	16,058	2,634	16.4	4,961	30.9	6,218	38.7	2,245	14.0
Ethnicity									
Hispanic or Latino	8,678	2,001	23.1	3,238	37.3	2,886	33.3	553	6.4
Race									
American Indian/:Alaskan Native	6,657	1,089	16.4	2,268	34.1	2,618	39.3	682	10.2
Asian	917	92	10.0	222	24.2	372	40.6	231	25.2
Black/:African American	4,253	1,251	29.4	1,655	38.9	1,139	26.8	208	4.9
Pacific Islander	159	46	28.9	57	35.9	44	27.7	12	7.6
White/:Caucasian	23,316	2,794	12.0	6,412	27.5	10,416	44.7	3,694	15.8
Two or More Races	4,469	693	15.5	1,362	30.5	1,884	42.2	530	11.9
Gender									
Female	23,909	3,186	13.3	7,470	31.2	10,001	41.8	3,252	13.6
Male	24,497	4,766	19.5	7,724	31.5	9,349	38.2	2,658	10.9
Not Indicated	43	14	32.6	20	46.5	9	20.9	0	0.0
Other									
ELL 1st Yr: Proficient	1,417	203	14.3	680	48.0	494	34.9	40	2.8
ELL 2nd Yr: Proficient	1,715	194	11.3	759	44.3	678	39.5	84	4.9
Econ. Disadv.	30,004	6,382	21.3	10,802	36.0	10,667	35.6	2,153	7.2
Non-Econ. Disadv.	18,445	1,584	8.6	4,412	23.9	8,692	47.1	3,757	20.4
Migrant	31	6	19.4	10	32.3	14	45.2	1	3.2
Non-Migrant	48,418	7,960	16.4	15,204	31.4	19,345	40.0	5,909	12.2
Individualized Education Plan (IEP)									
IEP	8,316	4,144	49.8	2,640	31.8	1,320	15.9	212	2.6
IEP w/ Accom.	5,301	3,089	58.3	1,626	30.7	536	10.1	50	0.9
IEP w/o Accom.	3,015	1,055	35.0	1,014	33.6	784	26.0	162	5.4
Plan 504	1,061	158	14.9	361	34.0	445	41.9	97	9.1
Plan 504 w/ Accom.	520	102	19.6	185	35.6	201	38.7	32	6.2
Plan 504 w/o Accom.	541	56	10.4	176	32.5	244	45.1	65	12.0
English Language Learners (ELL)									
ELL	2,462	1,255	51.0	904	36.7	270	11.0	33	1.3
ELL w/ Accom.	746	441	59.1	258	34.6	45	6.0	2	0.3
ELL w/o Accom.	1,716	814	47.4	646	37.7	225	13.1	31	1.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,987	6,711	14.6	14,310	31.1	19,089	41.5	5,877	12.8

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 05									
Military									
Military	247	17	6.9	57	23.1	111	44.9	62	25.1
Non-Military	48,202	7,949	16.5	15,157	31.4	19,248	39.9	5,848	12.1
Foster									
Foster	299	74	24.8	126	42.1	85	28.4	14	4.7
Non-Foster	48,150	7,892	16.4	15,088	31.3	19,274	40.0	5,896	12.3

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
English Language Arts - Grade 06									
Total									
All	46,499	8,461	18.2	19,293	41.5	12,658	27.2	6,087	13.1
Form									
Form 1	15,973	3,207	20.1	6,263	39.2	4,265	26.7	2,238	14.0
Form 2	15,254	2,683	17.6	6,547	42.9	4,072	26.7	1,952	12.8
Form 3	15,272	2,571	16.8	6,483	42.5	4,321	28.3	1,897	12.4
Ethnicity									
Hispanic or Latino	7,593	1,910	25.2	3,506	46.2	1,622	21.4	555	7.3
Race									
American Indian/:Alaskan Native	6,745	1,324	19.6	2,965	44.0	1,726	25.6	730	10.8
Asian	871	92	10.6	261	30.0	261	30.0	257	29.5
Black/:African American	3,837	1,117	29.1	1,792	46.7	716	18.7	212	5.5
Pacific Islander	139	42	30.2	62	44.6	28	20.1	7	5.0
White/:Caucasian	23,366	3,279	14.0	9,133	39.1	7,168	30.7	3,786	16.2
Two or More Races	3,948	697	17.7	1,574	39.9	1,137	28.8	540	13.7
Gender									
Female	22,695	3,484	15.4	9,552	42.1	6,423	28.3	3,236	14.3
Male	23,726	4,945	20.8	9,714	40.9	6,220	26.2	2,847	12.0
Not Indicated	78	32	41.0	27	34.6	15	19.2	4	5.1
Other									
ELL 1st Yr: Proficient	638	122	19.1	392	61.4	102	16.0	22	3.5
ELL 2nd Yr: Proficient	916	177	19.3	527	57.5	169	18.5	43	4.7
Econ. Disadv.	28,339	6,744	23.8	12,821	45.2	6,431	22.7	2,343	8.3
Non-Econ. Disadv.	18,160	1,717	9.5	6,472	35.6	6,227	34.3	3,744	20.6
Migrant	28	12	42.9	12	42.9	3	10.7	1	3.6
Non-Migrant	46,471	8,449	18.2	19,281	41.5	12,655	27.2	6,086	13.1
Individualized Education Plan (IEP)									
IEP	7,443	4,101	55.1	2,469	33.2	680	9.1	193	2.6
IEP w/ Accom.	4,019	2,467	61.4	1,278	31.8	232	5.8	42	1.1
IEP w/o Accom.	3,424	1,634	47.7	1,191	34.8	448	13.1	151	4.4
Plan 504	1,091	168	15.4	520	47.7	288	26.4	115	10.5
Plan 504 w/ Accom.	332	67	20.2	165	49.7	74	22.3	26	7.8
Plan 504 w/o Accom.	759	101	13.3	355	46.8	214	28.2	89	11.7
English Language Learners (ELL)									
ELL	1,658	1,025	61.8	523	31.5	91	5.5	19	1.2
ELL w/ Accom.	293	220	75.1	68	23.2	5	1.7	0	0.0
ELL w/o Accom.	1,365	805	59.0	455	33.3	86	6.3	19	1.4
Non-English Language Learners (Non-ELL)									
Non-ELL	44,841	7,436	16.6	18,770	41.9	12,567	28.0	6,068	13.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 06									
Military									
Military	260	27	10.4	93	35.8	86	33.1	54	20.8
Non-Military	46,239	8,434	18.2	19,200	41.5	12,572	27.2	6,033	13.1
Foster									
Foster	279	81	29.0	138	49.5	44	15.8	16	5.7
Non-Foster	46,220	8,380	18.1	19,155	41.4	12,614	27.3	6,071	13.1

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English Language Arts - Grade 07	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,035	12,184	25.4	13,246	27.6	16,862	35.1	5,743	12.0
Form									
Form 1	16,436	4,486	27.3	4,262	25.9	5,910	36.0	1,778	10.8
Form 2	15,795	3,921	24.8	4,339	27.5	5,781	36.6	1,754	11.1
Form 3	15,804	3,777	23.9	4,645	29.4	5,171	32.7	2,211	14.0
Ethnicity									
Hispanic or Latino	8,086	2,894	35.8	2,430	30.1	2,243	27.7	519	6.4
Race									
American Indian/:Alaskan Native	7,027	1,845	26.3	2,083	29.6	2,382	33.9	717	10.2
Asian	997	150	15.1	220	22.1	365	36.6	262	26.3
Black/:African American	4,178	1,799	43.1	1,185	28.4	975	23.3	219	5.2
Pacific Islander	146	63	43.2	39	26.7	38	26.0	6	4.1
White/:Caucasian	23,684	4,484	18.9	6,170	26.1	9,457	39.9	3,573	15.1
Two or More Races	3,917	949	24.2	1,119	28.6	1,402	35.8	447	11.4
Gender									
Female	23,357	5,120	21.9	6,455	27.6	8,716	37.3	3,066	13.1
Male	24,622	7,035	28.6	6,779	27.5	8,132	33.0	2,676	10.9
Not Indicated	56	29	51.8	12	21.4	14	25.0	1	1.8
Other									
ELL 1st Yr: Proficient	200	48	24.0	83	41.5	60	30.0	9	4.5
ELL 2nd Yr: Proficient	440	126	28.6	188	42.7	113	25.7	13	3.0
Econ. Disadv.	29,593	9,768	33.0	8,882	30.0	8,756	29.6	2,187	7.4
Non-Econ. Disadv.	18,442	2,416	13.1	4,364	23.7	8,106	44.0	3,556	19.3
Migrant	32	16	50.0	6	18.8	8	25.0	2	6.3
Non-Migrant	48,003	12,168	25.4	13,240	27.6	16,854	35.1	5,741	12.0
Individualized Education Plan (IEP)									
IEP	8,153	5,380	66.0	1,663	20.4	918	11.3	192	2.4
IEP w/ Accom.	4,211	3,043	72.3	765	18.2	339	8.1	64	1.5
IEP w/o Accom.	3,942	2,337	59.3	898	22.8	579	14.7	128	3.3
Plan 504	1,009	208	20.6	305	30.2	391	38.8	105	10.4
Plan 504 w/ Accom.	233	61	26.2	80	34.3	74	31.8	18	7.7
Plan 504 w/o Accom.	776	147	18.9	225	29.0	317	40.9	87	11.2
English Language Learners (ELL)									
ELL	2,173	1,622	74.6	416	19.1	120	5.5	15	0.7
ELL w/ Accom.	287	245	85.4	36	12.5	6	2.1	0	0.0
ELL w/o Accom.	1,886	1,377	73.0	380	20.2	114	6.0	15	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,862	10,562	23.0	12,830	28.0	16,742	36.5	5,728	12.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 07									
Military									
Military	228	30	13.2	69	30.3	90	39.5	39	17.1
Non-Military	47,807	12,154	25.4	13,177	27.6	16,772	35.1	5,704	11.9
Foster									
Foster	260	105	40.4	73	28.1	57	21.9	25	9.6
Non-Foster	47,775	12,079	25.3	13,173	27.6	16,805	35.2	5,718	12.0

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English Language Arts - Grade 08	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	47,893	9,972	20.8	20,292	42.4	12,084	25.2	5,545	11.6
Form									
Form 1	16,470	3,786	23.0	7,095	43.1	3,804	23.1	1,785	10.8
Form 2	15,698	3,256	20.7	6,285	40.0	4,498	28.7	1,659	10.6
Form 3	15,725	2,930	18.6	6,912	44.0	3,782	24.1	2,101	13.4
Ethnicity									
Hispanic or Latino	7,816	2,353	30.1	3,525	45.1	1,437	18.4	501	6.4
Race									
American Indian/:Alaskan Native	6,990	1,470	21.0	3,168	45.3	1,694	24.2	658	9.4
Asian	943	124	13.2	294	31.2	277	29.4	248	26.3
Black/:African American	4,196	1,569	37.4	1,761	42.0	671	16.0	195	4.7
Pacific Islander	167	62	37.1	62	37.1	36	21.6	7	4.2
White/:Caucasian	24,041	3,662	15.2	9,876	41.1	6,995	29.1	3,508	14.6
Two or More Races	3,740	732	19.6	1,606	42.9	974	26.0	428	11.4
Gender									
Female	23,511	3,864	16.4	9,751	41.5	6,517	27.7	3,379	14.4
Male	24,312	6,072	25.0	10,511	43.2	5,565	22.9	2,164	8.9
Not Indicated	70	36	51.4	30	42.9	2	2.9	2	2.9
Other									
ELL 1st Yr: Proficient	183	27	14.8	122	66.7	28	15.3	6	3.3
ELL 2nd Yr: Proficient	242	23	9.5	143	59.1	55	22.7	21	8.7
Econ. Disadv.	29,058	8,035	27.7	13,169	45.3	5,941	20.5	1,913	6.6
Non-Econ. Disadv.	18,835	1,937	10.3	7,123	37.8	6,143	32.6	3,632	19.3
Migrant	37	18	48.7	9	24.3	7	18.9	3	8.1
Non-Migrant	47,856	9,954	20.8	20,283	42.4	12,077	25.2	5,542	11.6
Individualized Education Plan (IEP)									
IEP	7,713	4,697	60.9	2,468	32.0	435	5.6	113	1.5
IEP w/ Accom.	4,247	2,870	67.6	1,176	27.7	170	4.0	31	0.7
IEP w/o Accom.	3,466	1,827	52.7	1,292	37.3	265	7.7	82	2.4
Plan 504	986	161	16.3	475	48.2	245	24.9	105	10.7
Plan 504 w/ Accom.	211	42	19.9	104	49.3	49	23.2	16	7.6
Plan 504 w/o Accom.	775	119	15.4	371	47.9	196	25.3	89	11.5
English Language Learners (ELL)									
ELL	2,127	1,460	68.6	582	27.4	71	3.3	14	0.7
ELL w/ Accom.	360	296	82.2	59	16.4	5	1.4	0	0.0
ELL w/o Accom.	1,767	1,164	65.9	523	29.6	66	3.7	14	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,766	8,512	18.6	19,710	43.1	12,013	26.3	5,531	12.1

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
English Language Arts - Grade 08	N	N	%	N	%	N	%	N	%
Military									
Military	226	29	12.8	91	40.3	71	31.4	35	15.5
Non-Military	47,667	9,943	20.9	20,201	42.4	12,013	25.2	5,510	11.6
Foster									
Foster	241	91	37.8	108	44.8	36	14.9	6	2.5
Non-Foster	47,652	9,881	20.7	20,184	42.4	12,048	25.3	5,539	11.6

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 2 Committee Results

English Language Arts - Grade 10	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	45,802	5,938	13.0	14,440	31.5	16,797	36.7	8,627	18.8
Form									
Form 1	15,658	2,125	13.6	5,022	32.1	5,521	35.3	2,990	19.1
Form 2	15,095	1,863	12.3	4,752	31.5	5,729	38.0	2,751	18.2
Form 3	15,049	1,950	13.0	4,666	31.0	5,547	36.9	2,886	19.2
Ethnicity									
Hispanic or Latino	6,942	1,258	18.1	2,588	37.3	2,293	33.0	803	11.6
Race									
American Indian/:Alaskan Native	6,809	921	13.5	2,314	34.0	2,554	37.5	1,020	15.0
Asian	1,073	118	11.0	238	22.2	347	32.3	370	34.5
Black/:African American	3,981	952	23.9	1,604	40.3	1,110	27.9	315	7.9
Pacific Islander	149	24	16.1	60	40.3	45	30.2	20	13.4
White/:Caucasian	23,604	2,267	9.6	6,627	28.1	9,231	39.1	5,479	23.2
Two or More Races	3,244	398	12.3	1,009	31.1	1,217	37.5	620	19.1
Gender									
Female	22,529	2,004	8.9	6,770	30.1	8,760	38.9	4,995	22.2
Male	23,246	3,927	16.9	7,662	33.0	8,027	34.5	3,630	15.6
Not Indicated	27	7	25.9	8	29.6	10	37.0	2	7.4
Other									
ELL 1st Yr: Proficient	581	81	13.9	318	54.7	165	28.4	17	2.9
ELL 2nd Yr: Proficient	212	29	13.7	85	40.1	79	37.3	19	9.0
Econ. Disadv.	25,078	4,410	17.6	9,380	37.4	8,369	33.4	2,919	11.6
Non-Econ. Disadv.	20,724	1,528	7.4	5,060	24.4	8,428	40.7	5,708	27.5
Migrant	32	5	15.6	10	31.3	11	34.4	6	18.8
Non-Migrant	45,770	5,933	13.0	14,430	31.5	16,786	36.7	8,621	18.8
Individualized Education Plan (IEP)									
IEP	6,868	2,878	41.9	2,924	42.6	935	13.6	131	1.9
IEP w/ Accom.	2,369	1,057	44.6	992	41.9	290	12.2	30	1.3
IEP w/o Accom.	4,499	1,821	40.5	1,932	42.9	645	14.3	101	2.2
Plan 504	898	98	10.9	308	34.3	347	38.6	145	16.2
Plan 504 w/ Accom.	80	7	8.8	35	43.8	24	30.0	14	17.5
Plan 504 w/o Accom.	818	91	11.1	273	33.4	323	39.5	131	16.0
English Language Learners (ELL)									
ELL	1,601	851	53.2	602	37.6	117	7.3	31	1.9
ELL w/ Accom.	262	162	61.8	86	32.8	13	5.0	1	0.4
ELL w/o Accom.	1,339	689	51.5	516	38.5	104	7.8	30	2.2
Non-English Language Learners (Non-ELL)									
Non-ELL	44,201	5,087	11.5	13,838	31.3	16,680	37.7	8,596	19.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
English Language Arts - Grade 10	N	N	%	N	%	N	%	N	%
Military									
Military	131	10	7.6	29	22.1	62	47.3	30	22.9
Non-Military	45,671	5,928	13.0	14,411	31.6	16,735	36.6	8,597	18.8
Foster									
Foster	194	43	22.2	79	40.7	61	31.4	11	5.7
Non-Foster	45,608	5,895	12.9	14,361	31.5	16,736	36.7	8,616	18.9

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 03									
Military	232	41	17.7	55	23.7	109	47.0	27	11.6
Non-Military	51,828	15,320	29.6	14,315	27.6	18,247	35.2	3,946	7.6
Foster									
Foster	390	150	38.5	123	31.5	107	27.4	10	2.6
Non-Foster	51,670	15,211	29.4	14,247	27.6	18,249	35.3	3,963	7.7

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 3 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
English Language Arts - Grade 04									
Total									
All	50,512	14,564	28.8	14,161	28.0	18,422	36.5	3,365	6.7
Form									
Form 1	16,954	4,994	29.5	4,381	25.8	6,549	38.6	1,030	6.1
Form 2	16,758	4,629	27.6	4,782	28.5	6,163	36.8	1,184	7.1
Form 3	16,800	4,941	29.4	4,998	29.8	5,710	34.0	1,151	6.9
Ethnicity									
Hispanic or Latino	9,168	3,802	41.5	2,740	29.9	2,352	25.7	274	3.0
Race									
American Indian/:Alaskan Native	6,650	2,006	30.2	1,984	29.8	2,333	35.1	327	4.9
Asian	960	185	19.3	212	22.1	423	44.1	140	14.6
Black/:African American	4,344	2,037	46.9	1,224	28.2	996	22.9	87	2.0
Pacific Islander	164	71	43.3	45	27.4	45	27.4	3	1.8
White/:Caucasian	24,207	5,132	21.2	6,489	26.8	10,379	42.9	2,207	9.1
Two or More Races	5,019	1,331	26.5	1,467	29.2	1,894	37.7	327	6.5
Gender									
Female	24,786	6,420	25.9	7,008	28.3	9,479	38.2	1,879	7.6
Male	25,691	8,125	31.6	7,144	27.8	8,936	34.8	1,486	5.8
Not Indicated	35	19	54.3	9	25.7	7	20.0	0	0.0
Other									
ELL 1st Yr: Proficient	1,799	464	25.8	744	41.4	547	30.4	44	2.5
ELL 2nd Yr: Proficient	584	62	10.6	198	33.9	282	48.3	42	7.2
Econ. Disadv.	31,744	11,342	35.7	9,651	30.4	9,621	30.3	1,130	3.6
Non-Econ. Disadv.	18,768	3,222	17.2	4,510	24.0	8,801	46.9	2,235	11.9
Migrant	29	14	48.3	8	27.6	7	24.1	0	0.0
Non-Migrant	50,483	14,550	28.8	14,153	28.0	18,415	36.5	3,365	6.7
Individualized Education Plan (IEP)									
IEP	8,795	5,614	63.8	1,792	20.4	1,235	14.0	154	1.8
IEP w/ Accom.	5,296	3,992	75.4	914	17.3	371	7.0	19	0.4
IEP w/o Accom.	3,499	1,622	46.4	878	25.1	864	24.7	135	3.9
Plan 504	965	290	30.1	289	30.0	341	35.3	45	4.7
Plan 504 w/ Accom.	471	153	32.5	143	30.4	161	34.2	14	3.0
Plan 504 w/o Accom.	494	137	27.7	146	29.6	180	36.4	31	6.3
English Language Learners (ELL)									
ELL	4,027	2,651	65.8	991	24.6	369	9.2	16	0.4
ELL w/ Accom.	1,260	936	74.3	259	20.6	64	5.1	1	0.1
ELL w/o Accom.	2,767	1,715	62.0	732	26.5	305	11.0	15	0.5
Non-English Language Learners (Non-ELL)									
Non-ELL	46,485	11,913	25.6	13,170	28.3	18,053	38.8	3,349	7.2

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 04									
Military									
Military	253	41	16.2	68	26.9	115	45.5	29	11.5
Non-Military	50,259	14,523	28.9	14,093	28.0	18,307	36.4	3,336	6.6
Foster									
Foster	362	147	40.6	107	29.6	97	26.8	11	3.0
Non-Foster	50,150	14,417	28.8	14,054	28.0	18,325	36.5	3,354	6.7

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 3 Committee Results

English Language Arts - Grade 05	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,449	7,966	16.4	14,643	30.2	19,930	41.1	5,910	12.2
Form									
Form 1	16,248	2,857	17.6	5,129	31.6	6,429	39.6	1,833	11.3
Form 2	16,143	2,475	15.3	4,553	28.2	7,283	45.1	1,832	11.4
Form 3	16,058	2,634	16.4	4,961	30.9	6,218	38.7	2,245	14.0
Ethnicity									
Hispanic or Latino	8,678	2,001	23.1	3,134	36.1	2,990	34.5	553	6.4
Race									
American Indian/:Alaskan Native	6,657	1,089	16.4	2,202	33.1	2,684	40.3	682	10.2
Asian	917	92	10.0	213	23.2	381	41.6	231	25.2
Black/:African American	4,253	1,251	29.4	1,613	37.9	1,181	27.8	208	4.9
Pacific Islander	159	46	28.9	53	33.3	48	30.2	12	7.6
White/:Caucasian	23,316	2,794	12.0	6,117	26.2	10,711	45.9	3,694	15.8
Two or More Races	4,469	693	15.5	1,311	29.3	1,935	43.3	530	11.9
Gender									
Female	23,909	3,186	13.3	7,184	30.1	10,287	43.0	3,252	13.6
Male	24,497	4,766	19.5	7,439	30.4	9,634	39.3	2,658	10.9
Not Indicated	43	14	32.6	20	46.5	9	20.9	0	0.0
Other									
ELL 1st Yr: Proficient	1,417	203	14.3	659	46.5	515	36.3	40	2.8
ELL 2nd Yr: Proficient	1,715	194	11.3	727	42.4	710	41.4	84	4.9
Econ. Disadv.	30,004	6,382	21.3	10,424	34.7	11,045	36.8	2,153	7.2
Non-Econ. Disadv.	18,445	1,584	8.6	4,219	22.9	8,885	48.2	3,757	20.4
Migrant	31	6	19.4	10	32.3	14	45.2	1	3.2
Non-Migrant	48,418	7,960	16.4	14,633	30.2	19,916	41.1	5,909	12.2
Individualized Education Plan (IEP)									
IEP	8,316	4,144	49.8	2,580	31.0	1,380	16.6	212	2.6
IEP w/ Accom.	5,301	3,089	58.3	1,596	30.1	566	10.7	50	0.9
IEP w/o Accom.	3,015	1,055	35.0	984	32.6	814	27.0	162	5.4
Plan 504	1,061	158	14.9	349	32.9	457	43.1	97	9.1
Plan 504 w/ Accom.	520	102	19.6	178	34.2	208	40.0	32	6.2
Plan 504 w/o Accom.	541	56	10.4	171	31.6	249	46.0	65	12.0
English Language Learners (ELL)									
ELL	2,462	1,255	51.0	887	36.0	287	11.7	33	1.3
ELL w/ Accom.	746	441	59.1	254	34.1	49	6.6	2	0.3
ELL w/o Accom.	1,716	814	47.4	633	36.9	238	13.9	31	1.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,987	6,711	14.6	13,756	29.9	19,643	42.7	5,877	12.8

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 05									
Military									
Military	247	17	6.9	56	22.7	112	45.3	62	25.1
Non-Military	48,202	7,949	16.5	14,587	30.3	19,818	41.1	5,848	12.1
Foster									
Foster	299	74	24.8	125	41.8	86	28.8	14	4.7
Non-Foster	48,150	7,892	16.4	14,518	30.2	19,844	41.2	5,896	12.3

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 3 Committee Results

English Language Arts - Grade 06	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	46,499	8,461	18.2	18,606	40.0	15,079	32.4	4,353	9.4
Form									
Form 1	15,973	3,207	20.1	6,263	39.2	4,924	30.8	1,579	9.9
Form 2	15,254	2,683	17.6	5,860	38.4	5,261	34.5	1,450	9.5
Form 3	15,272	2,571	16.8	6,483	42.5	4,894	32.1	1,324	8.7
Ethnicity									
Hispanic or Latino	7,593	1,910	25.2	3,398	44.8	1,902	25.1	383	5.0
Race									
American Indian/:Alaskan Native	6,745	1,324	19.6	2,870	42.6	2,040	30.2	511	7.6
Asian	871	92	10.6	250	28.7	336	38.6	193	22.2
Black/:African American	3,837	1,117	29.1	1,743	45.4	836	21.8	141	3.7
Pacific Islander	139	42	30.2	59	42.5	33	23.7	5	3.6
White/:Caucasian	23,366	3,279	14.0	8,776	37.6	8,550	36.6	2,761	11.8
Two or More Races	3,948	697	17.7	1,510	38.3	1,382	35.0	359	9.1
Gender									
Female	22,695	3,484	15.4	9,198	40.5	7,668	33.8	2,345	10.3
Male	23,726	4,945	20.8	9,382	39.5	7,393	31.2	2,006	8.5
Not Indicated	78	32	41.0	26	33.3	18	23.1	2	2.6
Other									
ELL 1st Yr: Proficient	638	122	19.1	384	60.2	114	17.9	18	2.8
ELL 2nd Yr: Proficient	916	177	19.3	508	55.5	205	22.4	26	2.8
Econ. Disadv.	28,339	6,744	23.8	12,406	43.8	7,579	26.7	1,610	5.7
Non-Econ. Disadv.	18,160	1,717	9.5	6,200	34.1	7,500	41.3	2,743	15.1
Migrant	28	12	42.9	12	42.9	3	10.7	1	3.6
Non-Migrant	46,471	8,449	18.2	18,594	40.0	15,076	32.4	4,352	9.4
Individualized Education Plan (IEP)									
IEP	7,443	4,101	55.1	2,431	32.7	781	10.5	130	1.8
IEP w/ Accom.	4,019	2,467	61.4	1,264	31.5	260	6.5	28	0.7
IEP w/o Accom.	3,424	1,634	47.7	1,167	34.1	521	15.2	102	3.0
Plan 504	1,091	168	15.4	504	46.2	337	30.9	82	7.5
Plan 504 w/ Accom.	332	67	20.2	161	48.5	86	25.9	18	5.4
Plan 504 w/o Accom.	759	101	13.3	343	45.2	251	33.1	64	8.4
English Language Learners (ELL)									
ELL	1,658	1,025	61.8	513	30.9	106	6.4	14	0.8
ELL w/ Accom.	293	220	75.1	66	22.5	7	2.4	0	0.0
ELL w/o Accom.	1,365	805	59.0	447	32.8	99	7.3	14	1.0
Non-English Language Learners (Non-ELL)									
Non-ELL	44,841	7,436	16.6	18,093	40.4	14,973	33.4	4,339	9.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 06									
Military									
Military	260	27	10.4	88	33.9	99	38.1	46	17.7
Non-Military	46,239	8,434	18.2	18,518	40.1	14,980	32.4	4,307	9.3
Foster									
Foster	279	81	29.0	132	47.3	56	20.1	10	3.6
Non-Foster	46,220	8,380	18.1	18,474	40.0	15,023	32.5	4,343	9.4

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Oklahoma School Testing Program (OSTP)
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English Language Arts - Grade 07	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,035	14,029	29.2	12,126	25.2	16,137	33.6	5,743	12.0
Form									
Form 1	16,436	4,978	30.3	4,495	27.4	5,185	31.6	1,778	10.8
Form 2	15,795	4,386	27.8	3,874	24.5	5,781	36.6	1,754	11.1
Form 3	15,804	4,665	29.5	3,757	23.8	5,171	32.7	2,211	14.0
Ethnicity									
Hispanic or Latino	8,086	3,278	40.5	2,170	26.8	2,119	26.2	519	6.4
Race									
American Indian/:Alaskan Native	7,027	2,144	30.5	1,897	27.0	2,269	32.3	717	10.2
Asian	997	173	17.4	208	20.9	354	35.5	262	26.3
Black/:African American	4,178	1,978	47.3	1,067	25.5	914	21.9	219	5.2
Pacific Islander	146	68	46.6	38	26.0	34	23.3	6	4.1
White/:Caucasian	23,684	5,286	22.3	5,721	24.2	9,104	38.4	3,573	15.1
Two or More Races	3,917	1,102	28.1	1,025	26.2	1,343	34.3	447	11.4
Gender									
Female	23,357	5,983	25.6	5,958	25.5	8,350	35.8	3,066	13.1
Male	24,622	8,015	32.6	6,158	25.0	7,773	31.6	2,676	10.9
Not Indicated	56	31	55.4	10	17.9	14	25.0	1	1.8
Other									
ELL 1st Yr: Proficient	200	61	30.5	73	36.5	57	28.5	9	4.5
ELL 2nd Yr: Proficient	440	159	36.1	165	37.5	103	23.4	13	3.0
Econ. Disadv.	29,593	11,113	37.6	7,966	26.9	8,327	28.1	2,187	7.4
Non-Econ. Disadv.	18,442	2,916	15.8	4,160	22.6	7,810	42.4	3,556	19.3
Migrant	32	18	56.3	4	12.5	8	25.0	2	6.3
Non-Migrant	48,003	14,011	29.2	12,122	25.3	16,129	33.6	5,741	12.0
Individualized Education Plan (IEP)									
IEP	8,153	5,711	70.1	1,391	17.1	859	10.5	192	2.4
IEP w/ Accom.	4,211	3,202	76.0	632	15.0	313	7.4	64	1.5
IEP w/o Accom.	3,942	2,509	63.7	759	19.3	546	13.9	128	3.3
Plan 504	1,009	268	26.6	264	26.2	372	36.9	105	10.4
Plan 504 w/ Accom.	233	81	34.8	66	28.3	68	29.2	18	7.7
Plan 504 w/o Accom.	776	187	24.1	198	25.5	304	39.2	87	11.2
English Language Learners (ELL)									
ELL	2,173	1,714	78.9	332	15.3	112	5.2	15	0.7
ELL w/ Accom.	287	258	89.9	24	8.4	5	1.7	0	0.0
ELL w/o Accom.	1,886	1,456	77.2	308	16.3	107	5.7	15	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,862	12,315	26.9	11,794	25.7	16,025	34.9	5,728	12.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 07									
Military									
Military	228	43	18.9	57	25.0	89	39.0	39	17.1
Non-Military	47,807	13,986	29.3	12,069	25.3	16,048	33.6	5,704	11.9
Foster									
Foster	260	114	43.9	65	25.0	56	21.5	25	9.6
Non-Foster	47,775	13,915	29.1	12,061	25.3	16,081	33.7	5,718	12.0

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 3 Committee Results

English Language Arts - Grade 08	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	47,893	9,972	20.8	20,292	42.4	12,084	25.2	5,545	11.6
Form									
Form 1	16,470	3,786	23.0	7,095	43.1	3,804	23.1	1,785	10.8
Form 2	15,698	3,256	20.7	6,285	40.0	4,498	28.7	1,659	10.6
Form 3	15,725	2,930	18.6	6,912	44.0	3,782	24.1	2,101	13.4
Ethnicity									
Hispanic or Latino	7,816	2,353	30.1	3,525	45.1	1,437	18.4	501	6.4
Race									
American Indian/:Alaskan Native	6,990	1,470	21.0	3,168	45.3	1,694	24.2	658	9.4
Asian	943	124	13.2	294	31.2	277	29.4	248	26.3
Black/:African American	4,196	1,569	37.4	1,761	42.0	671	16.0	195	4.7
Pacific Islander	167	62	37.1	62	37.1	36	21.6	7	4.2
White/:Caucasian	24,041	3,662	15.2	9,876	41.1	6,995	29.1	3,508	14.6
Two or More Races	3,740	732	19.6	1,606	42.9	974	26.0	428	11.4
Gender									
Female	23,511	3,864	16.4	9,751	41.5	6,517	27.7	3,379	14.4
Male	24,312	6,072	25.0	10,511	43.2	5,565	22.9	2,164	8.9
Not Indicated	70	36	51.4	30	42.9	2	2.9	2	2.9
Other									
ELL 1st Yr: Proficient	183	27	14.8	122	66.7	28	15.3	6	3.3
ELL 2nd Yr: Proficient	242	23	9.5	143	59.1	55	22.7	21	8.7
Econ. Disadv.	29,058	8,035	27.7	13,169	45.3	5,941	20.5	1,913	6.6
Non-Econ. Disadv.	18,835	1,937	10.3	7,123	37.8	6,143	32.6	3,632	19.3
Migrant	37	18	48.7	9	24.3	7	18.9	3	8.1
Non-Migrant	47,856	9,954	20.8	20,283	42.4	12,077	25.2	5,542	11.6
Individualized Education Plan (IEP)									
IEP	7,713	4,697	60.9	2,468	32.0	435	5.6	113	1.5
IEP w/ Accom.	4,247	2,870	67.6	1,176	27.7	170	4.0	31	0.7
IEP w/o Accom.	3,466	1,827	52.7	1,292	37.3	265	7.7	82	2.4
Plan 504	986	161	16.3	475	48.2	245	24.9	105	10.7
Plan 504 w/ Accom.	211	42	19.9	104	49.3	49	23.2	16	7.6
Plan 504 w/o Accom.	775	119	15.4	371	47.9	196	25.3	89	11.5
English Language Learners (ELL)									
ELL	2,127	1,460	68.6	582	27.4	71	3.3	14	0.7
ELL w/ Accom.	360	296	82.2	59	16.4	5	1.4	0	0.0
ELL w/o Accom.	1,767	1,164	65.9	523	29.6	66	3.7	14	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,766	8,512	18.6	19,710	43.1	12,013	26.3	5,531	12.1

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 08									
Military									
Military	226	29	12.8	91	40.3	71	31.4	35	15.5
Non-Military	47,667	9,943	20.9	20,201	42.4	12,013	25.2	5,510	11.6
Foster									
Foster	241	91	37.8	108	44.8	36	14.9	6	2.5
Non-Foster	47,652	9,881	20.7	20,184	42.4	12,048	25.3	5,539	11.6

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 3 Committee Results

English Language Arts - Grade 10	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	45,802	5,938	13.0	14,440	31.5	20,622	45.0	4,802	10.5
Form									
Form 1	15,658	2,125	13.6	5,022	32.1	6,930	44.3	1,581	10.1
Form 2	15,095	1,863	12.3	4,752	31.5	7,032	46.6	1,448	9.6
Form 3	15,049	1,950	13.0	4,666	31.0	6,660	44.3	1,773	11.8
Ethnicity									
Hispanic or Latino	6,942	1,258	18.1	2,588	37.3	2,697	38.9	399	5.8
Race									
American Indian/:Alaskan Native	6,809	921	13.5	2,314	34.0	3,045	44.7	529	7.8
Asian	1,073	118	11.0	238	22.2	472	44.0	245	22.8
Black/:African American	3,981	952	23.9	1,604	40.3	1,281	32.2	144	3.6
Pacific Islander	149	24	16.1	60	40.3	57	38.3	8	5.4
White/:Caucasian	23,604	2,267	9.6	6,627	28.1	11,590	49.1	3,120	13.2
Two or More Races	3,244	398	12.3	1,009	31.1	1,480	45.6	357	11.0
Gender									
Female	22,529	2,004	8.9	6,770	30.1	10,905	48.4	2,850	12.7
Male	23,246	3,927	16.9	7,662	33.0	9,705	41.8	1,952	8.4
Not Indicated	27	7	25.9	8	29.6	12	44.4	0	0.0
Other									
ELL 1st Yr: Proficient	581	81	13.9	318	54.7	174	30.0	8	1.4
ELL 2nd Yr: Proficient	212	29	13.7	85	40.1	92	43.4	6	2.8
Econ. Disadv.	25,078	4,410	17.6	9,380	37.4	9,860	39.3	1,428	5.7
Non-Econ. Disadv.	20,724	1,528	7.4	5,060	24.4	10,762	51.9	3,374	16.3
Migrant	32	5	15.6	10	31.3	12	37.5	5	15.6
Non-Migrant	45,770	5,933	13.0	14,430	31.5	20,610	45.0	4,797	10.5
Individualized Education Plan (IEP)									
IEP	6,868	2,878	41.9	2,924	42.6	1,012	14.7	54	0.8
IEP w/ Accom.	2,369	1,057	44.6	992	41.9	307	13.0	13	0.6
IEP w/o Accom.	4,499	1,821	40.5	1,932	42.9	705	15.7	41	0.9
Plan 504	898	98	10.9	308	34.3	409	45.6	83	9.2
Plan 504 w/ Accom.	80	7	8.8	35	43.8	30	37.5	8	10.0
Plan 504 w/o Accom.	818	91	11.1	273	33.4	379	46.3	75	9.2
English Language Learners (ELL)									
ELL	1,601	851	53.2	602	37.6	129	8.1	19	1.2
ELL w/ Accom.	262	162	61.8	86	32.8	13	5.0	1	0.4
ELL w/o Accom.	1,339	689	51.5	516	38.5	116	8.7	18	1.3
Non-English Language Learners (Non-ELL)									
Non-ELL	44,201	5,087	11.5	13,838	31.3	20,493	46.4	4,783	10.8

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
English Language Arts - Grade 10	N	N	%	N	%	N	%	N	%
Military									
Military	131	10	7.6	29	22.1	77	58.8	15	11.5
Non-Military	45,671	5,928	13.0	14,411	31.6	20,545	45.0	4,787	10.5
Foster									
Foster	194	43	22.2	79	40.7	66	34.0	6	3.1
Non-Foster	45,608	5,895	12.9	14,361	31.5	20,556	45.1	4,796	10.5

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 03									
Military	232	41	17.7	55	23.7	109	47.0	27	11.6
Non-Military	51,828	15,320	29.6	14,315	27.6	18,247	35.2	3,946	7.6
Foster									
Foster	390	150	38.5	123	31.5	107	27.4	10	2.6
Non-Foster	51,670	15,211	29.4	14,247	27.6	18,249	35.3	3,963	7.7

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 4 Committee Results

English Language Arts - Grade 04	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	50,512	14,564	28.8	14,161	28.0	18,422	36.5	3,365	6.7
Form									
Form 1	16,954	4,994	29.5	4,381	25.8	6,549	38.6	1,030	6.1
Form 2	16,758	4,629	27.6	4,782	28.5	6,163	36.8	1,184	7.1
Form 3	16,800	4,941	29.4	4,998	29.8	5,710	34.0	1,151	6.9
Ethnicity									
Hispanic or Latino	9,168	3,802	41.5	2,740	29.9	2,352	25.7	274	3.0
Race									
American Indian/:Alaskan Native	6,650	2,006	30.2	1,984	29.8	2,333	35.1	327	4.9
Asian	960	185	19.3	212	22.1	423	44.1	140	14.6
Black/:African American	4,344	2,037	46.9	1,224	28.2	996	22.9	87	2.0
Pacific Islander	164	71	43.3	45	27.4	45	27.4	3	1.8
White/:Caucasian	24,207	5,132	21.2	6,489	26.8	10,379	42.9	2,207	9.1
Two or More Races	5,019	1,331	26.5	1,467	29.2	1,894	37.7	327	6.5
Gender									
Female	24,786	6,420	25.9	7,008	28.3	9,479	38.2	1,879	7.6
Male	25,691	8,125	31.6	7,144	27.8	8,936	34.8	1,486	5.8
Not Indicated	35	19	54.3	9	25.7	7	20.0	0	0.0
Other									
ELL 1st Yr: Proficient	1,799	464	25.8	744	41.4	547	30.4	44	2.5
ELL 2nd Yr: Proficient	584	62	10.6	198	33.9	282	48.3	42	7.2
Econ. Disadv.	31,744	11,342	35.7	9,651	30.4	9,621	30.3	1,130	3.6
Non-Econ. Disadv.	18,768	3,222	17.2	4,510	24.0	8,801	46.9	2,235	11.9
Migrant	29	14	48.3	8	27.6	7	24.1	0	0.0
Non-Migrant	50,483	14,550	28.8	14,153	28.0	18,415	36.5	3,365	6.7
Individualized Education Plan (IEP)									
IEP	8,795	5,614	63.8	1,792	20.4	1,235	14.0	154	1.8
IEP w/ Accom.	5,296	3,992	75.4	914	17.3	371	7.0	19	0.4
IEP w/o Accom.	3,499	1,622	46.4	878	25.1	864	24.7	135	3.9
Plan 504	965	290	30.1	289	30.0	341	35.3	45	4.7
Plan 504 w/ Accom.	471	153	32.5	143	30.4	161	34.2	14	3.0
Plan 504 w/o Accom.	494	137	27.7	146	29.6	180	36.4	31	6.3
English Language Learners (ELL)									
ELL	4,027	2,651	65.8	991	24.6	369	9.2	16	0.4
ELL w/ Accom.	1,260	936	74.3	259	20.6	64	5.1	1	0.1
ELL w/o Accom.	2,767	1,715	62.0	732	26.5	305	11.0	15	0.5
Non-English Language Learners (Non-ELL)									
Non-ELL	46,485	11,913	25.6	13,170	28.3	18,053	38.8	3,349	7.2

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 04									
Military									
Military	253	41	16.2	68	26.9	115	45.5	29	11.5
Non-Military	50,259	14,523	28.9	14,093	28.0	18,307	36.4	3,336	6.6
Foster									
Foster	362	147	40.6	107	29.6	97	26.8	11	3.0
Non-Foster	50,150	14,417	28.8	14,054	28.0	18,325	36.5	3,354	6.7

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 4 Committee Results

English Language Arts - Grade 05	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,449	10,229	21.1	18,897	39.0	13,413	27.7	5,910	12.2
Form									
Form 1	16,248	3,491	21.5	6,509	40.1	4,415	27.2	1,833	11.3
Form 2	16,143	3,448	21.4	6,023	37.3	4,840	30.0	1,832	11.4
Form 3	16,058	3,290	20.5	6,365	39.6	4,158	25.9	2,245	14.0
Ethnicity									
Hispanic or Latino	8,678	2,564	29.6	3,749	43.2	1,812	20.9	553	6.4
Race									
American Indian/:Alaskan Native	6,657	1,428	21.5	2,752	41.3	1,795	27.0	682	10.2
Asian	917	115	12.5	289	31.5	282	30.8	231	25.2
Black/:African American	4,253	1,545	36.3	1,800	42.3	700	16.5	208	4.9
Pacific Islander	159	55	34.6	66	41.5	26	16.4	12	7.6
White/:Caucasian	23,316	3,648	15.7	8,480	36.4	7,494	32.1	3,694	15.8
Two or More Races	4,469	874	19.6	1,761	39.4	1,304	29.2	530	11.9
Gender									
Female	23,909	4,257	17.8	9,456	39.6	6,944	29.0	3,252	13.6
Male	24,497	5,956	24.3	9,417	38.4	6,466	26.4	2,658	10.9
Not Indicated	43	16	37.2	24	55.8	3	7.0	0	0.0
Other									
ELL 1st Yr: Proficient	1,417	312	22.0	774	54.6	291	20.5	40	2.8
ELL 2nd Yr: Proficient	1,715	305	17.8	913	53.2	413	24.1	84	4.9
Econ. Disadv.	30,004	8,102	27.0	12,785	42.6	6,964	23.2	2,153	7.2
Non-Econ. Disadv.	18,445	2,127	11.5	6,112	33.1	6,449	35.0	3,757	20.4
Migrant	31	7	22.6	14	45.2	9	29.0	1	3.2
Non-Migrant	48,418	10,222	21.1	18,883	39.0	13,404	27.7	5,909	12.2
Individualized Education Plan (IEP)									
IEP	8,316	4,742	57.0	2,591	31.2	771	9.3	212	2.6
IEP w/ Accom.	5,301	3,493	65.9	1,490	28.1	268	5.1	50	0.9
IEP w/o Accom.	3,015	1,249	41.4	1,101	36.5	503	16.7	162	5.4
Plan 504	1,061	208	19.6	449	42.3	307	28.9	97	9.1
Plan 504 w/ Accom.	520	130	25.0	229	44.0	129	24.8	32	6.2
Plan 504 w/o Accom.	541	78	14.4	220	40.7	178	32.9	65	12.0
English Language Learners (ELL)									
ELL	2,462	1,474	59.9	824	33.5	131	5.3	33	1.3
ELL w/ Accom.	746	516	69.2	212	28.4	16	2.1	2	0.3
ELL w/o Accom.	1,716	958	55.8	612	35.7	115	6.7	31	1.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,987	8,755	19.0	18,073	39.3	13,282	28.9	5,877	12.8

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 05									
Military									
Military	247	25	10.1	70	28.3	90	36.4	62	25.1
Non-Military	48,202	10,204	21.2	18,827	39.1	13,323	27.6	5,848	12.1
Foster									
Foster	299	96	32.1	138	46.2	51	17.1	14	4.7
Non-Foster	48,150	10,133	21.0	18,759	39.0	13,362	27.8	5,896	12.3

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 4 Committee Results

English Language Arts - Grade 06	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	46,499	8,461	18.2	18,606	40.0	15,079	32.4	4,353	9.4
Form									
Form 1	15,973	3,207	20.1	6,263	39.2	4,924	30.8	1,579	9.9
Form 2	15,254	2,683	17.6	5,860	38.4	5,261	34.5	1,450	9.5
Form 3	15,272	2,571	16.8	6,483	42.5	4,894	32.1	1,324	8.7
Ethnicity									
Hispanic or Latino	7,593	1,910	25.2	3,398	44.8	1,902	25.1	383	5.0
Race									
American Indian/:Alaskan Native	6,745	1,324	19.6	2,870	42.6	2,040	30.2	511	7.6
Asian	871	92	10.6	250	28.7	336	38.6	193	22.2
Black/:African American	3,837	1,117	29.1	1,743	45.4	836	21.8	141	3.7
Pacific Islander	139	42	30.2	59	42.5	33	23.7	5	3.6
White/:Caucasian	23,366	3,279	14.0	8,776	37.6	8,550	36.6	2,761	11.8
Two or More Races	3,948	697	17.7	1,510	38.3	1,382	35.0	359	9.1
Gender									
Female	22,695	3,484	15.4	9,198	40.5	7,668	33.8	2,345	10.3
Male	23,726	4,945	20.8	9,382	39.5	7,393	31.2	2,006	8.5
Not Indicated	78	32	41.0	26	33.3	18	23.1	2	2.6
Other									
ELL 1st Yr: Proficient	638	122	19.1	384	60.2	114	17.9	18	2.8
ELL 2nd Yr: Proficient	916	177	19.3	508	55.5	205	22.4	26	2.8
Econ. Disadv.	28,339	6,744	23.8	12,406	43.8	7,579	26.7	1,610	5.7
Non-Econ. Disadv.	18,160	1,717	9.5	6,200	34.1	7,500	41.3	2,743	15.1
Migrant	28	12	42.9	12	42.9	3	10.7	1	3.6
Non-Migrant	46,471	8,449	18.2	18,594	40.0	15,076	32.4	4,352	9.4
Individualized Education Plan (IEP)									
IEP	7,443	4,101	55.1	2,431	32.7	781	10.5	130	1.8
IEP w/ Accom.	4,019	2,467	61.4	1,264	31.5	260	6.5	28	0.7
IEP w/o Accom.	3,424	1,634	47.7	1,167	34.1	521	15.2	102	3.0
Plan 504	1,091	168	15.4	504	46.2	337	30.9	82	7.5
Plan 504 w/ Accom.	332	67	20.2	161	48.5	86	25.9	18	5.4
Plan 504 w/o Accom.	759	101	13.3	343	45.2	251	33.1	64	8.4
English Language Learners (ELL)									
ELL	1,658	1,025	61.8	513	30.9	106	6.4	14	0.8
ELL w/ Accom.	293	220	75.1	66	22.5	7	2.4	0	0.0
ELL w/o Accom.	1,365	805	59.0	447	32.8	99	7.3	14	1.0
Non-English Language Learners (Non-ELL)									
Non-ELL	44,841	7,436	16.6	18,093	40.4	14,973	33.4	4,339	9.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 06									
Military									
Military	260	27	10.4	88	33.9	99	38.1	46	17.7
Non-Military	46,239	8,434	18.2	18,518	40.1	14,980	32.4	4,307	9.3
Foster									
Foster	279	81	29.0	132	47.3	56	20.1	10	3.6
Non-Foster	46,220	8,380	18.1	18,474	40.0	15,023	32.5	4,343	9.4

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Oklahoma School Testing Program (OSTP)
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English Language Arts - Grade 07	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	48,035	14,029	29.2	12,126	25.2	16,137	33.6	5,743	12.0
Form									
Form 1	16,436	4,978	30.3	4,495	27.4	5,185	31.6	1,778	10.8
Form 2	15,795	4,386	27.8	3,874	24.5	5,781	36.6	1,754	11.1
Form 3	15,804	4,665	29.5	3,757	23.8	5,171	32.7	2,211	14.0
Ethnicity									
Hispanic or Latino	8,086	3,278	40.5	2,170	26.8	2,119	26.2	519	6.4
Race									
American Indian/:Alaskan Native	7,027	2,144	30.5	1,897	27.0	2,269	32.3	717	10.2
Asian	997	173	17.4	208	20.9	354	35.5	262	26.3
Black/:African American	4,178	1,978	47.3	1,067	25.5	914	21.9	219	5.2
Pacific Islander	146	68	46.6	38	26.0	34	23.3	6	4.1
White/:Caucasian	23,684	5,286	22.3	5,721	24.2	9,104	38.4	3,573	15.1
Two or More Races	3,917	1,102	28.1	1,025	26.2	1,343	34.3	447	11.4
Gender									
Female	23,357	5,983	25.6	5,958	25.5	8,350	35.8	3,066	13.1
Male	24,622	8,015	32.6	6,158	25.0	7,773	31.6	2,676	10.9
Not Indicated	56	31	55.4	10	17.9	14	25.0	1	1.8
Other									
ELL 1st Yr: Proficient	200	61	30.5	73	36.5	57	28.5	9	4.5
ELL 2nd Yr: Proficient	440	159	36.1	165	37.5	103	23.4	13	3.0
Econ. Disadv.	29,593	11,113	37.6	7,966	26.9	8,327	28.1	2,187	7.4
Non-Econ. Disadv.	18,442	2,916	15.8	4,160	22.6	7,810	42.4	3,556	19.3
Migrant	32	18	56.3	4	12.5	8	25.0	2	6.3
Non-Migrant	48,003	14,011	29.2	12,122	25.3	16,129	33.6	5,741	12.0
Individualized Education Plan (IEP)									
IEP	8,153	5,711	70.1	1,391	17.1	859	10.5	192	2.4
IEP w/ Accom.	4,211	3,202	76.0	632	15.0	313	7.4	64	1.5
IEP w/o Accom.	3,942	2,509	63.7	759	19.3	546	13.9	128	3.3
Plan 504	1,009	268	26.6	264	26.2	372	36.9	105	10.4
Plan 504 w/ Accom.	233	81	34.8	66	28.3	68	29.2	18	7.7
Plan 504 w/o Accom.	776	187	24.1	198	25.5	304	39.2	87	11.2
English Language Learners (ELL)									
ELL	2,173	1,714	78.9	332	15.3	112	5.2	15	0.7
ELL w/ Accom.	287	258	89.9	24	8.4	5	1.7	0	0.0
ELL w/o Accom.	1,886	1,456	77.2	308	16.3	107	5.7	15	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,862	12,315	26.9	11,794	25.7	16,025	34.9	5,728	12.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 07									
Military									
Military	228	43	18.9	57	25.0	89	39.0	39	17.1
Non-Military	47,807	13,986	29.3	12,069	25.3	16,048	33.6	5,704	11.9
Foster									
Foster	260	114	43.9	65	25.0	56	21.5	25	9.6
Non-Foster	47,775	13,915	29.1	12,061	25.3	16,081	33.7	5,718	12.0

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 4 Committee Results

English Language Arts - Grade 08	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	47,893	9,972	20.8	20,292	42.4	12,084	25.2	5,545	11.6
Form									
Form 1	16,470	3,786	23.0	7,095	43.1	3,804	23.1	1,785	10.8
Form 2	15,698	3,256	20.7	6,285	40.0	4,498	28.7	1,659	10.6
Form 3	15,725	2,930	18.6	6,912	44.0	3,782	24.1	2,101	13.4
Ethnicity									
Hispanic or Latino	7,816	2,353	30.1	3,525	45.1	1,437	18.4	501	6.4
Race									
American Indian/:Alaskan Native	6,990	1,470	21.0	3,168	45.3	1,694	24.2	658	9.4
Asian	943	124	13.2	294	31.2	277	29.4	248	26.3
Black/:African American	4,196	1,569	37.4	1,761	42.0	671	16.0	195	4.7
Pacific Islander	167	62	37.1	62	37.1	36	21.6	7	4.2
White/:Caucasian	24,041	3,662	15.2	9,876	41.1	6,995	29.1	3,508	14.6
Two or More Races	3,740	732	19.6	1,606	42.9	974	26.0	428	11.4
Gender									
Female	23,511	3,864	16.4	9,751	41.5	6,517	27.7	3,379	14.4
Male	24,312	6,072	25.0	10,511	43.2	5,565	22.9	2,164	8.9
Not Indicated	70	36	51.4	30	42.9	2	2.9	2	2.9
Other									
ELL 1st Yr: Proficient	183	27	14.8	122	66.7	28	15.3	6	3.3
ELL 2nd Yr: Proficient	242	23	9.5	143	59.1	55	22.7	21	8.7
Econ. Disadv.	29,058	8,035	27.7	13,169	45.3	5,941	20.5	1,913	6.6
Non-Econ. Disadv.	18,835	1,937	10.3	7,123	37.8	6,143	32.6	3,632	19.3
Migrant	37	18	48.7	9	24.3	7	18.9	3	8.1
Non-Migrant	47,856	9,954	20.8	20,283	42.4	12,077	25.2	5,542	11.6
Individualized Education Plan (IEP)									
IEP	7,713	4,697	60.9	2,468	32.0	435	5.6	113	1.5
IEP w/ Accom.	4,247	2,870	67.6	1,176	27.7	170	4.0	31	0.7
IEP w/o Accom.	3,466	1,827	52.7	1,292	37.3	265	7.7	82	2.4
Plan 504	986	161	16.3	475	48.2	245	24.9	105	10.7
Plan 504 w/ Accom.	211	42	19.9	104	49.3	49	23.2	16	7.6
Plan 504 w/o Accom.	775	119	15.4	371	47.9	196	25.3	89	11.5
English Language Learners (ELL)									
ELL	2,127	1,460	68.6	582	27.4	71	3.3	14	0.7
ELL w/ Accom.	360	296	82.2	59	16.4	5	1.4	0	0.0
ELL w/o Accom.	1,767	1,164	65.9	523	29.6	66	3.7	14	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,766	8,512	18.6	19,710	43.1	12,013	26.3	5,531	12.1

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
English Language Arts - Grade 08									
Military									
Military	226	29	12.8	91	40.3	71	31.4	35	15.5
Non-Military	47,667	9,943	20.9	20,201	42.4	12,013	25.2	5,510	11.6
Foster									
Foster	241	91	37.8	108	44.8	36	14.9	6	2.5
Non-Foster	47,652	9,881	20.7	20,184	42.4	12,048	25.3	5,539	11.6

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Oklahoma School Testing Program (OSTP)
English Language Arts - Standard Setting - Round 4 Committee Results

English Language Arts - Grade 10	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Total									
All	45,802	5,938	13.0	14,440	31.5	20,622	45.0	4,802	10.5
Form									
Form 1	15,658	2,125	13.6	5,022	32.1	6,930	44.3	1,581	10.1
Form 2	15,095	1,863	12.3	4,752	31.5	7,032	46.6	1,448	9.6
Form 3	15,049	1,950	13.0	4,666	31.0	6,660	44.3	1,773	11.8
Ethnicity									
Hispanic or Latino	6,942	1,258	18.1	2,588	37.3	2,697	38.9	399	5.8
Race									
American Indian/:Alaskan Native	6,809	921	13.5	2,314	34.0	3,045	44.7	529	7.8
Asian	1,073	118	11.0	238	22.2	472	44.0	245	22.8
Black/:African American	3,981	952	23.9	1,604	40.3	1,281	32.2	144	3.6
Pacific Islander	149	24	16.1	60	40.3	57	38.3	8	5.4
White/:Caucasian	23,604	2,267	9.6	6,627	28.1	11,590	49.1	3,120	13.2
Two or More Races	3,244	398	12.3	1,009	31.1	1,480	45.6	357	11.0
Gender									
Female	22,529	2,004	8.9	6,770	30.1	10,905	48.4	2,850	12.7
Male	23,246	3,927	16.9	7,662	33.0	9,705	41.8	1,952	8.4
Not Indicated	27	7	25.9	8	29.6	12	44.4	0	0.0
Other									
ELL 1st Yr: Proficient	581	81	13.9	318	54.7	174	30.0	8	1.4
ELL 2nd Yr: Proficient	212	29	13.7	85	40.1	92	43.4	6	2.8
Econ. Disadv.	25,078	4,410	17.6	9,380	37.4	9,860	39.3	1,428	5.7
Non-Econ. Disadv.	20,724	1,528	7.4	5,060	24.4	10,762	51.9	3,374	16.3
Migrant	32	5	15.6	10	31.3	12	37.5	5	15.6
Non-Migrant	45,770	5,933	13.0	14,430	31.5	20,610	45.0	4,797	10.5
Individualized Education Plan (IEP)									
IEP	6,868	2,878	41.9	2,924	42.6	1,012	14.7	54	0.8
IEP w/ Accom.	2,369	1,057	44.6	992	41.9	307	13.0	13	0.6
IEP w/o Accom.	4,499	1,821	40.5	1,932	42.9	705	15.7	41	0.9
Plan 504	898	98	10.9	308	34.3	409	45.6	83	9.2
Plan 504 w/ Accom.	80	7	8.8	35	43.8	30	37.5	8	10.0
Plan 504 w/o Accom.	818	91	11.1	273	33.4	379	46.3	75	9.2
English Language Learners (ELL)									
ELL	1,601	851	53.2	602	37.6	129	8.1	19	1.2
ELL w/ Accom.	262	162	61.8	86	32.8	13	5.0	1	0.4
ELL w/o Accom.	1,339	689	51.5	516	38.5	116	8.7	18	1.3
Non-English Language Learners (Non-ELL)									
Non-ELL	44,201	5,087	11.5	13,838	31.3	20,493	46.4	4,783	10.8

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
English Language Arts - Grade 10	N	N	%	N	%	N	%	N	%
Military									
Military	131	10	7.6	29	22.1	77	58.8	15	11.5
Non-Military	45,671	5,928	13.0	14,411	31.6	20,545	45.0	4,787	10.5
Foster									
Foster	194	43	22.2	79	40.7	66	34.0	6	3.1
Non-Foster	45,608	5,895	12.9	14,361	31.5	20,556	45.1	4,796	10.5

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 03									
Military	234	3	1.3	19	8.1	67	28.6	145	62.0
Non-Military	52,284	1,731	3.3	7,533	14.4	18,440	35.3	24,580	47.0
Foster									
Foster	394	25	6.4	80	20.3	158	40.1	131	33.3
Non-Foster	52,124	1,709	3.3	7,472	14.3	18,349	35.2	24,594	47.2

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Oklahoma School Testing Program (OSTP)
Mathematics - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 04									
Total									
All	50,677	10,455	20.6	18,251	36.0	14,863	29.3	7,108	14.0
Form									
Form 1	16,913	3,573	21.1	5,856	34.6	5,273	31.2	2,211	13.1
Form 2	16,920	3,392	20.1	5,899	34.9	5,079	30.0	2,550	15.1
Form 3	16,844	3,490	20.7	6,496	38.6	4,511	26.8	2,347	13.9
Ethnicity									
Hispanic or Latino	9,251	2,683	29.0	3,657	39.5	2,193	23.7	718	7.8
Race									
American Indian/:Alaskan Native	6,646	1,318	19.8	2,639	39.7	1,939	29.2	750	11.3
Asian	988	90	9.1	207	21.0	342	34.6	349	35.3
Black/:African American	4,355	1,768	40.6	1,630	37.4	733	16.8	224	5.1
Pacific Islander	166	48	28.9	66	39.8	37	22.3	15	9.0
White/:Caucasian	24,235	3,598	14.9	8,134	33.6	8,098	33.4	4,405	18.2
Two or More Races	5,036	950	18.9	1,918	38.1	1,521	30.2	647	12.9
Gender									
Female	24,869	5,353	21.5	9,359	37.6	7,094	28.5	3,063	12.3
Male	25,770	5,086	19.7	8,878	34.5	7,764	30.1	4,042	15.7
Not Indicated	38	16	42.1	14	36.8	5	13.2	3	7.9
Other									
ELL 1st Yr: Proficient	1,798	311	17.3	766	42.6	545	30.3	176	9.8
ELL 2nd Yr: Proficient	584	40	6.9	215	36.8	215	36.8	114	19.5
Econ. Disadv.	31,870	8,179	25.7	12,731	40.0	8,240	25.9	2,720	8.5
Non-Econ. Disadv.	18,807	2,276	12.1	5,520	29.4	6,623	35.2	4,388	23.3
Migrant	30	7	23.3	14	46.7	7	23.3	2	6.7
Non-Migrant	50,647	10,448	20.6	18,237	36.0	14,856	29.3	7,106	14.0
Individualized Education Plan (IEP)									
IEP	8,789	3,725	42.4	3,199	36.4	1,450	16.5	415	4.7
IEP w/ Accom.	5,293	2,632	49.7	1,954	36.9	608	11.5	99	1.9
IEP w/o Accom.	3,496	1,093	31.3	1,245	35.6	842	24.1	316	9.0
Plan 504	964	202	21.0	388	40.3	266	27.6	108	11.2
Plan 504 w/ Accom.	469	113	24.1	190	40.5	132	28.1	34	7.3
Plan 504 w/o Accom.	495	89	18.0	198	40.0	134	27.1	74	15.0
English Language Learners (ELL)									
ELL	4,144	1,817	43.9	1,632	39.4	580	14.0	115	2.8
ELL w/ Accom.	1,354	668	49.3	507	37.4	154	11.4	25	1.9
ELL w/o Accom.	2,790	1,149	41.2	1,125	40.3	426	15.3	90	3.2
Non-English Language Learners (Non-ELL)									
Non-ELL	46,533	8,638	18.6	16,619	35.7	14,283	30.7	6,993	15.0

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 04	N	N	%	N	%	N	%	N	%
Military									
Military	254	16	6.3	86	33.9	80	31.5	72	28.4
Non-Military	50,423	10,439	20.7	18,165	36.0	14,783	29.3	7,036	14.0
Foster									
Foster	360	117	32.5	135	37.5	79	21.9	29	8.1
Non-Foster	50,317	10,338	20.6	18,116	36.0	14,784	29.4	7,079	14.1

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Oklahoma School Testing Program (OSTP)
Mathematics - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 05									
Total									
All	48,460	9,029	18.6	14,472	29.9	19,057	39.3	5,902	12.2
Form									
Form 1	16,146	3,141	19.5	5,049	31.3	6,206	38.4	1,750	10.8
Form 2	16,160	2,968	18.4	4,631	28.7	6,343	39.3	2,218	13.7
Form 3	16,154	2,920	18.1	4,792	29.7	6,508	40.3	1,934	12.0
Ethnicity									
Hispanic or Latino	8,760	2,126	24.3	2,981	34.0	3,016	34.4	637	7.3
Race									
American Indian/:Alaskan Native	6,644	1,256	18.9	2,197	33.1	2,573	38.7	618	9.3
Asian	951	83	8.7	172	18.1	378	39.8	318	33.4
Black/:African American	4,250	1,522	35.8	1,394	32.8	1,152	27.1	182	4.3
Pacific Islander	164	41	25.0	50	30.5	58	35.4	15	9.2
White/:Caucasian	23,245	3,226	13.9	6,325	27.2	10,076	43.4	3,618	15.6
Two or More Races	4,446	775	17.4	1,353	30.4	1,804	40.6	514	11.6
Gender									
Female	23,927	4,347	18.2	7,364	30.8	9,564	40.0	2,652	11.1
Male	24,490	4,666	19.1	7,096	29.0	9,478	38.7	3,250	13.3
Not Indicated	43	16	37.2	12	27.9	15	34.9	0	0.0
Other									
ELL 1st Yr: Proficient	1,420	247	17.4	532	37.5	558	39.3	83	5.9
ELL 2nd Yr: Proficient	1,711	298	17.4	597	34.9	665	38.9	151	8.8
Econ. Disadv.	30,007	6,979	23.3	10,148	33.8	10,696	35.7	2,184	7.3
Non-Econ. Disadv.	18,453	2,050	11.1	4,324	23.4	8,361	45.3	3,718	20.2
Migrant	31	4	12.9	11	35.5	14	45.2	2	6.5
Non-Migrant	48,429	9,025	18.6	14,461	29.9	19,043	39.3	5,900	12.2
Individualized Education Plan (IEP)									
IEP	8,228	3,489	42.4	2,817	34.2	1,657	20.1	265	3.2
IEP w/ Accom.	5,220	2,477	47.5	1,830	35.1	838	16.1	75	1.4
IEP w/o Accom.	3,008	1,012	33.6	987	32.8	819	27.2	190	6.3
Plan 504	1,048	202	19.3	359	34.3	392	37.4	95	9.1
Plan 504 w/ Accom.	514	115	22.4	195	37.9	173	33.7	31	6.0
Plan 504 w/o Accom.	534	87	16.3	164	30.7	219	41.0	64	12.0
English Language Learners (ELL)									
ELL	2,600	1,146	44.1	902	34.7	494	19.0	58	2.2
ELL w/ Accom.	863	416	48.2	285	33.0	150	17.4	12	1.4
ELL w/o Accom.	1,737	730	42.0	617	35.5	344	19.8	46	2.7
Non-English Language Learners (Non-ELL)									
Non-ELL	45,860	7,883	17.2	13,570	29.6	18,563	40.5	5,844	12.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 05	N	N	%	N	%	N	%	N	%
Military									
Military	246	19	7.7	59	24.0	124	50.4	44	17.9
Non-Military	48,214	9,010	18.7	14,413	29.9	18,933	39.3	5,858	12.2
Foster									
Foster	299	92	30.8	111	37.1	84	28.1	12	4.0
Non-Foster	48,161	8,937	18.6	14,361	29.8	18,973	39.4	5,890	12.2

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Oklahoma School Testing Program (OSTP)
Mathematics - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 06									
Total									
All	45,876	11,055	24.1	17,714	38.6	14,273	31.1	2,834	6.2
Form									
Form 1	18,114	5,446	30.1	6,663	36.8	5,109	28.2	896	5.0
Form 2	13,898	2,731	19.7	5,604	40.3	4,589	33.0	974	7.0
Form 3	13,864	2,878	20.8	5,447	39.3	4,575	33.0	964	7.0
Ethnicity									
Hispanic or Latino	7,529	2,401	31.9	3,078	40.9	1,814	24.1	236	3.1
Race									
American Indian/:Alaskan Native	6,604	1,677	25.4	2,711	41.1	1,957	29.6	259	3.9
Asian	884	104	11.8	218	24.7	369	41.7	193	21.8
Black/:African American	3,774	1,720	45.6	1,423	37.7	572	15.2	59	1.6
Pacific Islander	143	71	49.7	41	28.7	23	16.1	8	5.6
White/:Caucasian	23,074	4,227	18.3	8,710	37.8	8,287	35.9	1,850	8.0
Two or More Races	3,868	855	22.1	1,533	39.6	1,251	32.3	229	5.9
Gender									
Female	22,439	5,625	25.1	9,064	40.4	6,523	29.1	1,227	5.5
Male	23,363	5,402	23.1	8,628	36.9	7,729	33.1	1,604	6.9
Not Indicated	74	28	37.8	22	29.7	21	28.4	3	4.1
Other									
ELL 1st Yr: Proficient	634	201	31.7	285	45.0	139	21.9	9	1.4
ELL 2nd Yr: Proficient	903	260	28.8	427	47.3	199	22.0	17	1.9
Econ. Disadv.	27,891	8,563	30.7	11,476	41.2	6,941	24.9	911	3.3
Non-Econ. Disadv.	17,985	2,492	13.9	6,238	34.7	7,332	40.8	1,923	10.7
Migrant	30	11	36.7	12	40.0	7	23.3	0	0.0
Non-Migrant	45,846	11,044	24.1	17,702	38.6	14,266	31.1	2,834	6.2
Individualized Education Plan (IEP)									
IEP	6,891	4,040	58.6	2,003	29.1	749	10.9	99	1.4
IEP w/ Accom.	3,600	2,323	64.5	971	27.0	280	7.8	26	0.7
IEP w/o Accom.	3,291	1,717	52.2	1,032	31.4	469	14.3	73	2.2
Plan 504	1,072	264	24.6	435	40.6	318	29.7	55	5.1
Plan 504 w/ Accom.	319	92	28.8	136	42.6	81	25.4	10	3.1
Plan 504 w/o Accom.	753	172	22.8	299	39.7	237	31.5	45	6.0
English Language Learners (ELL)									
ELL	1,667	1,054	63.2	499	29.9	99	5.9	15	0.9
ELL w/ Accom.	297	208	70.0	76	25.6	11	3.7	2	0.7
ELL w/o Accom.	1,370	846	61.8	423	30.9	88	6.4	13	1.0
Non-English Language Learners (Non-ELL)									
Non-ELL	44,209	10,001	22.6	17,215	38.9	14,174	32.1	2,819	6.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 06									
Military									
Military	258	42	16.3	85	33.0	102	39.5	29	11.2
Non-Military	45,618	11,013	24.1	17,629	38.6	14,171	31.1	2,805	6.2
Foster									
Foster	266	92	34.6	120	45.1	47	17.7	7	2.6
Non-Foster	45,610	10,963	24.0	17,594	38.6	14,226	31.2	2,827	6.2

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Oklahoma School Testing Program (OSTP)
Mathematics - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 07									
Total									
All	47,554	23,487	49.4	8,372	17.6	12,321	25.9	3,374	7.1
Form									
Form 1	19,110	10,746	56.2	3,065	16.0	4,227	22.1	1,072	5.6
Form 2	14,221	6,416	45.1	2,626	18.5	4,006	28.2	1,173	8.3
Form 3	14,223	6,325	44.5	2,681	18.9	4,088	28.7	1,129	7.9
Ethnicity									
Hispanic or Latino	8,024	4,826	60.1	1,364	17.0	1,546	19.3	288	3.6
Race									
American Indian/:Alaskan Native	6,910	3,606	52.2	1,265	18.3	1,679	24.3	360	5.2
Asian	1,021	246	24.1	159	15.6	373	36.5	243	23.8
Black/:African American	4,170	3,028	72.6	541	13.0	523	12.5	78	1.9
Pacific Islander	151	98	64.9	29	19.2	20	13.3	4	2.7
White/:Caucasian	23,411	9,797	41.9	4,317	18.4	7,167	30.6	2,130	9.1
Two or More Races	3,867	1,886	48.8	697	18.0	1,013	26.2	271	7.0
Gender									
Female	23,187	11,395	49.1	4,265	18.4	6,066	26.2	1,461	6.3
Male	24,312	12,062	49.6	4,094	16.8	6,245	25.7	1,911	7.9
Not Indicated	55	30	54.6	13	23.6	10	18.2	2	3.6
Other									
ELL 1st Yr: Proficient	199	98	49.3	51	25.6	39	19.6	11	5.5
ELL 2nd Yr: Proficient	432	254	58.8	88	20.4	77	17.8	13	3.0
Econ. Disadv.	29,240	17,508	59.9	5,006	17.1	5,741	19.6	985	3.4
Non-Econ. Disadv.	18,314	5,979	32.7	3,366	18.4	6,580	35.9	2,389	13.0
Migrant	30	19	63.3	4	13.3	5	16.7	2	6.7
Non-Migrant	47,524	23,468	49.4	8,368	17.6	12,316	25.9	3,372	7.1
Individualized Education Plan (IEP)									
IEP	7,705	6,389	82.9	674	8.8	537	7.0	105	1.4
IEP w/ Accom.	3,877	3,378	87.1	303	7.8	167	4.3	29	0.8
IEP w/o Accom.	3,828	3,011	78.7	371	9.7	370	9.7	76	2.0
Plan 504	995	518	52.1	175	17.6	232	23.3	70	7.0
Plan 504 w/ Accom.	229	140	61.1	41	17.9	39	17.0	9	3.9
Plan 504 w/o Accom.	766	378	49.4	134	17.5	193	25.2	61	8.0
English Language Learners (ELL)									
ELL	2,185	1,816	83.1	221	10.1	129	5.9	19	0.9
ELL w/ Accom.	294	247	84.0	33	11.2	12	4.1	2	0.7
ELL w/o Accom.	1,891	1,569	83.0	188	9.9	117	6.2	17	0.9
Non-English Language Learners (Non-ELL)									
Non-ELL	45,369	21,671	47.8	8,151	18.0	12,192	26.9	3,355	7.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 07									
Military									
Military	228	94	41.2	41	18.0	75	32.9	18	7.9
Non-Military	47,326	23,393	49.4	8,331	17.6	12,246	25.9	3,356	7.1
Foster									
Foster	245	162	66.1	34	13.9	36	14.7	13	5.3
Non-Foster	47,309	23,325	49.3	8,338	17.6	12,285	26.0	3,361	7.1

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Oklahoma School Testing Program (OSTP)
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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 08									
Total									
All	47,141	24,124	51.2	12,826	27.2	4,577	9.7	5,614	11.9
Form									
Form 1	18,715	10,795	57.7	4,493	24.0	1,394	7.5	2,033	10.9
Form 2	14,218	6,601	46.4	4,470	31.4	1,313	9.2	1,834	12.9
Form 3	14,208	6,728	47.4	3,863	27.2	1,870	13.2	1,747	12.3
Ethnicity									
Hispanic or Latino	7,722	4,776	61.9	1,882	24.4	547	7.1	517	6.7
Race									
American Indian/:Alaskan Native	6,814	3,816	56.0	1,846	27.1	570	8.4	582	8.5
Asian	960	232	24.2	239	24.9	143	14.9	346	36.0
Black/:African American	4,098	2,832	69.1	873	21.3	212	5.2	181	4.4
Pacific Islander	164	104	63.4	40	24.4	12	7.3	8	4.9
White/:Caucasian	23,721	10,511	44.3	6,928	29.2	2,720	11.5	3,562	15.0
Two or More Races	3,662	1,853	50.6	1,018	27.8	373	10.2	418	11.4
Gender									
Female	23,200	11,302	48.7	6,770	29.2	2,367	10.2	2,761	11.9
Male	23,870	12,770	53.5	6,045	25.3	2,206	9.2	2,849	11.9
Not Indicated	71	52	73.2	11	15.5	4	5.6	4	5.6
Other									
ELL 1st Yr: Proficient	183	90	49.2	65	35.5	18	9.8	10	5.5
ELL 2nd Yr: Proficient	241	112	46.5	71	29.5	30	12.5	28	11.6
Econ. Disadv.	28,521	17,538	61.5	7,072	24.8	2,083	7.3	1,828	6.4
Non-Econ. Disadv.	18,620	6,586	35.4	5,754	30.9	2,494	13.4	3,786	20.3
Migrant	35	20	57.1	10	28.6	3	8.6	2	5.7
Non-Migrant	47,106	24,104	51.2	12,816	27.2	4,574	9.7	5,612	11.9
Individualized Education Plan (IEP)									
IEP	7,240	6,250	86.3	727	10.0	144	2.0	119	1.6
IEP w/ Accom.	3,905	3,505	89.8	304	7.8	53	1.4	43	1.1
IEP w/o Accom.	3,335	2,745	82.3	423	12.7	91	2.7	76	2.3
Plan 504	964	505	52.4	269	27.9	94	9.8	96	10.0
Plan 504 w/ Accom.	197	115	58.4	51	25.9	17	8.6	14	7.1
Plan 504 w/o Accom.	767	390	50.9	218	28.4	77	10.0	82	10.7
English Language Learners (ELL)									
ELL	2,105	1,776	84.4	266	12.6	34	1.6	29	1.4
ELL w/ Accom.	375	324	86.4	44	11.7	5	1.3	2	0.5
ELL w/o Accom.	1,730	1,452	83.9	222	12.8	29	1.7	27	1.6
Non-English Language Learners (Non-ELL)									
Non-ELL	45,036	22,348	49.6	12,560	27.9	4,543	10.1	5,585	12.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 08	N	N	%	N	%	N	%	N	%
Military									
Military	227	88	38.8	79	34.8	24	10.6	36	15.9
Non-Military	46,914	24,036	51.2	12,747	27.2	4,553	9.7	5,578	11.9
Foster									
Foster	237	158	66.7	60	25.3	12	5.1	7	3.0
Non-Foster	46,904	23,966	51.1	12,766	27.2	4,565	9.7	5,607	12.0

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 10	N	N	%	N	%	N	%	N	%
Total									
All	45,352	21,574	47.6	12,523	27.6	6,985	15.4	4,270	9.4
Form									
Form 1	16,973	8,448	49.8	4,592	27.1	2,421	14.3	1,512	8.9
Form 2	14,163	6,929	48.9	3,682	26.0	2,200	15.5	1,352	9.6
Form 3	14,216	6,197	43.6	4,249	29.9	2,364	16.6	1,406	9.9
Ethnicity									
Hispanic or Latino	6,933	3,939	56.8	1,870	27.0	776	11.2	348	5.0
Race									
American Indian/:Alaskan Native	6,690	3,435	51.4	1,946	29.1	920	13.8	389	5.8
Asian	1,096	288	26.3	227	20.7	244	22.3	337	30.8
Black/:African American	3,934	2,687	68.3	834	21.2	295	7.5	118	3.0
Pacific Islander	155	82	52.9	43	27.7	20	12.9	10	6.5
White/:Caucasian	23,341	9,601	41.1	6,748	28.9	4,235	18.1	2,757	11.8
Two or More Races	3,203	1,542	48.1	855	26.7	495	15.5	311	9.7
Gender									
Female	22,336	10,063	45.1	6,670	29.9	3,583	16.0	2,020	9.0
Male	22,991	11,496	50.0	5,846	25.4	3,399	14.8	2,250	9.8
Not Indicated	25	15	60.0	7	28.0	3	12.0	0	0.0
Other									
ELL 1st Yr: Proficient	584	368	63.0	153	26.2	48	8.2	15	2.6
ELL 2nd Yr: Proficient	218	119	54.6	62	28.4	23	10.6	14	6.4
Econ. Disadv.	24,793	14,451	58.3	6,439	26.0	2,722	11.0	1,181	4.8
Non-Econ. Disadv.	20,559	7,123	34.7	6,084	29.6	4,263	20.7	3,089	15.0
Migrant	32	16	50.0	5	15.6	7	21.9	4	12.5
Non-Migrant	45,320	21,558	47.6	12,518	27.6	6,978	15.4	4,266	9.4
Individualized Education Plan (IEP)									
IEP	6,532	5,601	85.8	727	11.1	147	2.3	57	0.9
IEP w/ Accom.	2,173	1,903	87.6	220	10.1	38	1.8	12	0.6
IEP w/o Accom.	4,359	3,698	84.8	507	11.6	109	2.5	45	1.0
Plan 504	882	435	49.3	260	29.5	116	13.2	71	8.1
Plan 504 w/ Accom.	77	41	53.3	22	28.6	9	11.7	5	6.5
Plan 504 w/o Accom.	805	394	48.9	238	29.6	107	13.3	66	8.2
English Language Learners (ELL)									
ELL	1,625	1,364	83.9	189	11.6	48	3.0	24	1.5
ELL w/ Accom.	278	246	88.5	23	8.3	4	1.4	5	1.8
ELL w/o Accom.	1,347	1,118	83.0	166	12.3	44	3.3	19	1.4
Non-English Language Learners (Non-ELL)									
Non-ELL	43,727	20,210	46.2	12,334	28.2	6,937	15.9	4,246	9.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 10	N	N	%	N	%	N	%	N	%
Military									
Military	130	54	41.5	32	24.6	27	20.8	17	13.1
Non-Military	45,222	21,520	47.6	12,491	27.6	6,958	15.4	4,253	9.4
Foster									
Foster	196	124	63.3	51	26.0	16	8.2	5	2.6
Non-Foster	45,156	21,450	47.5	12,472	27.6	6,969	15.4	4,265	9.5

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 03	N	N	%	N	%	N	%	N	%
Military	234	21	9.0	44	18.8	82	35.0	87	37.2
Non-Military	52,284	8,552	16.4	13,134	25.1	17,064	32.6	13,534	25.9
Foster									
Foster	394	97	24.6	121	30.7	118	30.0	58	14.7
Non-Foster	52,124	8,476	16.3	13,057	25.1	17,028	32.7	13,563	26.0

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Oklahoma School Testing Program (OSTP)
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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 04									
Total									
All	50,677	10,455	20.6	19,624	38.7	13,490	26.6	7,108	14.0
Form									
Form 1	16,913	3,573	21.1	6,490	38.4	4,639	27.4	2,211	13.1
Form 2	16,920	3,392	20.1	6,638	39.2	4,340	25.7	2,550	15.1
Form 3	16,844	3,490	20.7	6,496	38.6	4,511	26.8	2,347	13.9
Ethnicity									
Hispanic or Latino	9,251	2,683	29.0	3,904	42.2	1,946	21.0	718	7.8
Race									
American Indian/:Alaskan Native	6,646	1,318	19.8	2,840	42.7	1,738	26.2	750	11.3
Asian	988	90	9.1	230	23.3	319	32.3	349	35.3
Black/:African American	4,355	1,768	40.6	1,721	39.5	642	14.7	224	5.1
Pacific Islander	166	48	28.9	75	45.2	28	16.9	15	9.0
White/:Caucasian	24,235	3,598	14.9	8,796	36.3	7,436	30.7	4,405	18.2
Two or More Races	5,036	950	18.9	2,058	40.9	1,381	27.4	647	12.9
Gender									
Female	24,869	5,353	21.5	10,028	40.3	6,425	25.8	3,063	12.3
Male	25,770	5,086	19.7	9,581	37.2	7,061	27.4	4,042	15.7
Not Indicated	38	16	42.1	15	39.5	4	10.5	3	7.9
Other									
ELL 1st Yr: Proficient	1,798	311	17.3	832	46.3	479	26.6	176	9.8
ELL 2nd Yr: Proficient	584	40	6.9	230	39.4	200	34.3	114	19.5
Econ. Disadv.	31,870	8,179	25.7	13,583	42.6	7,388	23.2	2,720	8.5
Non-Econ. Disadv.	18,807	2,276	12.1	6,041	32.1	6,102	32.5	4,388	23.3
Migrant	30	7	23.3	14	46.7	7	23.3	2	6.7
Non-Migrant	50,647	10,448	20.6	19,610	38.7	13,483	26.6	7,106	14.0
Individualized Education Plan (IEP)									
IEP	8,789	3,725	42.4	3,374	38.4	1,275	14.5	415	4.7
IEP w/ Accom.	5,293	2,632	49.7	2,039	38.5	523	9.9	99	1.9
IEP w/o Accom.	3,496	1,093	31.3	1,335	38.2	752	21.5	316	9.0
Plan 504	964	202	21.0	415	43.1	239	24.8	108	11.2
Plan 504 w/ Accom.	469	113	24.1	206	43.9	116	24.7	34	7.3
Plan 504 w/o Accom.	495	89	18.0	209	42.2	123	24.9	74	15.0
English Language Learners (ELL)									
ELL	4,144	1,817	43.9	1,712	41.3	500	12.1	115	2.8
ELL w/ Accom.	1,354	668	49.3	537	39.7	124	9.2	25	1.9
ELL w/o Accom.	2,790	1,149	41.2	1,175	42.1	376	13.5	90	3.2
Non-English Language Learners (Non-ELL)									
Non-ELL	46,533	8,638	18.6	17,912	38.5	12,990	27.9	6,993	15.0

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 04									
Military									
Military	254	16	6.3	93	36.6	73	28.7	72	28.4
Non-Military	50,423	10,439	20.7	19,531	38.7	13,417	26.6	7,036	14.0
Foster									
Foster	360	117	32.5	140	38.9	74	20.6	29	8.1
Non-Foster	50,317	10,338	20.6	19,484	38.7	13,416	26.7	7,079	14.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 05									
Total									
All	48,460	9,029	18.6	14,472	29.9	16,868	34.8	8,091	16.7
Form									
Form 1	16,146	3,141	19.5	5,049	31.3	5,385	33.4	2,571	15.9
Form 2	16,160	2,968	18.4	4,631	28.7	5,825	36.1	2,736	16.9
Form 3	16,154	2,920	18.1	4,792	29.7	5,658	35.0	2,784	17.2
Ethnicity									
Hispanic or Latino	8,760	2,126	24.3	2,981	34.0	2,750	31.4	903	10.3
Race									
American Indian/:Alaskan Native	6,644	1,256	18.9	2,197	33.1	2,316	34.9	875	13.2
Asian	951	83	8.7	172	18.1	298	31.3	398	41.9
Black/:African American	4,250	1,522	35.8	1,394	32.8	1,060	24.9	274	6.5
Pacific Islander	164	41	25.0	50	30.5	53	32.3	20	12.2
White/:Caucasian	23,245	3,226	13.9	6,325	27.2	8,794	37.8	4,900	21.1
Two or More Races	4,446	775	17.4	1,353	30.4	1,597	35.9	721	16.2
Gender									
Female	23,927	4,347	18.2	7,364	30.8	8,519	35.6	3,697	15.5
Male	24,490	4,666	19.1	7,096	29.0	8,335	34.0	4,393	17.9
Not Indicated	43	16	37.2	12	27.9	14	32.6	1	2.3
Other									
ELL 1st Yr: Proficient	1,420	247	17.4	532	37.5	508	35.8	133	9.4
ELL 2nd Yr: Proficient	1,711	298	17.4	597	34.9	601	35.1	215	12.6
Econ. Disadv.	30,007	6,979	23.3	10,148	33.8	9,683	32.3	3,197	10.7
Non-Econ. Disadv.	18,453	2,050	11.1	4,324	23.4	7,185	38.9	4,894	26.5
Migrant	31	4	12.9	11	35.5	13	41.9	3	9.7
Non-Migrant	48,429	9,025	18.6	14,461	29.9	16,855	34.8	8,088	16.7
Individualized Education Plan (IEP)									
IEP	8,228	3,489	42.4	2,817	34.2	1,520	18.5	402	4.9
IEP w/ Accom.	5,220	2,477	47.5	1,830	35.1	799	15.3	114	2.2
IEP w/o Accom.	3,008	1,012	33.6	987	32.8	721	24.0	288	9.6
Plan 504	1,048	202	19.3	359	34.3	356	34.0	131	12.5
Plan 504 w/ Accom.	514	115	22.4	195	37.9	160	31.1	44	8.6
Plan 504 w/o Accom.	534	87	16.3	164	30.7	196	36.7	87	16.3
English Language Learners (ELL)									
ELL	2,600	1,146	44.1	902	34.7	472	18.2	80	3.1
ELL w/ Accom.	863	416	48.2	285	33.0	143	16.6	19	2.2
ELL w/o Accom.	1,737	730	42.0	617	35.5	329	18.9	61	3.5
Non-English Language Learners (Non-ELL)									
Non-ELL	45,860	7,883	17.2	13,570	29.6	16,396	35.8	8,011	17.5

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 05	N	N	%	N	%	N	%	N	%
Military									
Military	246	19	7.7	59	24.0	106	43.1	62	25.2
Non-Military	48,214	9,010	18.7	14,413	29.9	16,762	34.8	8,029	16.7
Foster									
Foster	299	92	30.8	111	37.1	76	25.4	20	6.7
Non-Foster	48,161	8,937	18.6	14,361	29.8	16,792	34.9	8,071	16.8

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Oklahoma School Testing Program (OSTP)
Mathematics - Standard Setting - Round 2 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 06									
Total									
All	45,876	8,634	18.8	22,163	48.3	12,245	26.7	2,834	6.2
Form									
Form 1	18,114	4,313	23.8	8,513	47.0	4,392	24.3	896	5.0
Form 2	13,898	2,297	16.5	6,725	48.4	3,902	28.1	974	7.0
Form 3	13,864	2,024	14.6	6,925	50.0	3,951	28.5	964	7.0
Ethnicity									
Hispanic or Latino	7,529	1,883	25.0	3,878	51.5	1,532	20.4	236	3.1
Race									
American Indian/:Alaskan Native	6,604	1,284	19.4	3,403	51.5	1,658	25.1	259	3.9
Asian	884	83	9.4	271	30.7	337	38.1	193	21.8
Black/:African American	3,774	1,420	37.6	1,825	48.4	470	12.5	59	1.6
Pacific Islander	143	60	42.0	58	40.6	17	11.9	8	5.6
White/:Caucasian	23,074	3,234	14.0	10,824	46.9	7,166	31.1	1,850	8.0
Two or More Races	3,868	670	17.3	1,904	49.2	1,065	27.5	229	5.9
Gender									
Female	22,439	4,339	19.3	11,335	50.5	5,538	24.7	1,227	5.5
Male	23,363	4,274	18.3	10,795	46.2	6,690	28.6	1,604	6.9
Not Indicated	74	21	28.4	33	44.6	17	23.0	3	4.1
Other									
ELL 1st Yr: Proficient	634	148	23.3	365	57.6	112	17.7	9	1.4
ELL 2nd Yr: Proficient	903	183	20.3	535	59.3	168	18.6	17	1.9
Econ. Disadv.	27,891	6,812	24.4	14,331	51.4	5,837	20.9	911	3.3
Non-Econ. Disadv.	17,985	1,822	10.1	7,832	43.6	6,408	35.6	1,923	10.7
Migrant	30	8	26.7	15	50.0	7	23.3	0	0.0
Non-Migrant	45,846	8,626	18.8	22,148	48.3	12,238	26.7	2,834	6.2
Individualized Education Plan (IEP)									
IEP	6,891	3,536	51.3	2,635	38.2	621	9.0	99	1.4
IEP w/ Accom.	3,600	2,042	56.7	1,315	36.5	217	6.0	26	0.7
IEP w/o Accom.	3,291	1,494	45.4	1,320	40.1	404	12.3	73	2.2
Plan 504	1,072	195	18.2	555	51.8	267	24.9	55	5.1
Plan 504 w/ Accom.	319	68	21.3	174	54.6	67	21.0	10	3.1
Plan 504 w/o Accom.	753	127	16.9	381	50.6	200	26.6	45	6.0
English Language Learners (ELL)									
ELL	1,667	894	53.6	680	40.8	78	4.7	15	0.9
ELL w/ Accom.	297	169	56.9	117	39.4	9	3.0	2	0.7
ELL w/o Accom.	1,370	725	52.9	563	41.1	69	5.0	13	1.0
Non-English Language Learners (Non-ELL)									
Non-ELL	44,209	7,740	17.5	21,483	48.6	12,167	27.5	2,819	6.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 06									
Military									
Military	258	33	12.8	107	41.5	89	34.5	29	11.2
Non-Military	45,618	8,601	18.9	22,056	48.4	12,156	26.7	2,805	6.2
Foster									
Foster	266	75	28.2	140	52.6	44	16.5	7	2.6
Non-Foster	45,610	8,559	18.8	22,023	48.3	12,201	26.8	2,827	6.2

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Oklahoma School Testing Program (OSTP)
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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 07									
Total									
All	47,554	23,487	49.4	8,372	17.6	12,321	25.9	3,374	7.1
Form									
Form 1	19,110	10,746	56.2	3,065	16.0	4,227	22.1	1,072	5.6
Form 2	14,221	6,416	45.1	2,626	18.5	4,006	28.2	1,173	8.3
Form 3	14,223	6,325	44.5	2,681	18.9	4,088	28.7	1,129	7.9
Ethnicity									
Hispanic or Latino	8,024	4,826	60.1	1,364	17.0	1,546	19.3	288	3.6
Race									
American Indian/:Alaskan Native	6,910	3,606	52.2	1,265	18.3	1,679	24.3	360	5.2
Asian	1,021	246	24.1	159	15.6	373	36.5	243	23.8
Black/:African American	4,170	3,028	72.6	541	13.0	523	12.5	78	1.9
Pacific Islander	151	98	64.9	29	19.2	20	13.3	4	2.7
White/:Caucasian	23,411	9,797	41.9	4,317	18.4	7,167	30.6	2,130	9.1
Two or More Races	3,867	1,886	48.8	697	18.0	1,013	26.2	271	7.0
Gender									
Female	23,187	11,395	49.1	4,265	18.4	6,066	26.2	1,461	6.3
Male	24,312	12,062	49.6	4,094	16.8	6,245	25.7	1,911	7.9
Not Indicated	55	30	54.6	13	23.6	10	18.2	2	3.6
Other									
ELL 1st Yr: Proficient	199	98	49.3	51	25.6	39	19.6	11	5.5
ELL 2nd Yr: Proficient	432	254	58.8	88	20.4	77	17.8	13	3.0
Econ. Disadv.	29,240	17,508	59.9	5,006	17.1	5,741	19.6	985	3.4
Non-Econ. Disadv.	18,314	5,979	32.7	3,366	18.4	6,580	35.9	2,389	13.0
Migrant	30	19	63.3	4	13.3	5	16.7	2	6.7
Non-Migrant	47,524	23,468	49.4	8,368	17.6	12,316	25.9	3,372	7.1
Individualized Education Plan (IEP)									
IEP	7,705	6,389	82.9	674	8.8	537	7.0	105	1.4
IEP w/ Accom.	3,877	3,378	87.1	303	7.8	167	4.3	29	0.8
IEP w/o Accom.	3,828	3,011	78.7	371	9.7	370	9.7	76	2.0
Plan 504	995	518	52.1	175	17.6	232	23.3	70	7.0
Plan 504 w/ Accom.	229	140	61.1	41	17.9	39	17.0	9	3.9
Plan 504 w/o Accom.	766	378	49.4	134	17.5	193	25.2	61	8.0
English Language Learners (ELL)									
ELL	2,185	1,816	83.1	221	10.1	129	5.9	19	0.9
ELL w/ Accom.	294	247	84.0	33	11.2	12	4.1	2	0.7
ELL w/o Accom.	1,891	1,569	83.0	188	9.9	117	6.2	17	0.9
Non-English Language Learners (Non-ELL)									
Non-ELL	45,369	21,671	47.8	8,151	18.0	12,192	26.9	3,355	7.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 07	N	N	%	N	%	N	%	N	%
Military									
Military	228	94	41.2	41	18.0	75	32.9	18	7.9
Non-Military	47,326	23,393	49.4	8,331	17.6	12,246	25.9	3,356	7.1
Foster									
Foster	245	162	66.1	34	13.9	36	14.7	13	5.3
Non-Foster	47,309	23,325	49.3	8,338	17.6	12,285	26.0	3,361	7.1

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Oklahoma School Testing Program (OSTP)
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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 08									
Total									
All	47,141	23,065	48.9	13,106	27.8	5,356	11.4	5,614	11.9
Form									
Form 1	18,715	10,242	54.7	4,656	24.9	1,784	9.5	2,033	10.9
Form 2	14,218	6,601	46.4	4,081	28.7	1,702	12.0	1,834	12.9
Form 3	14,208	6,222	43.8	4,369	30.8	1,870	13.2	1,747	12.3
Ethnicity									
Hispanic or Latino	7,722	4,615	59.8	1,956	25.3	634	8.2	517	6.7
Race									
American Indian/:Alaskan Native	6,814	3,664	53.8	1,887	27.7	681	10.0	582	8.5
Asian	960	215	22.4	230	24.0	169	17.6	346	36.0
Black/:African American	4,098	2,739	66.8	936	22.8	242	5.9	181	4.4
Pacific Islander	164	101	61.6	41	25.0	14	8.5	8	4.9
White/:Caucasian	23,721	9,970	42.0	7,018	29.6	3,171	13.4	3,562	15.0
Two or More Races	3,662	1,761	48.1	1,038	28.4	445	12.2	418	11.4
Gender									
Female	23,200	10,754	46.4	6,938	29.9	2,747	11.8	2,761	11.9
Male	23,870	12,260	51.4	6,156	25.8	2,605	10.9	2,849	11.9
Not Indicated	71	51	71.8	12	16.9	4	5.6	4	5.6
Other									
ELL 1st Yr: Proficient	183	84	45.9	69	37.7	20	10.9	10	5.5
ELL 2nd Yr: Proficient	241	106	44.0	74	30.7	33	13.7	28	11.6
Econ. Disadv.	28,521	16,868	59.1	7,365	25.8	2,460	8.6	1,828	6.4
Non-Econ. Disadv.	18,620	6,197	33.3	5,741	30.8	2,896	15.6	3,786	20.3
Migrant	35	19	54.3	10	28.6	4	11.4	2	5.7
Non-Migrant	47,106	23,046	48.9	13,096	27.8	5,352	11.4	5,612	11.9
Individualized Education Plan (IEP)									
IEP	7,240	6,143	84.9	795	11.0	183	2.5	119	1.6
IEP w/ Accom.	3,905	3,439	88.1	351	9.0	72	1.8	43	1.1
IEP w/o Accom.	3,335	2,704	81.1	444	13.3	111	3.3	76	2.3
Plan 504	964	479	49.7	269	27.9	120	12.5	96	10.0
Plan 504 w/ Accom.	197	110	55.8	51	25.9	22	11.2	14	7.1
Plan 504 w/o Accom.	767	369	48.1	218	28.4	98	12.8	82	10.7
English Language Learners (ELL)									
ELL	2,105	1,741	82.7	290	13.8	45	2.1	29	1.4
ELL w/ Accom.	375	321	85.6	44	11.7	8	2.1	2	0.5
ELL w/o Accom.	1,730	1,420	82.1	246	14.2	37	2.1	27	1.6
Non-English Language Learners (Non-ELL)									
Non-ELL	45,036	21,324	47.4	12,816	28.5	5,311	11.8	5,585	12.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 08									
Military									
Military	227	84	37.0	80	35.2	27	11.9	36	15.9
Non-Military	46,914	22,981	49.0	13,026	27.8	5,329	11.4	5,578	11.9
Foster									
Foster	237	150	63.3	60	25.3	20	8.4	7	3.0
Non-Foster	46,904	22,915	48.9	13,046	27.8	5,336	11.4	5,607	12.0

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Oklahoma School Testing Program (OSTP)
Mathematics - Standard Setting - Round 2 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 10									
Total									
All	45,352	24,439	53.9	9,658	21.3	6,985	15.4	4,270	9.4
Form									
Form 1	16,973	9,421	55.5	3,619	21.3	2,421	14.3	1,512	8.9
Form 2	14,163	7,832	55.3	2,779	19.6	2,200	15.5	1,352	9.6
Form 3	14,216	7,186	50.6	3,260	22.9	2,364	16.6	1,406	9.9
Ethnicity									
Hispanic or Latino	6,933	4,418	63.7	1,391	20.1	776	11.2	348	5.0
Race									
American Indian/:Alaskan Native	6,690	3,902	58.3	1,479	22.1	920	13.8	389	5.8
Asian	1,096	333	30.4	182	16.6	244	22.3	337	30.8
Black/:African American	3,934	2,883	73.3	638	16.2	295	7.5	118	3.0
Pacific Islander	155	92	59.4	33	21.3	20	12.9	10	6.5
White/:Caucasian	23,341	11,059	47.4	5,290	22.7	4,235	18.1	2,757	11.8
Two or More Races	3,203	1,752	54.7	645	20.1	495	15.5	311	9.7
Gender									
Female	22,336	11,576	51.8	5,157	23.1	3,583	16.0	2,020	9.0
Male	22,991	12,846	55.9	4,496	19.6	3,399	14.8	2,250	9.8
Not Indicated	25	17	68.0	5	20.0	3	12.0	0	0.0
Other									
ELL 1st Yr: Proficient	584	411	70.4	110	18.8	48	8.2	15	2.6
ELL 2nd Yr: Proficient	218	136	62.4	45	20.6	23	10.6	14	6.4
Econ. Disadv.	24,793	16,075	64.8	4,815	19.4	2,722	11.0	1,181	4.8
Non-Econ. Disadv.	20,559	8,364	40.7	4,843	23.6	4,263	20.7	3,089	15.0
Migrant	32	17	53.1	4	12.5	7	21.9	4	12.5
Non-Migrant	45,320	24,422	53.9	9,654	21.3	6,978	15.4	4,266	9.4
Individualized Education Plan (IEP)									
IEP	6,532	5,834	89.3	494	7.6	147	2.3	57	0.9
IEP w/ Accom.	2,173	1,979	91.1	144	6.6	38	1.8	12	0.6
IEP w/o Accom.	4,359	3,855	88.4	350	8.0	109	2.5	45	1.0
Plan 504	882	503	57.0	192	21.8	116	13.2	71	8.1
Plan 504 w/ Accom.	77	46	59.7	17	22.1	9	11.7	5	6.5
Plan 504 w/o Accom.	805	457	56.8	175	21.7	107	13.3	66	8.2
English Language Learners (ELL)									
ELL	1,625	1,438	88.5	115	7.1	48	3.0	24	1.5
ELL w/ Accom.	278	255	91.7	14	5.0	4	1.4	5	1.8
ELL w/o Accom.	1,347	1,183	87.8	101	7.5	44	3.3	19	1.4
Non-English Language Learners (Non-ELL)									
Non-ELL	43,727	23,001	52.6	9,543	21.8	6,937	15.9	4,246	9.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 10									
Military									
Military	130	62	47.7	24	18.5	27	20.8	17	13.1
Non-Military	45,222	24,377	53.9	9,634	21.3	6,958	15.4	4,253	9.4
Foster									
Foster	196	134	68.4	41	20.9	16	8.2	5	2.6
Non-Foster	45,156	24,305	53.8	9,617	21.3	6,969	15.4	4,265	9.5

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 03	N	N	%	N	%	N	%	N	%
Military	234	21	9.0	44	18.8	116	49.6	53	22.7
Non-Military	52,284	8,552	16.4	13,134	25.1	21,726	41.6	8,872	17.0
Foster									
Foster	394	97	24.6	121	30.7	143	36.3	33	8.4
Non-Foster	52,124	8,476	16.3	13,057	25.1	21,699	41.6	8,892	17.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 04									
Total									
All	50,677	10,455	20.6	18,251	36.0	14,863	29.3	7,108	14.0
Form									
Form 1	16,913	3,573	21.1	5,856	34.6	5,273	31.2	2,211	13.1
Form 2	16,920	3,392	20.1	5,899	34.9	5,079	30.0	2,550	15.1
Form 3	16,844	3,490	20.7	6,496	38.6	4,511	26.8	2,347	13.9
Ethnicity									
Hispanic or Latino	9,251	2,683	29.0	3,657	39.5	2,193	23.7	718	7.8
Race									
American Indian/:Alaskan Native	6,646	1,318	19.8	2,639	39.7	1,939	29.2	750	11.3
Asian	988	90	9.1	207	21.0	342	34.6	349	35.3
Black/:African American	4,355	1,768	40.6	1,630	37.4	733	16.8	224	5.1
Pacific Islander	166	48	28.9	66	39.8	37	22.3	15	9.0
White/:Caucasian	24,235	3,598	14.9	8,134	33.6	8,098	33.4	4,405	18.2
Two or More Races	5,036	950	18.9	1,918	38.1	1,521	30.2	647	12.9
Gender									
Female	24,869	5,353	21.5	9,359	37.6	7,094	28.5	3,063	12.3
Male	25,770	5,086	19.7	8,878	34.5	7,764	30.1	4,042	15.7
Not Indicated	38	16	42.1	14	36.8	5	13.2	3	7.9
Other									
ELL 1st Yr: Proficient	1,798	311	17.3	766	42.6	545	30.3	176	9.8
ELL 2nd Yr: Proficient	584	40	6.9	215	36.8	215	36.8	114	19.5
Econ. Disadv.	31,870	8,179	25.7	12,731	40.0	8,240	25.9	2,720	8.5
Non-Econ. Disadv.	18,807	2,276	12.1	5,520	29.4	6,623	35.2	4,388	23.3
Migrant	30	7	23.3	14	46.7	7	23.3	2	6.7
Non-Migrant	50,647	10,448	20.6	18,237	36.0	14,856	29.3	7,106	14.0
Individualized Education Plan (IEP)									
IEP	8,789	3,725	42.4	3,199	36.4	1,450	16.5	415	4.7
IEP w/ Accom.	5,293	2,632	49.7	1,954	36.9	608	11.5	99	1.9
IEP w/o Accom.	3,496	1,093	31.3	1,245	35.6	842	24.1	316	9.0
Plan 504	964	202	21.0	388	40.3	266	27.6	108	11.2
Plan 504 w/ Accom.	469	113	24.1	190	40.5	132	28.1	34	7.3
Plan 504 w/o Accom.	495	89	18.0	198	40.0	134	27.1	74	15.0
English Language Learners (ELL)									
ELL	4,144	1,817	43.9	1,632	39.4	580	14.0	115	2.8
ELL w/ Accom.	1,354	668	49.3	507	37.4	154	11.4	25	1.9
ELL w/o Accom.	2,790	1,149	41.2	1,125	40.3	426	15.3	90	3.2
Non-English Language Learners (Non-ELL)									
Non-ELL	46,533	8,638	18.6	16,619	35.7	14,283	30.7	6,993	15.0

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 04	N	N	%	N	%	N	%	N	%
Military									
Military	254	16	6.3	86	33.9	80	31.5	72	28.4
Non-Military	50,423	10,439	20.7	18,165	36.0	14,783	29.3	7,036	14.0
Foster									
Foster	360	117	32.5	135	37.5	79	21.9	29	8.1
Non-Foster	50,317	10,338	20.6	18,116	36.0	14,784	29.4	7,079	14.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 05									
Total									
All	48,460	8,146	16.8	19,953	41.2	14,459	29.8	5,902	12.2
Form									
Form 1	16,146	3,141	19.5	6,682	41.4	4,573	28.3	1,750	10.8
Form 2	16,160	2,535	15.7	6,852	42.4	4,555	28.2	2,218	13.7
Form 3	16,154	2,470	15.3	6,419	39.7	5,331	33.0	1,934	12.0
Ethnicity									
Hispanic or Latino	8,760	1,921	21.9	4,016	45.8	2,186	25.0	637	7.3
Race									
American Indian/:Alaskan Native	6,644	1,114	16.8	2,993	45.1	1,919	28.9	618	9.3
Asian	951	70	7.4	245	25.8	318	33.4	318	33.4
Black/:African American	4,250	1,403	33.0	1,836	43.2	829	19.5	182	4.3
Pacific Islander	164	37	22.6	68	41.5	44	26.8	15	9.2
White/:Caucasian	23,245	2,897	12.5	8,920	38.4	7,810	33.6	3,618	15.6
Two or More Races	4,446	704	15.8	1,875	42.2	1,353	30.4	514	11.6
Gender									
Female	23,927	3,905	16.3	10,193	42.6	7,177	30.0	2,652	11.1
Male	24,490	4,229	17.3	9,738	39.8	7,273	29.7	3,250	13.3
Not Indicated	43	12	27.9	22	51.2	9	20.9	0	0.0
Other									
ELL 1st Yr: Proficient	1,420	210	14.8	731	51.5	396	27.9	83	5.9
ELL 2nd Yr: Proficient	1,711	261	15.3	809	47.3	490	28.6	151	8.8
Econ. Disadv.	30,007	6,327	21.1	13,725	45.7	7,771	25.9	2,184	7.3
Non-Econ. Disadv.	18,453	1,819	9.9	6,228	33.8	6,688	36.2	3,718	20.2
Migrant	31	4	12.9	14	45.2	11	35.5	2	6.5
Non-Migrant	48,429	8,142	16.8	19,939	41.2	14,448	29.8	5,900	12.2
Individualized Education Plan (IEP)									
IEP	8,228	3,285	39.9	3,567	43.4	1,111	13.5	265	3.2
IEP w/ Accom.	5,220	2,345	44.9	2,258	43.3	542	10.4	75	1.4
IEP w/o Accom.	3,008	940	31.3	1,309	43.5	569	18.9	190	6.3
Plan 504	1,048	178	17.0	462	44.1	313	29.9	95	9.1
Plan 504 w/ Accom.	514	107	20.8	243	47.3	133	25.9	31	6.0
Plan 504 w/o Accom.	534	71	13.3	219	41.0	180	33.7	64	12.0
English Language Learners (ELL)									
ELL	2,600	1,064	40.9	1,165	44.8	313	12.0	58	2.2
ELL w/ Accom.	863	387	44.8	367	42.5	97	11.2	12	1.4
ELL w/o Accom.	1,737	677	39.0	798	45.9	216	12.4	46	2.7
Non-English Language Learners (Non-ELL)									
Non-ELL	45,860	7,082	15.4	18,788	41.0	14,146	30.9	5,844	12.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 05									
Military									
Military	246	17	6.9	87	35.4	98	39.8	44	17.9
Non-Military	48,214	8,129	16.9	19,866	41.2	14,361	29.8	5,858	12.2
Foster									
Foster	299	83	27.8	147	49.2	57	19.1	12	4.0
Non-Foster	48,161	8,063	16.7	19,806	41.1	14,402	29.9	5,890	12.2

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 06									
Total									
All	45,876	8,634	18.8	20,852	45.5	13,556	29.6	2,834	6.2
Form									
Form 1	18,114	4,313	23.8	8,513	47.0	4,392	24.3	896	5.0
Form 2	13,898	2,297	16.5	6,038	43.5	4,589	33.0	974	7.0
Form 3	13,864	2,024	14.6	6,301	45.5	4,575	33.0	964	7.0
Ethnicity									
Hispanic or Latino	7,529	1,883	25.0	3,689	49.0	1,721	22.9	236	3.1
Race									
American Indian/:Alaskan Native	6,604	1,284	19.4	3,205	48.5	1,856	28.1	259	3.9
Asian	884	83	9.4	249	28.2	359	40.6	193	21.8
Black/:African American	3,774	1,420	37.6	1,763	46.7	532	14.1	59	1.6
Pacific Islander	143	60	42.0	56	39.2	19	13.3	8	5.6
White/:Caucasian	23,074	3,234	14.0	10,111	43.8	7,879	34.2	1,850	8.0
Two or More Races	3,868	670	17.3	1,779	46.0	1,190	30.8	229	5.9
Gender									
Female	22,439	4,339	19.3	10,684	47.6	6,189	27.6	1,227	5.5
Male	23,363	4,274	18.3	10,138	43.4	7,347	31.5	1,604	6.9
Not Indicated	74	21	28.4	30	40.5	20	27.0	3	4.1
Other									
ELL 1st Yr: Proficient	634	148	23.3	348	54.9	129	20.4	9	1.4
ELL 2nd Yr: Proficient	903	183	20.3	514	56.9	189	20.9	17	1.9
Econ. Disadv.	27,891	6,812	24.4	13,618	48.8	6,550	23.5	911	3.3
Non-Econ. Disadv.	17,985	1,822	10.1	7,234	40.2	7,006	39.0	1,923	10.7
Migrant	30	8	26.7	15	50.0	7	23.3	0	0.0
Non-Migrant	45,846	8,626	18.8	20,837	45.5	13,549	29.6	2,834	6.2
Individualized Education Plan (IEP)									
IEP	6,891	3,536	51.3	2,594	37.6	662	9.6	99	1.4
IEP w/ Accom.	3,600	2,042	56.7	1,305	36.3	227	6.3	26	0.7
IEP w/o Accom.	3,291	1,494	45.4	1,289	39.2	435	13.2	73	2.2
Plan 504	1,072	195	18.2	523	48.8	299	27.9	55	5.1
Plan 504 w/ Accom.	319	68	21.3	165	51.7	76	23.8	10	3.1
Plan 504 w/o Accom.	753	127	16.9	358	47.5	223	29.6	45	6.0
English Language Learners (ELL)									
ELL	1,667	894	53.6	664	39.8	94	5.6	15	0.9
ELL w/ Accom.	297	169	56.9	117	39.4	9	3.0	2	0.7
ELL w/o Accom.	1,370	725	52.9	547	39.9	85	6.2	13	1.0
Non-English Language Learners (Non-ELL)									
Non-ELL	44,209	7,740	17.5	20,188	45.7	13,462	30.5	2,819	6.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 06									
Military									
Military	258	33	12.8	98	38.0	98	38.0	29	11.2
Non-Military	45,618	8,601	18.9	20,754	45.5	13,458	29.5	2,805	6.2
Foster									
Foster	266	75	28.2	137	51.5	47	17.7	7	2.6
Non-Foster	45,610	8,559	18.8	20,715	45.4	13,509	29.6	2,827	6.2

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 07									
Total									
All	47,554	22,240	46.8	9,087	19.1	12,853	27.0	3,374	7.1
Form									
Form 1	19,110	10,005	52.4	3,274	17.1	4,759	24.9	1,072	5.6
Form 2	14,221	5,910	41.6	3,132	22.0	4,006	28.2	1,173	8.3
Form 3	14,223	6,325	44.5	2,681	18.9	4,088	28.7	1,129	7.9
Ethnicity									
Hispanic or Latino	8,024	4,605	57.4	1,501	18.7	1,630	20.3	288	3.6
Race									
American Indian/:Alaskan Native	6,910	3,430	49.6	1,369	19.8	1,751	25.3	360	5.2
Asian	1,021	225	22.0	167	16.4	386	37.8	243	23.8
Black/:African American	4,170	2,904	69.6	641	15.4	547	13.1	78	1.9
Pacific Islander	151	94	62.3	33	21.9	20	13.3	4	2.7
White/:Caucasian	23,411	9,203	39.3	4,630	19.8	7,448	31.8	2,130	9.1
Two or More Races	3,867	1,779	46.0	746	19.3	1,071	27.7	271	7.0
Gender									
Female	23,187	10,794	46.6	4,600	19.8	6,332	27.3	1,461	6.3
Male	24,312	11,418	47.0	4,473	18.4	6,510	26.8	1,911	7.9
Not Indicated	55	28	50.9	14	25.5	11	20.0	2	3.6
Other									
ELL 1st Yr: Proficient	199	89	44.7	56	28.1	43	21.6	11	5.5
ELL 2nd Yr: Proficient	432	244	56.5	94	21.8	81	18.8	13	3.0
Econ. Disadv.	29,240	16,707	57.1	5,521	18.9	6,027	20.6	985	3.4
Non-Econ. Disadv.	18,314	5,533	30.2	3,566	19.5	6,826	37.3	2,389	13.0
Migrant	30	18	60.0	5	16.7	5	16.7	2	6.7
Non-Migrant	47,524	22,222	46.8	9,082	19.1	12,848	27.0	3,372	7.1
Individualized Education Plan (IEP)									
IEP	7,705	6,211	80.6	791	10.3	598	7.8	105	1.4
IEP w/ Accom.	3,877	3,281	84.6	364	9.4	203	5.2	29	0.8
IEP w/o Accom.	3,828	2,930	76.5	427	11.2	395	10.3	76	2.0
Plan 504	995	486	48.8	200	20.1	239	24.0	70	7.0
Plan 504 w/ Accom.	229	129	56.3	49	21.4	42	18.3	9	3.9
Plan 504 w/o Accom.	766	357	46.6	151	19.7	197	25.7	61	8.0
English Language Learners (ELL)									
ELL	2,185	1,768	80.9	257	11.8	141	6.5	19	0.9
ELL w/ Accom.	294	243	82.7	33	11.2	16	5.4	2	0.7
ELL w/o Accom.	1,891	1,525	80.7	224	11.9	125	6.6	17	0.9
Non-English Language Learners (Non-ELL)									
Non-ELL	45,369	20,472	45.1	8,830	19.5	12,712	28.0	3,355	7.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 07									
Military									
Military	228	90	39.5	40	17.5	80	35.1	18	7.9
Non-Military	47,326	22,150	46.8	9,047	19.1	12,773	27.0	3,356	7.1
Foster									
Foster	245	160	65.3	34	13.9	38	15.5	13	5.3
Non-Foster	47,309	22,080	46.7	9,053	19.1	12,815	27.1	3,361	7.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 08									
Total									
All	47,141	23,065	48.9	13,106	27.8	5,356	11.4	5,614	11.9
Form									
Form 1	18,715	10,242	54.7	4,656	24.9	1,784	9.5	2,033	10.9
Form 2	14,218	6,601	46.4	4,081	28.7	1,702	12.0	1,834	12.9
Form 3	14,208	6,222	43.8	4,369	30.8	1,870	13.2	1,747	12.3
Ethnicity									
Hispanic or Latino	7,722	4,615	59.8	1,956	25.3	634	8.2	517	6.7
Race									
American Indian/:Alaskan Native	6,814	3,664	53.8	1,887	27.7	681	10.0	582	8.5
Asian	960	215	22.4	230	24.0	169	17.6	346	36.0
Black/:African American	4,098	2,739	66.8	936	22.8	242	5.9	181	4.4
Pacific Islander	164	101	61.6	41	25.0	14	8.5	8	4.9
White/:Caucasian	23,721	9,970	42.0	7,018	29.6	3,171	13.4	3,562	15.0
Two or More Races	3,662	1,761	48.1	1,038	28.4	445	12.2	418	11.4
Gender									
Female	23,200	10,754	46.4	6,938	29.9	2,747	11.8	2,761	11.9
Male	23,870	12,260	51.4	6,156	25.8	2,605	10.9	2,849	11.9
Not Indicated	71	51	71.8	12	16.9	4	5.6	4	5.6
Other									
ELL 1st Yr: Proficient	183	84	45.9	69	37.7	20	10.9	10	5.5
ELL 2nd Yr: Proficient	241	106	44.0	74	30.7	33	13.7	28	11.6
Econ. Disadv.	28,521	16,868	59.1	7,365	25.8	2,460	8.6	1,828	6.4
Non-Econ. Disadv.	18,620	6,197	33.3	5,741	30.8	2,896	15.6	3,786	20.3
Migrant	35	19	54.3	10	28.6	4	11.4	2	5.7
Non-Migrant	47,106	23,046	48.9	13,096	27.8	5,352	11.4	5,612	11.9
Individualized Education Plan (IEP)									
IEP	7,240	6,143	84.9	795	11.0	183	2.5	119	1.6
IEP w/ Accom.	3,905	3,439	88.1	351	9.0	72	1.8	43	1.1
IEP w/o Accom.	3,335	2,704	81.1	444	13.3	111	3.3	76	2.3
Plan 504	964	479	49.7	269	27.9	120	12.5	96	10.0
Plan 504 w/ Accom.	197	110	55.8	51	25.9	22	11.2	14	7.1
Plan 504 w/o Accom.	767	369	48.1	218	28.4	98	12.8	82	10.7
English Language Learners (ELL)									
ELL	2,105	1,741	82.7	290	13.8	45	2.1	29	1.4
ELL w/ Accom.	375	321	85.6	44	11.7	8	2.1	2	0.5
ELL w/o Accom.	1,730	1,420	82.1	246	14.2	37	2.1	27	1.6
Non-English Language Learners (Non-ELL)									
Non-ELL	45,036	21,324	47.4	12,816	28.5	5,311	11.8	5,585	12.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 08									
Military									
Military	227	84	37.0	80	35.2	27	11.9	36	15.9
Non-Military	46,914	22,981	49.0	13,026	27.8	5,329	11.4	5,578	11.9
Foster									
Foster	237	150	63.3	60	25.3	20	8.4	7	3.0
Non-Foster	46,904	22,915	48.9	13,046	27.8	5,336	11.4	5,607	12.0

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 10									
Total									
All	45,352	24,439	53.9	9,658	21.3	6,985	15.4	4,270	9.4
Form									
Form 1	16,973	9,421	55.5	3,619	21.3	2,421	14.3	1,512	8.9
Form 2	14,163	7,832	55.3	2,779	19.6	2,200	15.5	1,352	9.6
Form 3	14,216	7,186	50.6	3,260	22.9	2,364	16.6	1,406	9.9
Ethnicity									
Hispanic or Latino	6,933	4,418	63.7	1,391	20.1	776	11.2	348	5.0
Race									
American Indian/:Alaskan Native	6,690	3,902	58.3	1,479	22.1	920	13.8	389	5.8
Asian	1,096	333	30.4	182	16.6	244	22.3	337	30.8
Black/:African American	3,934	2,883	73.3	638	16.2	295	7.5	118	3.0
Pacific Islander	155	92	59.4	33	21.3	20	12.9	10	6.5
White/:Caucasian	23,341	11,059	47.4	5,290	22.7	4,235	18.1	2,757	11.8
Two or More Races	3,203	1,752	54.7	645	20.1	495	15.5	311	9.7
Gender									
Female	22,336	11,576	51.8	5,157	23.1	3,583	16.0	2,020	9.0
Male	22,991	12,846	55.9	4,496	19.6	3,399	14.8	2,250	9.8
Not Indicated	25	17	68.0	5	20.0	3	12.0	0	0.0
Other									
ELL 1st Yr: Proficient	584	411	70.4	110	18.8	48	8.2	15	2.6
ELL 2nd Yr: Proficient	218	136	62.4	45	20.6	23	10.6	14	6.4
Econ. Disadv.	24,793	16,075	64.8	4,815	19.4	2,722	11.0	1,181	4.8
Non-Econ. Disadv.	20,559	8,364	40.7	4,843	23.6	4,263	20.7	3,089	15.0
Migrant	32	17	53.1	4	12.5	7	21.9	4	12.5
Non-Migrant	45,320	24,422	53.9	9,654	21.3	6,978	15.4	4,266	9.4
Individualized Education Plan (IEP)									
IEP	6,532	5,834	89.3	494	7.6	147	2.3	57	0.9
IEP w/ Accom.	2,173	1,979	91.1	144	6.6	38	1.8	12	0.6
IEP w/o Accom.	4,359	3,855	88.4	350	8.0	109	2.5	45	1.0
Plan 504	882	503	57.0	192	21.8	116	13.2	71	8.1
Plan 504 w/ Accom.	77	46	59.7	17	22.1	9	11.7	5	6.5
Plan 504 w/o Accom.	805	457	56.8	175	21.7	107	13.3	66	8.2
English Language Learners (ELL)									
ELL	1,625	1,438	88.5	115	7.1	48	3.0	24	1.5
ELL w/ Accom.	278	255	91.7	14	5.0	4	1.4	5	1.8
ELL w/o Accom.	1,347	1,183	87.8	101	7.5	44	3.3	19	1.4
Non-English Language Learners (Non-ELL)									
Non-ELL	43,727	23,001	52.6	9,543	21.8	6,937	15.9	4,246	9.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 10									
Military									
Military	130	62	47.7	24	18.5	27	20.8	17	13.1
Non-Military	45,222	24,377	53.9	9,634	21.3	6,958	15.4	4,253	9.4
Foster									
Foster	196	134	68.4	41	20.9	16	8.2	5	2.6
Non-Foster	45,156	24,305	53.8	9,617	21.3	6,969	15.4	4,265	9.5

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 03	N	N	%	N	%	N	%	N	%
Military	234	25	10.7	62	26.5	94	40.2	53	22.7
Non-Military	52,284	10,339	19.8	16,603	31.8	16,470	31.5	8,872	17.0
Foster									
Foster	394	115	29.2	141	35.8	105	26.7	33	8.4
Non-Foster	52,124	10,249	19.7	16,524	31.7	16,459	31.6	8,892	17.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 04									
Total									
All	50,677	10,455	20.6	18,251	36.0	14,863	29.3	7,108	14.0
Form									
Form 1	16,913	3,573	21.1	5,856	34.6	5,273	31.2	2,211	13.1
Form 2	16,920	3,392	20.1	5,899	34.9	5,079	30.0	2,550	15.1
Form 3	16,844	3,490	20.7	6,496	38.6	4,511	26.8	2,347	13.9
Ethnicity									
Hispanic or Latino	9,251	2,683	29.0	3,657	39.5	2,193	23.7	718	7.8
Race									
American Indian/:Alaskan Native	6,646	1,318	19.8	2,639	39.7	1,939	29.2	750	11.3
Asian	988	90	9.1	207	21.0	342	34.6	349	35.3
Black/:African American	4,355	1,768	40.6	1,630	37.4	733	16.8	224	5.1
Pacific Islander	166	48	28.9	66	39.8	37	22.3	15	9.0
White/:Caucasian	24,235	3,598	14.9	8,134	33.6	8,098	33.4	4,405	18.2
Two or More Races	5,036	950	18.9	1,918	38.1	1,521	30.2	647	12.9
Gender									
Female	24,869	5,353	21.5	9,359	37.6	7,094	28.5	3,063	12.3
Male	25,770	5,086	19.7	8,878	34.5	7,764	30.1	4,042	15.7
Not Indicated	38	16	42.1	14	36.8	5	13.2	3	7.9
Other									
ELL 1st Yr: Proficient	1,798	311	17.3	766	42.6	545	30.3	176	9.8
ELL 2nd Yr: Proficient	584	40	6.9	215	36.8	215	36.8	114	19.5
Econ. Disadv.	31,870	8,179	25.7	12,731	40.0	8,240	25.9	2,720	8.5
Non-Econ. Disadv.	18,807	2,276	12.1	5,520	29.4	6,623	35.2	4,388	23.3
Migrant	30	7	23.3	14	46.7	7	23.3	2	6.7
Non-Migrant	50,647	10,448	20.6	18,237	36.0	14,856	29.3	7,106	14.0
Individualized Education Plan (IEP)									
IEP	8,789	3,725	42.4	3,199	36.4	1,450	16.5	415	4.7
IEP w/ Accom.	5,293	2,632	49.7	1,954	36.9	608	11.5	99	1.9
IEP w/o Accom.	3,496	1,093	31.3	1,245	35.6	842	24.1	316	9.0
Plan 504	964	202	21.0	388	40.3	266	27.6	108	11.2
Plan 504 w/ Accom.	469	113	24.1	190	40.5	132	28.1	34	7.3
Plan 504 w/o Accom.	495	89	18.0	198	40.0	134	27.1	74	15.0
English Language Learners (ELL)									
ELL	4,144	1,817	43.9	1,632	39.4	580	14.0	115	2.8
ELL w/ Accom.	1,354	668	49.3	507	37.4	154	11.4	25	1.9
ELL w/o Accom.	2,790	1,149	41.2	1,125	40.3	426	15.3	90	3.2
Non-English Language Learners (Non-ELL)									
Non-ELL	46,533	8,638	18.6	16,619	35.7	14,283	30.7	6,993	15.0

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 04	N	N	%	N	%	N	%	N	%
Military									
Military	254	16	6.3	86	33.9	80	31.5	72	28.4
Non-Military	50,423	10,439	20.7	18,165	36.0	14,783	29.3	7,036	14.0
Foster									
Foster	360	117	32.5	135	37.5	79	21.9	29	8.1
Non-Foster	50,317	10,338	20.6	18,116	36.0	14,784	29.4	7,079	14.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 05	N	N	%	N	%	N	%	N	%
Total									
All	48,460	8,146	16.8	19,953	41.2	14,459	29.8	5,902	12.2
Form									
Form 1	16,146	3,141	19.5	6,682	41.4	4,573	28.3	1,750	10.8
Form 2	16,160	2,535	15.7	6,852	42.4	4,555	28.2	2,218	13.7
Form 3	16,154	2,470	15.3	6,419	39.7	5,331	33.0	1,934	12.0
Ethnicity									
Hispanic or Latino	8,760	1,921	21.9	4,016	45.8	2,186	25.0	637	7.3
Race									
American Indian/:Alaskan Native	6,644	1,114	16.8	2,993	45.1	1,919	28.9	618	9.3
Asian	951	70	7.4	245	25.8	318	33.4	318	33.4
Black/:African American	4,250	1,403	33.0	1,836	43.2	829	19.5	182	4.3
Pacific Islander	164	37	22.6	68	41.5	44	26.8	15	9.2
White/:Caucasian	23,245	2,897	12.5	8,920	38.4	7,810	33.6	3,618	15.6
Two or More Races	4,446	704	15.8	1,875	42.2	1,353	30.4	514	11.6
Gender									
Female	23,927	3,905	16.3	10,193	42.6	7,177	30.0	2,652	11.1
Male	24,490	4,229	17.3	9,738	39.8	7,273	29.7	3,250	13.3
Not Indicated	43	12	27.9	22	51.2	9	20.9	0	0.0
Other									
ELL 1st Yr: Proficient	1,420	210	14.8	731	51.5	396	27.9	83	5.9
ELL 2nd Yr: Proficient	1,711	261	15.3	809	47.3	490	28.6	151	8.8
Econ. Disadv.	30,007	6,327	21.1	13,725	45.7	7,771	25.9	2,184	7.3
Non-Econ. Disadv.	18,453	1,819	9.9	6,228	33.8	6,688	36.2	3,718	20.2
Migrant	31	4	12.9	14	45.2	11	35.5	2	6.5
Non-Migrant	48,429	8,142	16.8	19,939	41.2	14,448	29.8	5,900	12.2
Individualized Education Plan (IEP)									
IEP	8,228	3,285	39.9	3,567	43.4	1,111	13.5	265	3.2
IEP w/ Accom.	5,220	2,345	44.9	2,258	43.3	542	10.4	75	1.4
IEP w/o Accom.	3,008	940	31.3	1,309	43.5	569	18.9	190	6.3
Plan 504	1,048	178	17.0	462	44.1	313	29.9	95	9.1
Plan 504 w/ Accom.	514	107	20.8	243	47.3	133	25.9	31	6.0
Plan 504 w/o Accom.	534	71	13.3	219	41.0	180	33.7	64	12.0
English Language Learners (ELL)									
ELL	2,600	1,064	40.9	1,165	44.8	313	12.0	58	2.2
ELL w/ Accom.	863	387	44.8	367	42.5	97	11.2	12	1.4
ELL w/o Accom.	1,737	677	39.0	798	45.9	216	12.4	46	2.7
Non-English Language Learners (Non-ELL)									
Non-ELL	45,860	7,082	15.4	18,788	41.0	14,146	30.9	5,844	12.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 05	N	N	%	N	%	N	%	N	%
Military									
Military	246	17	6.9	87	35.4	98	39.8	44	17.9
Non-Military	48,214	8,129	16.9	19,866	41.2	14,361	29.8	5,858	12.2
Foster									
Foster	299	83	27.8	147	49.2	57	19.1	12	4.0
Non-Foster	48,161	8,063	16.7	19,806	41.1	14,402	29.9	5,890	12.2

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 06	N	N	%	N	%	N	%	N	%
Total									
All	45,876	8,634	18.8	20,852	45.5	13,556	29.6	2,834	6.2
Form									
Form 1	18,114	4,313	23.8	8,513	47.0	4,392	24.3	896	5.0
Form 2	13,898	2,297	16.5	6,038	43.5	4,589	33.0	974	7.0
Form 3	13,864	2,024	14.6	6,301	45.5	4,575	33.0	964	7.0
Ethnicity									
Hispanic or Latino	7,529	1,883	25.0	3,689	49.0	1,721	22.9	236	3.1
Race									
American Indian/:Alaskan Native	6,604	1,284	19.4	3,205	48.5	1,856	28.1	259	3.9
Asian	884	83	9.4	249	28.2	359	40.6	193	21.8
Black/:African American	3,774	1,420	37.6	1,763	46.7	532	14.1	59	1.6
Pacific Islander	143	60	42.0	56	39.2	19	13.3	8	5.6
White/:Caucasian	23,074	3,234	14.0	10,111	43.8	7,879	34.2	1,850	8.0
Two or More Races	3,868	670	17.3	1,779	46.0	1,190	30.8	229	5.9
Gender									
Female	22,439	4,339	19.3	10,684	47.6	6,189	27.6	1,227	5.5
Male	23,363	4,274	18.3	10,138	43.4	7,347	31.5	1,604	6.9
Not Indicated	74	21	28.4	30	40.5	20	27.0	3	4.1
Other									
ELL 1st Yr: Proficient	634	148	23.3	348	54.9	129	20.4	9	1.4
ELL 2nd Yr: Proficient	903	183	20.3	514	56.9	189	20.9	17	1.9
Econ. Disadv.	27,891	6,812	24.4	13,618	48.8	6,550	23.5	911	3.3
Non-Econ. Disadv.	17,985	1,822	10.1	7,234	40.2	7,006	39.0	1,923	10.7
Migrant	30	8	26.7	15	50.0	7	23.3	0	0.0
Non-Migrant	45,846	8,626	18.8	20,837	45.5	13,549	29.6	2,834	6.2
Individualized Education Plan (IEP)									
IEP	6,891	3,536	51.3	2,594	37.6	662	9.6	99	1.4
IEP w/ Accom.	3,600	2,042	56.7	1,305	36.3	227	6.3	26	0.7
IEP w/o Accom.	3,291	1,494	45.4	1,289	39.2	435	13.2	73	2.2
Plan 504	1,072	195	18.2	523	48.8	299	27.9	55	5.1
Plan 504 w/ Accom.	319	68	21.3	165	51.7	76	23.8	10	3.1
Plan 504 w/o Accom.	753	127	16.9	358	47.5	223	29.6	45	6.0
English Language Learners (ELL)									
ELL	1,667	894	53.6	664	39.8	94	5.6	15	0.9
ELL w/ Accom.	297	169	56.9	117	39.4	9	3.0	2	0.7
ELL w/o Accom.	1,370	725	52.9	547	39.9	85	6.2	13	1.0
Non-English Language Learners (Non-ELL)									
Non-ELL	44,209	7,740	17.5	20,188	45.7	13,462	30.5	2,819	6.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 06	N	N	%	N	%	N	%	N	%
Military									
Military	258	33	12.8	98	38.0	98	38.0	29	11.2
Non-Military	45,618	8,601	18.9	20,754	45.5	13,458	29.5	2,805	6.2
Foster									
Foster	266	75	28.2	137	51.5	47	17.7	7	2.6
Non-Foster	45,610	8,559	18.8	20,715	45.4	13,509	29.6	2,827	6.2

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 07									
Total									
All	47,554	22,240	46.8	9,087	19.1	12,853	27.0	3,374	7.1
Form									
Form 1	19,110	10,005	52.4	3,274	17.1	4,759	24.9	1,072	5.6
Form 2	14,221	5,910	41.6	3,132	22.0	4,006	28.2	1,173	8.3
Form 3	14,223	6,325	44.5	2,681	18.9	4,088	28.7	1,129	7.9
Ethnicity									
Hispanic or Latino	8,024	4,605	57.4	1,501	18.7	1,630	20.3	288	3.6
Race									
American Indian/:Alaskan Native	6,910	3,430	49.6	1,369	19.8	1,751	25.3	360	5.2
Asian	1,021	225	22.0	167	16.4	386	37.8	243	23.8
Black/:African American	4,170	2,904	69.6	641	15.4	547	13.1	78	1.9
Pacific Islander	151	94	62.3	33	21.9	20	13.3	4	2.7
White/:Caucasian	23,411	9,203	39.3	4,630	19.8	7,448	31.8	2,130	9.1
Two or More Races	3,867	1,779	46.0	746	19.3	1,071	27.7	271	7.0
Gender									
Female	23,187	10,794	46.6	4,600	19.8	6,332	27.3	1,461	6.3
Male	24,312	11,418	47.0	4,473	18.4	6,510	26.8	1,911	7.9
Not Indicated	55	28	50.9	14	25.5	11	20.0	2	3.6
Other									
ELL 1st Yr: Proficient	199	89	44.7	56	28.1	43	21.6	11	5.5
ELL 2nd Yr: Proficient	432	244	56.5	94	21.8	81	18.8	13	3.0
Econ. Disadv.	29,240	16,707	57.1	5,521	18.9	6,027	20.6	985	3.4
Non-Econ. Disadv.	18,314	5,533	30.2	3,566	19.5	6,826	37.3	2,389	13.0
Migrant	30	18	60.0	5	16.7	5	16.7	2	6.7
Non-Migrant	47,524	22,222	46.8	9,082	19.1	12,848	27.0	3,372	7.1
Individualized Education Plan (IEP)									
IEP	7,705	6,211	80.6	791	10.3	598	7.8	105	1.4
IEP w/ Accom.	3,877	3,281	84.6	364	9.4	203	5.2	29	0.8
IEP w/o Accom.	3,828	2,930	76.5	427	11.2	395	10.3	76	2.0
Plan 504	995	486	48.8	200	20.1	239	24.0	70	7.0
Plan 504 w/ Accom.	229	129	56.3	49	21.4	42	18.3	9	3.9
Plan 504 w/o Accom.	766	357	46.6	151	19.7	197	25.7	61	8.0
English Language Learners (ELL)									
ELL	2,185	1,768	80.9	257	11.8	141	6.5	19	0.9
ELL w/ Accom.	294	243	82.7	33	11.2	16	5.4	2	0.7
ELL w/o Accom.	1,891	1,525	80.7	224	11.9	125	6.6	17	0.9
Non-English Language Learners (Non-ELL)									
Non-ELL	45,369	20,472	45.1	8,830	19.5	12,712	28.0	3,355	7.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 07									
Military									
Military	228	90	39.5	40	17.5	80	35.1	18	7.9
Non-Military	47,326	22,150	46.8	9,047	19.1	12,773	27.0	3,356	7.1
Foster									
Foster	245	160	65.3	34	13.9	38	15.5	13	5.3
Non-Foster	47,309	22,080	46.7	9,053	19.1	12,815	27.1	3,361	7.1

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 08									
Total									
All	47,141	23,065	48.9	13,106	27.8	5,356	11.4	5,614	11.9
Form									
Form 1	18,715	10,242	54.7	4,656	24.9	1,784	9.5	2,033	10.9
Form 2	14,218	6,601	46.4	4,081	28.7	1,702	12.0	1,834	12.9
Form 3	14,208	6,222	43.8	4,369	30.8	1,870	13.2	1,747	12.3
Ethnicity									
Hispanic or Latino	7,722	4,615	59.8	1,956	25.3	634	8.2	517	6.7
Race									
American Indian/:Alaskan Native	6,814	3,664	53.8	1,887	27.7	681	10.0	582	8.5
Asian	960	215	22.4	230	24.0	169	17.6	346	36.0
Black/:African American	4,098	2,739	66.8	936	22.8	242	5.9	181	4.4
Pacific Islander	164	101	61.6	41	25.0	14	8.5	8	4.9
White/:Caucasian	23,721	9,970	42.0	7,018	29.6	3,171	13.4	3,562	15.0
Two or More Races	3,662	1,761	48.1	1,038	28.4	445	12.2	418	11.4
Gender									
Female	23,200	10,754	46.4	6,938	29.9	2,747	11.8	2,761	11.9
Male	23,870	12,260	51.4	6,156	25.8	2,605	10.9	2,849	11.9
Not Indicated	71	51	71.8	12	16.9	4	5.6	4	5.6
Other									
ELL 1st Yr: Proficient	183	84	45.9	69	37.7	20	10.9	10	5.5
ELL 2nd Yr: Proficient	241	106	44.0	74	30.7	33	13.7	28	11.6
Econ. Disadv.	28,521	16,868	59.1	7,365	25.8	2,460	8.6	1,828	6.4
Non-Econ. Disadv.	18,620	6,197	33.3	5,741	30.8	2,896	15.6	3,786	20.3
Migrant	35	19	54.3	10	28.6	4	11.4	2	5.7
Non-Migrant	47,106	23,046	48.9	13,096	27.8	5,352	11.4	5,612	11.9
Individualized Education Plan (IEP)									
IEP	7,240	6,143	84.9	795	11.0	183	2.5	119	1.6
IEP w/ Accom.	3,905	3,439	88.1	351	9.0	72	1.8	43	1.1
IEP w/o Accom.	3,335	2,704	81.1	444	13.3	111	3.3	76	2.3
Plan 504	964	479	49.7	269	27.9	120	12.5	96	10.0
Plan 504 w/ Accom.	197	110	55.8	51	25.9	22	11.2	14	7.1
Plan 504 w/o Accom.	767	369	48.1	218	28.4	98	12.8	82	10.7
English Language Learners (ELL)									
ELL	2,105	1,741	82.7	290	13.8	45	2.1	29	1.4
ELL w/ Accom.	375	321	85.6	44	11.7	8	2.1	2	0.5
ELL w/o Accom.	1,730	1,420	82.1	246	14.2	37	2.1	27	1.6
Non-English Language Learners (Non-ELL)									
Non-ELL	45,036	21,324	47.4	12,816	28.5	5,311	11.8	5,585	12.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Mathematics - Grade 08									
Military									
Military	227	84	37.0	80	35.2	27	11.9	36	15.9
Non-Military	46,914	22,981	49.0	13,026	27.8	5,329	11.4	5,578	11.9
Foster									
Foster	237	150	63.3	60	25.3	20	8.4	7	3.0
Non-Foster	46,904	22,915	48.9	13,046	27.8	5,336	11.4	5,607	12.0

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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Mathematics - Grade 10									
Total									
All	45,352	24,439	53.9	9,658	21.3	6,985	15.4	4,270	9.4
Form									
Form 1	16,973	9,421	55.5	3,619	21.3	2,421	14.3	1,512	8.9
Form 2	14,163	7,832	55.3	2,779	19.6	2,200	15.5	1,352	9.6
Form 3	14,216	7,186	50.6	3,260	22.9	2,364	16.6	1,406	9.9
Ethnicity									
Hispanic or Latino	6,933	4,418	63.7	1,391	20.1	776	11.2	348	5.0
Race									
American Indian/:Alaskan Native	6,690	3,902	58.3	1,479	22.1	920	13.8	389	5.8
Asian	1,096	333	30.4	182	16.6	244	22.3	337	30.8
Black/:African American	3,934	2,883	73.3	638	16.2	295	7.5	118	3.0
Pacific Islander	155	92	59.4	33	21.3	20	12.9	10	6.5
White/:Caucasian	23,341	11,059	47.4	5,290	22.7	4,235	18.1	2,757	11.8
Two or More Races	3,203	1,752	54.7	645	20.1	495	15.5	311	9.7
Gender									
Female	22,336	11,576	51.8	5,157	23.1	3,583	16.0	2,020	9.0
Male	22,991	12,846	55.9	4,496	19.6	3,399	14.8	2,250	9.8
Not Indicated	25	17	68.0	5	20.0	3	12.0	0	0.0
Other									
ELL 1st Yr: Proficient	584	411	70.4	110	18.8	48	8.2	15	2.6
ELL 2nd Yr: Proficient	218	136	62.4	45	20.6	23	10.6	14	6.4
Econ. Disadv.	24,793	16,075	64.8	4,815	19.4	2,722	11.0	1,181	4.8
Non-Econ. Disadv.	20,559	8,364	40.7	4,843	23.6	4,263	20.7	3,089	15.0
Migrant	32	17	53.1	4	12.5	7	21.9	4	12.5
Non-Migrant	45,320	24,422	53.9	9,654	21.3	6,978	15.4	4,266	9.4
Individualized Education Plan (IEP)									
IEP	6,532	5,834	89.3	494	7.6	147	2.3	57	0.9
IEP w/ Accom.	2,173	1,979	91.1	144	6.6	38	1.8	12	0.6
IEP w/o Accom.	4,359	3,855	88.4	350	8.0	109	2.5	45	1.0
Plan 504	882	503	57.0	192	21.8	116	13.2	71	8.1
Plan 504 w/ Accom.	77	46	59.7	17	22.1	9	11.7	5	6.5
Plan 504 w/o Accom.	805	457	56.8	175	21.7	107	13.3	66	8.2
English Language Learners (ELL)									
ELL	1,625	1,438	88.5	115	7.1	48	3.0	24	1.5
ELL w/ Accom.	278	255	91.7	14	5.0	4	1.4	5	1.8
ELL w/o Accom.	1,347	1,183	87.8	101	7.5	44	3.3	19	1.4
Non-English Language Learners (Non-ELL)									
Non-ELL	43,727	23,001	52.6	9,543	21.8	6,937	15.9	4,246	9.7

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Mathematics - Grade 10	N	N	%	N	%	N	%	N	%
Military									
Military	130	62	47.7	24	18.5	27	20.8	17	13.1
Non-Military	45,222	24,377	53.9	9,634	21.3	6,958	15.4	4,253	9.4
Foster									
Foster	196	134	68.4	41	20.9	16	8.2	5	2.6
Non-Foster	45,156	24,305	53.8	9,617	21.3	6,969	15.4	4,265	9.5

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Science - Grade 05									
Total									
All	48,450	10,429	21.5	13,023	26.9	17,568	36.3	7,430	15.3
Form									
Form 1	48,450	10,429	21.5	13,023	26.9	17,568	36.3	7,430	15.3
Ethnicity									
Hispanic or Latino	8,739	2,683	30.7	2,729	31.2	2,670	30.6	657	7.5
Race									
American Indian/:Alaskan Native	6,656	1,462	22.0	1,906	28.6	2,432	36.5	856	12.9
Asian	944	123	13.0	196	20.8	344	36.4	281	29.8
Black/:African American	4,247	1,737	40.9	1,311	30.9	994	23.4	205	4.8
Pacific Islander	165	64	38.8	44	26.7	50	30.3	7	4.2
White/:Caucasian	23,264	3,502	15.1	5,643	24.3	9,388	40.4	4,731	20.3
Two or More Races	4,435	858	19.4	1,194	26.9	1,690	38.1	693	15.6
Gender									
Female	23,925	5,071	21.2	6,585	27.5	8,853	37.0	3,416	14.3
Male	24,481	5,341	21.8	6,423	26.2	8,705	35.6	4,012	16.4
Not Indicated	44	17	38.6	15	34.1	10	22.7	2	4.6
Other									
ELL 1st Yr: Proficient	1,415	359	25.4	539	38.1	446	31.5	71	5.0
ELL 2nd Yr: Proficient	1,700	387	22.8	599	35.2	586	34.5	128	7.5
Econ. Disadv.	30,012	8,079	26.9	8,942	29.8	10,017	33.4	2,974	9.9
Non-Econ. Disadv.	18,438	2,350	12.8	4,081	22.1	7,551	41.0	4,456	24.2
Migrant	32	6	18.8	8	25.0	12	37.5	6	18.8
Non-Migrant	48,418	10,423	21.5	13,015	26.9	17,556	36.3	7,424	15.3
Individualized Education Plan (IEP)									
IEP	8,247	3,845	46.6	2,349	28.5	1,640	19.9	413	5.0
IEP w/ Accom.	5,216	2,785	53.4	1,473	28.2	818	15.7	140	2.7
IEP w/o Accom.	3,031	1,060	35.0	876	28.9	822	27.1	273	9.0
Plan 504	1,048	236	22.5	294	28.1	355	33.9	163	15.6
Plan 504 w/ Accom.	513	145	28.3	156	30.4	156	30.4	56	10.9
Plan 504 w/o Accom.	535	91	17.0	138	25.8	199	37.2	107	20.0
English Language Learners (ELL)									
ELL	2,599	1,438	55.3	764	29.4	349	13.4	48	1.9
ELL w/ Accom.	861	522	60.6	241	28.0	89	10.3	9	1.1
ELL w/o Accom.	1,738	916	52.7	523	30.1	260	15.0	39	2.2
Non-English Language Learners (Non-ELL)									
Non-ELL	45,851	8,991	19.6	12,259	26.7	17,219	37.6	7,382	16.1
Military									
Military	250	24	9.6	52	20.8	97	38.8	77	30.8
Non-Military	48,200	10,405	21.6	12,971	26.9	17,471	36.3	7,353	15.3

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 05	N	N	%	N	%	N	%	N	%
Foster									
Foster	295	106	35.9	82	27.8	94	31.9	13	4.4
Non-Foster	48,155	10,323	21.4	12,941	26.9	17,474	36.3	7,417	15.4

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Oklahoma School Testing Program (OSTP)
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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 08									
Total									
All	47,342	17,847	37.7	10,117	21.4	14,256	30.1	5,122	10.8
Form									
Form 1	47,342	17,847	37.7	10,117	21.4	14,256	30.1	5,122	10.8
Ethnicity									
Hispanic or Latino	7,731	3,774	48.8	1,751	22.7	1,797	23.2	409	5.3
Race									
American Indian/:Alaskan Native	6,860	2,735	39.9	1,580	23.0	1,991	29.0	554	8.1
Asian	963	193	20.0	179	18.6	344	35.7	247	25.7
Black/:African American	4,156	2,494	60.0	848	20.4	674	16.2	140	3.4
Pacific Islander	166	92	55.4	26	15.7	39	23.5	9	5.4
White/:Caucasian	23,783	7,151	30.1	4,917	20.7	8,355	35.1	3,360	14.1
Two or More Races	3,683	1,408	38.2	816	22.2	1,056	28.7	403	10.9
Gender									
Female	23,293	8,517	36.6	5,334	22.9	7,187	30.9	2,255	9.7
Male	23,979	9,275	38.7	4,774	19.9	7,066	29.5	2,864	11.9
Not Indicated	70	55	78.6	9	12.9	3	4.3	3	4.3
Other									
ELL 1st Yr: Proficient	182	62	34.1	53	29.1	57	31.3	10	5.5
ELL 2nd Yr: Proficient	241	79	32.8	72	29.9	77	32.0	13	5.4
Econ. Disadv.	28,653	13,476	47.0	6,362	22.2	7,066	24.7	1,749	6.1
Non-Econ. Disadv.	18,689	4,371	23.4	3,755	20.1	7,190	38.5	3,373	18.1
Migrant	35	15	42.9	8	22.9	9	25.7	3	8.6
Non-Migrant	47,307	17,832	37.7	10,109	21.4	14,247	30.1	5,119	10.8
Individualized Education Plan (IEP)									
IEP	7,285	5,404	74.2	1,020	14.0	713	9.8	148	2.0
IEP w/ Accom.	3,929	3,113	79.2	496	12.6	278	7.1	42	1.1
IEP w/o Accom.	3,356	2,291	68.3	524	15.6	435	13.0	106	3.2
Plan 504	968	332	34.3	215	22.2	309	31.9	112	11.6
Plan 504 w/ Accom.	197	88	44.7	38	19.3	55	27.9	16	8.1
Plan 504 w/o Accom.	771	244	31.7	177	23.0	254	32.9	96	12.5
English Language Learners (ELL)									
ELL	2,113	1,684	79.7	271	12.8	145	6.9	13	0.6
ELL w/ Accom.	372	328	88.2	31	8.3	13	3.5	0	0.0
ELL w/o Accom.	1,741	1,356	77.9	240	13.8	132	7.6	13	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,229	16,163	35.7	9,846	21.8	14,111	31.2	5,109	11.3
Military									
Military	226	58	25.7	53	23.5	73	32.3	42	18.6

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 08	N	N	%	N	%	N	%	N	%
Non-Military	47,116	17,789	37.8	10,064	21.4	14,183	30.1	5,080	10.8
Foster									
Foster	241	135	56.0	50	20.8	50	20.8	6	2.5
Non-Foster	47,101	17,712	37.6	10,067	21.4	14,206	30.2	5,116	10.9

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 1 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 10									
Total									
All	29,367	16,385	55.8	8,195	27.9	3,863	13.2	924	3.2
Form									
Form 1	29,367	16,385	55.8	8,195	27.9	3,863	13.2	924	3.2
Ethnicity									
Hispanic or Latino	4,477	2,958	66.1	1,072	23.9	383	8.6	64	1.4
Race									
American Indian/:Alaskan Native	5,249	2,916	55.6	1,528	29.1	648	12.4	157	3.0
Asian	439	256	58.3	107	24.4	61	13.9	15	3.4
Black/:African American	2,414	1,874	77.6	420	17.4	102	4.2	18	0.8
Pacific Islander	113	81	71.7	21	18.6	10	8.9	1	0.9
White/:Caucasian	14,587	7,179	49.2	4,446	30.5	2,365	16.2	597	4.1
Two or More Races	2,088	1,121	53.7	601	28.8	294	14.1	72	3.5
Gender									
Female	14,181	7,788	54.9	4,201	29.6	1,795	12.7	397	2.8
Male	15,165	8,584	56.6	3,990	26.3	2,064	13.6	527	3.5
Not Indicated	21	13	61.9	4	19.1	4	19.1	0	0.0
Other									
ELL 1st Yr: Proficient	377	257	68.2	101	26.8	19	5.0	0	0.0
ELL 2nd Yr: Proficient	82	41	50.0	28	34.2	11	13.4	2	2.4
Econ. Disadv.	18,043	11,221	62.2	4,598	25.5	1,834	10.2	390	2.2
Non-Econ. Disadv.	11,324	5,164	45.6	3,597	31.8	2,029	17.9	534	4.7
Migrant	27	13	48.2	6	22.2	3	11.1	5	18.5
Non-Migrant	29,340	16,372	55.8	8,189	27.9	3,860	13.2	919	3.1
Individualized Education Plan (IEP)									
IEP	5,290	4,402	83.2	698	13.2	164	3.1	26	0.5
IEP w/ Accom.	1,911	1,599	83.7	252	13.2	51	2.7	9	0.5
IEP w/o Accom.	3,379	2,803	83.0	446	13.2	113	3.3	17	0.5
Plan 504	542	308	56.8	146	26.9	75	13.8	13	2.4
Plan 504 w/ Accom.	63	35	55.6	16	25.4	12	19.1	0	0.0
Plan 504 w/o Accom.	479	273	57.0	130	27.1	63	13.2	13	2.7
English Language Learners (ELL)									
ELL	1,341	1,194	89.0	117	8.7	25	1.9	5	0.4
ELL w/ Accom.	246	228	92.7	15	6.1	3	1.2	0	0.0
ELL w/o Accom.	1,095	966	88.2	102	9.3	22	2.0	5	0.5
Non-English Language Learners (Non-ELL)									
Non-ELL	28,026	15,191	54.2	8,078	28.8	3,838	13.7	919	3.3
Military									
Military	85	44	51.8	21	24.7	14	16.5	6	7.1

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Science - Grade 10									
Non-Military	29,282	16,341	55.8	8,174	27.9	3,849	13.1	918	3.1
Foster									
Foster	155	105	67.7	36	23.2	13	8.4	1	0.7
Non-Foster	29,212	16,280	55.7	8,159	27.9	3,850	13.2	923	3.2

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 2 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 05									
Total									
All	48,450	10,429	21.5	13,023	26.9	17,568	36.3	7,430	15.3
Form									
Form 1	48,450	10,429	21.5	13,023	26.9	17,568	36.3	7,430	15.3
Ethnicity									
Hispanic or Latino	8,739	2,683	30.7	2,729	31.2	2,670	30.6	657	7.5
Race									
American Indian/:Alaskan Native	6,656	1,462	22.0	1,906	28.6	2,432	36.5	856	12.9
Asian	944	123	13.0	196	20.8	344	36.4	281	29.8
Black/:African American	4,247	1,737	40.9	1,311	30.9	994	23.4	205	4.8
Pacific Islander	165	64	38.8	44	26.7	50	30.3	7	4.2
White/:Caucasian	23,264	3,502	15.1	5,643	24.3	9,388	40.4	4,731	20.3
Two or More Races	4,435	858	19.4	1,194	26.9	1,690	38.1	693	15.6
Gender									
Female	23,925	5,071	21.2	6,585	27.5	8,853	37.0	3,416	14.3
Male	24,481	5,341	21.8	6,423	26.2	8,705	35.6	4,012	16.4
Not Indicated	44	17	38.6	15	34.1	10	22.7	2	4.6
Other									
ELL 1st Yr: Proficient	1,415	359	25.4	539	38.1	446	31.5	71	5.0
ELL 2nd Yr: Proficient	1,700	387	22.8	599	35.2	586	34.5	128	7.5
Econ. Disadv.	30,012	8,079	26.9	8,942	29.8	10,017	33.4	2,974	9.9
Non-Econ. Disadv.	18,438	2,350	12.8	4,081	22.1	7,551	41.0	4,456	24.2
Migrant	32	6	18.8	8	25.0	12	37.5	6	18.8
Non-Migrant	48,418	10,423	21.5	13,015	26.9	17,556	36.3	7,424	15.3
Individualized Education Plan (IEP)									
IEP	8,247	3,845	46.6	2,349	28.5	1,640	19.9	413	5.0
IEP w/ Accom.	5,216	2,785	53.4	1,473	28.2	818	15.7	140	2.7
IEP w/o Accom.	3,031	1,060	35.0	876	28.9	822	27.1	273	9.0
Plan 504	1,048	236	22.5	294	28.1	355	33.9	163	15.6
Plan 504 w/ Accom.	513	145	28.3	156	30.4	156	30.4	56	10.9
Plan 504 w/o Accom.	535	91	17.0	138	25.8	199	37.2	107	20.0
English Language Learners (ELL)									
ELL	2,599	1,438	55.3	764	29.4	349	13.4	48	1.9
ELL w/ Accom.	861	522	60.6	241	28.0	89	10.3	9	1.1
ELL w/o Accom.	1,738	916	52.7	523	30.1	260	15.0	39	2.2
Non-English Language Learners (Non-ELL)									
Non-ELL	45,851	8,991	19.6	12,259	26.7	17,219	37.6	7,382	16.1
Military									
Military	250	24	9.6	52	20.8	97	38.8	77	30.8
Non-Military	48,200	10,405	21.6	12,971	26.9	17,471	36.3	7,353	15.3

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 05	N	N	%	N	%	N	%	N	%
Foster									
Foster	295	106	35.9	82	27.8	94	31.9	13	4.4
Non-Foster	48,155	10,323	21.4	12,941	26.9	17,474	36.3	7,417	15.4

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Oklahoma School Testing Program (OSTP)
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	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 08									
Total									
All	47,342	19,525	41.2	10,170	21.5	12,525	26.5	5,122	10.8
Form									
Form 1	47,342	19,525	41.2	10,170	21.5	12,525	26.5	5,122	10.8
Ethnicity									
Hispanic or Latino	7,731	4,092	52.9	1,691	21.9	1,539	19.9	409	5.3
Race									
American Indian/:Alaskan Native	6,860	2,994	43.6	1,574	22.9	1,738	25.3	554	8.1
Asian	963	228	23.7	168	17.5	320	33.2	247	25.7
Black/:African American	4,156	2,659	64.0	796	19.2	561	13.5	140	3.4
Pacific Islander	166	93	56.0	29	17.5	35	21.1	9	5.4
White/:Caucasian	23,783	7,929	33.3	5,101	21.5	7,393	31.1	3,360	14.1
Two or More Races	3,683	1,530	41.5	811	22.0	939	25.5	403	10.9
Gender									
Female	23,293	9,410	40.4	5,351	23.0	6,277	27.0	2,255	9.7
Male	23,979	10,057	41.9	4,812	20.1	6,246	26.1	2,864	11.9
Not Indicated	70	58	82.9	7	10.0	2	2.9	3	4.3
Other									
ELL 1st Yr: Proficient	182	70	38.5	54	29.7	48	26.4	10	5.5
ELL 2nd Yr: Proficient	241	92	38.2	66	27.4	70	29.1	13	5.4
Econ. Disadv.	28,653	14,617	51.0	6,190	21.6	6,097	21.3	1,749	6.1
Non-Econ. Disadv.	18,689	4,908	26.3	3,980	21.3	6,428	34.4	3,373	18.1
Migrant	35	17	48.6	7	20.0	8	22.9	3	8.6
Non-Migrant	47,307	19,508	41.2	10,163	21.5	12,517	26.5	5,119	10.8
Individualized Education Plan (IEP)									
IEP	7,285	5,630	77.3	916	12.6	591	8.1	148	2.0
IEP w/ Accom.	3,929	3,221	82.0	438	11.2	228	5.8	42	1.1
IEP w/o Accom.	3,356	2,409	71.8	478	14.2	363	10.8	106	3.2
Plan 504	968	373	38.5	219	22.6	264	27.3	112	11.6
Plan 504 w/ Accom.	197	95	48.2	42	21.3	44	22.3	16	8.1
Plan 504 w/o Accom.	771	278	36.1	177	23.0	220	28.5	96	12.5
English Language Learners (ELL)									
ELL	2,113	1,757	83.2	229	10.8	114	5.4	13	0.6
ELL w/ Accom.	372	338	90.9	28	7.5	6	1.6	0	0.0
ELL w/o Accom.	1,741	1,419	81.5	201	11.6	108	6.2	13	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,229	17,768	39.3	9,941	22.0	12,411	27.4	5,109	11.3
Military									
Military	226	65	28.8	57	25.2	62	27.4	42	18.6

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Science - Grade 08									
Non-Military	47,116	19,460	41.3	10,113	21.5	12,463	26.5	5,080	10.8
Foster									
Foster	241	142	58.9	53	22.0	40	16.6	6	2.5
Non-Foster	47,101	19,383	41.2	10,117	21.5	12,485	26.5	5,116	10.9

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 2 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 10									
Total									
All	29,367	16,385	55.8	8,195	27.9	3,505	11.9	1,282	4.4
Form									
Form 1	29,367	16,385	55.8	8,195	27.9	3,505	11.9	1,282	4.4
Ethnicity									
Hispanic or Latino	4,477	2,958	66.1	1,072	23.9	361	8.1	86	1.9
Race									
American Indian/:Alaskan Native	5,249	2,916	55.6	1,528	29.1	588	11.2	217	4.1
Asian	439	256	58.3	107	24.4	56	12.8	20	4.6
Black/:African American	2,414	1,874	77.6	420	17.4	98	4.1	22	0.9
Pacific Islander	113	81	71.7	21	18.6	9	8.0	2	1.8
White/:Caucasian	14,587	7,179	49.2	4,446	30.5	2,127	14.6	835	5.7
Two or More Races	2,088	1,121	53.7	601	28.8	266	12.7	100	4.8
Gender									
Female	14,181	7,788	54.9	4,201	29.6	1,637	11.5	555	3.9
Male	15,165	8,584	56.6	3,990	26.3	1,864	12.3	727	4.8
Not Indicated	21	13	61.9	4	19.1	4	19.1	0	0.0
Other									
ELL 1st Yr: Proficient	377	257	68.2	101	26.8	18	4.8	1	0.3
ELL 2nd Yr: Proficient	82	41	50.0	28	34.2	11	13.4	2	2.4
Econ. Disadv.	18,043	11,221	62.2	4,598	25.5	1,680	9.3	544	3.0
Non-Econ. Disadv.	11,324	5,164	45.6	3,597	31.8	1,825	16.1	738	6.5
Migrant	27	13	48.2	6	22.2	2	7.4	6	22.2
Non-Migrant	29,340	16,372	55.8	8,189	27.9	3,503	11.9	1,276	4.4
Individualized Education Plan (IEP)									
IEP	5,290	4,402	83.2	698	13.2	151	2.9	39	0.7
IEP w/ Accom.	1,911	1,599	83.7	252	13.2	46	2.4	14	0.7
IEP w/o Accom.	3,379	2,803	83.0	446	13.2	105	3.1	25	0.7
Plan 504	542	308	56.8	146	26.9	69	12.7	19	3.5
Plan 504 w/ Accom.	63	35	55.6	16	25.4	10	15.9	2	3.2
Plan 504 w/o Accom.	479	273	57.0	130	27.1	59	12.3	17	3.6
English Language Learners (ELL)									
ELL	1,341	1,194	89.0	117	8.7	24	1.8	6	0.5
ELL w/ Accom.	246	228	92.7	15	6.1	3	1.2	0	0.0
ELL w/o Accom.	1,095	966	88.2	102	9.3	21	1.9	6	0.6
Non-English Language Learners (Non-ELL)									
Non-ELL	28,026	15,191	54.2	8,078	28.8	3,481	12.4	1,276	4.6
Military									
Military	85	44	51.8	21	24.7	12	14.1	8	9.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 10	N	N	%	N	%	N	%	N	%
Non-Military	29,282	16,341	55.8	8,174	27.9	3,493	11.9	1,274	4.4
Foster									
Foster	155	105	67.7	36	23.2	12	7.7	2	1.3
Non-Foster	29,212	16,280	55.7	8,159	27.9	3,493	12.0	1,280	4.4

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 3 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 05									
Total									
All	48,450	10,429	21.5	13,023	26.9	17,568	36.3	7,430	15.3
Form									
Form 1	48,450	10,429	21.5	13,023	26.9	17,568	36.3	7,430	15.3
Ethnicity									
Hispanic or Latino	8,739	2,683	30.7	2,729	31.2	2,670	30.6	657	7.5
Race									
American Indian/:Alaskan Native	6,656	1,462	22.0	1,906	28.6	2,432	36.5	856	12.9
Asian	944	123	13.0	196	20.8	344	36.4	281	29.8
Black/:African American	4,247	1,737	40.9	1,311	30.9	994	23.4	205	4.8
Pacific Islander	165	64	38.8	44	26.7	50	30.3	7	4.2
White/:Caucasian	23,264	3,502	15.1	5,643	24.3	9,388	40.4	4,731	20.3
Two or More Races	4,435	858	19.4	1,194	26.9	1,690	38.1	693	15.6
Gender									
Female	23,925	5,071	21.2	6,585	27.5	8,853	37.0	3,416	14.3
Male	24,481	5,341	21.8	6,423	26.2	8,705	35.6	4,012	16.4
Not Indicated	44	17	38.6	15	34.1	10	22.7	2	4.6
Other									
ELL 1st Yr: Proficient	1,415	359	25.4	539	38.1	446	31.5	71	5.0
ELL 2nd Yr: Proficient	1,700	387	22.8	599	35.2	586	34.5	128	7.5
Econ. Disadv.	30,012	8,079	26.9	8,942	29.8	10,017	33.4	2,974	9.9
Non-Econ. Disadv.	18,438	2,350	12.8	4,081	22.1	7,551	41.0	4,456	24.2
Migrant	32	6	18.8	8	25.0	12	37.5	6	18.8
Non-Migrant	48,418	10,423	21.5	13,015	26.9	17,556	36.3	7,424	15.3
Individualized Education Plan (IEP)									
IEP	8,247	3,845	46.6	2,349	28.5	1,640	19.9	413	5.0
IEP w/ Accom.	5,216	2,785	53.4	1,473	28.2	818	15.7	140	2.7
IEP w/o Accom.	3,031	1,060	35.0	876	28.9	822	27.1	273	9.0
Plan 504	1,048	236	22.5	294	28.1	355	33.9	163	15.6
Plan 504 w/ Accom.	513	145	28.3	156	30.4	156	30.4	56	10.9
Plan 504 w/o Accom.	535	91	17.0	138	25.8	199	37.2	107	20.0
English Language Learners (ELL)									
ELL	2,599	1,438	55.3	764	29.4	349	13.4	48	1.9
ELL w/ Accom.	861	522	60.6	241	28.0	89	10.3	9	1.1
ELL w/o Accom.	1,738	916	52.7	523	30.1	260	15.0	39	2.2
Non-English Language Learners (Non-ELL)									
Non-ELL	45,851	8,991	19.6	12,259	26.7	17,219	37.6	7,382	16.1
Military									
Military	250	24	9.6	52	20.8	97	38.8	77	30.8
Non-Military	48,200	10,405	21.6	12,971	26.9	17,471	36.3	7,353	15.3

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 05	N	N	%	N	%	N	%	N	%
Foster									
Foster	295	106	35.9	82	27.8	94	31.9	13	4.4
Non-Foster	48,155	10,323	21.4	12,941	26.9	17,474	36.3	7,417	15.4

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 3 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 08									
Total									
All	47,342	17,847	37.7	10,117	21.4	14,256	30.1	5,122	10.8
Form									
Form 1	47,342	17,847	37.7	10,117	21.4	14,256	30.1	5,122	10.8
Ethnicity									
Hispanic or Latino	7,731	3,774	48.8	1,751	22.7	1,797	23.2	409	5.3
Race									
American Indian/:Alaskan Native	6,860	2,735	39.9	1,580	23.0	1,991	29.0	554	8.1
Asian	963	193	20.0	179	18.6	344	35.7	247	25.7
Black/:African American	4,156	2,494	60.0	848	20.4	674	16.2	140	3.4
Pacific Islander	166	92	55.4	26	15.7	39	23.5	9	5.4
White/:Caucasian	23,783	7,151	30.1	4,917	20.7	8,355	35.1	3,360	14.1
Two or More Races	3,683	1,408	38.2	816	22.2	1,056	28.7	403	10.9
Gender									
Female	23,293	8,517	36.6	5,334	22.9	7,187	30.9	2,255	9.7
Male	23,979	9,275	38.7	4,774	19.9	7,066	29.5	2,864	11.9
Not Indicated	70	55	78.6	9	12.9	3	4.3	3	4.3
Other									
ELL 1st Yr: Proficient	182	62	34.1	53	29.1	57	31.3	10	5.5
ELL 2nd Yr: Proficient	241	79	32.8	72	29.9	77	32.0	13	5.4
Econ. Disadv.	28,653	13,476	47.0	6,362	22.2	7,066	24.7	1,749	6.1
Non-Econ. Disadv.	18,689	4,371	23.4	3,755	20.1	7,190	38.5	3,373	18.1
Migrant	35	15	42.9	8	22.9	9	25.7	3	8.6
Non-Migrant	47,307	17,832	37.7	10,109	21.4	14,247	30.1	5,119	10.8
Individualized Education Plan (IEP)									
IEP	7,285	5,404	74.2	1,020	14.0	713	9.8	148	2.0
IEP w/ Accom.	3,929	3,113	79.2	496	12.6	278	7.1	42	1.1
IEP w/o Accom.	3,356	2,291	68.3	524	15.6	435	13.0	106	3.2
Plan 504	968	332	34.3	215	22.2	309	31.9	112	11.6
Plan 504 w/ Accom.	197	88	44.7	38	19.3	55	27.9	16	8.1
Plan 504 w/o Accom.	771	244	31.7	177	23.0	254	32.9	96	12.5
English Language Learners (ELL)									
ELL	2,113	1,684	79.7	271	12.8	145	6.9	13	0.6
ELL w/ Accom.	372	328	88.2	31	8.3	13	3.5	0	0.0
ELL w/o Accom.	1,741	1,356	77.9	240	13.8	132	7.6	13	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,229	16,163	35.7	9,846	21.8	14,111	31.2	5,109	11.3
Military									
Military	226	58	25.7	53	23.5	73	32.3	42	18.6

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 08	N	N	%	N	%	N	%	N	%
Non-Military	47,116	17,789	37.8	10,064	21.4	14,183	30.1	5,080	10.8
Foster									
Foster	241	135	56.0	50	20.8	50	20.8	6	2.5
Non-Foster	47,101	17,712	37.6	10,067	21.4	14,206	30.2	5,116	10.9

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 3 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 10									
Total									
All	29,367	17,618	60.0	6,157	21.0	4,310	14.7	1,282	4.4
Form									
Form 1	29,367	17,618	60.0	6,157	21.0	4,310	14.7	1,282	4.4
Ethnicity									
Hispanic or Latino	4,477	3,136	70.1	810	18.1	445	9.9	86	1.9
Race									
American Indian/:Alaskan Native	5,249	3,155	60.1	1,136	21.6	741	14.1	217	4.1
Asian	439	273	62.2	84	19.1	62	14.1	20	4.6
Black/:African American	2,414	1,954	80.9	322	13.3	116	4.8	22	0.9
Pacific Islander	113	83	73.5	16	14.2	12	10.6	2	1.8
White/:Caucasian	14,587	7,810	53.5	3,339	22.9	2,603	17.8	835	5.7
Two or More Races	2,088	1,207	57.8	450	21.6	331	15.9	100	4.8
Gender									
Female	14,181	8,448	59.6	3,140	22.1	2,038	14.4	555	3.9
Male	15,165	9,157	60.4	3,013	19.9	2,268	15.0	727	4.8
Not Indicated	21	13	61.9	4	19.1	4	19.1	0	0.0
Other									
ELL 1st Yr: Proficient	377	280	74.3	68	18.0	28	7.4	1	0.3
ELL 2nd Yr: Proficient	82	44	53.7	21	25.6	15	18.3	2	2.4
Econ. Disadv.	18,043	11,986	66.4	3,408	18.9	2,105	11.7	544	3.0
Non-Econ. Disadv.	11,324	5,632	49.7	2,749	24.3	2,205	19.5	738	6.5
Migrant	27	13	48.2	6	22.2	2	7.4	6	22.2
Non-Migrant	29,340	17,605	60.0	6,151	21.0	4,308	14.7	1,276	4.4
Individualized Education Plan (IEP)									
IEP	5,290	4,547	86.0	508	9.6	196	3.7	39	0.7
IEP w/ Accom.	1,911	1,647	86.2	194	10.2	56	2.9	14	0.7
IEP w/o Accom.	3,379	2,900	85.8	314	9.3	140	4.1	25	0.7
Plan 504	542	322	59.4	123	22.7	78	14.4	19	3.5
Plan 504 w/ Accom.	63	37	58.7	13	20.6	11	17.5	2	3.2
Plan 504 w/o Accom.	479	285	59.5	110	23.0	67	14.0	17	3.6
English Language Learners (ELL)									
ELL	1,341	1,216	90.7	90	6.7	29	2.2	6	0.5
ELL w/ Accom.	246	232	94.3	11	4.5	3	1.2	0	0.0
ELL w/o Accom.	1,095	984	89.9	79	7.2	26	2.4	6	0.6
Non-English Language Learners (Non-ELL)									
Non-ELL	28,026	16,402	58.5	6,067	21.7	4,281	15.3	1,276	4.6
Military									
Military	85	49	57.7	15	17.7	13	15.3	8	9.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Science - Grade 10									
Non-Military	29,282	17,569	60.0	6,142	21.0	4,297	14.7	1,274	4.4
Foster									
Foster	155	109	70.3	29	18.7	15	9.7	2	1.3
Non-Foster	29,212	17,509	59.9	6,128	21.0	4,295	14.7	1,280	4.4

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 4 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 05									
Total									
All	48,450	10,429	21.5	17,171	35.4	16,311	33.7	4,539	9.4
Form									
Form 1	48,450	10,429	21.5	17,171	35.4	16,311	33.7	4,539	9.4
Ethnicity									
Hispanic or Latino	8,739	2,683	30.7	3,457	39.6	2,228	25.5	371	4.3
Race									
American Indian/:Alaskan Native	6,656	1,462	22.0	2,501	37.6	2,200	33.1	493	7.4
Asian	944	123	13.0	266	28.2	365	38.7	190	20.1
Black/:African American	4,247	1,737	40.9	1,609	37.9	783	18.4	118	2.8
Pacific Islander	165	64	38.8	51	30.9	46	27.9	4	2.4
White/:Caucasian	23,264	3,502	15.1	7,672	33.0	9,120	39.2	2,970	12.8
Two or More Races	4,435	858	19.4	1,615	36.4	1,569	35.4	393	8.9
Gender									
Female	23,925	5,071	21.2	8,722	36.5	8,087	33.8	2,045	8.6
Male	24,481	5,341	21.8	8,427	34.4	8,219	33.6	2,494	10.2
Not Indicated	44	17	38.6	22	50.0	5	11.4	0	0.0
Other									
ELL 1st Yr: Proficient	1,415	359	25.4	679	48.0	338	23.9	39	2.8
ELL 2nd Yr: Proficient	1,700	387	22.8	762	44.8	491	28.9	60	3.5
Econ. Disadv.	30,012	8,079	26.9	11,599	38.7	8,633	28.8	1,701	5.7
Non-Econ. Disadv.	18,438	2,350	12.8	5,572	30.2	7,678	41.6	2,838	15.4
Migrant	32	6	18.8	11	34.4	10	31.3	5	15.6
Non-Migrant	48,418	10,423	21.5	17,160	35.4	16,301	33.7	4,534	9.4
Individualized Education Plan (IEP)									
IEP	8,247	3,845	46.6	2,871	34.8	1,286	15.6	245	3.0
IEP w/ Accom.	5,216	2,785	53.4	1,766	33.9	594	11.4	71	1.4
IEP w/o Accom.	3,031	1,060	35.0	1,105	36.5	692	22.8	174	5.7
Plan 504	1,048	236	22.5	368	35.1	347	33.1	97	9.3
Plan 504 w/ Accom.	513	145	28.3	194	37.8	140	27.3	34	6.6
Plan 504 w/o Accom.	535	91	17.0	174	32.5	207	38.7	63	11.8
English Language Learners (ELL)									
ELL	2,599	1,438	55.3	892	34.3	242	9.3	27	1.0
ELL w/ Accom.	861	522	60.6	269	31.2	66	7.7	4	0.5
ELL w/o Accom.	1,738	916	52.7	623	35.9	176	10.1	23	1.3
Non-English Language Learners (Non-ELL)									
Non-ELL	45,851	8,991	19.6	16,279	35.5	16,069	35.1	4,512	9.8
Military									
Military	250	24	9.6	77	30.8	95	38.0	54	21.6
Non-Military	48,200	10,405	21.6	17,094	35.5	16,216	33.6	4,485	9.3

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 05	N	N	%	N	%	N	%	N	%
Foster									
Foster	295	106	35.9	112	38.0	71	24.1	6	2.0
Non-Foster	48,155	10,323	21.4	17,059	35.4	16,240	33.7	4,533	9.4

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 4 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 08									
Total									
All	47,342	17,847	37.7	10,117	21.4	14,256	30.1	5,122	10.8
Form									
Form 1	47,342	17,847	37.7	10,117	21.4	14,256	30.1	5,122	10.8
Ethnicity									
Hispanic or Latino	7,731	3,774	48.8	1,751	22.7	1,797	23.2	409	5.3
Race									
American Indian/:Alaskan Native	6,860	2,735	39.9	1,580	23.0	1,991	29.0	554	8.1
Asian	963	193	20.0	179	18.6	344	35.7	247	25.7
Black/:African American	4,156	2,494	60.0	848	20.4	674	16.2	140	3.4
Pacific Islander	166	92	55.4	26	15.7	39	23.5	9	5.4
White/:Caucasian	23,783	7,151	30.1	4,917	20.7	8,355	35.1	3,360	14.1
Two or More Races	3,683	1,408	38.2	816	22.2	1,056	28.7	403	10.9
Gender									
Female	23,293	8,517	36.6	5,334	22.9	7,187	30.9	2,255	9.7
Male	23,979	9,275	38.7	4,774	19.9	7,066	29.5	2,864	11.9
Not Indicated	70	55	78.6	9	12.9	3	4.3	3	4.3
Other									
ELL 1st Yr: Proficient	182	62	34.1	53	29.1	57	31.3	10	5.5
ELL 2nd Yr: Proficient	241	79	32.8	72	29.9	77	32.0	13	5.4
Econ. Disadv.	28,653	13,476	47.0	6,362	22.2	7,066	24.7	1,749	6.1
Non-Econ. Disadv.	18,689	4,371	23.4	3,755	20.1	7,190	38.5	3,373	18.1
Migrant	35	15	42.9	8	22.9	9	25.7	3	8.6
Non-Migrant	47,307	17,832	37.7	10,109	21.4	14,247	30.1	5,119	10.8
Individualized Education Plan (IEP)									
IEP	7,285	5,404	74.2	1,020	14.0	713	9.8	148	2.0
IEP w/ Accom.	3,929	3,113	79.2	496	12.6	278	7.1	42	1.1
IEP w/o Accom.	3,356	2,291	68.3	524	15.6	435	13.0	106	3.2
Plan 504	968	332	34.3	215	22.2	309	31.9	112	11.6
Plan 504 w/ Accom.	197	88	44.7	38	19.3	55	27.9	16	8.1
Plan 504 w/o Accom.	771	244	31.7	177	23.0	254	32.9	96	12.5
English Language Learners (ELL)									
ELL	2,113	1,684	79.7	271	12.8	145	6.9	13	0.6
ELL w/ Accom.	372	328	88.2	31	8.3	13	3.5	0	0.0
ELL w/o Accom.	1,741	1,356	77.9	240	13.8	132	7.6	13	0.8
Non-English Language Learners (Non-ELL)									
Non-ELL	45,229	16,163	35.7	9,846	21.8	14,111	31.2	5,109	11.3
Military									
Military	226	58	25.7	53	23.5	73	32.3	42	18.6

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
Science - Grade 08	N	N	%	N	%	N	%	N	%
Non-Military	47,116	17,789	37.8	10,064	21.4	14,183	30.1	5,080	10.8
Foster									
Foster	241	135	56.0	50	20.8	50	20.8	6	2.5
Non-Foster	47,101	17,712	37.6	10,067	21.4	14,206	30.2	5,116	10.9

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Oklahoma School Testing Program (OSTP)
Science - Standard Setting - Round 4 Committee Results

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
		N	N	%	N	%	N	%	N
Science - Grade 10									
Total									
All	29,367	17,618	60.0	6,157	21.0	4,310	14.7	1,282	4.4
Form									
Form 1	29,367	17,618	60.0	6,157	21.0	4,310	14.7	1,282	4.4
Ethnicity									
Hispanic or Latino	4,477	3,136	70.1	810	18.1	445	9.9	86	1.9
Race									
American Indian/:Alaskan Native	5,249	3,155	60.1	1,136	21.6	741	14.1	217	4.1
Asian	439	273	62.2	84	19.1	62	14.1	20	4.6
Black/:African American	2,414	1,954	80.9	322	13.3	116	4.8	22	0.9
Pacific Islander	113	83	73.5	16	14.2	12	10.6	2	1.8
White/:Caucasian	14,587	7,810	53.5	3,339	22.9	2,603	17.8	835	5.7
Two or More Races	2,088	1,207	57.8	450	21.6	331	15.9	100	4.8
Gender									
Female	14,181	8,448	59.6	3,140	22.1	2,038	14.4	555	3.9
Male	15,165	9,157	60.4	3,013	19.9	2,268	15.0	727	4.8
Not Indicated	21	13	61.9	4	19.1	4	19.1	0	0.0
Other									
ELL 1st Yr: Proficient	377	280	74.3	68	18.0	28	7.4	1	0.3
ELL 2nd Yr: Proficient	82	44	53.7	21	25.6	15	18.3	2	2.4
Econ. Disadv.	18,043	11,986	66.4	3,408	18.9	2,105	11.7	544	3.0
Non-Econ. Disadv.	11,324	5,632	49.7	2,749	24.3	2,205	19.5	738	6.5
Migrant	27	13	48.2	6	22.2	2	7.4	6	22.2
Non-Migrant	29,340	17,605	60.0	6,151	21.0	4,308	14.7	1,276	4.4
Individualized Education Plan (IEP)									
IEP	5,290	4,547	86.0	508	9.6	196	3.7	39	0.7
IEP w/ Accom.	1,911	1,647	86.2	194	10.2	56	2.9	14	0.7
IEP w/o Accom.	3,379	2,900	85.8	314	9.3	140	4.1	25	0.7
Plan 504	542	322	59.4	123	22.7	78	14.4	19	3.5
Plan 504 w/ Accom.	63	37	58.7	13	20.6	11	17.5	2	3.2
Plan 504 w/o Accom.	479	285	59.5	110	23.0	67	14.0	17	3.6
English Language Learners (ELL)									
ELL	1,341	1,216	90.7	90	6.7	29	2.2	6	0.5
ELL w/ Accom.	246	232	94.3	11	4.5	3	1.2	0	0.0
ELL w/o Accom.	1,095	984	89.9	79	7.2	26	2.4	6	0.6
Non-English Language Learners (Non-ELL)									
Non-ELL	28,026	16,402	58.5	6,067	21.7	4,281	15.3	1,276	4.6
Military									
Military	85	49	57.7	15	17.7	13	15.3	8	9.4

	Number and Percent in Each Performance Levels								
	Total	Unsatisfactory		Limited Knowledge		Proficient		Advanced	
	N	N	%	N	%	N	%	N	%
Science - Grade 10									
Non-Military	29,282	17,569	60.0	6,142	21.0	4,297	14.7	1,274	4.4
Foster									
Foster	155	109	70.3	29	18.7	15	9.7	2	1.3
Non-Foster	29,212	17,509	59.9	6,128	21.0	4,295	14.7	1,280	4.4

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APPENDIX L—STANDARD SETTING RESULTS

Table L-1. 2017 OK Standard Setting Report: ELA Round 1

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Limited					
	Knowledge	-0.64765	0.26270	0.11630	15.2	73.3
	Proficient	-0.13874	0.26610	0.14068	43.9	58.1
	Advanced	1.05701	0.31280	0.20766	14.2	14.2
4	Limited					
	Knowledge	-0.62585	0.27530	0.10794	28.6	73.3
	Proficient	0.22107	0.26960	0.23869	38.1	44.7
	Advanced	1.49870	0.40580	0.00000	6.7	6.7
5	Limited					
	Knowledge	-0.88324	0.25990	0.10002	28.7	80.9
	Proficient	0.01724	0.27960	0.04911	40.0	52.2
	Advanced	1.17231	0.37400	0.20371	12.2	12.2
6	Limited					
	Knowledge	-0.91616	0.27630	0.02491	40.0	81.8
	Proficient	0.23755	0.29840	0.09798	28.7	41.8
	Advanced	1.10725	0.37280	0.12135	13.1	13.1
7	Limited					
	Knowledge	-0.54707	0.28370	0.27647	24.7	71.7
	Proficient	0.16319	0.30400	0.00000	32.6	47.1
	Advanced	1.08454	0.37720	0.10642	14.5	14.5
8	Limited					
	Knowledge	-0.69508	0.30310	0.13326	34.1	79.2
	Proficient	0.31452	0.29180	0.15152	33.5	45.1
	Advanced	1.46111	0.42420	0.00000	11.6	11.6
10	Limited					
	Knowledge	-1.09572	0.32570	0.12543	31.5	87.0
	Proficient	0.10061	0.24300	0.02055	33.1	55.5
	Advanced	0.95003	0.25560	0.18552	22.4	22.4

Table L-2. 2017 OK Standard Setting Report: Math Round 1

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Limited					
	Knowledge	-2.13131	0.37400	0.00000	14.4	96.7
	Proficient	-0.95609	0.24790	0.11562	35.2	82.3
	Advanced	0.14369	0.25020	0.12622	47.1	47.1
4	Limited					
	Knowledge	-0.85598	0.28500	0.06719	36.0	79.4
						continued

Grade	Performance Level	Theta Cut	SE	MAD	At %	At or Above %
4	Proficient	0.21582	0.23060	0.03156	29.3	43.4
	Advanced	1.07636	0.31480	0.02931	14.0	14.0
5	Limited Knowledge	-0.92288	0.31960	0.09119	29.9	81.4
	Proficient	-0.00351	0.25380	0.00000	39.3	51.5
	Advanced	1.16994	0.25880	0.15748	12.2	12.2
6	Limited Knowledge	-0.69754	0.27450	0.11264	38.6	75.9
	Proficient	0.37560	0.26900	0.06487	31.1	37.3
	Advanced	1.57909	0.31490	0.23581	6.2	6.2
7	Limited Knowledge	0.02240	0.25410	0.06151	17.6	50.6
	Proficient	0.49130	0.23010	0.17953	25.9	33.0
	Advanced	1.48547	0.22170	0.02713	7.1	7.1
8	Limited Knowledge	0.05488	0.24840	0.06636	27.2	48.8
	Proficient	0.80638	0.22250	0.09280	9.7	21.6
	Advanced	1.21172	0.24950	0.03131	11.9	11.9
10	Limited Knowledge	-0.03088	0.24340	0.19325	27.6	52.4
	Proficient	0.70757	0.19320	0.05858	15.4	24.8
	Advanced	1.31796	0.17800	0.20980	9.4	9.4

Table L-3. 2017 OK Standard Setting Report: Science Round 1

Grade	Performance Level	Theta Cut	SE	MAD	At %	At or Above %
5	Limited Knowledge	-0.91364	0.33480	0.06659	26.9	78.5
	Proficient	0.01333	0.30500	0.17095	36.3	51.6
	Advanced	1.14632	0.32040	0.26336	15.3	15.3
8	Limited Knowledge	-0.34011	0.29830	0.12405	21.4	62.3
	Proficient	0.27999	0.28320	0.08315	30.1	40.9
	Advanced	1.32579	0.33330	0.24435	10.8	10.8
10	Limited Knowledge	0.23461	0.30420	0.06169	27.9	44.2
	Proficient	1.04237	0.26860	0.03976	13.2	16.3
	Advanced	1.87180	0.33700	0.19295	3.1	3.1

Table L-4. 2017 OK Standard Setting Report: ELA Round 2

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Limited Knowledge	-0.64765	0.26270	0.08145	15.2	73.3
	Proficient	-0.13874	0.26610	0.00000	46.1	58.1
	Advanced	1.18279	0.32270	0.11129	11.9	11.9
4	Limited Knowledge	-0.52719	0.27240	0.09866	26.4	71.2
	Proficient	0.22107	0.26960	0.02076	38.1	44.7
	Advanced	1.49870	0.40580	0.00000	6.7	6.7
5	Limited Knowledge	-0.99935	0.26110	0.09897	31.4	83.6
	Proficient	-0.03187	0.27550	0.02818	40.0	52.2
	Advanced	1.17231	0.37400	0.20371	12.2	12.2
6	Limited Knowledge	-0.91616	0.27630	0.00204	41.5	81.8
	Proficient	0.28516	0.29840	0.05038	27.2	40.3
	Advanced	1.19106	0.40020	0.20063	13.1	13.1
7	Limited Knowledge	-0.65400	0.28340	0.15629	27.6	74.6
	Proficient	0.16319	0.30400	0.00000	35.1	47.1
	Advanced	1.19095	0.37720	0.06795	12.0	12.0
8	Limited Knowledge	-0.69508	0.30310	0.07289	42.4	79.2
	Proficient	0.53881	0.29710	0.17617	25.2	36.8
	Advanced	1.46111	0.42420	0.00000	11.6	11.6
10	Limited Knowledge	-1.09572	0.32570	0.00000	31.5	87.0
	Proficient	0.10061	0.24300	0.00000	36.7	55.5
	Advanced	1.09912	0.25970	0.00000	18.8	18.8

Table L-5. 2017 OK Standard Setting Report: Math Round 2

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Limited Knowledge	-1.03105	0.25190	0.00000	25.1	83.7
	Proficient	-0.17669	0.24040	0.03597	32.6	58.6
						continued

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Advanced	0.67238	0.29910	0.05491	25.9	25.9
4	Limited					
	Knowledge	-0.85598	0.28500	0.00000	38.7	79.4
	Proficient	0.25249	0.23060	0.03473	26.6	40.6
5	Advanced	1.07636	0.31480	0.02931	14.0	14.0
	Limited					
	Knowledge	-0.92288	0.31960	0.09119	29.9	81.4
6	Proficient	-0.00351	0.25380	0.00000	34.8	51.5
	Advanced	1.01246	0.25420	0.06194	16.7	16.7
	Limited					
7	Knowledge	-0.89687	0.28670	0.06497	48.3	81.2
	Proficient	0.51727	0.27030	0.07680	26.7	32.9
	Advanced	1.51120	0.31490	0.00000	6.2	6.2
8	Limited					
	Knowledge	0.02240	0.25410	0.03457	17.6	50.6
	Proficient	0.49130	0.23010	0.09735	25.9	33.0
10	Advanced	1.50462	0.22830	0.01092	7.1	7.1
	Limited					
	Knowledge	-0.00143	0.25620	0.05630	27.8	51.1
8	Proficient	0.75594	0.22180	0.06830	11.4	23.3
	Advanced	1.21172	0.24950	0.03131	11.9	11.9
	Limited					
10	Knowledge	0.14320	0.23170	0.10222	21.3	46.1
	Proficient	0.70757	0.19320	0.04647	15.4	24.8
	Advanced	1.34848	0.17820	0.01425	9.4	9.4

Table L-6. 2017 OK Standard Setting Report: Science Round 2

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
5	Limited					
	Knowledge	-0.91364	0.33480	0.00000	26.9	78.5
	Proficient	0.01333	0.30500	0.17095	36.3	51.6
8	Advanced	1.02686	0.31430	0.03361	15.3	15.3
	Limited					
	Knowledge	-0.21606	0.29300	0.00000	21.5	58.8
10	Proficient	0.35797	0.28430	0.05276	26.5	37.3
	Advanced	1.32579	0.33330	0.00000	10.8	10.8
	Limited					
10	Knowledge	0.24130	0.30420	0.05500	27.9	44.2
	Proficient	1.03243	0.26860	0.00994	11.9	16.3
	Advanced	1.77837	0.31740	0.03393	4.4	4.4

Table L-7. 2017 OK Standard Setting Report: ELA Round 3

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Limited Knowledge	-0.53135	0.26350	0.08202	27.6	70.5
	Proficient	0.26234	0.27550	0.04597	35.3	42.9
	Advanced	1.39558	0.33530	0.05766	7.6	7.6
	Limited Knowledge	-0.52719	0.27240	0.09866	28.0	71.2
4	Proficient	0.24183	0.27350	0.02076	36.5	43.1
	Advanced	1.49870	0.40580	0.00000	6.7	6.7
	Limited Knowledge	-0.99935	0.26110	0.09897	30.2	83.6
5	Proficient	-0.05950	0.27550	0.05581	41.1	53.3
	Advanced	1.17231	0.37400	0.20371	12.2	12.2
	Limited Knowledge	-0.91412	0.27630	0.00204	40.0	81.8
6	Proficient	0.23755	0.29840	0.00000	32.4	41.8
	Advanced	1.39169	0.43700	0.00000	9.4	9.4
	Limited Knowledge	-0.49771	0.28460	0.10266	25.2	70.8
7	Proficient	0.19463	0.30960	0.03144	33.6	45.6
	Advanced	1.19095	0.37720	0.18213	12.0	12.0
	Limited Knowledge	-0.69508	0.30310	0.07289	42.4	79.2
8	Proficient	0.53881	0.29710	0.14447	25.2	36.8
	Advanced	1.46111	0.42420	0.00000	11.6	11.6
	Limited Knowledge	-1.09572	0.32570	0.00000	31.5	87.0
10	Proficient	0.10061	0.24300	0.00000	45.0	55.5
	Advanced	1.40466	0.29110	0.00000	10.5	10.5

Table L-8. 2017 OK Standard Setting Report: Math Round 3

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
3	Limited Knowledge	-1.03105	0.25190	0.00000	25.1	83.7
	Proficient	-0.17669	0.24040	0.03904	41.6	58.6
	Advanced	0.98750	0.33110	0.07881	17.0	17.0
4	Limited Knowledge	-0.85598	0.28500	0.02886	36.0	79.4
	continued					

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
4	Proficient	0.21582	0.23060	0.00000	29.3	43.4
	Advanced	1.06199	0.31480	0.02664	14.0	14.0
5	Limited Knowledge	-1.01408	0.33040	0.00000	41.2	83.2
	Proficient	0.25552	0.24550	0.17136	29.8	42.0
	Advanced	1.16994	0.25880	0.00000	12.2	12.2
6	Limited Knowledge	-0.89687	0.28670	0.06497	45.5	81.2
	Proficient	0.44047	0.27030	0.07680	29.5	35.7
	Advanced	1.51120	0.31490	0.00000	6.2	6.2
7	Limited Knowledge	-0.00998	0.26000	0.06696	19.1	53.2
	Proficient	0.44732	0.23320	0.04397	27.0	34.1
	Advanced	1.47147	0.22170	0.03315	7.1	7.1
8	Limited Knowledge	-0.00143	0.25620	0.05630	27.8	51.1
	Proficient	0.75594	0.22180	0.05044	11.4	23.3
	Advanced	1.21172	0.24950	0.03131	11.9	11.9
10	Limited Knowledge	0.14320	0.23170	0.10222	21.3	46.1
	Proficient	0.70757	0.19320	0.04647	15.4	24.8
	Advanced	1.34848	0.17820	0.01425	9.4	9.4

Table L-9. 2017 OK Standard Setting Report: Science Round 3

<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
5	Limited Knowledge	-0.91364	0.33480	0.00000	26.9	78.5
	Proficient	0.01333	0.30500	0.16236	36.3	51.6
	Advanced	1.02686	0.31430	0.03361	15.3	15.3
8	Limited Knowledge	-0.34011	0.29830	0.00000	21.4	62.3
	Proficient	0.27999	0.28320	0.00000	30.1	40.9
	Advanced	1.32579	0.33330	0.00000	10.8	10.8
10	Limited Knowledge	0.28292	0.29740	0.01338	21.0	40.0
	Proficient	1.02248	0.26860	0.00000	14.7	19.0
	Advanced	1.77837	0.31740	0.00000	4.4	4.4

APPENDIX M—MEMORANDUM STANDARD SETTING IMPACT DATA

Memorandum: Oklahoma School Testing Program 2016-2017 – Standard Setting Impact Data

The purpose of this memo is to summarize an issue that was discovered with the calculation of the impact data for the recent Oklahoma standard settings. This issue affected only two tests: English Language Arts (ELA) Grade 8 and 10 (hereafter ELA08 and ELA10). This issue was limited to grades 8 and 10 because the issue had to do with missing score points related to the writing prompts, which did not occur with grade 5.

Oklahoma writing prompts are scored on five traits, with each trait earning a score of 1 to 4. A holistic score is obtained by taking a weighted average of the five trait scores and then multiplying by a constant: 5/4 for grade 5, 7/4 for grade 8, and 11/4 for grade 10. These multipliers have the effect of stretching the score scale for the writing prompt from 1 to 4 to: 1 to 5 for grade 5; 2 to 7 for grade 8; and 3 to 11 for grade 10. It is also possible to get a score of zero on a writing prompt, which occurs when a student's response is off topic. In that case, all the trait scores are assigned a zero. Thus, the possible scores on the writing prompts were: 0 to 5 for grade 5; 0 and 2 to 7 for grade 8; and 0 and 3 to 11 for grade 10. This scoring mechanism clearly results in certain scores not being possible for grades 8 and 10. The score of 1 cannot occur for grade 8, and the scores of 1 and 2 cannot occur for grade 10. As a result of these score points being missing by design, extra care needs to be taken to ensure that the Test Characteristic Curve (TCC) is properly built to reflect this design. Usually, if a writing prompt has a maximum score of N, the number of score categories is N+1, reflecting the integer scores from 0 to N. This is not the case for grades 8 and 10. The grade 8 writing prompt has 7 categories, but the highest score is 7, not a high of 6 the N+1 model would normally expect. And the grade 10 writing prompt has 10 categories, but the highest score is 11, not a high of 9 the N+1 model would normally expect.

When the writing prompts were calibrated using the commercially available software PARSCALE, it only knew the number of categories (this is the way PARSCALE works): ELA08 with 6 and ELA10 with 10. When the calibrated item parameters were used to get the TCC, the number of categories was not equal to the maximum score minus one, which was inadvertently overlooked. Thus, the TCC for ELA08 had a maximum score that was one point less than it should have been, and the TCC for ELA10 had a maximum score that was two points less than it should have been.

Additionally, during the review of the writing prompts, it was noticed that in ELA08 there were some students who received a score of 8 on the writing prompt, even though the maximum possible score was supposed to be a 7. Through our investigation, it was discovered that the problem was due to a rounding procedure. The correct rounding procedure has now been implemented, a new data file produced, and the ELA08 writing prompt has been recalibrated using the new data. This problem did not affect the calibration of any other ELA08 items, and it did not occur with the grade 10 writing prompt. This did have an effect on the OIB for ELA08, but the shifts were small and generally far away from the cuts, except for one instance. The Advanced cut was placed next to a WP OIB page, and the new WP page moved away from that location. This means the advanced cut needed to be recalculated. The change for the ability estimate associated with that page number was only 0.01.

As a consequence of the updates to the ELA08 and ELA10 writing prompts to account for the appropriate number of score categories, the impact data changed because the changes in the TCC required the

calculation of a new theta estimate for each student using the inverse TCC method (as was done previously for standard setting). The TCC program developed to provide student theta estimates was updated and used to recalculate the theta estimate (using the inverse TCC method) for every student in ELA08 and ELA10. These results were then used to update the impact data for the standard setting.

In the information provided below, there are three pieces of information “After Standard Setting”, “No Adjustment”, and “After Adjustment”. “After Standard Setting” identifies the impact data and cut scores produced from the standard setting recommendations following vertical articulation, “No Adjustment” identifies the impact data and cut scores after changing the student theta estimates with no adjustment to the original cut scores and “After Adjustment” is the impact data and cut scores after changing the student theta estimates and also adjusting the theta cut bookmarks in the ordered item booklets so as to give impact data results similar to those approved after the standard setting.

In ELA08, the adjustments required to generate impact data resembling the outcomes from standard setting, would be to move the Bookmarks down two OIB pages for both Proficient and Advanced. In ELA10, the adjustments required to generate impact data resembling the outcomes from standard setting, would be to move the Bookmark down 5 OIB pages for Proficient, while also moving the Bookmark down 3 OIB pages for Advanced.

Scope and Impact

English Language Arts – Grade 8

The Percent-Proficient-and-Above (PPAA)

After Standard Setting:	33.65% (22.07% Proficient, 11.58% Advanced)
No Adjustment:	29.48% (22.44% Proficient, 7.04% Advanced)
After Adjustment:	34.63% (23.35% Proficient, 11.28% Advanced)

The benchmark NAEP percentage was 29

Raw scores (associated with cut scores) with point change¹

Cut 2 After Standard Setting:	40, 42, 40
Cut 2 No Adjustment:	40, 42, 40
Cut 2 After Adjustment:	39, 41, 40
Cut 3 After Standard Setting:	45, 47, 45
Cut 3 No Adjustment:	45, 47, 45
Cut 3 After Adjustment:	44, 46, 45

English Language Arts – Grade 10

The Percent-Proficient-and-Above (PPAA)

After Standard Setting:	39.00% (28.52% Proficient, 10.48% Advanced)
No Adjustment:	32.89% (26.01% Proficient, 6.88% Advanced)
After Adjustment:	35.78% (26.00% Proficient, 9.78% Advanced)

The ACT College Readiness benchmark percentage was 37

¹ The three values represent the three operational forms. Although the standard setting used a single synthetic form, impact data was calculated using the actual three forms that were administered.

Raw score point change

Cut 2 After Standard Setting:	47, 45, 45
Cut 2 No Adjustment:	49, 47, 47
Cut 2 After Adjustment:	48, 46, 46
Cut 3 After Standard Setting:	58, 56, 55
Cut 3 No Adjustment:	60, 58, 57
Cut 3 After Adjustment:	58, 56, 56

Options and Recommendation

One purpose of the standard setting was to recommend cut scores that aligned to expectations of College and Career Readiness goals and to ACT and NAEP Benchmarks. A key component informing these cut scores was impact data. Given the changes resulting from re-computing the student ability estimates there are two options to consider.

Option One: Make no adjustments to the cut scores and have different impact data

Option Two: Make adjustments to the cut scores recapture impact data closely resembling the results from standard setting

As a consequence of updates to the TCC to more accurately reflect the total score points available, which caused changes to the student theta estimates and impact data, and since impact data was key to the final cut scores, we recommend *Option Two*. *Option Two* makes an adjustment to the cut scores (in the OIB) in order to more closely align with the impact data produced from the standard setting.

APPENDIX N—FINAL CUTPOINTS

Table N-1. 2017 OK Standard Setting Report: Final Cutpoints—ELA

<i>Content</i>	<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
English Language Arts	3	Unsatisfactory		29.5	100.0
		Limited Knowledge	-0.53135	31.8	70.5
		Proficient	0.34092	31.1	38.7
		Advanced	1.39558	7.6	7.6
	4	Unsatisfactory		28.8	100.0
		Limited Knowledge	-0.52719	34.0	71.2
		Proficient	0.38608	30.5	37.1
		Advanced	1.49870	6.7	6.7
	5	Unsatisfactory		21.1	100.0
		Limited Knowledge	-0.78321	39.0	78.9
		Proficient	0.32533	27.7	39.9
		Advanced	1.17231	12.2	12.2
	6	Unsatisfactory		18.2	100.0
		Limited Knowledge	-0.90856	41.5	81.8
		Proficient	0.28516	31.0	40.3
		Advanced	1.39169	9.4	9.4
	7	Unsatisfactory		29.2	100.0
		Limited Knowledge	-0.49771	38.0	70.8
		Proficient	0.46660	22.3	32.8
		Advanced	1.25890	10.6	10.6
	8	Unsatisfactory		20.8	100.0
		Limited Knowledge	-0.69508	45.5	79.2
		Proficient	0.45070	23.4	34.6
		Advanced	1.20801	11.3	11.3
10	Unsatisfactory		16.4	100.0	
	Limited Knowledge	-0.88010	44.6	83.6	
	Proficient	0.45602	26.0	35.8	
	Advanced	1.25613	9.8	9.8	

Table N-2. 2017 OK Standard Setting Report: Final Cutpoints—Mathematics

<i>Content</i>	<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
Mathematics	3	Unsatisfactory		20.6	100.0
		Limited Knowledge	-0.84047	35.2	79.4
		Proficient	0.18660	27.2	44.2
		Advanced	0.98750	17.0	17.0
	4	Unsatisfactory		23.5	100.0
		Limited Knowledge	-0.77087	35.9	76.5
		Proficient	0.26986	26.6	40.6
		Advanced	1.06199	14.0	14.0
	5	Unsatisfactory		21.6	100.0

continued

<i>Content</i>	<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>	
Mathematics	5	Limited Knowledge	-0.82901	43.2	78.4	
		Proficient	0.42687	23.1	35.3	
		Advanced	1.16994	12.2	12.2	
	6	Unsatisfactory			21.8	100.0
		Limited Knowledge	-0.75897	42.5	78.2	
		Proficient	0.44047	29.5	35.7	
	7	Advanced	1.51120	6.2	6.2	
		Unsatisfactory			34.9	100.0
		Limited Knowledge	-0.33556	31.0	65.1	
	8	Proficient	0.44732	27.0	34.1	
		Advanced	1.47147	7.1	7.1	
		Unsatisfactory			48.9	100.0
	10	Limited Knowledge	-0.02698	27.8	51.1	
		Proficient	0.75594	12.6	23.3	
		Advanced	1.26746	10.6	10.6	
10	Unsatisfactory			53.9	100.0	
	Limited Knowledge	0.13593	20.0	46.1		
	Proficient	0.68404	16.7	26.2		
		Advanced	1.33423	9.4	9.4	

Table N-3. 2017 OK Standard Setting Report: Final Cutpoints—Science

<i>Content</i>	<i>Grade</i>	<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>	
Science	5	Unsatisfactory		21.5	100.0	
		Limited Knowledge	-0.91364	35.4	78.5	
		Proficient	0.17570	33.7	43.0	
		Advanced	1.32213	9.4	9.4	
	8	Unsatisfactory			37.7	100.0
		Limited Knowledge	-0.34011	21.4	62.3	
		Proficient	0.27999	30.1	40.9	
	10	Advanced	1.32579	10.8	10.8	
		Unsatisfactory			60.0	100.0
		Limited Knowledge	0.28292	21.0	40.0	
			Proficient	1.02248	14.7	19.0
			Advanced	1.77837	4.4	4.4

APPENDIX P
2019 CCRA STANDARD SETTING
REPORT



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —

Oklahoma College and Career Readiness

Standard-Setting Report

June 5-6, 2019

Oklahoma City, OK

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Chapter 1. OVERVIEW OF STANDARD-SETTING PROCEDURES

The purpose of this report is to summarize the activities involved in the standard-setting process for the Oklahoma College and Career Readiness Assessment (CCRA) in high school science (SCI) on behalf of the Oklahoma State Department of Education (SDE). The need for standard setting arises from the fact that this is a new assessment that was administered for the first time in 2019. For such new assessments, performance standards must be set. The primary goal of the standard setting was to determine the knowledge, skills, and abilities (KSAs) that students must demonstrate to be classified into each of the student status levels (performance levels).

The standard-setting process used was the bookmark procedure (see, e.g., Lewis et al., 1996; Mitzel et al., 2000; Cizek & Bunch, 2007). There were two main reasons this method was chosen. First, the assessment consists primarily of multiple-choice items but also includes some constructed-response items, and the bookmark procedure is appropriate for use with assessments that contain primarily or exclusively multiple-choice items, scaled using item response theory (IRT; Cizek & Bunch, 2007). Second, the modified bookmark method has been used successfully to establish performance standards for Oklahoma in the past (CTB/McGraw-Hill, 2013, 2014; Measured Progress, 2015).

The standard-setting meeting was held from June 5th through June 6th of 2019. In all, 12 panelists participated in the process and were organized into 2 groups of 6 panelists each plus a facilitator provided by Cognia. In initial rounds, panelists were organized according to the domain (Life Sciences or Physical Sciences) in which each panelist had the most professional experience. In later rounds, panelists were organized into a single panel.

This report is organized into three major sections, describing tasks completed prior to, during, and after the standard-setting meeting.

Chapter 2. TASKS COMPLETED PRIOR TO STANDARD-SETTING

2.1 Creation of Performance Level Descriptors

Oklahoma State Statute: Title 70. Schools, Chapter 22 – Testing and Assessment, Section 1210.541 – Student Performance Levels and Cut Scores – Accountability System mandates the adoption of “a series of student performance levels and the corresponding cut scores pursuant to the Oklahoma School Testing Program Act.” The law states that performance levels must be labeled and defined as follows:

1. Advanced, which shall indicate that students demonstrate superior performance on challenging subject matter;
2. Proficient, which shall indicate that students demonstrate mastery over appropriate grade-level subject matter and that students are ready for the next grade, course, or level of education, as applicable;
3. Basic, which shall indicate that students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level or course; and
4. Below Basic, which shall indicate that students have not performed at least at the limited knowledge level.

In 2016, the 29 Oklahoma educators who formed the science PLD committees, members of the Oklahoma SDE, and three Cognia staff members met for a three-day PLD writing meeting in Oklahoma City. The purpose of the meetings was to write PLDs for grades 5, 8 and high school that describe what students know and are able to display on a statewide assessment of the Oklahoma academic standards. The descriptors are used to provide a common understanding of each performance level for recommending cut scores during standard setting and to inform stakeholders on how to interpret student test scores.

After introductions of those in attendance at the PLD writing meetings, a brief overview of the purpose of PLDs, and an explanation of the PLD writing process, the Oklahoma PLD committees used the standards and the SDE test and item specifications document to begin development of the PLDs. To ensure that the committee members focused on the state-adopted standards and objectives, the committee members were not shown any items that appeared on the assessment.

Independently, PLD committee members filled in the PLD tables by writing down the skills and knowledge students would demonstrate in the Advanced, Proficient, and Limited Knowledge levels for each standard and objective. After the individual work was completed, the group discussed and arrived at a consensus on the wording for the performance levels. As a final step,

the PLD committee members reviewed and revised the suggested wording for each level to ensure appropriateness and consistency, and that each level indicated a trajectory of students' knowledge of the content.

At this 2016 meeting the committee members dedicated to high school completed the PLDs for the Life Science domain of the assessment. In February of 2019 a second group was convened to define the PLDs for Physical Science. This meeting was conducted virtually, with some participants in the state department office in OK and the rest on a web conference with the facilitator from Cognia. Prior to the meeting the participants were provided with materials to review, including the Life Science PLDs for reference. The same process was followed as described above to create the Physical Science PLD descriptions.

2.2 Preparation of Materials for Panelists

The following materials were assembled for presentation to the panelists at the standard-setting meeting in paper or digital form (as indicated):

- PLDs (paper)
- Meeting agendas (paper)
- Nondisclosure forms (paper)
- Test booklets (paper)
- Answer keys/scoring rubrics (paper)
- Ordered item booklets (paper)
- Item map forms (digital)
- Rating forms (digital)
- Evaluation forms (digital)

Copies of the PLDs, meeting agenda, nondisclosure form, sample item map form, sample rating form, and evaluation form are included in Appendices A through F.

2.3 Preparation of Presentation Materials

The PowerPoint presentation used in the opening session was prepared and approved by the SDE and TAC prior to the meeting. A copy of the presentation is included in Appendix A.

2.4 Preparation of Instructions for Facilitators

Scripts were created for the group facilitators to refer to while working through each step of the standard-setting process. This document is included in Appendix B. The facilitators also attended a training session, led by a Cognia psychometrician, approximately four weeks before the

standard setting. The purpose of the training was to prepare the facilitators for the panel activities and to ensure consistency in the implemented procedures.

2.5 Preparation of Systems and Materials for Analysis During the Meeting

The computational programming used to calculate cutpoints and impact data during the standard-setting meeting was completed and thoroughly tested prior to the standard-setting meeting. See *Section 3.7.2, Round 1 Judgments and Results*, for a description of the analyses performed during standard setting.

2.6 Selection of Panelists

As emphasized in Cizek and Bunch (2007), regardless of the method used, the selection of panelists is an important factor in determining standard-setting outcomes and maximizing the validity of the standard-setting process. The guidance provided by *Standards for Educational and Psychological Testing* (AERA et al., 1999) states that “a sufficiently large and representative group of judges should be involved to provide reasonable assurance that results would not vary greatly if the process were repeated.” Consistent with the above guidance and respecting practical considerations regarding the maximum size of a group that can be successfully managed, the goal was to recruit a standard-setting panel of 10–12 members representing different stakeholder groups to set standards for the CCRA science. Additionally, in consideration of the distinct content of each domain, an attempt was made to ensure the panel equally represented experts in both the LS and PS domains. Targets for the size and composition of the panel were also consistent with federal guidelines as described in *Standards and Assessment Peer Review Guidance: Information and examples for meeting requirements of the No Child Left Behind Act of 2001* (U.S. Department of Education, 2009).

The SDE selected panelists prior to the standard-setting meeting. The goal for panel selection was to include participants who are primarily teachers, but also to include school administrators, higher education personnel, and stakeholders from other interest groups. Moreover, to the extent possible, panelists were selected to reflect a balance of gender, race/ethnicity, and geographic location. Finally, panelists were selected who were familiar not only with the subject matter, but also with the grade for which they would be setting standards. A list of the panelists is included in Appendix C.

Chapter 3. TASKS COMPLETED DURING THE STANDARD-SETTING MEETING

3.1 Overview of the Bookmark Method

The bookmark method (Lewis et al., 1996; Mitzel et al., 2000; Cizek & Bunch, 2007) involves rank ordering the items by difficulty and asking the panelists to identify the point in the ordered set of items at which the students at the borderline of two adjacent performance levels no longer have at least a two-thirds chance of answering the item correctly.

3.2 General Orientation and Panelist Training

Concerning panelist training, *Standards for Educational and Psychological Testing* (AERA et al., 2014) states the following:

Care must be taken to assure these persons understand what they are to do and that their judgments are as thoughtful and objective as possible. The process must be such that well-qualified participants can apply their knowledge and experience to reach meaningful and relevant judgments that accurately reflect their understandings and intentions. (p. 101)

The training of the panelists began with a general orientation session at the start of the standard-setting meeting. The purpose of the orientation was to ensure that all panelists received the same information about the need for and the goals of standard setting, and about their part in the process. The orientation consisted of three parts. First, Oklahoma Executive Director of State Assessments Craig Walker provided an overview of education policy in the state of Oklahoma, including additional context specific to the CCRA science assessment. Next, a Cognia psychometrician, Dr. Matthew Gushta, presented a brief overview of the bookmark procedure and the activities that would occur during the standard-setting meeting. Finally, Cognia Lead Program Manager Julie DiBona provided panelists with logistical information (e.g., materials review, content security, attendance).

Once the general orientation was complete, panelists broke out into domain specific groups, where they received more detailed training and completed the first two rounds of the standard-setting activities.

3.3 Lead Facilitator Training

Prior to Day 1, the two facilitators attended a brief training session led by Cognia psychometricians Dr. Matthew Gushta and Dr. Frank Padellaro. During this training, expectations for facilitators were set to include leading panelist review of the ordered item booklet, leading panelist development of borderline descriptors, facilitation of panel discussion, collection and review

of standard- setting materials, and control of secure materials. Facilitators were separately expected to act as table leaders during the preliminary rounds, ensuring that discussion and logistics within each domain group were conducted fairly and efficiently.

3.4 Review of Assessment Materials

The first step after the opening session was for the panelists to take the test. The purpose of this step was to familiarize the panelists with the assessment and the test taking activities expected of students during administration. Once panelists completed the test, the answer key was distributed. At this point, panelists were encouraged to discuss any issues regarding items or scoring.

3.5 Completion of the Item Map Form

Panelists were then split into two groups based on domain expertise and each panelist reviewed a domain-specific ordered item booklet item by item, considering the knowledge, skills, and abilities (KSAs) students needed to answer each one. The ordered item booklet contained one item per page, ordered from the easiest item to the most difficult item. The ordered item booklet was created by sorting the items according to their item response theory (IRT)-based difficulty values ($RP_{0.67}$ was used). A three-parameter logistic IRT model was used to calculate the $RP_{0.67}$ values for dichotomous items.

Panelists then completed the item map form using the provided laptop computers. The item map form listed the items in the same order as they were presented in the ordered item booklet. The form included space for the panelists to type in the KSAs required to answer each item correctly and to indicate why they believed each item was more difficult than the previous one. To ensure each panelist was comfortable using the provided laptop computers and understood the mechanics of data entry, Cognia Psychometrician Dr. Frank Padellaro reviewed the technology the panelists would use to complete their item maps.

Additionally, the item map form was shaded to show a projected range of expected proficiency, based on historic averages of student performance on state assessments from multiple grades and subjects. Item map entries that would produce percentages of students at or above Proficient comparable to those external assessments were identified as benchmarking locations. The shaded region on the item map form was then calculated as +/-2 standard errors around the IRT-based difficulty of the CCRA benchmarking locations. Table 3-1 identifies the benchmarking region for each booklet.

Table 3-1: CCR Standard-Setting Benchmarking Regions

Subject	Grade	Percentage*	PS OIB Shaded Region	LS OIB Shaded Region	Complete OIB Shaded Region
Science	11	18% – 50%	3-9	4-12	6-21

*OSTP historic % proficient and above grades 3–8 (ELA and mathematics) and grades 5 and 8 SCI were used to generate a predicted range of SCI 11 % proficient or above performance.

After working individually, panelists had the opportunity to discuss the item map with members of their domain-specific group and make necessary additions or adjustments. The purpose of this step was to ensure that panelists became familiar with the ordered item booklet and understood the relationships among the ordered items.

3.6 Review of Performance Level Descriptors

Oklahoma State Statute: Title 70. Schools, Chapter 22 – Testing and Assessment, Section 1210.541 – Student Performance Levels and Cut Scores – Accountability System mandates the adoption of “a series of student performance levels and the corresponding cut scores pursuant to the Oklahoma School Testing Program Act.” The law states that performance levels must be labeled and defined as follows:

1. Advanced, which shall indicate that students demonstrate superior performance on challenging subject matter;
2. Proficient, which shall indicate that students demonstrate mastery over appropriate grade-level subject matter and that students are ready for the next grade, course, or level of education, as applicable;
3. Basic, which shall indicate that students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level or course; and
4. Below Basic, which shall indicate that students have not performed at least at the basic level.

In June of 2019, 12 Oklahoma educators, members of the SDE, and five Cognia staff members met for a two-day standard-setting meeting in Oklahoma City. Panelists discussed performance level descriptors (PLD), which describe what students know and are able to display on a statewide assessment of the Oklahoma academic standards. The descriptors are used to provide a common understanding of each performance level for recommending cut scores during standard setting and to inform stakeholders of how to interpret student test scores. Panelists then worked to

define descriptors of a borderline level student. A borderline student is one who is minimally able to meet the requirements set by the descriptors for each performance level.

After introductions of those in attendance, a brief overview of the meeting’s purpose, and an explanation of the standard-setting process, the panelists were organized into groups to begin setting standards for the Oklahoma CCR Science assessment. According to their professional experience, the panelists were organized into Life Science (LS) and Physical Science (PS) groups. Independently, standard-setting committee members filled in the item mapping tables by writing down the knowledge, skills, and abilities necessary for a student to be successful on each item within the subset of items relevant to the domain to which the group was assigned. After the individual work was completed, each group carefully reviewed and discussed the PLDs for Proficient, Advanced, Basic, and Below Basic as they applied to their domain. This understanding was used within the LS and PS groups to separately discuss and arrive at consensus on the definition of a borderline student for each of the Basic, Proficient, and Advanced performance levels. After developing a working understanding of the PLDs and defining borderline students at each cut, the panelists engaged in the standard-setting process in order to recommend the cuts between performance levels.

3.7 Review of Performance Level Descriptors and Definition of Borderline Students

Next, panelists reviewed the Performance Level Descriptors (PLDs). This important step was designed to ensure that panelists thoroughly understood the KSAs needed for students to be classified into performance levels (Below Basic, Basic, Proficient, and Advanced). Panelists first reviewed the PLDs on their own and then participated in group discussion of the PLDs, clarifying each level. Afterward, panelists developed consensus definitions of borderline students—that is, students who have only barely qualified for a particular performance level. Bulleted lists of characteristics for each level were generated based on the whole-group discussion and posted in the room for reference throughout the bookmark process. Note that the purpose of this step was to clarify and add specificity to the PLDs based on the KSAs, paying particular attention to the definitions of the borderline students.

The bulleted lists were developed as working documents to be used by the panelists for the purposes of standard setting. They supplemented the PLDs, which provide the official definitions of each performance level, by specifically addressing the KSAs that define the borderline of each level.

The PLDs are provided in Appendix D.

3.8 Rating Rounds and Feedback

3.8.1 Practice Round

Next, the panelists completed a practice round of ratings. The purpose of the practice round was to familiarize the panelists with all the materials they would be using for the standard-setting process and to walk them through the process of placing bookmarks. In addition to the PLDs and borderline descriptions, panelists were given a practice ordered item booklet, which consisted of 10 items representing the range of difficulty on the test, and a practice rating form.

Within each domain-specific group, the facilitator explained what each of the materials was and how panelists would use it to make their ratings. Additionally, Cognia Psychometrician Dr. Frank Padellaro reviewed the technology panelists would use to complete their ratings, to ensure each panelist understood how to use the tools provided. Then, beginning with the first ordered item and considering the skills and abilities needed to complete it, panelists were instructed to ask themselves, “Would at least two out of three students performing at the borderline of Proficient answer this question correctly?” Panelists considered each ordered item in turn, asking themselves the same question until their answer changed from “yes” (or predominantly “yes”) to “no” (or predominantly “no”). Each panelist practiced placing the Proficient bookmark in the ordered item booklet. The facilitator then led the panelists in a readiness discussion, asking panelists to share the reasoning behind their bookmark placements with the group and assessing each panelist’s understanding of the rating task, borderline students, and the two-thirds rule. At the end of the practice round, panelists completed the practice evaluation form. The evaluation form was designed to ascertain whether the panelists were comfortable moving ahead to the rating task or whether they had lingering questions or issues that needed to be addressed before proceeding to the Round 1 ratings. Facilitators were instructed to glance over each panelist’s evaluation as he or she completed it, to make sure panelists were ready to move on. The results of the training evaluation can be found in Appendix E.

3.8.2 Round 1 Judgments and Results

In the first round, panelists worked individually with the borderline definitions, the item map form, and the ordered item booklet. Beginning with the first ordered item in the shaded region of the domain-specific OIB, described previously, and considering the skills and abilities needed to complete it, panelists asked themselves, “Would at least two out of three students performing at the borderline of Proficient answer this question correctly?” Panelists considered each ordered item in turn, asking themselves the same question. They placed the bookmark between the two items where their answer changed from “yes” (or predominantly “yes”) to “no” (or predominantly “no”). For the identification of this Proficient cut point, panelists were instructed that placing a bookmark

outside the shaded region required explicit written justification by the panelist. Panelists then repeated the process for the other two cut points and used the rating form to record their ratings for each cut point.

After the completion of each round, Cognia staff members calculated a variety of statistics which served various functions: feedback to panelists as part of the standard-setting method, reporting to Cognia and the SDE as intermediate evidence for the impact of panelists' judgements, and as quality control metrics. While these statistics were available, only specific results were revealed to panelists as appropriate for the goals of the specific round.

Results for panelist ratings across all rounds are displayed in Appendix F. For each round, Cognia staff members calculated the median cut points for the group based on bookmark placements, theta scale cuts, the Median Absolute Deviation (MAD) of the panelists' cut points, the conditional standard error of measurement (SEM) for each of the scale cuts, and impact data.

Each panelist's theta scale cut points were found by averaging the $RP_{0.67}$ values of the items on either side of the bookmark placed by that panelist for each cut point. The /Round 1 overall cut points were then determined by calculating the median of the individual cut points obtained from each panelist. The MAD of the panelists' cut points indicates the extent to which judgments were consistent across panelists and reflects the level of agreement among the ratings with each successive round of ratings. Conditional SEM characterizes the measurement precision for each of the scale cuts. Finally, impact data reflect the percentage of students across the state who would fall into each performance level category according to the total group median cut points.

3.8.3 Round 2 Judgments and Results

The purpose of Round 2 was for panelists to discuss their Round 1 placements and, if necessary, to revise their ratings. Prior to beginning their discussions, the panelists at each table were presented with the median cut points based on their Round 1 ratings for each cut point in that subject and grade. A Cognia psychometrician presented this information to the group using a projector and laptop and explained how to use it as they completed their Round 2 discussions. The distribution of panelists' cut points was presented in terms of location in the ordered item booklet, both as numerical summaries of cut points ranges and graphically, as histograms.

Within both domain-specific groups, panelists were then given the opportunity to share their individual rationales for their bookmark placements in terms of the necessary knowledge and skills for each classification. Panelists were asked to pay particular attention to how their individual ratings compared to those of other panelists in their room to assess whether they were unusually stringent or lenient within the group. Once the discussions were complete, panelists were given the opportunity to revise their Round 1 ratings on the rating form. Panelists were told to set bookmarks according to their *individual* best judgments; consensus among the panelists was not necessary.

They were encouraged to listen to the points made by their colleagues but not to feel compelled to change their bookmark placements.

When Round 2 ratings were complete, Cognia staff members calculated the statistics described above and discussed the results with SDE staff. During this discussion, a lack of agreement was noted among some panelists, especially regarding the bookmark associated with the placement of the Advanced cut. This provided an opportunity for Cognia and SDE staff to return to the panels for the purpose of clarifying and confirming the judgmental task—answering for each item, "Would at least two out of three students performing at the borderline of the current PLD answer this item correctly?"

3.8.4 Round 3 Judgments and Results

The purpose of Round 3 was for panelists to gather in a single group, regardless of domain-specific expertise, to discuss their Round 2 placements and, if necessary, to revise their ratings. Prior to the discussions, the panelists were separated into domain-specific groups and presented with the median cuts based on Round 2 results. A Cognia psychometrician presented the information and explained how to use it, as described in Round 2. Additionally, SDE staff members presented condensed versions of the educational context information originally provided during the opening session.

Following the domain-specific presentations, the panelists were gathered into a single group. During this discussion, domain-specific information was combined and presented according to the entire CCRA Science assessment and content. The lead facilitator, David Harrison, led an extended discussion of the Round 2 results as they applied to the entire CCRA Science form: walking the panelists through the complete ordered item booklet (i.e., LS and PS items), focusing on the KSAs needed for each item and how they related to the overall PLDs, and facilitated synthesis of the borderline definitions into overall concepts of borderline students. In addition, the discussion explored the differences in cut point placement among panelists and across domains. After the discussions, panelists were given another opportunity to revise their bookmark placements, this time considering the entirety of CCRA Science. Once again, the facilitator reminded the panelists to place the bookmarks according to their individual best judgment, and that it was not necessary for them to reach a consensus. When Round 3 ratings were complete, Cognia staff members once again calculated the statistics described previously and reviewed these results with SDE staff.

When Round 3 ratings were complete, Cognia staff members calculated the usual statistics though in the context of CCRA Science and not separated by domain. The results were discussed with SDE staff, noting a lack of agreement among some panelists – though less so than round 2 – especially regarding the bookmark associated with the placement of the Advanced cut. This

provided an opportunity for Cognia and SDE staff to return to the panels for the purpose of clarifying and confirming the judgmental task—answering for each item, "Would at least two out of three students performing at the borderline of the current PLD answer this item correctly?"

3.8.5 Round 4 Judgments and Results

Due to the separation of panelists into domain-specific groups in the first two rounds, a fourth round of judgments was planned as part of the standard-setting process, in order to review the results of Round 3 and introduce impact data (the percentage of students in each performance level using the Round 3 cuts). Following the introduction of impact data, the panelists met as a single group to discuss their Round 3 placements and, if necessary, revise their individual ratings

Prior to the discussions, a Cognia psychometrician presented the panelists with the median cuts based on Round 3 results, as well as the associated impact data. The lead facilitator then led an extended discussion of the Round 3 results. After discussion, panelists were given a final opportunity to revise their bookmark placements. When Round 4 ratings were complete, Cognia staff members once again calculated the various associated statistics.

A summary of the results is provided in Table 3-2, reporting final median cut points on the theta scale and impact data (percentage of students in performance level; percentage of students at-or-above performance level), respectively. Note that disaggregated impact data broken down by demographics are provided in Appendix G.

Table 3-2: CCRA Science Standard Setting: Round 4 Results

Statistic	Below Basic	Basic	Proficient	Advanced
Theta Scale Cuts	-1.52	0.17	0.80	1.53
Percentage of Students at/in Performance Level	53.30%	20.70%	18.10%	7.90%
Percentage of Students at/above Performance Level	100.00%	46.70%	26.00%	7.90%

Chapter 4. TASKS COMPLETED AFTER THE STANDARD-SETTING MEETING

Upon conclusion of the standard-setting meeting, several important tasks were completed. These tasks centered on the following: reviewing the standard-setting process and addressing issues presented by the outcomes; presenting the results to the SDE; and making any final revisions or adjustments based on policy considerations, under direction of the SDE.

4.1 Analysis and Review of Panelists' Feedback

The measurement literature sometimes considers the evaluation process to be another product of the standard-setting process (e.g., Reckase, 2001), as it provides important validity evidence supporting the cut points that are obtained. To provide evidence of the participants' views of the standard-setting process, panelists were asked to complete questionnaires after the practice round, after the completion of Round 1, and at the end of the meeting.

After the evaluation forms were completed, panelists' responses were reviewed. This review did not reveal any anomalies in the standard-setting process or indicate any reason that a particular panelist's data should not be included when the final cut points were calculated. In general, participants felt that the recommended cut points were appropriate and that their judgments were based on appropriate information and decision making. The results of the evaluations are presented in Appendix E.

4.2 Policy Adjustments

After all standard-setting activities had been completed and all materials reviewed, the SDE recommended no adjustments to the Round 4 cuts as recommended by panelists at the standard-setting meeting. The full set of cuts as shown in Table 3-2 were presented to the CEQA and approved for use assigning students to performance levels in the 2018–2019 CCRA science assessment.

4.3 Preparation of Standard-Setting Report

Following final compilation of standard-setting results, Cognia prepared this report, which documents the procedures and results of the 2019 standard-setting meeting that was held to establish performance standards for the assessment.

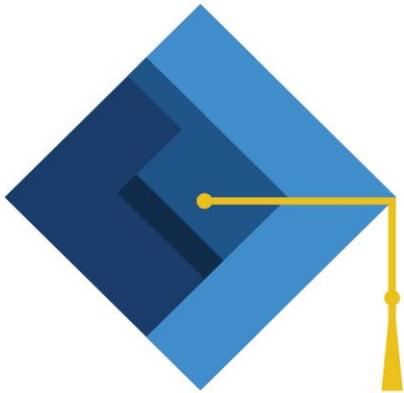
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APPENDICES

APPENDIX A—POWERPOINT PRESENTATION

Welcome!



OKLAHOMA STATE DEPARTMENT OF
EDUCATION
— CHAMPION EXCELLENCE —

Oklahoma Career and College Readiness Assessment
(CCRA)

Standard Setting
Science
June 5-6, 2019

Today's Agenda

1. Context and Policy Introduction
2. Standard Setting Process



Oklahoma State Department of Education Staff

Craig Walker
Executive Director of State Assessments



Assessment Report 2017

Oklahoma Legislature directed the State Board of Education to:

- Evaluate Oklahoma's current state assessment system, and make recommendations for its future.

As a result, Oklahoma State Department of Education:

- Held regional meetings across the state to determine stakeholder concerns
- Convened the Oklahoma Assessment & Accountability Task Force to develop recommendations
- Followed the federal requirements and rules as described in ESSA



Recommendations from the Task Force for CCR Assessments

- Score Interpretation
 - Support criterion-referenced interpretations (i.e., performance against the OAS) and report individual claims appropriate for high school students;
 - Provide a measure of performance indicative of being on track to College and Career Readiness (CCR).
 - (1) supported using theoretically related data in standard-setting activities (e.g., measures of college readiness and other nationally available data) and
 - (2) validated empirically using available postsecondary data linking to performance on the college-readiness assessment;



Goals for Oklahoma Schools

- Focus on college- and career- readiness:
College and career ready means that students graduate from high school prepared to enter and succeed in postsecondary opportunities whether college or career.
- **Students** should graduate high school ready for postsecondary success and need to demonstrate they are on-track toward that goal.



Individual Career Academic Plan

Student-driven, multi-measures approach representing indications of college- and career-readiness

- Students' coursework, learning and assessment results
- Students' postsecondary plans, aligned with their career, academic and personal/social goals and financial reality
- Students' records of college- and career-readiness activities



Oklahoma Statute on Performance Levels

- The Commission for Educational Quality and Accountability shall determine and adopt a series of student **performance levels** and the corresponding cut scores pursuant to the Oklahoma School Testing Program Act.
- The Commission for Educational Quality and Accountability shall have the authority to set cut scores using any method which the State Board of Education was authorized to use in setting cut scores prior to July 1, 2013.



Oklahoma Statute on Performance Levels

- The **performance levels** shall be set by a method that indicates students are ready for the next grade, course, or level of education, as applicable.
- The Commission for Educational Quality and Accountability shall establish panels to review and revise the **performance level descriptors (PLDs)** for each subject and grade level.
- The Commission shall ensure that the criterion-referenced tests developed and administered by the State Board of Education pursuant to the Oklahoma School Testing Program Act in grades three through eight and the tests administered at the high school level are vertically aligned by content across grade levels to ensure consistency, continuity, alignment and clarity.



Content Standards and PLDs

Academic Content Standards (OAS-S)

define what the State expects all students to know and be able to do.*

Academic Achievement Standards (PLDs)

define levels of student achievement on the assessments.*

**U.S. Department of Education Peer Review of State Assessment Systems Non-Regulatory Guidance for States, September 25, 2015*



More about PLDs

PLDs provide a narrative account of the knowledge, skills, and abilities **demonstrated by** students in each level of achievement.

PLDs describe what students *know and are able to do* based on the OAS.

PLDs inform stakeholders of how to interpret student test scores in relation to the OAS

PLDs are typically used for standard setting and score reporting.



Purpose and Use of PLDs

PLDs define the intended interpretations of test scores

Purposes of PLDs

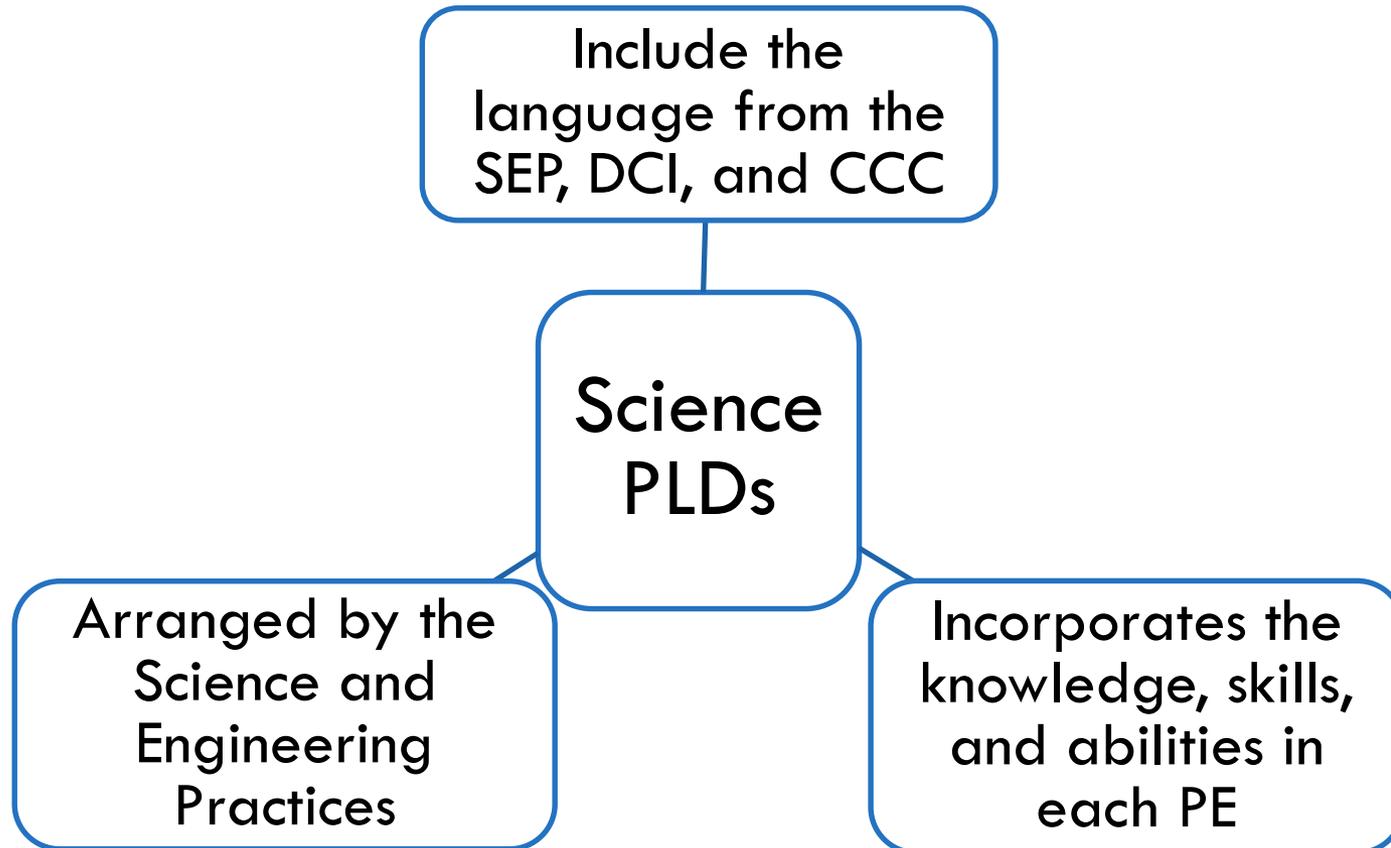
- Inform standard setting
- Inform score interpretation

OK SDE uses for PLDs

- Item and test development
- Standard setting
- Score interpretation



Structure of PLDs for Science



Anatomy of a Science PLD

PS1-1

PS3-2

Standard/s

Proficient:

Performance Level

SEP:

Develop and Use Models

DCI

- PS1.A Structure and Properties of Matter
- PS3.A Definitions of Energy

CCC

- Patterns
- Energy and Matter

Students demonstrate mastery with subject matter and exhibit readiness for college and career. Students scoring at the Proficient level typically **use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**

PLD Knowledge, Skills, and Abilities (KSAs)



OK CCRA Science

Standard Setting

Cognia Staff

- Julie DiBona – Lead Program Manager, Client Services
- Matthew Gushta – Director, Research & Analytics
- Frank Padellaro – Psychometrician
- David Harrison – Content Manager, Content Development – State
- Katie Schmidt – Content Specialist II, Content Development - State

Housekeeping

- Folder review
 - Content material
 - Administrative forms
- Secure materials
 - Signing out
 - No electronics
- Use of laptops
 - Only use sites you are directed to
 - Do not log out

The Standard Setting Process

Content Standards vs. Performance Standards

- Content standards = “What”
 - Describe the knowledge and skills students are expected to demonstrate by content area and grade
- Performance standards = “How well”
 - Describe attributes of student performance based on Performance Level descriptors

What is Your Job?

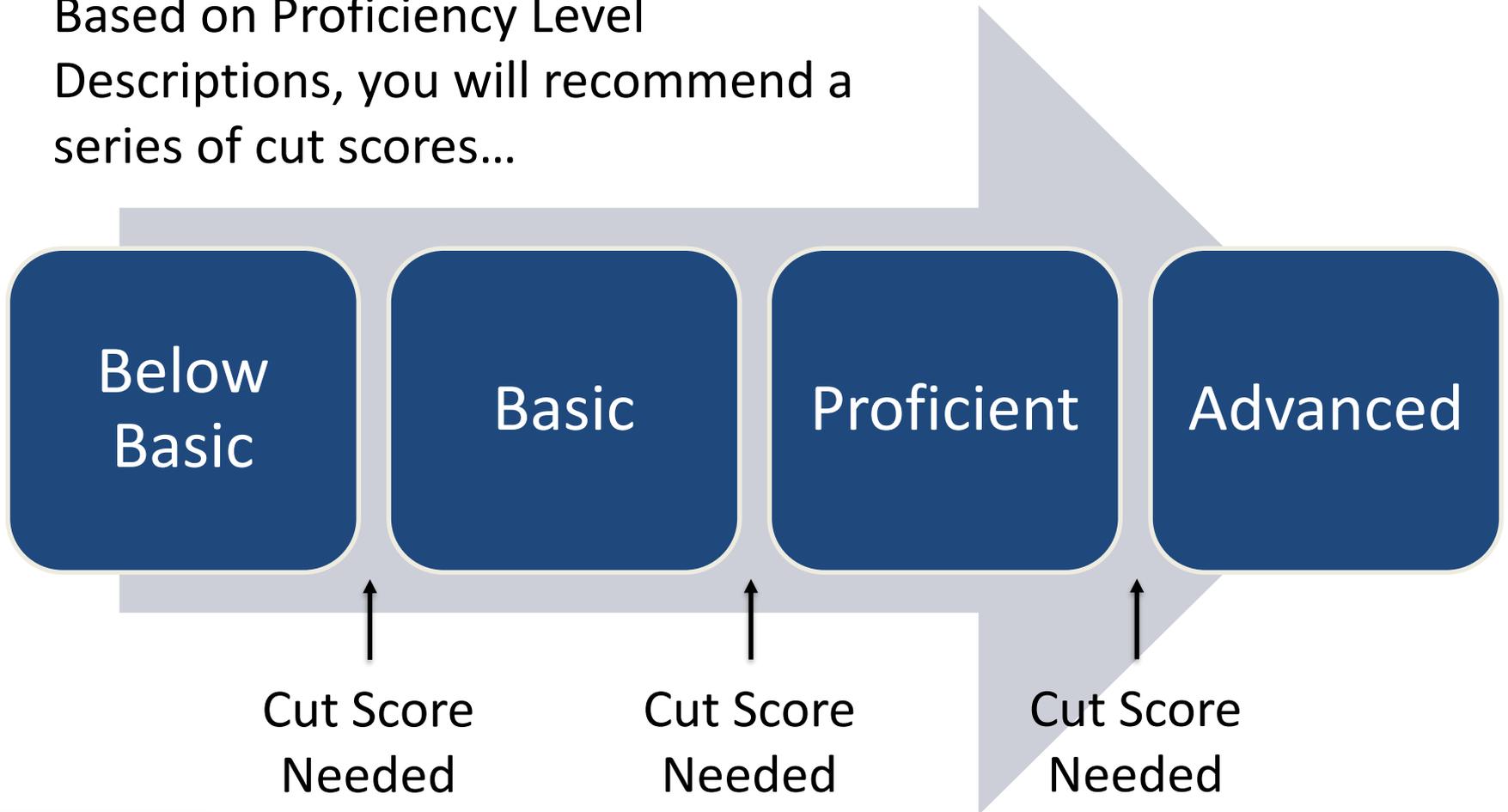
- To recommend cut scores for each of the performance levels that will be used to report results:
 - Below Basic
← Cut Score
 - Basic
← Cut Score
 - Proficient
← Cut Score
 - Advanced

What are we Trying to Determine?

- What knowledge, skills, and abilities (KSAs) need to be demonstrated to be classified in each Performance Level?
- How much is enough?
- What test performance corresponds to:
 - Below Basic
 - Basic
 - Proficient
 - Advanced

Performance Continuum

Based on Proficiency Level
Descriptions, you will recommend a
series of cut scores...



General Phases of Standard Setting

- Data Collection
 - Your recommendations will be reviewed and presented to the policy makers, responsible for final adoption of the cut scores.
- Policy/Decision Making
 - The recommendations may be accepted, rejected, or modified by the Commission for Educational Quality and Accountability (CEQA).

Overview of Standard Setting Method

- We will cover implementation of the Bookmark standard setting procedure
- This session is intended to be an overview
- Your facilitator will give you more details and guide you through the process step by step

Factors that Influence Selection of Standard Setting Method

- Prior usage and history
- Recommendation or requirement by policy making authority
- Type of assessment(s)
 -
 -
 -
- Bookmark method chosen

What is the Bookmark Method and How Does It Work?

- A collection of test items is arranged in an Ordered Item Booklet (OIB)
 - Based on statistical analysis.
 - From easiest to most difficult.
- Panelists place one or more “bookmarks” in that OIB to recommend cut scores.

Important Terms to Know

- Performance Levels
- Test items
- “Borderline” students
- Knowledge, skills, and abilities (KSAs) needed to answer each test question
- Cut scores

Performance Levels

- Individual review of Performance Level Descriptors (PLDs)
- Group discussion of what student performance in each Performance Level looks like.
- Focus on the “borderline” students, i.e., students who just barely make it into Performance Level.

Develop Borderline Descriptions

- Create bulleted lists of
 - Knowledge, skills, and abilities (KSAs) a student must demonstrate to be classified in each Performance Level, and
 - Knowledge, skills, and abilities that distinguish one Performance Level from another.
- You must reach consensus as a group about the KSAs that define borderline student performance.

How to Place a Bookmark

- Start at the beginning of the OIB.
- Evaluate whether at least two thirds of the students who demonstrate knowledge and skills at the borderline of Proficient would correctly answer the item
- If Yes, move on to the next item.
- Place the bookmark where you think at least two thirds of the Proficient “borderline” students would no longer correctly answer the item.

How to Place a Bookmark

Item Number	Would at least two-thirds of borderline Proficient students correctly answer this item?
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	No
7	Yes
8	Yes
9	No
10	No
11	No
12	No
13	No
14	No
15	No
...	No

How to Place a Bookmark

- You will have opportunities to discuss your bookmark placements and change them, if desired.
- Place one bookmark for each cut score (between the Performance Levels).

Before You Place the Bookmarks

- Take the test to familiarize yourself with the test taking experience.
- Review the OIB.
- Use the item map form to identify KSAs specific to each item.

Item Map

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
1		
2		
3		
4		
5		
6		
7		
8		

- Review and discuss Performance Levels.
- Develop definition of “borderline” for Below Basic, Proficient, and Advanced.

The Practice Round

- Before placing actual bookmarks, you will have an opportunity to practice the method with a set of practice items.
- You will be given an OIB with approximately 10 items to practice the bookmark placement for the cut point between Basic and Proficient.

Check for Understanding

- Your facilitator will check with you for understanding and answer any questions you may have during and after the practice round.
- You will then complete a training evaluation form which serves as readiness check before proceeding.

Domain-Specific Bookmark Placement

- Round 1 (Without Discussion)
 - Work through the ordered item booklet.
 - Place bookmarks between the items as appropriate.
- Round 2 (With Group Discussion)
 - Discuss the first-round bookmark placements (focus on the KSAs).
 - Examine your cut points in relation to the group results.
 - Review and revise placement of bookmarks as appropriate.

Overall Science Bookmark Placement

- Round 3 (With Group Discussion)
 - Discuss the second-round bookmark placements (focus on the KSAs).
 - Examine your cut points in relation to the group results and impact data.
 - Review and revise placement of bookmarks as appropriate.
- Round 4 (With Group Discussion)
 - Discuss the third bookmark placements (focus on the impact data).
 - Examine your cut points in relation to the group results and impact data.
 - Review and revise placement of bookmarks as appropriate.

External Assessment Data

- Information from prior OSTP assessments in grades 3-8 included as a validity check
- A region of the item map is shaded that corresponds to projected proficiency percentages, with a range of +/- 2SEMs around that point.
- Within this region is where the Proficient bookmark should be placed.
- Your facilitator will give additional training and guidance on the usage of this data.

External Assessment Data

Example Item Map with Shading

Item Order	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		

Role of the Facilitator

- Lead and keep the group on track.
- Ensure that all panelists clearly understand the procedures.
- Ensure that the evaluation forms are completed.
- Your honest feedback is important!

A Few Reminders

- It is not necessary for panelists to reach consensus as to how the items should be assigned to Performance Levels.
- You may or may not change your mind as a result of the discussions.
- Process is focused solely on recommending cut scores.
- The Performance Levels and their definitions are not open for debate.
- Items are operational and fixed.
- Panelists' recommendations are vital, but final cut score decisions will be made by the Commission of Educational Quality and Accountability (CEQA).

Each Panelist Must

- Use his or her own best judgment in each round of rating.
- Be open-minded when listening to your colleagues' rationales for their ratings.
- Complete an evaluation form at the end of the process.
- Participate in the entire process or his/her judgments will be discounted.
- Use cell phones only during breaks.
- Arrive on time after breaks and each day.

What's Next?

- Take the Test
- Domain-Specific Work
 - Complete Item Map Form
 - Discuss the Performance Levels
 - Practice, Rounds 1 & 2
- Overall Science Work
 - Rounds 3 & 4
- Final Evaluation

Any Questions?

Thank you.

APPENDIX B—INSTRUCTIONS FOR FACILITATORS

GENERAL INSTRUCTIONS FOR STANDARD SETTING GROUP FACILITATORS

CCRA Science
June 5-6, 2019

Single-Group Activity

General Orientation

The Standard Setting activities begin with all panelists in one large group, facilitated by the lead facilitator.

Take the Test

Overview: In order to establish an understanding of the test items and for panelists to gain an understanding of the experience of the students who take the test, each participant will take the test. Panelists may wish to discuss or take issue with the items in the test. Tell them we will gladly take their feedback to the SDE. However, this is the actual assessment that students took, and it is the set of items on which we must set standards.

Activities:

- 1) Introduce the assessment and convey/do each of the following:
 - a. Tell panelists that they are about to take an actual OSTP assessment.
 - b. The purpose of the exercise is to help them establish a good understanding of the test items and to gain an understanding of the experience of the students who take the assessment.
- 2) Distribute a computer to each panelist
- 3) Ensure each panelist is able to login to the eMetric Portal and begin the assessment
- 4) Tell panelists to try to take on the perspective of a student as they complete the test. The expectation is that they will spend no more than 30 minutes on this task.
- 5) When the majority of the panelists have finished, pass out the answer key/scoring rubrics.

Domain-Specific Panels: Preparation

Split into Smaller Panels

Overview: After the general orientation, panelists will convene into two smaller standard setting panels according to domain (Life Sciences or Physical Sciences) for which they will be setting standards. Domain-specific standard setting activities will first occur, allowing for close consideration of the distinct content within CCRA Science. These panels will reconvene at a later point in the meeting in order to set a single set of cut-points.

Preliminaries

1. Welcome group, introduce yourself (name, affiliation, a little selected background information).
2. Have each participant introduce him/herself.
3. Ask each participant to sign a nondisclosure form. Do not proceed until a signed nondisclosure form has been collected from each participant.
4. Note that while panelists are making their recommendation for the cut scores, the Commission for Education Quality and Accountability make the final cut decision. The decision is almost always within a range around the recommended cut.

Fill Out Item Map Form

Overview: The primary purpose of this activity is for panelists to think about what knowledge, skills and abilities (KSAs) are measured by each item as well as what makes one question harder or easier than another. The notes panelists take here will be useful in helping them place their bookmarks and in discussions during the rounds of ratings.

On the item map form there is a shaded region based on projections derived from previous assessment. This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to a projection based on expected proficiency with a range of +/- 2 SEMs around that point.

Activities:

1. Prepare the materials
 - a. Ensure each panelist can open and view item map form (computer)
 - b. Distribute the domain-specific ordered item book
2. Review the domain-specific ordered item book and item map form (computer) with the panelists. Explain what each is, and point out the correspondence of the ordered items between the two. Explain that the items are statistically ordered from easiest to hardest, based on student performance from the most recent administration of the assessment.
3. Tell panelists that the shaded region represents a projection or expectation based on other assessment information, including prior-grade assessment results. During the actual standard setting activity, the Proficient bookmark placement should be set within this range. This information is not critical for the current activity.

4. Tell panelists they will work individually at first. After they have completed the item map form, they will then discuss it as a group.
5. Starting with the first item, they will record for each item:
 - a. The knowledge, skills and abilities (KSAs) the item measures, and
 - b. their thoughts about what makes that question harder than the previous question.
6. Panelists should not agonize over these decisions. It may be that the second item is only slightly harder than the first. Panelists should keep in mind that the purpose of the task is to record notes that will be useful to them in completing their ratings and not necessarily to fill in every space on the form.
7. Once panelists have completed the item map form, they should discuss them as a group.
8. Based on the group discussion, the panelists may modify their own item map form (make additional notes, cross things out, etc.)

Discuss Performance Level Definitions and Describe Characteristics of the “Borderline”

Student

Overview: In order to establish an understanding of the expected performance of borderline students on the test, panelists must have a clear understanding of:

- 1) Specific interpretation of the performance levels within their current domain (Life Sciences or Physical Sciences), and
- 2) Characteristics of students who are “just able enough” to be classified into each level above Below Basic within a specific domain. These students will be referred to as borderline students, since they are right on the border between levels.

The purpose of this activity is for the panelists to obtain an understanding of the domain-specific Performance Level Definitions with an emphasis on characteristics that describe students at the borderline within a specific domain -- both what these students can and cannot do.

This activity is critical since the ratings panelists will be making will be based on these understandings.

Preparation:

1. Use 3 sheets of chart paper and label the top of each one: Borderline Basic, Borderline Proficient and Borderline Advanced.

Activities:

- 1) Introduce the task. In this activity they will:
 - a. individually review the domain-specific Performance Level Descriptors again as needed;

- b. generate group descriptions of borderline Basic, Proficient and Advanced students.

The facilitator should compile the descriptions as bulleted lists on chart paper; the chart paper will then be posted so the panelists can refer to the lists as they go through the bookmark process.

- 2) Check to see if panelists want to discuss the performance levels again. Once they have a solid understanding of the PLDs, have them focus their discussion on the knowledge, skills, and abilities of students who are in the Proficient category, but just barely. The focus should be on those characteristics and KSAs that best describe the lowest level of performance necessary to warrant Proficient classification.
- 3) After discussing Proficient, have the panelists discuss characteristics of the borderline Basic student and then characteristics of the borderline Advanced student. Panelists should be made aware of the importance of the Proficient cut. This is the cut from non-proficient to just barely proficient.
- 4) Using chart paper, generate a bulleted list of characteristics for each of the levels. Post these on the wall of the room. Make sure that panelists agree on the bulleted characteristics and have a common understanding.

Practice Round

Overview of Practice Round: The primary purpose of the Practice Round is for panelists to become familiar with the task of placing the bookmarks. The facilitator will walk the panelists through the Proficient bookmark placement on the practice set, engage the panelists in a readiness discussion and check for understanding. If any of the panelists indicate an incomplete understanding of the practice rating task, then the facilitator will continue to work with the panelists to clarify any misconceptions before proceeding to Round 1.

Activities:

1. Make sure panelists have the following materials:
 - a. Domain-specific practice ordered item set
 - b. Domain-specific Performance Level Definitions
 - c. Access to the domain-specific practice rating form (computer)
2. Orient panelists to the domain-specific practice ordered item set. Point out the following:
 - a. Only items from the current domain are included in the item set;
 - b. Items are organized by difficulty from easiest to hardest.
 - c. The items represent the full range of difficulty included on the test.
 - d. Identify the items on the item map form that correspond to the practice ordered item set. Panelists can see their item map form entries on the practice rating form.
 - e. Show panelists how to indicate their bookmark placement on the practice rating form (computer).

3. Give the panelists a few minutes to read through the items.
4. The facilitator leads the group through a discussion of the Proficient bookmark placement in the domain-specific practice OIB.
 - a. Referring to the ten ordered items in the practice set, the domain-specific Performance Level Definitions, and the bulleted lists of domain-specific borderline characteristics posted on chart paper, the facilitator will lead a discussion about the placement of the Proficient bookmark.
 - b. Panelists should consider the question: **would at least two-thirds of the students performing at the borderline of Proficient answer the item correctly?**
 - c. Where the answer changes from yes to no is where the bookmark should be placed.
 - d. Panelists should answer the above question for all items to check for anomalies.
 - e. Panelists should enter their bookmark placement on the practice rating form (computer)
 - f. Use the practice rating master sheet to show where each panelist placed their bookmark. Have a discussion of their ratings in the context of the ratings made by other members of their group. Ask the panelists to discuss the rationale for placement of the highest and lowest ratings. The group should get a sense of how much variation there is in the ratings.

Readiness Discussion

After the panelists have placed bookmarks in the domain-specific practice ordered item set, lead a readiness discussion by posing the following seven questions.

The purpose of this discussion is to determine how well each panelist understands the bookmark task, to correct any misunderstandings, and if necessary, to identify panelists whose ratings should be excluded from the standard setting if their understanding doesn't improve.

The "correct" answer for each of the question is listed directly under each question. Some common misunderstandings are also listed for questions one and two. Please watch for these typical misunderstandings and if they arise, redirect the panelists to the correct responses.

Make sure any questions or concerns are resolved prior to moving on.

1. What questions should you ask for each item?
 - Would at least two-thirds of the borderline students get this item correct?
 - Would at least two-thirds of the students who just barely fall in the criteria level of interest get this item correct?

Please watch for and correct the following misconceptions.

- Omission of two-thirds (stating all students is also incorrect)
- Omission of borderline (stating all students, or all students in the criteria level of interest is also incorrect)

2. What is meant by the “at least two-thirds” rule?
 - At least two-thirds of the borderline students would get items like this correct
 Please watch for and correct the following misconceptions.
 - All students falling in the performance level of interest have a one out of two chance of getting this item correct.

3. What population of students should you consider for each item?
 - Borderline students
 - Students who just barely fall in the performance level of interest
 - a. Does the target population of borderline students change as I progress through the items for the first bookmark? (NO)
 - b. Does the target population change as I progress to the next bookmark? (YES)

4. As you approach a bookmark, how do answers change?
 - The answer to “Would at least two-thirds of the borderline students get this item correct” should change from a “yes” to a “no”
5. How should your confidence in the answers affect your bookmark placement?
 - As you become less confident in a “yes” answer, the bookmark placement should be approaching.
 - Where you are least confident in your “yes” answer, suggesting a “no”, is typically where the bookmark will be placed.

6. Does placing a bookmark after a certain page mean the student needs to get that many items correct on the assessment?
 - NO. The OIB page number is only an ordered index, and does not correspond to the number correct.

7. Should the population you are thinking about be the students in your classroom or school?
 - NO. You should be thinking about all of the students in the state.

NOTE: Make sure you collect all of the ‘training’ OIBs!

Standard Setting Practice Evaluation

After the panelists have placed bookmarks in the domain-specific practice ordered item set and you’ve completed the readiness discussion and answered any questions, have panelists fill out the training evaluation form. Before you start the Round 1 activities, scan the completed evaluations to see if there are any problems or concerns that need to be addressed before proceeding. **Make sure any questions or concerns are resolved prior to moving on.** Return the completed evaluations to the data analysis work room at the next convenient opportunity.

Domain-Specific Panels: Standard Setting

Round 1

Overview of Round 1: The primary purpose of Round 1 is to ask the panelists to make their initial judgments as to where the bookmark should be placed for each cut within their domain-specific OIB. For this round, panelists will work individually, without consulting with their colleagues. Beginning with the first ordered item in the domain-specific OIB, panelists will evaluate each item in turn. The panelists will gauge the level of difficulty of each of the items for those students who barely meet the definition of Proficient. The task that panelists are asked to do is to estimate whether a student performing at the borderline of Proficient, would answer each question correctly. More specifically, panelists should answer:

- Would *at least* two-thirds of the students performing at the borderline of Proficient answer the question correctly?

On the item map form there is a shaded region based on projections derived from previous assessments. This is the region panelists should consider for the placement of the Proficient bookmark. The shaded region corresponds to a projection based on expected proficiency with a range of +/- 2 SEMs around that point.

The Proficient bookmark placement must be between two shaded items. Should a panelist desire to set the bookmark outside the shaded region they will be asked to provide written justification.

The same process is then repeated for the [Below Basic/Basic] and [Proficient/Advanced] cuts.

Activities:

1. Panelists should have their domain-specific ordered item booklets, and Performance Level Definitions. Instruct the panelists to open the procedural rating form (computer) and show how details from their individual item map descriptions have been carried forward to the rating form. Ensure each panelist is able to open their rating form before proceeding.
2. Have panelists confirm their ID number matches the ID number on their procedural rating form and item map form. The ID number is on the back of their table tent.
3. Provide an overview of Round 1, covering each of the following:
 - a. Orient panelists to the domain-specific ordered-item book. Remind them that the items are presented in order of difficulty, from easiest to hardest, for their current domain only.
4. Remind panelists the shaded region is derived from growth projections, and that the Proficient bookmark placement should be set in this range. Placing the bookmark outside the shaded region will require that the panelist provide brief written justification.

- b. The primary purpose of this activity is for the panelists to make their initial determination as to whether students whose performance is barely Proficient would correctly answer each item, and to place their bookmark where they believe the answer of ‘yes’ turns to ‘no’. Remind panelists that they should be thinking about at least two-thirds of the borderline students. Once they have completed the process for the [Basic/Proficient] cut, they will proceed to the remaining two cut points starting with [Below Basic/Basic] and then the [Proficient/Advanced] cut.
 - c. Each panelist needs to base his/her judgments on his/her experience with the content, understanding of students, and the definitions of the borderline students generated previously.
 - d. One bookmark will be placed for each cut point. For CCRA there are 3 cut points and, therefore, three bookmarks will be placed [“Basic”, “Proficient”, “Advanced”]. Place the cut point number on the procedural rating form in the RND 1 column.
 - e. If panelists are struggling with placing a particular bookmark, they should use their best judgment and move on. They will have an opportunity to discuss their ratings and make revisions in Rounds 2 and 3.
5. Tell panelists that they will be placing the bookmarks individually; they will have the option to discuss each cut point with the other panelists during Round 2. **It is not necessary for the panelists to come to consensus about where the bookmarks should be placed.**
 6. Go over the rating form with panelists.
 - a. Lead panelists through a step-by-step demonstration of how to fill in the rating form.
 - b. Answer questions the panelists may have about the work in Round 1.
 - c. Once everyone understands what they are to do in Round 1, tell them to begin.
 7. Starting with the first ordered item in the OIB and proceeding up to their bookmark placement for the [Basic/Proficient] cut point, the panelists will work through the OIB item by item and make their initial bookmark placements. Have panelists continue to examine five items past their placement to check for anomalies.
 8. As panelists complete the task, ask them to carefully inspect their rating forms to ensure they are filled out properly.
 - a. **The ID number must be filled in.**
 - b. **Exactly three cuts must be entered and identified “Basic”, “Proficient” and “Advanced” on the procedural rating form in the RND 1 column.**

- c. The cut points must be entered sequentially on the rating form (e.g., the bookmark for “Proficient” cannot be placed on an easier item in the OIB than the bookmark for “Basic” on the rating sheet).
- d. The “Proficient” bookmark placement should be between two shaded items on the item map form, or a written justification must be provided.
- e. Check each panelist’s rating form before you allow them to leave for a short break.
- f. When all the rating forms have been validated, the group will take a break. Rating information for round 1 will be locked, so it cannot be changed.

Complete Procedural Evaluation Form

Make sure panelists fill out the procedural evaluation for the grade. Emphasize that their honest feedback is important. Return the completed evaluations to the data analysis work room at the next convenient opportunity. Collect the materials from the grade and mark them off on the Materials Tracking sheet.

Tabulation of Round 1 Results

Tabulation of Round 1 results will be completed by the data analysis team as quickly as possible after processing the rating forms.

Round 2

Overview of Round 2: In Round 2, the panelists will discuss their Round 1 placements as a group and then revise their ratings on the basis of that discussion. They will discuss their ratings in the context of the ratings made by other members of their group. Panelists should discuss the rationale for placement of the highest and lowest ratings. The group should get a sense of how much variation there is in the ratings. Panelists should also consider the question, “How tough or easy a rater are you?” The purpose here is to allow panelists to examine their individual expectations (in terms of their experiences) and to share these expectations and experiences in order to attain a better understanding of how their experiences impact their decision-making.

To aid with the discussion, the panelists will be provided with the median Round 1 bookmark placements for their group.

Once panelists have reviewed and discussed their bookmark placements, they will be given the opportunity to change or revise their Round 1 ratings.

Activities:

1. Make sure the panelists have their domain-specific ordered item booklets, item map forms (computer), and Performance Level Definitions. Ensure each panelist is able to open their rating form.
2. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. This information is provided so panelists can get a sense of where they fall

relative to the group median –if they are more stringent or more lenient than other panelists.

3. Provide an overview of Round 2. Remind panelists of the following:
 - a. As in Round 1, the primary purpose is to place bookmarks where you feel the criteria levels are best distinguished, considering the additional information and discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area and specific domain, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities (KSAs) required to answer each item.
4. The panelists will discuss their Round 1 ratings as a group, beginning with the Proficient cut point and followed by the Basic and Advanced cuts.
 - a. The discussion should focus on differences in where individual panelists in the group placed their bookmarks.
 - b. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
 - c. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
 - d. On the basis of the discussions, panelists should make a second round of ratings.
 - e. Remind panelists the shaded region is derived from growth projections and that the Proficient bookmark placement will be set in this range. The Proficient bookmark should be between two shaded items.
 - f. When placing their Round 2 bookmarks, panelists should not feel compelled to change their ratings.
 - g. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.

Encourage the panelists to use the discussion and feedback to assess how stringent or lenient a judge they are. If a panelist is consistently higher or lower than the group, they may have a different understanding of the borderline student than the rest of the group, or a different understanding of the Performance Level Definitions, or both. **It is O.K. for panelists to disagree, but that disagreement should be based on a common understanding of the Performance Level Definitions.**

5. As the group is conducting their discussions, circulate around the room to ensure that the discussions are staying on topic, the panelists understand the task, and that all panelists are participating appropriately in the discussion.
6. When all panelists in each group have completed their second ratings, **carefully inspect the rating forms** to ensure they are filled out properly.
 - a. **The ID number must be filled in correctly.**
 - b. **Exactly three cuts must be entered and identified “Basic”, “Proficient” and “Advanced” on the procedural rating form.**
 - c. **The cut points must be entered sequentially on the rating form (e.g., the bookmark for “Proficient” can’t come before the bookmark for “Basic” on the rating sheet).**
 - d. **The “Proficient” bookmark placement should be between two shaded items on the item map form. If it is outside the shaded region, a written justification must be provided.**
 - e. Check each panelist’s rating form before you allow them to leave for a short break.
 - f. When all the rating forms have been validated, the group will take a break. Rating information for round 2 will be locked, so it cannot be changed.

Single-Group Activity: Standard Setting

Round 3

Overview of Round 3: At the conclusion of Round 2 discussions, the complete Science panel will be reassembled from the domain-specific Life Sciences and Physical Sciences panels. Subsequent standard setting activities will be conducted with the entire panel. The primary purpose of Round 3 is to ask the complete Science panel to discuss their Round 2 placements as a group. However, unlike in Round 2, in Round 3 the panelists will have the opportunity to discuss the impact of their domain-specific bookmark placements against overall Science performance and to revise the cut-points based on that discussion. The goal of these discussions is for panelists to resolve the cut-points determined separately by domain, considering whether the percentage of students in each achievement level category seems reasonable.

To aid with the discussion, a psychometrician will present the following information to the panelists:

1. The group median Round 2 bookmark placements for each domain;
2. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements from Round 2 for each domain; and
3. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms. Both Median Absolute Deviation (How much disagreement among panelists) and Conditional Standard Error (Measure of error in assessment) data will be provided. A range of impact data for each cut will be determined for +/-1 SE around the cut score for each of these.

Once panelists have reviewed and discussed their bookmark placements and the impact data, they will be given the opportunity to change or revise their Round 2 ratings.

Activities:

1. Make sure the panelists have their complete Science ordered item booklets, item map forms (computer), and Performance Level Definitions. Ensure each panelist is able to open and access their Round 3 and 4 procedural rating form.
 - a. The rating form for Rounds 3 and 4 (computer) is a different worksheet than for Rounds 1 and 2.
 - b. The rating form continues to include the shaded region for guiding placement of the Proficient bookmark and includes colored regions for the range of domain-specific bookmark placements. Yellow indicates the range of Basic bookmarks, green indicates the range of Proficient bookmarks, and blue indicates the range of Advanced bookmarks. For example, a yellow region indicates the Life Sciences bookmark placement, the Physical Sciences bookmark placement, and any pages or items that are between the two.

2. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 2 ratings. Based on their Round 2 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
 - b. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements for each domain. Panelists will use this information as a “reasonableness check.” In other words, they will discuss whether the percentages in each level seem reasonable, based on their knowledge of the test and the current status of students across the state relative to the Performance Level Definitions. If the answer is no, panelists may choose to make adjustments to one or more of their bookmark placements. Panelists may decide to select bookmarks resulting from either domain or select an entirely new bookmark between the domain-specific bookmarks. To facilitate these discussions and decisions, the panelists will be provided with an overall Science OIB which will include both Life and Physical Science items as administered on the core operational form. To facilitate the identification of an appropriate bookmark, panelists will be instructed to consider only those items in the OIB that appear between the domain-specific bookmarks.
 - c. Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms. Both Median Absolute Deviation (How much disagreement among panelists) and Conditional Standard Error (Measure of error in assessment) data will be provided. A range of impact data for each cut will be determined for +/-1 SE around the cut score for each of these.
3. Provide an overview of Round 3. Remind panelists of the following:
 - a. As in Round 2, the primary purpose is to place bookmarks where you feel the performance levels are best distinguished, considering the additional information and further discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists, the knowledge, skills, and abilities required to answer each item, and the consensus and impact data.
 - c. The panelists will discuss their domain-specific ratings, beginning with the Proficient cut point and followed by the Basic and Advanced cuts.
 - d. The discussion should focus on differences in where individual panelists placed their bookmarks.

- e. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
 - f. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
 - g. On the basis of the discussions, panelists should make a third round of ratings.
 - h. Remind panelists the shaded region is derived from growth projections and that the Proficient bookmark placement will be set in this range. The Proficient bookmark must be between two shaded items or a written justification must be provided by the panelist.
 - i. Remind panelists additionally that the yellow, green, and blue shaded regions indicate the domain-specific bookmark placements. The complete Science bookmarks for Basic, Proficient, and Advanced should be placed within those ranges, or a written justification must be provided.
 - j. Because of the combination of domain-specific OIBs and the need to make a judgement about overall Science performance, it is likely that panelists will change their bookmark placement from the previous round.
 - k. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.
 - l. Write brief notes on any notable discussions of the process, any particular sticking points or issues, or key rationales had in their judgments. These do not need to be formal, but will be useful if the client has questions regarding the process.
4. When all panelists have completed their second ratings, **carefully inspect the rating forms (computer)** to ensure they are filled out properly.
- a. **The ID number must be filled in correctly.**
 - b. **Exactly three cuts must be entered and identified “Basic”, “Proficient” and “Advanced” on the procedural rating form.**
 - c. **The cut points must be entered sequentially on the rating form (e.g., the bookmark for “Proficient” can’t come before the bookmark for “Basic” on the rating sheet).**
 - d. **The “Proficient” bookmark placement should be between two shaded items on the item map form. If it is outside the shaded region, a written justification must be provided.**

- e. Check each panelist's rating form before you allow them to leave for a short break.
- f. When all the rating forms have been validated, the group will take a break. Rating information for round 3 will be locked, so it cannot be changed.

Round 4

Overview of Round 4: The primary purpose of Round 4 is to ask the panelists to discuss their Round 3 placements as a group and to give them one last opportunity to revise their ratings on the basis of that discussion. As in Round 3, they will discuss their ratings in the context of the ratings made by other members of the group.

To aid with the discussion, a psychometrician will present the following information to the panelists:

1. The group median Round 3 bookmark placements for Science overall, and
2. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements from Round 3 for Science overall.
3. Standard error information, as before.

Once panelists have reviewed and discussed their bookmark placements and the impact data, they will be given the opportunity to change or revise their Round 3 ratings.

Activities:

1. Make sure the panelists have their ordered item booklets, item map forms (computer), and Performance Level Definitions. Ensure each panelist can open their procedural rating form.
2. A psychometrician will present and explain the following information to the panelists:
 - a. the median bookmark placements for the group based on the Round 3 ratings. Based on their Round 3 rating form, panelists will know where they fall relative to the group median. This information is provided so panelists can get a sense if they are more stringent or more lenient than other panelists.
 - b. Impact data, showing the approximate percentage of students statewide that would be classified into each performance level category based on the room median bookmark placements. Panelists will use this information as a "reasonableness check." In other words, they will discuss whether the percentages in each level seem reasonable, based on their knowledge of the test and the current status of students across the state relative to the Performance Level Definitions. If the answer is no, panelists may choose to make adjustments to one or more of their bookmark placements.

Standard error information, this will demonstrate to the panelists the amount of variability present in the cut scores expressed in real-world terms. Both Median Absolute Deviation (How much disagreement among panelists) and Conditional Standard Error (Measure of error in assessment) data will be provided. A range of impact data for each cut will be determined for +/-1 SE around the cut score for each of these.

3. Provide an overview of Round 4. Remind panelists of the following:
 - a. As in Round 3, the primary purpose is to place bookmarks where you feel the performance levels are best distinguished, considering the additional information and further discussion.
 - b. Each panelist needs to base his/her judgments on his/her experience with the content area, understanding of students, the definitions of the borderline students generated previously, discussions with other panelists and the knowledge, skills, and abilities required to answer each item.
 - c. The panelists will discuss their Round 3 ratings, beginning with the Proficient cut point and followed by the Basic and Advanced cuts.
 - d. The discussion should focus on differences in where individual panelists placed their bookmarks.
 - e. Panelists should be encouraged to listen to their colleagues as well as express their own points of view.
 - f. If the panelists hear a logic/rationale/argument that they did not consider and that they feel is compelling, then they may adjust their ratings to incorporate that information.
 - g. On the basis of the discussions, panelists should make a fourth round of ratings.
 - h. Remind panelists that the shaded regions for Proficient, Basic, and Advanced should guide placement of their bookmarks. Placement outside these ranges will require brief written justification.
 - i. When placing their Round 4 bookmarks, panelists should not feel compelled to change their ratings.
 - j. The group does not have to achieve consensus. If panelists honestly disagree, that is fine. We are trying to get the best judgment of each panelist. Panelists should not feel compelled or coerced into making a rating they disagree with.
 - k. Write brief notes on any notable discussions of the process, any particular sticking points or issues, or key rationales had in their judgments. These do not

need to formal, but will be useful if the client has questions regarding the process.

4. When all panelists have completed their fourth ratings, **carefully inspect the rating forms (computer)** to ensure they are filled out properly.
 - a. **The ID number must be filled in.**
 - b. **Exactly three cuts must be entered and identified “Basic”, “Proficient” and “Advanced” on the procedural rating form.**
 - c. **The cut points must be entered sequentially on the rating form (e.g., the bookmark for “Proficient” can’t come before the bookmark for “Basic” on the rating sheet).**
 - d. **The “Proficient” bookmark placement should be between two shaded items on the item map form. If it is outside the shaded region, a written justification must be provided.**
 - e. The standard setting team will now lock the round 4 ratings.

Complete Final Evaluation Forms

Make sure panelists fill out the final evaluations before they leave. Emphasize that their honest feedback is important.

APPENDIX C—PANELISTS

Panelists

Table C-1. 2019 OK Standard Setting Report: Science Panelists

<i>Full Name</i>	<i>Email Address</i>	<i>Company</i>	<i>Invitation List</i>	<i>Status</i>
Peters, Chanda	cpeters@woodwardps.net	Woodward	Physical Science	Accepted
Wright, Gayla	docgayla@cox.net	OERB	Physical Science	Accepted
Jones, Vanessa (cancelled)	jonesv@bethel.k12.ok.us	Bethel High School	Life Science	Accepted
Chaisson, Leiha	lchaisson1@cox.net	Mustang	Life Science	Accepted
Will, Tammy	tammywill@morrisonps.com	Morrison Public School	Physical Science	Accepted
Tamez, Jeramey	Jeramey.Tamez@yukonps.com	Yukon	Life Science	Accepted
Zumwalt, Ruth	ruth.zumwalt@edmondschools.net	Edmond Public Schools	Physical Science	Accepted
Richardson, Traci	trichardson@stillwaterschools.com	Currently Stillwater, but that will change	Life Science	Accepted
Schweitzer, Dawna	schweitzer.dawna@gmail.com	Retired	Life Science	Accepted
Shrauner, Jennifer	jshrauner@putnamcityschools.org	Putnam City	Life Science	Accepted
Gilmore, Paul	pgilmore@putnamcityschools.org	Putnam City	Physical Science	Accepted
Maier, Steve	sjmaier@nwsu.edu	Alva	Physical Science	Accepted

APPENDIX D—PERFORMANCE LEVEL DESCRIPTORS

Oklahoma School Testing Program
Performance-Level Descriptors
Grade 7 Geography: Eastern Hemisphere

ADVANCED: Students demonstrate superior understanding of challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level will

- infer and apply information using a variety of geographic sources
- analyze the importance of Celebrate Freedom Week
- compare and contrast cultural, physical, and political regions; urban areas and countries
- analyze how human and physical characteristics affect regions over time
- evaluate the role of international organizations in conflict and cooperation
- identify and describe major landforms and bodies of water
- identify the causes of natural disasters and analyze their effects on human populations and the environment
- summarize and evaluate how countries/regions are categorized based on cultures, population locations, economic development, social and political structures, and standard of living measures
- analyze and predict the distribution of natural resources and the three sectors of the economy
- analyze how humans adapt to and change the natural environment
- evaluate governmental policies that address regional resource issues

PROFICIENT: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade. Students scoring at the Proficient level will

- interpret information using a variety of geographic sources
- explain the importance of Celebrate Freedom Week
- identify and describe cultural, physical, and political regions; urban areas and countries
- explain how human and physical characteristics affect regions over time

- describe the role of international organizations in conflict and cooperation
- identify and describe major landforms and bodies of water
- identify the causes of natural disasters and explain their effects on human populations and the environment
- compare and contrast how countries/regions are categorized based on cultures, population locations, economic development, social and political structures, and standard of living measures
- identify and describe the distribution of natural resources and the three sectors of the economy
- explain how humans adapt to and change the natural environment
- describe governmental policies that address regional resource issues

LIMITED KNOWLEDGE: Students demonstrate partial mastery of the essential grade-level knowledge and skills. Students at the Limited Knowledge level will

- identify some information using a variety of geographic sources
- identify the importance of Celebrate Freedom Week
- identify or describe some of the cultural, physical, and political regions; urban areas and countries
- identify how some human and physical characteristics affect regions over time
- identify the involvement of some international organizations in conflict and cooperation
- identify and locate some major landforms and bodies of water
- identify some of the causes of natural disasters and explain some of their effects on human populations and the environment
- compare or contrast how some countries/regions are categorized based on cultures, population locations, economic development, social and political structures, and standard of living measures
- identify or describe the distribution of some natural resources and some sectors of the economy
- identify some ways humans adapt to and change the natural environment
- identify or describe some governmental policies that address regional resource issues

UNSATISFACTORY: Students have not performed at least at the Limited Knowledge level. Students at the Unsatisfactory level have not demonstrated grade-level knowledge and skills.

Grade 3 Mathematics Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically complete complex addition, subtraction, and multiplication problems and model division facts. Students order fractions using models and compose and decompose fractions related to the same whole. Students extend patterns and generate real-world situations to represent number sentences. Students determine volume and elapsed time. Students summarize complex data sets and analyze the data to solve problems. Students solve complex and non-routine real-world problems, draw logical conclusions, and justify solutions.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically compare and order whole numbers. Students complete addition, subtraction, and multiplication problems and recognize the relationship between multiplication and division. Students construct and compare fractions using models. Students select the fewest number of coins for a given amount of money. Students determine rules to describe basic patterns. Students determine unknowns in equations and apply number properties. Students classify angles. Students sort three-dimensional figures and determine the perimeter of polygons. Students determine the area of two-dimensional figures. Students read and analyze length, temperature, and time. Students summarize a data set and analyze the data to solve problems. Students solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level represent whole numbers. Students complete simple addition, subtraction, and multiplication problems. Students read and write fractions. Students determine the value of a set of coins or bills. Students determine rules to describe simple patterns. Students determine unknowns in simple equations. Students identify right angles. Students choose an appropriate instrument to measure an object. Students read and write time from a digital clock.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive mathematical instruction.

Grade 3 English Language Arts Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level consistently choose the best summary of the text and identify the main idea and key details. Students compare and contrast details in literary and nonfiction/informational texts to describe genres. Students frequently identify literary elements, literary devices, and author's purpose and frequently distinguish fact from opinion. Students consistently infer whether a text is written in first or third person point of view.

Students consistently engage in a recursive writing process to create organized written works with a purpose that is clearly communicated for an appropriate audience. Students skillfully use details that support the writing task.

Students skillfully use vocabulary knowledge and resources to analyze complex text through word parts, word relationships, and context clues. Students consistently use appropriate and meaningful vocabulary to enhance clarity and effectiveness in their writing.

Students consistently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.

Students generate a question on a specific topic and consistently locate and use information, including graphic features, to understand the text. Students determine the relevance and reliability of information. Students clearly summarize and present information in an organized and cohesive way.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically choose the best summary of the text and identify the main idea and key details. Students compare and contrast details to classify genres. Students identify literary elements, literary devices, and author's purpose and distinguish fact from opinion. Students infer whether a text is written in first or third person point of view.

Students engage in a recursive writing process to create organized written works. Students create written works for specific purposes and audiences using details that support the writing task.

Students use vocabulary knowledge and resources to interpret text through word parts, word relationships, and context clues. Students use appropriate vocabulary to write clearly and effectively.

Students frequently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.

Students generate a question on a specific topic and locate and use information, including graphic features, to understand the text. Students summarize and present information in an organized way.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level inconsistently choose the best summary of the text and have difficulty identifying main ideas and key details. Students compare and contrast but inconsistently classify genres. Students inconsistently identify literary elements, literary devices, author's purpose, or points of view or inconsistently distinguish fact from opinion.

Students inconsistently engage in a recursive writing process to create written works that lack organization. Students write for a specific purpose but seldom consider the audience. Students inconsistently support their ideas with details.

Students inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships, or context clues. Students inconsistently use appropriate vocabulary in written works.

Students inconsistently identify and apply appropriate use of grammar and mechanics.

Students generate a question on a topic but ineffectively locate and use information, or imprecisely use graphic features, to understand the text. Students provide an incomplete summary and present information with lack of clarity.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive reading instruction.

Grade 4 Mathematics Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically estimate and solve complex mathematical problems and determine the unknown in non-equivalent expressions. Students compare decimals and fractions. Students solve complex money problems. Students determine a rule and extend a complex pattern. Students determine and represent unknown values in complex problems. Students determine volume. Students solve complex measurement problems. Students represent complex data sets and solve problems involving the data. Students solve complex and non-routine real-world problems, draw logical conclusions, and justify solutions.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically estimate and solve mathematical problems. Students use models to determine equivalent fractions, compare and order fractions, and add and subtract fractions. Students read and write decimals and make connections between decimals and fractions. Students determine change using coins. Students determine rules and extend patterns. Students determine unknown values in mathematical problems. Students describe parts of geometrical figures and identify similarities in three-dimensional figures. Students decompose and determine the area of polygons. Students solve measurement problems. Students represent data sets and solve problems involving the data. Students solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level demonstrate the ability to estimate and solve simple mathematical problems. Students use models to determine simple equivalent fractions, compare and order whole numbers and simple fractions, and decompose fractions. Students read and write simple decimals and compare and order whole numbers and decimals. Students determine change using whole dollars. Students determine a rule and extend a simple pattern. Students determine unknown values in simple mathematical problems. Students identify quadrilaterals and determine the area of simple polygons. Students identify appropriate units and tools to measure. Students solve simple problems given a data set.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive mathematical instruction.

Grade 4 English Language Arts Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level consistently choose the best summary of the text and explain how the details support the main idea. Students compare and contrast details in literary and nonfiction/informational texts to describe and analyze genres. Students consistently recognize the paraphrase of original text. Students consistently identify and describe literary elements, literary devices, author's purpose, accuracy of facts, and text structure in various texts. Students consistently infer meaning from increasingly complex text including author's purpose and points of view.

Students consistently engage in a recursive writing process to create purposeful and organized written works. Students create fully developed and engaging written works for specific purposes and audiences using details that support the writing task.

Students efficiently use vocabulary knowledge and resources to analyze complex text through word parts, word relationships, and context clues. Students consistently use appropriate and meaningful vocabulary to enhance clarity and effectiveness in their writing.

Students consistently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.

Students generate a viable research question on a specific topic and consistently locate and use information, including graphic features, to interpret the text. Students organize and synthesize relevant and reliable information in order to present findings.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically choose the best summary of the text and identify the details that support the main idea. Students compare and contrast details in literary and nonfiction/informational texts to classify genres. Students recognize the paraphrase of original text most of the time. Students identify and describe literary elements, literary devices, author's purpose, accuracy of facts, and text structure in various texts. Students infer meaning from a text including author's purpose and points of view.

Students engage in a recursive writing process to create purposeful written works. Students select and apply the organizational structure that best fits the mode, purpose, and audience.

Students use vocabulary knowledge and resources to interpret text through word parts, word relationships, and context clues. Students use appropriate vocabulary to write clearly and effectively.

Students frequently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.

Students generate a viable research question on a specific topic and adequately locate and use information, including graphic features, to interpret the text. Students organize relevant and reliable information in order to present findings.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level inconsistently choose the best summary of the text and have difficulty differentiating main ideas from details. Students compare and contrast details in literary and nonfiction/informational texts but inconsistently classify genres. Students seldom identify the paraphrase of original text. Students inconsistently identify and describe literary elements, literary devices, author's purpose, points of view, or accuracy of fact.

Students inconsistently engage in a recursive writing process to create written works. Students' writing lacks organizational structure. Students create underdeveloped written works for specific purposes and audiences with inconsistent use of details.

Students inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships, or context clues. Students inconsistently use appropriate vocabulary in written works.

Students inconsistently identify and apply appropriate use of grammar and mechanics.

Students generate a research question on a topic but ineffectively locate and use information, or imprecisely use graphic features, to interpret the text.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive reading instruction.

Grade 5 Mathematics Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically interpret the remainder of division problems within the context of the problem. Students order decimals, fractions, and whole numbers. Students evaluate complex expressions, equations, and inequalities. Students construct geometric figures and identify them in various contexts. Students compare the volume, perimeter, or surface area of geometric figures. Students analyze complex graphs. Students solve complex and non-routine real-world problems, draw logical conclusions, and justify solutions.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically estimate and solve division problems with the remainder represented as a fraction or decimal. Students generate equivalent decimals and fractions, represent whole numbers or decimals, and compare fractions and decimals, including mixed numbers. Students estimate, add, and subtract decimals and fractions. Students describe patterns of change and graph these patterns as ordered pairs on a coordinate plane. Students evaluate expressions, equations, and inequalities. Students solve volume and perimeter problems and simple surface area problems. Students determine reasonable values for the perimeter of shapes with curves. Students compare angles. Students recognize relationships within a measurement system. Students determine the mean, median, mode, and range of a data set and analyze simple graphs. Students solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level estimate and solve division problems with remainders and solve addition and subtraction real-world problems. Students recognize basic equivalent decimals and fractions, represent whole numbers, and compare and order fractions or decimals. Students add and subtract decimals and fractions with like denominators. Students describe simple patterns of change and identify ordered pairs on a coordinate plane. Students evaluate simple equivalent numerical expressions or equations. Students describe and classify geometric figures. Students solve simple volume and perimeter problems. Students choose an appropriate instrument to measure objects and read and analyze the length of objects. Students read and analyze the measure of angles. Students read simple graphs.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive mathematical instruction.

Grade 5 Science Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically analyze scale, proportion, quantity and patterns when performing computational thinking to complex data as it pertains to distribution of water on Earth, conservation of matter, and Earth's relationship with the sun, moon and stars. Students predict, modify, and extend complex models at various scales to analyze the movement of matter and energy between organisms, ecosystems, and Earth's systems, and analyze the outcomes of these interactions. Students analyze and compare evidence, data, and models to engage in argument to explain the cause and effect relationships between an object and Earth's gravity, how scale and proportion affect the apparent brightness of the sun and other stars/ and/or how plants use matter (chiefly air and water) to grow. Students observe and measure phenomenon to interpret and evaluate patterns that classify materials based on properties. Students can describe complex cause and effect relationships when mixing substances within an investigation framework.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically describe, use and/or develop basic models at various scales to explain the movement of matter and energy between organisms, ecosystems, and Earth's systems and explain the outcomes of these interactions. Students apply scale, proportion, quantity, and/or patterns when performing computational thinking to data as it pertains to distribution of water on Earth, conservation of matter, and Earth's relationship with the sun, moon, and stars. Students use evidence, data, and/or models to engage in argument to explain the cause and effect relationships between an object and Earth's gravity, how scale and proportion affect the apparent brightness of the sun and other stars, or how plants use matter (chiefly air and water) to grow. Students observe and measure phenomenon to identify patterns that classify materials based on properties. Students can describe cause and effect relationships when mixing substances within an investigation framework.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level identify basic models to represent common features of matter and/or energy, ecosystems, and/or Earth's systems. Students recognize scale, proportion, quantity, or patterns when performing basic computations with data as it pertains to distribution of water on Earth, conservation of matter, and/or Earth's relationship with the sun, moon, and stars. Students identify evidence, data, or models to distinguish relationships between an object and Earth's gravity, how basic scale and proportion affect the brightness of the sun and other stars, or how plants use air and water. Students will observe or measure phenomenon to recognize patterns of materials. Students can identify basic relationships when mixing substances within an investigation framework.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive science instruction.

Grade 5 English Language Arts Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level analyze how summaries reflect a meaningful, text-based sequence of the main idea and supporting details. Students compare and contrast details in literary and nonfiction/informational texts to describe and analyze genres. Students consistently recognize the paraphrase of original text. Students evaluate and analyze literary devices, author's purpose, point of view, and accuracy of fact to interpret the meaning of the text as a whole. Students consistently compare and contrast texts, and ideas within and between texts, to support inferences.

Students consistently engage in a recursive writing process to create purposeful and organized written works. Students create thoroughly organized and engaging written works by selecting and applying the organizational structure that best fits the mode, purpose, and audience.

Students skillfully use vocabulary knowledge and resources to analyze complex text through word parts, word relationships, and context clues. Students consistently use appropriate and meaningful vocabulary to enhance clarity and effectiveness in their writing.

Students consistently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.

Students consistently locate, record, and organize relevant and reliable information on a topic in order to synthesize and clearly present findings.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically identify objective text-based summaries that include main idea, supporting details, and a logical sequence of events. Students compare and contrast details in literary and nonfiction/informational texts to classify genres. Students recognize the paraphrase of original text most of the time. Students explain how literary elements, literary devices, author's purpose, point of view, accuracy of facts, and text structure contribute to the meaning of the text. Students compare and contrast texts and ideas within and between texts.

Students engage in a recursive writing process to create purposeful written works. Students select and apply the organizational structure that best fits the mode, purpose, and audience.

Students use vocabulary knowledge and resources to interpret text through word parts, word relationships, and context clues. Students use appropriate vocabulary to write clearly and effectively.

Students frequently identify and apply appropriate use of grammar and mechanics to provide clarity and enhance communication.

Students adequately locate, record, and organize relevant and reliable information on a topic in order to present findings.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level inconsistently choose the best summary of the text and have difficulty differentiating main ideas from details. Students compare and contrast details in literary and nonfiction/informational texts but inconsistently classify genres. Students seldom identify the paraphrase of original text. Students identify literary elements, literary devices, author's purpose, point of view, or accuracy of fact. Students inconsistently compare and contrast texts and ideas within or between texts.

Students inconsistently engage in a recursive writing process to create written works. Students create written works for various purposes and audiences but inconsistently select and apply an organizational structure that fits the writing task.

Students inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships, or context clues. Students inconsistently use appropriate vocabulary in written works.

Students inconsistently identify and apply appropriate use of grammar and mechanics.

Students ineffectively locate, record, and organize information on a topic in order to present findings.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive reading instruction.

Grade 6 Mathematics Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically estimate and solve complex problems requiring unit conversions. Students use the distance between points and transformations to solve complex problems involving congruent figures. Students analyze the differences between two outcomes of simple experiments. Students solve complex and non-routine real-world problems, draw logical conclusions, and justify solutions.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level estimate, illustrate, and simplify the addition and subtraction of integers and assess the reasonableness of an answer. Students solve ratio and unit rate problems. Students estimate and illustrate the multiplication and division of non-negative rational numbers. Students evaluate the validity of the value of a variable. Students generate expressions, equations, and inequalities. Students interpret the solution of an equation and assess the reasonableness of the solution. Students determine the area of polygons and composite figures. Students use relationships between angles and the triangle sum theorem to solve problems. Students estimate and solve problems requiring unit conversion. Students predict transformations, analyze lines of symmetry, and use the distance between points and transformations to solve problems involving congruent figures. Students explain and justify which measure of central tendency provides the most descriptive information for a data set. Students create and analyze box-and-whisker plots and explain and compare possible outcomes of simple experiments. Students solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level read, order, represent, and explain rational numbers expressed as fractions, decimals, percents, and ratios. Students write positive integers as products of factors. Students illustrate or simplify the addition and subtraction of integers. Students identify and compare quantities, determine unit rates, and find equivalent fractions and percents. Students multiply and divide non-negative rational numbers. Students graph ordered pairs in all quadrants. Students represent reflective relationships between varying quantities. Students evaluate the value of a variable in expressions, equations, and inequalities. Students use number sense and properties of operations to solve equations and graph the solution. Students determine the area of parallelograms and triangles. Students identify angle relationships by name. Students identify and display the effect of transformations. Students identify lines of symmetry. Students calculate measures of central tendency, determine the sample space of simple experiments, and identify possible outcomes.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive mathematical instruction.

Grade 6 English Language Arts Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level will thoroughly comprehend, interpret, evaluate, and respond to a variety of increasingly complex texts of all literary and informational genres. Students skillfully create an objective summary including main idea and supporting details. Students effectively paraphrase main ideas with supporting details in a text. Students thoroughly compare and contrast stated or implied purposes of authors' writing. Students thoroughly evaluate literary devices, points of view, and perspectives, and they explicitly analyze how authors use key literary elements to contribute to the meaning of the text. Students consistently categorize facts included in an argument. Students analyze and evaluate complex textual evidence to support inferences and understanding within and between varied texts.

Students effectively engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In opinion writing, students strategically state an opinion supported with facts and details. Students use fully developed, complex ideas, thorough organization, purposeful word choice, a variety of fluent sentences, and appropriate voice.

Students skillfully use context clues, word parts, and reference tools to determine or clarify the meaning of words. Students infer complex relationships among words with multiple meanings. Students select precise vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.

Students intentionally apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a strong command of Standard English grammar, mechanics, and usage.

Students recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students thoroughly comprehend, evaluate, and synthesize resources. Students skillfully summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically comprehend, interpret, evaluate, and respond to a variety of complex texts of all literary and informational genres. Students create an objective summary including main idea and supporting details. Students paraphrase main ideas with supporting details in a text. Students compare and contrast stated or implied purposes of authors' writing. Students evaluate literary devices, points of view, and perspectives, and they analyze how authors use key literary elements to contribute to the meaning of the text. Students categorize facts included in an argument. Students analyze textual evidence to support inferences and understanding within and between texts.

Students engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students introduce a claim and organize reasons and evidence. Students use fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

Students use context clues, word parts, and reference tools to determine or clarify the meaning of words. Students infer the relationships among words with multiple meanings. Students select vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.

Students apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a command of Standard English grammar, mechanics, and usage.

Students recognize viable research questions to find information on a topic. Students record and organize information from various sources. Students comprehend, evaluate, and synthesize resources. Students summarize and integrate information following a citation style with guidance and support. Students summarize and present information in a report.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level partially comprehend, interpret, evaluate, and respond to literary and informational texts, applying limited critical thinking skills. Students create a summary including main idea and limited supporting details. Students inconsistently paraphrase main ideas with limited supporting details in a text. Students inconsistently compare and contrast stated or implied purposes of authors' writing. Students inconsistently identify literary devices, points of view, and perspectives, and they describe how authors use key literary elements. Students inconsistently categorize facts included in an argument. Students inconsistently identify limited textual evidence to support inferences between texts.

Students inconsistently engage in a writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In opinion writing, students inconsistently state an opinion supported with limited facts and details. Students use partially developed ideas, weak organization, and ineffective word choice, sentences, and voice.

Students ineffectively use context clues, word parts, and reference tools to determine the meaning of words. Students may or may not infer the relationships among words with multiple meanings. Students use a limited vocabulary to communicate ideas in writing and to create an effect according to a purpose.

Students inconsistently apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a limited command of Standard English grammar, mechanics, and usage.

Students may not recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students partially comprehend, evaluate, and synthesize resources. Students ineffectively summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive reading instruction.

Grade 7 Mathematics Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically interpret equations and inequalities involving variables and rational numbers. Students make connections between circumference and area to solve problems involving circles. Students analyze, apply, and display the effect of dilations and multiple transformations. Students use central tendencies and range, predict data and select an appropriate data display, and predict theoretical probability. Students solve complex and non-routine real-world problems, draw logical conclusions, and justify solutions.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically estimate solutions of problems involving rational numbers and assess the reasonableness of the solutions. Students differentiate between proportional and inversely proportional relationships and identify the constant of proportionality. Students represent proportional relationships in a variety of ways. Students use representations to identify and compare unit rates. Students solve problems involving proportional relationships and assess the reasonableness of solutions. Students represent, solve, and write equations. Students solve simple inequalities. Students generate and evaluate equivalent expressions with justification of steps. Students interpret theoretical probability and draw conclusions. Students apply the effect of dilations and transformations. Students solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level recognize, compare, and order rational numbers. Students create equivalent representations of rational numbers. Students calculate and model mathematical problems involving rational numbers and exponents. Students calculate the absolute value of a rational number. Students describe and identify a proportional relationship. Students identify and solve problems involving ratios and unit rates. Students represent, solve, and write simple equations. Students represent, write, and graph simple inequalities. Students evaluate expressions using the order of operations. Students determine the surface area and volume of rectangular prisms and calculate the area and perimeter of trapezoids. Students calculate the circumference and area of circles. Students describe the effect of dilations and transformations. Students calculate the measures of central tendencies and range and determine appropriate data displays. Students calculate theoretical probability.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive mathematical instruction.

Grade 7 English Language Arts Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level thoroughly comprehend, interpret, evaluate, and respond to a variety of increasingly complex texts of all literary and informational genres. Students skillfully create an objective summary including main idea and supporting details. Students effectively paraphrase main ideas with supporting details in a text. Students thoroughly compare and contrast stated or implied purposes of authors' writing. Students thoroughly evaluate literary devices, points of view, and perspectives, and they explicitly analyze how authors use key literary elements to contribute to the meaning of the text. Students consistently distinguish factual claims from opinions. Students analyze and evaluate complex textual evidence to support inferences and draw logical conclusions between and across multiple and varied texts.

Students effectively engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students strategically introduce a claim and organize well-developed reasons and evidence. Students use fully developed, complex ideas, thorough organization, purposeful word choice, a variety of fluent sentences, and appropriate voice.

Students skillfully use context clues, word parts, and reference tools to determine or clarify the meaning of words. Students infer complex relationships among words with multiple meanings. Students select precise vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.

Students intentionally apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a strong command of Standard English grammar, mechanics, and usage.

Students recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students thoroughly comprehend, evaluate, and synthesize resources. Students skillfully summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically read and comprehend increasingly complex literary and informational texts. Students create an objective summary including main idea and supporting details. Students paraphrase main ideas with supporting details in a text. Students compare and contrast stated or implied purposes of authors' writing. Students evaluate literary devices, points of view, and perspectives, and they analyze how authors use key literary elements to contribute to the meaning of the text. Students distinguish factual claims from opinions. Students analyze and evaluate textual evidence to support inferences and draw simple, logical conclusions between and across multiple texts.

Students engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students introduce a claim and organize reasons and evidence. Students use fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

Students use context clues, word parts, and reference tools to determine or clarify the meaning of words. Students infer the relationships among words with multiple meanings. Students select vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.

Students apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a command of Standard English grammar, mechanics, and usage.

Students recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students comprehend, evaluate, and synthesize resources. Students summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level partially comprehend, interpret, evaluate, and respond to literary and informational texts, applying limited critical thinking skills. Students create a summary including main idea and limited supporting details. Students inconsistently paraphrase main ideas with limited supporting details in a text. Students inconsistently compare and contrast stated or implied purposes of authors' writing. Students inconsistently identify literary devices, points of view, and perspectives, and they describe how authors use key literary elements. Students inconsistently distinguish factual claims from opinions. Students inconsistently identify limited textual evidence to support inferences and draw weak conclusions between texts.

Students inconsistently engage in a writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students introduce a claim, reasons, and evidence. Students use partially developed ideas, weak organization, and ineffective word choice, sentences, and voice.

Students ineffectively use context clues, word parts, and reference tools to determine the meaning of words. Students may or may not infer the relationships among words with multiple meanings. Students use a limited vocabulary to communicate ideas in writing and to create an effect according to a purpose.

Students inconsistently apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a limited command of Standard English grammar, mechanics, and usage.

Students may not recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students partially comprehend, evaluate, and synthesize resources. Students ineffectively summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive reading instruction.

Grade 8 Mathematics Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically generate, simplify, and evaluate complex equivalent expressions. Students make connections between volume and surface area to solve problems involving solids and compare the volume and surface area of different solids. Students describe the impact on central tendencies of a data set with multiple outliers and when inserting or deleting multiple data points. Students solve complex and non-routine real-world problems, draw logical conclusions and justify solutions.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically generate, simplify, and evaluate equivalent expressions. Students classify and explain operational closure of rational and irrational numbers. Students distinguish between a linear and nonlinear function. Students identify independent and dependent variables. Students describe, analyze, and represent linear functions with two variables and translate between representations. Students use and apply the Pythagorean Theorem. Students describe the impact on central tendencies of a data set with an outlier and when inserting or deleting a data point. Students interpret a scatterplot, determine the rate of change, and use a line of best fit to make predictions. Students calculate, interpret, and predict experimental probability and generalize samples to populations. Students solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level simplify and generate simple equivalent expressions, including expressions in scientific notation. Students translate between standard form and scientific notation. Students identify and compare real numbers. Students recognize if a graph represents a linear function. Students identify intercepts and slope from the graph of a line. Students identify the effect on the graph of a linear function when characteristics are changed. Students solve and graph equations and inequalities. Students use the Pythagorean Theorem to identify right triangles and to find the length of the hypotenuse. Students calculate the surface area and volume of solids. Students identify the outliers of a data set. Students identify the line of best fit from a given scatterplot and determine if the rate of change is positive or negative. Students calculate the experimental probability of single events, identify sample spaces, and classify events as independent or dependent.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive mathematical instruction.

Grade 8 Science Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically evaluate, revise, or develop a model from evidence, or apply models to complex concepts involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems. Students design, evaluate, or modify investigations about stability and change of forces and motion, or analyze and draw conclusions from patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards. Students modify, synthesize, or apply a design solution, or evaluate evidence of relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions. Students analyze, infer, relate, or identify complex relationships within a system to construct or evaluate explanations for evidence of anatomy and common ancestry of organisms, or aspects of Earth systems including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically make predictions about, describe, develop, or use a given model involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems. Students identify, describe, or explain how to plan or perform investigations about stability and change of forces and motion, or identify and apply patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards. Students use, describe, or explain a design solution, or identify evidence of relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions. Students construct explanations by identifying, describing, or comparing evidence of anatomy and common ancestry of organisms, or aspects of Earth systems including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level identify or describe basic components or concept(s) of a model involving conservation of matter in chemical reactions, patterns in the structure and function of waves, or stability and change at varying scales in Earth's systems. Students identify or describe basic steps or processes within investigations about stability and change of forces and motion, or identify and define patterns in data about common ancestry and diversity of organisms, the geologic history of Earth, or natural hazards. Students identify components of a design solution or describe simple relationships within a design solution in various systems involving energy transfer in chemical reactions or forces in collisions. Students identify or describe basic relationships shown in

evidence of anatomy and common ancestry of organisms, or aspects of Earth systems, including geologic history, materials and processes, natural resources, or human impacts on those systems using the concept of patterns in cause and effect relationships or the concept of scale and proportion.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive science instruction.

Grade 8 English Language Arts Performance Level Descriptors

Advanced: Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the **Advanced** level typically thoroughly comprehend, interpret, evaluate, and respond to literary and informational texts, applying critical thinking skills. Students skillfully evaluate literary devices, points of view, and perspectives, and they skillfully analyze how authors use key literary elements to contribute to the meaning of the text. Students explicitly analyze and evaluate textual evidence to support inferences and conclusions between and across multiple texts.

Students effectively engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students introduce a claim, counterclaim, and support with logical reasons and evidence. Students synthesize fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

Students skillfully use context clues, word parts, and reference tools to determine or clarify the meaning of words. Students infer complex relationships among words with multiple meanings. Students select precise vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.

Students intentionally apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a strong command of Standard English grammar, mechanics, and usage.

Students recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students thoroughly comprehend, evaluate, and synthesize resources. Students skillfully summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Proficient: Students demonstrate mastery over appropriate grade-level subject matter and readiness for the next grade level. Students scoring at the **Proficient** level typically read, comprehend, interpret, evaluate, and respond to literary and informational texts, applying critical thinking skills. Students evaluate literary devices, points of view, and perspectives, and they analyze how authors use key literary elements to contribute to the meaning of the text. Students analyze and evaluate textual evidence to support inferences and conclusions between and across multiple texts.

Students engage in a recursive writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students introduce a claim, recognize a claim from an opposing viewpoint, and organize reasons and evidence. Students use fully developed ideas, strong organization, well-chosen words, fluent sentences, and appropriate voice.

Students use context clues, word parts, and reference tools to determine or clarify the meaning of words. Students infer the relationships among words with multiple meanings. Students select vocabulary to communicate ideas in writing and to create a specific effect according to a purpose.

Students apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a command of Standard English grammar, mechanics, and usage.

Students recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students comprehend, evaluate, and synthesize resources. Students summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Basic: Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the **Basic** level partially comprehend, interpret, evaluate, and respond to literary and informational texts, applying limited critical thinking skills. Students inconsistently evaluate literary devices, points of view, and perspectives, and they inconsistently analyze how authors use key literary elements to contribute to the meaning of the text. Students inconsistently analyze and evaluate textual evidence to support inferences and conclusions between or across multiple texts.

Students inconsistently engage in a writing process to compose narrative, informative, and argumentative responses for varied purposes and audiences. In argumentative writing, students introduce a claim and provide reasons and evidence. Students use partially developed ideas, weak organization, ineffective word choice, basic sentences, or inconsistent voice.

Students ineffectively use context clues, word parts, and reference tools to determine the meaning of words. Students may or may not infer the relationships among words with multiple meanings. Students use a limited vocabulary to communicate ideas in writing and to create an effect according to a purpose.

Students inconsistently apply knowledge of grammar and rhetorical style to analyze and evaluate a variety of texts in reading and writing. Students demonstrate a limited command of Standard English grammar, mechanics, and usage.

Students may not recognize viable research questions and well-developed thesis statements to find information on a specific topic. Students partially comprehend, evaluate, and synthesize resources. Students ineffectively summarize and paraphrase, integrate evidence, and cite sources to create written works for multiple purposes.

Below Basic: Students have not performed at least at the Basic level. Students scoring at the **Below Basic** level should be given comprehensive reading instruction.



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**Oklahoma Grade 11 Life Science
Performance Level Descriptor Tables**

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. Students scoring at the Advanced level:

- develop and use models to interpret and evaluate components and relationships among components within and between complex systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems and/or energy in chemistry processes.
- plan and conduct investigations to produce reliable data considering the types, amounts, and accuracy of data needed; analyze and interpret complex data sets to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.
- ask questions to analyze relationships about the effect of structure and function on inheritance of traits; or support and/or evaluate the merits of arguments to synthesize and communicate understanding and defend them based on empirical evidence about stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- construct, evaluate, make inferences and revise an explanation based on valid and reliable evidence from a variety of sources regarding the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or evaluate or refine explanations derived from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. Students scoring at the Proficient Level:

- develop and use models to describe components and relationships among the components of a system, related to structure and function, growth and development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, and energy in chemistry processes, including hierarchical structures and inputs and outputs of a system. Use the models to represent basic aspects of phenomena that result from changes in energy and matter.
- plan and conduct investigations to produce reliable data; analyze and interpret provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.
- ask questions to clarify relationships about the effect of structure and function on inheritance of traits; or evaluate arguments based on evidence as

students synthesize and communicate understanding of **stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.**

- **construct an explanation based on valid and reliable evidence from sources of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or construct and revise explanations derived from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.**

Basic:

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career.

Students scoring at the Basic level typically:

- **identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.**
- **conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.**
- **ask questions to identify relationships about the effect of structure and function on inheritance of traits; or describe arguments based on evidence as students communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.**
- **identify and describe basic relationships based on evidence of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.**

Below Basic

Students scoring **Below Basic** have not demonstrated they can perform at the Basic level. Students scoring at the Basic Level:

- **identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.**
- **conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.**
- **ask questions to identify relationships about the effect of structure and function on inheritance of traits; or describe arguments based on evidence**

as students communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.

- identify and describe basic relationships based on evidence of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

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<p>LS1-2 LS1-4 LS1-5 LS1-7 LS2-5</p>	<p>Below Basic Students have not performed at least at the Basic level.</p>	<p>Basic Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR)</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR)</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Develop and Use Models DCI</p> <ul style="list-style-type: none"> • LS1.A Structure and function • LS1.B Growth and Development of Organisms • LS1.C Organization for Matter and Energy Flow in Organisms • LS2.B Cycles of matter and Energy Transfer In Ecosystems • PS3.D Energy in Chemistry Processes <p>CCC</p> <ul style="list-style-type: none"> • Systems and System Models • Energy and matter 		<p>Students scoring at the Basic level typically identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.</p>	<p>Students scoring at the Proficient level typically develop and use models describing components and relationships among components of a system, related to structure and function, growth and development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, and energy in chemistry processes, including hierarchical structures and inputs and outputs of a system. Use the models to represent basic aspects of phenomena that result from changes in energy and matter.</p>	<p>Students scoring at the Advanced level typically develop and use models to interpret and evaluate components and relationships among components within and between complex systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, and/or energy in chemistry processes.</p>

LS1-3 LS2-1 LS2-2 LS2-4 LS3-3 LS4-1 LS4-3	Below Basic: Students have not performed at least at the Limited Knowledge level.	Basic Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR)	Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR)	Advanced: Students demonstrate superior performance on challenging subject matter.
<p>Planning and Carrying Out Investigations, Using Mathematics and Computational Thinking, Analyzing and Interpreting Data</p> <p>DCI</p> <ul style="list-style-type: none"> • LS1.A Structure and Function • LS2.A Interdependent Relationships in Ecosystems • LS2.B Cycles of Matter and Energy Transfer in Ecosystems • LS2.C Ecosystem Dynamics, Functioning and Resilience • LS3.B Variation of Traits • LS4.A Evidence of Common Ancestry and Diversity • LS4.B Natural Selection • LS4.C Adaptation <p>CCC</p> <ul style="list-style-type: none"> • Patterns • Scale, Proportion, Quantity • Energy and matter • Stability and Change 		<p>Students scoring at the Limited Knowledge level typically conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.</p>	<p>Students scoring at the Proficient level typically plan and conduct investigations to produce reliable data; analyze and interpret provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.</p>	<p>Students scoring at the Advanced level typically plan and conduct investigations; produce reliable data considering the types, amounts, and accuracy of data needed; analyze and interpret complex data sets to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of common ancestry and diversity, natural selection, or adaptation.</p>

LS2-6 LS2-8 LS3-1 LS3-2 LS4-5	Limited Knowledge: Students have not performed at least at the Limited Knowledge level.	Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR)	Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR)	Advanced: Students demonstrate superior performance on challenging subject matter.
<p>Asking Questions, Engaging in Argument from Evidence (make and defend a claim, evaluate a claim)</p> <p>DCI</p> <ul style="list-style-type: none"> • LS2.C Ecosystem dynamics, functioning and resilience • LS2.D Social interactions and group behavior • LS3.A Inheritance of traits • LS1.A Structure and function • LS3.B Variation of traits • LS4.C Adaptation <p>CCC</p> <ul style="list-style-type: none"> • Stability and change • Cause and effect 		<p>Students scoring at the Basic level typically ask questions to identify relationships demonstrating how cause of structure and function affect inheritance of traits; or describe arguments based on evidence to communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.</p>	<p>Students scoring at the Proficient level typically ask questions to clarify relationships demonstrating how cause of structure and function affect inheritance of traits; or evaluate arguments based on evidence as students synthesize and communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.</p>	<p>Students scoring at the Advanced level typically ask questions to analyze relationships demonstrating how cause of structure and function affect inheritance of traits; or support, evaluate, and defend arguments based on evidence as students synthesize and communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause and effect relationships of social interactions, group behaviors, adaptation, and variation of traits.</p>

<p>LS1-1 LS1-6 LS2-3 LS4-2 LS4-4</p>	<p>Below Basic: Students have not performed at least at the Basic level.</p>	<p>Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR)</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR)</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Constructing Explanations DCI</p> <ul style="list-style-type: none"> • LS1.A Structure and function • LS1.C Organization for matter and energy flow in organisms • LS2.B Cycles of matter and energy transfer in ecosystems • LS4.B Natural selection • LS4.C Adaptation <p>CCC</p> <ul style="list-style-type: none"> • Structure and function • Energy and matter • Cause and effect 		<p>Students scoring at the Basic level typically identify and describe basic relationships based on evidence of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.</p>	<p>Students scoring at the Proficient level typically construct an explanation based on valid and reliable evidence from sources of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or construct and revise explanations from evidence from sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.</p>	<p>Students scoring at the Advanced level typically construct, evaluate, or draw inferences from an explanation based on valid and reliable evidence from a variety of sources of the cause and effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or evaluate or refine explanations from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.</p>

NAEP grade 12 Performance Level Descriptors with content extracted. NAEP only assesses science at grade 12 in high school.

Limited Knowledge	Proficient	Advanced
<p>Students performing at the Limited Knowledge level should be able to describe, measure, classify, explain, and predict phenomena at multiple scales, from atomic/molecular to interstellar. They should be able to design and critique observational and experimental studies, and they should be able to propose and critique solutions to problems at local or regional scales.</p>	<p>Students performing at the Proficient level should be able to demonstrate relationships and compare alternative models, predictions, and extrapolations. They should be able to design and critique observational and experimental studies, controlling multiple variables; use scientific models to explain results; and choose among alternative conclusions based on the arguments from evidence. They should be able to compare scientific costs or risks and benefits of alternative solutions to problems at local or regional scales.</p>	<p>Students performing at the Advanced level should be able to use alternative models to generate predictions and explanations. They should be able to explain differences, use evidence, and be able to design and critique investigations that relate data to alternative models of phenomena. They should be able to compare costs or risks and benefits of alternative solutions to problems at local, regional, and global scales.</p>



Oklahoma Grade 11 Physical Science Performance Level Descriptor Tables

Name: _____

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:

- **evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**
- **use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy, and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**
- **evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts.**
- **construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions, taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology.**

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic Level, students scoring at the Proficient Level typically:

- **use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**
- **use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**
- **evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published sources.**
- **construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and**

technology.

Basic

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career. Students scoring at the Basic level typically:

- use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.
- identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

Below Basic

Students scoring **Below Basic** have not demonstrated they can perform at the Basic level. Students scoring at the Basic Level:

- use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.
- identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

<p>PS1-1 PS3-2</p>	<p>Below Basic: Students have not performed at least at the Basic level.</p>	<p>Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Develop and Use Models</p> <p>DCI</p> <ul style="list-style-type: none"> • PS1.A Structure and Properties of Matter • PS3.A Definitions of Energy <p>CCC</p> <ul style="list-style-type: none"> • Patterns • Energy and Matter 		<p>Students scoring at the Basic level typically use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.</p>	<p>Students scoring at the Proficient level typically use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.</p>	<p>Students scoring at the Advanced level typically evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.</p>

<p>PS1-7 PS2-5 PS3-1 PS3-4 PS4-1</p>	<p>Below Basic: Students have not performed at least at the Basic level.</p>	<p>Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Planning and Carrying Out Investigations, Using Mathematics and Computational Thinking</p> <p>DCI</p> <ul style="list-style-type: none"> • PS1.B Chemical Reactions • PS2.B Types of Interactions • PS3.A Definitions of Energy • PS3.B Conservation of Energy and Energy Transfer • PS4.A Wave Properties <p>CCC</p> <ul style="list-style-type: none"> • Energy and Matter • Cause and Effect • Systems and System Models 		<p>Students scoring at the Basic level typically use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.</p>	<p>Students scoring at the Proficient level typically use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.</p>	<p>Students scoring at the Advanced level typically use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different type of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.</p>

<p>PS4-4</p>	<p>Below Basic: Students have not performed at least at the Basic level.</p>	<p>Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).</p>	<p>Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).</p>	<p>Advanced: Students demonstrate superior performance on challenging subject matter.</p>
<p>Obtaining, Evaluating, and Communicating Information</p> <p>DCI</p> <ul style="list-style-type: none"> PS4.B Electromagnetic Radiation <p>CCC</p> <ul style="list-style-type: none"> Cause and Effect 		<p>Students demonstrate partial mastery of the essential knowledge and skills appropriate to college and career readiness. Students scoring at the Basic level typically evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.</p>	<p>Students demonstrate mastery with subject matter and exhibit readiness for college and career. Students scoring at the Proficient level typically evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published sources.</p>	<p>Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts.</p>

PS1-2 PS1-5 PS3-3	Below Basic: Students have not performed at least at the Basic level.	Basic: Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course and that students are not on track to be career and college ready (CCR).	Proficient: Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on-track to be career and college ready (CCR).	Advanced: Students demonstrate superior performance on challenging subject matter.
Constructing Explanations and Designing Solutions DCI <ul style="list-style-type: none"> PS1.A Structure and Properties of Matter PS1.B: Chemical Reactions PS3.A Definitions of Energy ETS1.A Defining and Delimiting Engineering Problems ETS2.B Interdependence of Science, Engineering, and Technology CCC <ul style="list-style-type: none"> Patterns Energy and Matter 		Students scoring at the Basic level typically identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.	Students scoring at the Proficient level typically construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.	Students scoring at the Advanced level typically construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter and chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

APPENDIX E—EVALUATION RESULTS

Training Evaluation Results

I understand the goals of the standard setting meeting
 I understand the procedures we are using to set standards
 I understand how to use the standard setting materials
 I understand the differences between the performance levels
 I understand how to make the bookmark placements
 I know what tasks to expect for the remainder of the meeting
 I am confident in my understanding of the standard setting task
 I am ready to proceed with the standard setting process

N	Average	%SD	%D	%N	%A	%SA
12	4.92	0%	0%	0%	8%	92%
12	4.67	0%	0%	0%	33%	67%
12	4.67	0%	0%	0%	33%	67%
12	4.58	0%	0%	0%	42%	58%
12	4.83	0%	0%	0%	17%	83%
12	4.42	0%	0%	8%	42%	50%
12	4.67	0%	0%	0%	33%	67%
12				100%		

Procedural Evaluation Results

I understood how to make the bookmark placements
 I understood how to use the materials provided
 I understood how to record my judgments
 I thought the procedures made sense
 I was sufficiently familiar with the assessment
 I understood the differences between the performance levels

N	Average	%SD	%D	%N	%A	%SA
12	4.92	0%	0%	0%	8%	92%
12	4.92	0%	0%	0%	8%	92%
12	4.75	0%	0%	0%	25%	75%
12	4.67	0%	0%	8%	17%	75%
12	4.5	0%	0%	8%	33%	58%
12	4.67	0%	0%	0%	33%	67%

Final Evaluation Results

Please rate the usefulness of each of the following

The opening session
 Completing the practice test
 Completing the item map
 Discussions with other participants
 Impact data

N	Average	Not Useful at All			Extremely Useful	
		1	2	3	4	5
12	4.92	0%	0%	0%	8%	92%
12	4.92	0%	0%	0%	8%	92%
12	4.92	0%	0%	0%	8%	92%
12	4.92	0%	0%	0%	8%	92%
12	4.92	0%	0%	0%	8%	92%

Please rate the usefulness of each of the following

The Performance Level Definitions
 My expectations of students
 The difficulty of the test materials
 My experience in the field
 Discussions with other participants
 Decisions of other participants
 Impact data

N	Average	Not at all influential				Extremely Influential
		1	2	3	4	5
12	4.92	0%	0%	0%	8%	92%
12	4.33	0%	0%	17%	33%	50%
12	4.17	8%	0%	8%	33%	50%
12	4.58	0%	0%	8%	25%	67%
12	4.67	0%	0%	8%	17%	75%
12	4	0%	8%	8%	58%	25%
12	3.92	8%	0%	25%	25%	42%

I understood the goals of the standard setting meeting
 The facilitator helped me understand the process
 The materials contained the information needed to set standards
 I understood how to use the impact data
 I understood how the cut scores were calculated
 The facilitator was able to provide answers to my questions
 Sufficient time was allotted for training on the standard setting tasks
 Sufficient time was allotted to complete the standard setting tasks
 The facilitator helped the standard setting process run smoothly
 Overall, the standard setting process produced credible results

N	Average	%SD	%D	%N	%A	%SA
12	4.75	0%	0%	0%	25%	75%
12	4.92	0%	0%	0%	8%	92%
12	4.83	0%	0%	8%	0%	92%
12	4.58	0%	0%	8%	25%	67%
12	4.42	0%	8%	0%	33%	58%
12	5	0%	0%	0%	0%	100%
12	4	0%	8%	17%	42%	33%
12	4.25	0%	8%	8%	33%	50%
12	5	0%	0%	0%	0%	100%
12	4.92	0%	0%	0%	8%	92%

Do you believe the final recommended cut score for each performance level was Too Low, Somewhat Low, About Right, Somewhat High, or Too High?

Advanced / Proficient
 Proficient / Basic
 Basic / Below Basic

N	Average	%TL	%SL	%AR	%SH	%TH
12	3	0%	0%	100%	0%	0%
12	2.92	0%	8%	92%	0%	0%
12	2.92	0%	8%	92%	0%	0%

Demographics and Professional Experience

	Count (N=12)	%
<i>Panelist Demographics</i>		
<u>Gender:</u>		
Male	3	25.00%
Female	9	75.00%
<u>Race/Ethnicity:</u>		
White	11	91.67%
Black		0.00%
Hispanic		0.00%
Asian		0.00%
Pacific Islander		0.00%
American Indian	1	8.33%
<i>Professional Experience:</i>		
Students with Disabilities	1	8.33%
Students with Limited English Proficiency	1	8.33%
Economically Disadvantaged Students	3	25.00%
Gifted and Talented Students	7	58.33%
General Education	12	100.00%

APPENDIX F—STANDARD SETTING RESULTS

Table F-1. 2017 OK Standard Setting Report: Round 1 CCRA Physical Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
Limited Knowledge	0.3442	0.1432	0.0964	16.55%	40.49%
Proficient	0.8227	0.0838	0.4785	13.83%	23.94%
Advanced	1.3836	0.1416	0.2322	10.11%	10.11%

Table F-2. 2017 OK Standard Setting Report: Round 1 CCRA Life Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
Limited Knowledge	-0.2795	0.2642	0.4274	31.00%	66.03%
Proficient	0.5126	0.0472	1.0483	26.00%	35.03%
Advanced	1.4509	0.1408	0.1886	9.03%	9.03%

Table F-3. 2017 OK Standard Setting Report: Round 2 CCRA Physical Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
Limited Knowledge	0.3442	0.0604	0.1351	16.55%	40.49%
Proficient	0.8577	0.0567	0.4960	16.03%	23.94%
Advanced	1.5050	0.0319	0.0183	7.91%	7.91%

Table F-4. 2017 OK Standard Setting Report: Round 2 CCRA Life Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
Limited Knowledge	0.1684	0.1064	0.0825	16.33%	46.69%
Proficient	0.6290	0.0576	0.6404	20.25%	30.36%
Advanced	1.4265	0.0246	0.0527	10.11%	10.11%

Table F-5. 2017 OK Standard Setting Report: Round 3 CCRA Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
Limited Knowledge	0.3056	0.0258	0.1017	17.48%	43.47%
Proficient	0.8021	0.0211	0.4965	18.08%	25.99%
Advanced	1.5289	0.0053	0.0000	7.91%	7.91%

Table F-6. 2017 OK Standard Setting Report: Round 4 CCRA Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>SE</i>	<i>MAD</i>	<i>At %</i>	<i>At or Above %</i>
Limited Knowledge	0.1684	0.0114	0.0000	20.70%	46.69%
Proficient	0.8021	0.0131	0.6337	18.08%	25.99%
Advanced	1.5289	0.0047	0.0000	7.91%	7.91%

APPENDIX G—DISAGGREGATED IMPACT DATA

Table G-1. 2019 OK Standard Setting Report: Round 1—Physical Science

	<i>Total N</i>	<i>Below Basic N</i>	<i>Below Basic %</i>	<i>Basic N</i>	<i>Basic %</i>	<i>Prof N</i>	<i>Prof %</i>	<i>Adv N</i>	<i>Adv %</i>
Total	43,638	25,968	0.5951	7,222	0.1655	6,036	0.1383	4,412	0.1011
ELL	2,027	1,874	0.9245	116	0.0572	33	0.0163	4	0.0020
ELL w Acc	461	438	0.9501	17	0.0369	5	0.0108	1	0.0022
ELL wo Acc	1,566	1,436	0.9170	99	0.0632	28	0.0179	3	0.0019
Black African American	3,751	2,945	0.7851	409	0.1090	279	0.0744	118	0.0315
American Indian Alaskan Native	6,154	4,008	0.6513	995	0.1617	754	0.1225	397	0.0645
Hispanic or Latino	7,097	4,969	0.7002	1,044	0.1471	720	0.1015	364	0.0513
Asian	1,000	442	0.4420	156	0.1560	173	0.1730	229	0.2290
Native Hawaiian or Other Pacific Islander	136	104	0.7647	18	0.1324	9	0.0662	5	0.0368
White Caucasian	22,053	11,477	0.5204	4,006	0.1817	3,609	0.1637	2,961	0.1343
Multi Racial	3,404	1,994	0.5858	588	0.1727	487	0.1431	335	0.0984
No Response	43	29	0.6744	6	0.1395	5	0.1163	3	0.0698
Foster	166	123	0.7410	16	0.0964	19	0.1145	8	0.0482
Non Foster	43,472	25,845	0.5945	7,206	0.1658	6,017	0.1384	4,404	0.1013
Female	21,813	12,994	0.5957	3,898	0.1787	3,086	0.1415	1,835	0.0841
Male	21,788	12,948	0.5943	3,319	0.1523	2,947	0.1353	2,574	0.1181
Not Indicated	37	26	0.7027	5	0.1351	3	0.0811	3	0.0811
IEP	5,971	5,169	0.8657	447	0.0749	214	0.0358	141	0.0236
IEP w Accommm	2,689	2,361	0.8780	189	0.0703	85	0.0316	54	0.0201
IEP w o Accommm	3,282	2,808	0.8556	258	0.0786	129	0.0393	87	0.0265
Military	291	133	0.4570	61	0.2096	55	0.1890	42	0.1443
Non Military	43,347	25,835	0.5960	7,161	0.1652	5,981	0.1380	4,370	0.1008
ELL 1st Yr Proficient	159	88	0.5535	37	0.2327	24	0.1509	10	0.0629
ELL 2nd Yr Proficient	87	49	0.5632	20	0.2299	10	0.1149	8	0.0920
Econ Disadv	22,230	15,306	0.6885	3,328	0.1497	2,315	0.1041	1,281	0.0576
Non Econ Disadv	21,408	10,662	0.4980	3,894	0.1819	3,721	0.1738	3,131	0.1463
Migrant	13	8	0.6154	2	0.1538	2	0.1538	1	0.0769
Non Migrant	43,625	25,960	0.5951	7,220	0.1655	6,034	0.1383	4,411	0.1011
Plan 504	1,201	674	0.5612	207	0.1724	174	0.1449	146	0.1216
Plan 504 w Accommm	167	82	0.4910	28	0.1677	30	0.1796	27	0.1617
Plan 504 w o Accommm	1,034	592	0.5725	179	0.1731	144	0.1393	119	0.1151

Table G-2. 2019 OK Standard Setting Report: Round 1—Life Science

	<i>Total N</i>	<i>Below Basic N</i>	<i>Below Basic %</i>	<i>Basic N</i>	<i>Basic %</i>	<i>Prof N</i>	<i>Prof %</i>	<i>Adv N</i>	<i>Adv %</i>
Total	43,638	14,822	0.3397	13,529	0.3100	11,348	0.2600	3,939	0.0903
ELL	2,027	1,434	0.7074	490	0.2417	99	0.0488	4	0.0020
ELL w Acc	461	341	0.7397	99	0.2148	20	0.0434	1	0.0022
ELL wo Acc	1,566	1,093	0.6980	391	0.2497	79	0.0504	3	0.0019
Black African American	3,751	1,966	0.5241	1,127	0.3005	552	0.1472	106	0.0283
American Indian Alaskan Native	6,154	2,265	0.3681	2,051	0.3333	1,497	0.2433	341	0.0554
Hispanic or Latino	7,097	3,075	0.4333	2,272	0.3201	1,444	0.2035	306	0.0431
Asian	1,000	237	0.2370	240	0.2400	311	0.3110	212	0.2120
Native Hawaiian or Other Pacific Islander	136	70	0.5147	40	0.2941	21	0.1544	5	0.0368
White Caucasian	22,053	6,061	0.2748	6,728	0.3051	6,598	0.2992	2,666	0.1209
Multi Racial	3,404	1,131	0.3323	1,057	0.3105	916	0.2691	300	0.0881
No Response	43	17	0.3953	14	0.3256	9	0.2093	3	0.0698
Foster	166	73	0.4398	53	0.3193	32	0.1928	8	0.0482
Non Foster	43,472	14,749	0.3393	13,476	0.3100	11,316	0.2603	3,931	0.0904
Female	21,813	6,953	0.3188	7,329	0.3360	5,915	0.2712	1,616	0.0741
Male	21,788	7,853	0.3604	6,188	0.2840	5,427	0.2491	2,320	0.1065
Not Indicated	37	16	0.4324	12	0.3243	6	0.1622	3	0.0811
IEP	5,971	3,776	0.6324	1,566	0.2623	500	0.0837	129	0.0216
IEP w Accom	2,689	1,747	0.6497	681	0.2533	210	0.0781	51	0.0190
IEP w o Accom	3,282	2,029	0.6182	885	0.2697	290	0.0884	78	0.0238
Military	291	67	0.2302	82	0.2818	107	0.3677	35	0.1203
Non Military	43,347	14,755	0.3404	13,447	0.3102	11,241	0.2593	3,904	0.0901
ELL 1st Yr Proficient	159	35	0.2201	63	0.3962	51	0.3208	10	0.0629
ELL 2nd Yr Proficient	87	27	0.3103	28	0.3218	26	0.2989	6	0.0690
Econ Disadv	22,230	9,367	0.4214	7,099	0.3193	4,657	0.2095	1,107	0.0498
Non Econ Disadv	21,408	5,455	0.2548	6,430	0.3004	6,691	0.3125	2,832	0.1323
Migrant	13	6	0.4615	3	0.2308	3	0.2308	1	0.0769
Non Migrant	43,625	14,816	0.3396	13,526	0.3101	11,345	0.2601	3,938	0.0903
Plan 504	1,201	340	0.2831	409	0.3405	318	0.2648	134	0.1116
Plan 504 w Accom	167	36	0.2156	55	0.3293	51	0.3054	25	0.1497
Plan 504 w o Accom	1,034	304	0.2940	354	0.3424	267	0.2582	109	0.1054

Table G-3. 2019 OK Standard Setting Report: Round 2—Physical Science

	<i>Total N</i>	<i>Below Basic N</i>	<i>Below Basic %</i>	<i>Basic N</i>	<i>Basic %</i>	<i>Prof N</i>	<i>Prof %</i>	<i>Adv N</i>	<i>Adv %</i>
Total	43,638	25,968	0.5951	7,222	0.1655	6,997	0.1603	3,451	0.0791
ELL	2,027	1,874	0.9245	116	0.0572	33	0.0163	4	0.0020
ELL w Acc	461	438	0.9501	17	0.0369	5	0.0108	1	0.0022
ELL wo Acc	1,566	1,436	0.9170	99	0.0632	28	0.0179	3	0.0019
Black African American	3,751	2,945	0.7851	409	0.1090	304	0.0810	93	0.0248
American Indian Alaskan Native	6,154	4,008	0.6513	995	0.1617	850	0.1381	301	0.0489
Hispanic or Latino	7,097	4,969	0.7002	1,044	0.1471	832	0.1172	252	0.0355
Asian	1,000	442	0.4420	156	0.1560	205	0.2050	197	0.1970
Native Hawaiian or Other Pacific Islander	136	104	0.7647	18	0.1324	13	0.0956	1	0.0074
White Caucasian	22,053	11,477	0.5204	4,006	0.1817	4,227	0.1917	2,343	0.1062
Multi Racial	3,404	1,994	0.5858	588	0.1727	560	0.1645	262	0.0770
No Response	43	29	0.6744	6	0.1395	6	0.1395	2	0.0465
Foster	166	123	0.7410	16	0.0964	20	0.1205	7	0.0422
Non Foster	43,472	25,845	0.5945	7,206	0.1658	6,977	0.1605	3,444	0.0792
Female	21,813	12,994	0.5957	3,898	0.1787	3,533	0.1620	1,388	0.0636
Male	21,788	12,948	0.5943	3,319	0.1523	3,460	0.1588	2,061	0.0946
Not Indicated	37	26	0.7027	5	0.1351	4	0.1081	2	0.0541
IEP	5,971	5,169	0.8657	447	0.0749	243	0.0407	112	0.0188
IEP w Accommm	2,689	2,361	0.8780	189	0.0703	94	0.0350	45	0.0167
IEP w o Accommm	3,282	2,808	0.8556	258	0.0786	149	0.0454	67	0.0204
Military	291	133	0.4570	61	0.2096	63	0.2165	34	0.1168
Non Military	43,347	25,835	0.5960	7,161	0.1652	6,934	0.1600	3,417	0.0788
ELL 1st Yr Proficient	159	88	0.5535	37	0.2327	26	0.1635	8	0.0503
ELL 2nd Yr Proficient	87	49	0.5632	20	0.2299	14	0.1609	4	0.0460
Econ Disadv	22,230	15,306	0.6885	3,328	0.1497	2,649	0.1192	947	0.0426
Non Econ Disadv	21,408	10,662	0.4980	3,894	0.1819	4,348	0.2031	2,504	0.1170
Migrant	13	8	0.6154	2	0.1538	2	0.1538	1	0.0769
Non Migrant	43,625	25,960	0.5951	7,220	0.1655	6,995	0.1603	3,450	0.0791
Plan 504	1,201	674	0.5612	207	0.1724	207	0.1724	113	0.0941
Plan 504 w Accommm	167	82	0.4910	28	0.1677	36	0.2156	21	0.1257
Plan 504 w o Accommm	1,034	592	0.5725	179	0.1731	171	0.1654	92	0.0890

Table G-4. 2019 OK Standard Setting Report: Round 2—Life Science

	<i>Total N</i>	<i>Below Basic N</i>	<i>Below Basic %</i>	<i>Basic N</i>	<i>Basic %</i>	<i>Prof N</i>	<i>Prof %</i>	<i>Adv N</i>	<i>Adv %</i>
Total	43,638	23,265	0.5331	7,124	0.1633	8,837	0.2025	4,412	0.1011
ELL	2,027	1,809	0.8925	144	0.0710	70	0.0345	4	0.0020
ELL w Acc	461	431	0.9349	16	0.0347	13	0.0282	1	0.0022
ELL wo Acc	1,566	1,378	0.8799	128	0.0817	57	0.0364	3	0.0019
Black African American	3,751	2,747	0.7323	460	0.1226	426	0.1136	118	0.0315
American Indian Alaskan Native	6,154	3,591	0.5835	1,012	0.1644	1,154	0.1875	397	0.0645
Hispanic or Latino	7,097	4,550	0.6411	1,066	0.1502	1,117	0.1574	364	0.0513
Asian	1,000	375	0.3750	156	0.1560	240	0.2400	229	0.2290
Native Hawaiian or Other Pacific Islander	136	96	0.7059	17	0.1250	18	0.1324	5	0.0368
White Caucasian	22,053	10,120	0.4589	3,808	0.1727	5,164	0.2342	2,961	0.1343
Multi Racial	3,404	1,760	0.5170	597	0.1754	712	0.2092	335	0.0984
No Response	43	26	0.6047	8	0.1860	6	0.1395	3	0.0698
Foster	166	107	0.6446	24	0.1446	27	0.1627	8	0.0482
Non Foster	43,472	23,158	0.5327	7,100	0.1633	8,810	0.2027	4,404	0.1013
Female	21,813	11,502	0.5273	3,903	0.1789	4,573	0.2096	1,835	0.0841
Male	21,788	11,739	0.5388	3,214	0.1475	4,261	0.1956	2,574	0.1181
Not Indicated	37	24	0.6486	7	0.1892	3	0.0811	3	0.0811
IEP	5,971	4,924	0.8247	540	0.0904	366	0.0613	141	0.0236
IEP w Accommm	2,689	2,263	0.8416	211	0.0785	161	0.0599	54	0.0201
IEP w o Accommm	3,282	2,661	0.8108	329	0.1002	205	0.0625	87	0.0265
Military	291	115	0.3952	63	0.2165	71	0.2440	42	0.1443
Non Military	43,347	23,150	0.5341	7,061	0.1629	8,766	0.2022	4,370	0.1008
ELL 1st Yr Proficient	159	74	0.4654	34	0.2138	41	0.2579	10	0.0629
ELL 2nd Yr Proficient	87	44	0.5057	17	0.1954	18	0.2069	8	0.0920
Econ Disadv	22,230	13,947	0.6274	3,419	0.1538	3,583	0.1612	1,281	0.0576
Non Econ Disadv	21,408	9,318	0.4353	3,705	0.1731	5,254	0.2454	3,131	0.1463
Migrant	13	8	0.6154	1	0.0769	3	0.2308	1	0.0769
Non Migrant	43,625	23,257	0.5331	7,123	0.1633	8,834	0.2025	4,411	0.1011
Plan 504	1,201	591	0.4921	219	0.1823	245	0.2040	146	0.1216
Plan 504 w Accommm	167	73	0.4371	28	0.1677	39	0.2335	27	0.1617
Plan 504 w o Accommm	1,034	518	0.5010	191	0.1847	206	0.1992	119	0.1151

Table G-5. 2019 OK Standard Setting Report: Round 3—Combined

	<i>Total N</i>	<i>Below Basic N</i>	<i>Below Basic %</i>	<i>Basic N</i>	<i>Basic %</i>	<i>Prof N</i>	<i>Prof %</i>	<i>Adv N</i>	<i>Adv %</i>
Total	43,638	24,671	0.5654	7,626	0.1748	7,890	0.1808	3,451	0.0791
ELL	2,027	1,849	0.9122	131	0.0646	43	0.0212	4	0.0020
ELL w Acc	461	433	0.9393	18	0.0390	9	0.0195	1	0.0022
ELL wo Acc	1,566	1,416	0.9042	113	0.0722	34	0.0217	3	0.0019
Black African American	3,751	2,851	0.7601	456	0.1216	351	0.0936	93	0.0248
American Indian Alaskan Native	6,154	3,797	0.6170	1,066	0.1732	990	0.1609	301	0.0489
Hispanic or Latino	7,097	4,781	0.6737	1,108	0.1561	956	0.1347	252	0.0355
Asian	1,000	402	0.4020	178	0.1780	223	0.2230	197	0.1970
Native Hawaiian or Other Pacific Islander	136	100	0.7353	20	0.1471	15	0.1103	1	0.0074
White Caucasian	22,053	10,818	0.4905	4,180	0.1895	4,712	0.2137	2,343	0.1062
Multi Racial	3,404	1,895	0.5567	611	0.1795	636	0.1868	262	0.0770
No Response	43	27	0.6279	7	0.1628	7	0.1628	2	0.0465
Foster	166	114	0.6867	21	0.1265	24	0.1446	7	0.0422
Non Foster	43,472	24,557	0.5649	7,605	0.1749	7,866	0.1809	3,444	0.0792
Female	21,813	12,263	0.5622	4,164	0.1909	3,998	0.1833	1,388	0.0636
Male	21,788	12,383	0.5683	3,456	0.1586	3,888	0.1784	2,061	0.0946
Not Indicated	37	25	0.6757	6	0.1622	4	0.1081	2	0.0541
IEP	5,971	5,058	0.8471	512	0.0857	289	0.0484	112	0.0188
IEP w Accommm	2,689	2,324	0.8643	199	0.0740	121	0.0450	45	0.0167
IEP w o Accommm	3,282	2,734	0.8330	313	0.0954	168	0.0512	67	0.0204
Military	291	123	0.4227	65	0.2234	69	0.2371	34	0.1168
Non Military	43,347	24,548	0.5663	7,561	0.1744	7,821	0.1804	3,417	0.0788
ELL 1st Yr Proficient	159	84	0.5283	34	0.2138	33	0.2075	8	0.0503
ELL 2nd Yr Proficient	87	47	0.5402	19	0.2184	17	0.1954	4	0.0460
Econ Disadv	22,230	14,670	0.6599	3,581	0.1611	3,032	0.1364	947	0.0426
Non Econ Disadv	21,408	10,001	0.4672	4,045	0.1889	4,858	0.2269	2,504	0.1170
Migrant	13	8	0.6154	2	0.1538	2	0.1538	1	0.0769
Non Migrant	43,625	24,663	0.5653	7,624	0.1748	7,888	0.1808	3,450	0.0791
Plan 504	1,201	636	0.5296	223	0.1857	229	0.1907	113	0.0941
Plan 504 w Accommm	167	80	0.4790	24	0.1437	42	0.2515	21	0.1257
Plan 504 w o Accommm	1,034	556	0.5377	199	0.1925	187	0.1809	92	0.0890

Table G-6. 2019 OK Standard Setting Report: Round 4—Combined

	<i>Total N</i>	<i>Below Basic N</i>	<i>Below Basic %</i>	<i>Basic N</i>	<i>Basic %</i>	<i>Prof N</i>	<i>Prof %</i>	<i>Adv N</i>	<i>Adv %</i>
Total	43,638	23,265	0.5331	9,032	0.2070	7,890	0.1808	3,451	0.0791
ELL	2,027	1,809	0.8925	171	0.0844	43	0.0212	4	0.0020
ELL w Acc	461	431	0.9349	20	0.0434	9	0.0195	1	0.0022
ELL wo Acc	1,566	1,378	0.8799	151	0.0964	34	0.0217	3	0.0019
Black African American	3,751	2,747	0.7323	560	0.1493	351	0.0936	93	0.0248
American Indian Alaskan Native	6,154	3,591	0.5835	1,272	0.2067	990	0.1609	301	0.0489
Hispanic or Latino	7,097	4,550	0.6411	1,339	0.1887	956	0.1347	252	0.0355
Asian	1,000	375	0.3750	205	0.2050	223	0.2230	197	0.1970
Native Hawaiian or Other Pacific Islander	136	96	0.7059	24	0.1765	15	0.1103	1	0.0074
White Caucasian	22,053	10,120	0.4589	4,878	0.2212	4,712	0.2137	2,343	0.1062
Multi Racial	3,404	1,760	0.5170	746	0.2192	636	0.1868	262	0.0770
No Response	43	26	0.6047	8	0.1860	7	0.1628	2	0.0465
Foster	166	107	0.6446	28	0.1687	24	0.1446	7	0.0422
Non Foster	43,472	23,158	0.5327	9,004	0.2071	7,866	0.1809	3,444	0.0792
Female	21,813	11,502	0.5273	4,925	0.2258	3,998	0.1833	1,388	0.0636
Male	21,788	11,739	0.5388	4,100	0.1882	3,888	0.1784	2,061	0.0946
Not Indicated	37	24	0.6486	7	0.1892	4	0.1081	2	0.0541
IEP	5,971	4,924	0.8247	646	0.1082	289	0.0484	112	0.0188
IEP w Accommm	2,689	2,263	0.8416	260	0.0967	121	0.0450	45	0.0167
IEP w o Accommm	3,282	2,661	0.8108	386	0.1176	168	0.0512	67	0.0204
Military	291	115	0.3952	73	0.2509	69	0.2371	34	0.1168
Non Military	43,347	23,150	0.5341	8,959	0.2067	7,821	0.1804	3,417	0.0788
ELL 1st Yr Proficient	159	74	0.4654	44	0.2767	33	0.2075	8	0.0503
ELL 2nd Yr Proficient	87	44	0.5057	22	0.2529	17	0.1954	4	0.0460
Econ Disadv	22,230	13,947	0.6274	4,304	0.1936	3,032	0.1364	947	0.0426
Non Econ Disadv	21,408	9,318	0.4353	4,728	0.2209	4,858	0.2269	2,504	0.1170
Migrant	13	8	0.6154	2	0.1538	2	0.1538	1	0.0769
Non Migrant	43,625	23,257	0.5331	9,030	0.2070	7,888	0.1808	3,450	0.0791
Plan 504	1,201	591	0.4921	268	0.2231	229	0.1907	113	0.0941
Plan 504 w Accommm	167	73	0.4371	31	0.1856	42	0.2515	21	0.1257
Plan 504 w o Accommm	1,034	518	0.5010	237	0.2292	187	0.1809	92	0.0890

APPENDIX H—SAMPLE RATING FORM

ID	EXAMPLE_01	Example Domain 1 Panelist						
Procedural Round 3&4								
Directions:	For Each Round, In the column marked "Bookmark", indicate YOUR BOOKMARK PLACEMENT PAGE in the ordered item book. YELLOW AREA=BASIC, GREEN AREA=PROFICIENT, BLUE AREA=ADVANCED							
Warning:								
Item order	Item ID	RND 3 Bookmark	RND 3 Level	RND 4 Bookmark	RND 4 Level	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?	Rationale for placements outside shaded areas
1								
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APPENDIX I—EVALUATION FORM

Procedural Evaluation Form

OK CCRA SCI 11

The purpose of this evaluation form is to obtain your feedback about the Standard Setting process. Please complete the information below. Do not put your name on the form. We want your feedback to be confidential.

* Required

1. *

Please mark the appropriate circle for each statement
Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understood how to make the bookmark placements.	<input type="radio"/>				
I understood how to use the materials provided.	<input type="radio"/>				
I understood how to record my judgments.	<input type="radio"/>				
I thought the procedures made sense.	<input type="radio"/>				
I was sufficiently familiar with the assessment.	<input type="radio"/>				
I understood the differences between the performance levels.	<input type="radio"/>				

2. What materials, information, or procedures were most influential in your placement of the cut scores? Why? *

3. Please provide any additional comments about the cut score placements.



Final Evaluation Form

OK CCRA SCI 11

The purpose of this evaluation form is to obtain your feedback about the Standard Setting process. Please complete the information below. Do not put your name on the form. We want your feedback to be confidential.

* Required

1. *

Mark only one oval per row.

	Male	Female
Gender:	<input type="radio"/>	<input type="radio"/>

2. Mark only one oval per row.

	White	Black	Hispanic	Asian	Pacific Islander	American Indian
Race / ethnicity:	<input type="radio"/>					

3. Area of expertise (check all that apply)

Check all that apply.

- Students with Disabilities
- Students with Limited English Proficiency
- Economcally Disadvantaged Students
- Gifted and Talented Students
- General Education

4. *

Please rate the usefulness of each of the following
 Mark only one oval per row.

	Not at all useful	Somewhat not useful	Neutral	Somewhat useful	Extremely useful
The opening session.	<input type="radio"/>				
Completing the practice test	<input type="radio"/>				
Completing the item map	<input type="radio"/>				
Discussions with other participants	<input type="radio"/>				
Impact data.	<input type="radio"/>				

5. *

Please rate the influence of the following when setting standards:
 Mark only one oval per row.

	Not at all influential	Somewhat not influential	Neutral	Somewhat influential	Extremely influential
The Performance Level Definitions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My expectations of students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The difficulty of the test materials.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My experience in the field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussions with other participants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisions of other participants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Impact data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please select the appropriate circle for each statement. **Mark only one oval per row.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understood the goals of the standard setting meeting.	<input type="radio"/>				
The facilitator helped me understand the process.	<input type="radio"/>				
The materials contained the information needed to set standards.	<input type="radio"/>				
I understood how to use the impact data.	<input type="radio"/>				
I understood how the cut scores were calculated.	<input type="radio"/>				
The facilitator was able to provide answers to my questions.	<input type="radio"/>				
Sufficient time was allotted for training on the standard setting tasks.	<input type="radio"/>				
Sufficient time was allotted to complete the standard setting tasks	<input type="radio"/>				
The facilitator helped the standard setting process run smoothly.	<input type="radio"/>				
Overall, the standard setting process produced credible results.	<input type="radio"/>				

7. Do you believe the final recommended cut score for each performance level was Too Low, Somewhat Low, About Right, Somewhat High, or Too High? **Mark only one oval per row.*

	Too low	Somewhat low	About right	Somewhat high	Too high
Advanced / Proficient	<input type="radio"/>				
Proficient / Basic	<input type="radio"/>				
Basic / Below Basic	<input type="radio"/>				

8. Please provide any additional comments about the standard setting process or suggestions as to how the training and process could be improved.

Powered by



APPENDIX J—SAMPLE ITEM LIST FORM

ID	EXAMPLE_01		
DOMAIN	1		
Directions:	Enter your notes for knowledge / skills and rationale for increased difficulty in the columns below		
Item order	Item ID	What knowledge and skills does this item measure?	Why is this item more difficult than the preceding item?
1	586659-1		
2	592071		
3	592069		
4	586636		
5	586031		
6	586218		
7	593426		
8	586106		
9	586029		
10	594357		
11	586649		
12	586701		
13	586709		
14	586693		
15	586659-2		
16	594361		
17	586108		
18	594375		
19	594354		
20	591949		
21	593424		
22	586655		
23	586691		
24	586711		
25	586027		
26	594373		
27	592073		
28	586631		
29	586110		
30	594379		
31	586640		

APPENDIX K—NONDISCLOSURE FORM

Nondisclosure Agreement
CCRA – Science Standard Setting
June 5–6, 2019

The undersigned is an employee, contractor, assessment committee member, or person otherwise authorized to view secure state assessment materials. The undersigned hereby agrees to be bound to the terms of this agreement restricting the disclosure of said materials.

It is essential to the integrity of this item development project and testing program that all test items remain secure. To maintain this security, only authorized persons are permitted to view the test questions. With the exception of materials released by the Oklahoma State Department of Education for informational purposes, all test questions (draft or final) in hardcopy or electronic format and associated materials must be regarded as secure documents. As a result, such materials may not be reproduced, electronically transmitted, discussed, used in classroom instruction, or in any way released or distributed to unauthorized persons. All materials including items and item drafts must be returned at the end of the meeting.

I understand that I am responsible for test materials security. By breaching test materials security as described here, I am breaching professional testing ethics and may be subject to additional penalties under law.

Name: _____

Signature: _____

Date: _____

APPENDIX L—MEETING AGENDA

CCRA Science Content Standard Setting Meeting June 5-6, 2019

Agenda—Day 1: Wednesday, June 5, 2019

8:15 am	Registration/Breakfast
9:00 am	Welcome and Introductions Review of Agenda and Materials Overview of the Standard Setting Process
9:45 am	Take the Test
10:15 am	Break
10:30 am	Split into Domain-Specific Groups Fill Out Item Map
11:15 am	Discuss PLDs and Describe Characteristics of “Borderline” Students
12:00 pm	Lunch in Hotel Restaurant
1:00 pm	Practice Round
1:30 pm	Readiness Discussion
2:15 pm	Training Evaluation
2:30 pm	Break
2:45 pm	Round 1
4:15 pm	Round 1 questions and discussions
5:00 pm	Adjourn

All times are approximate
Breaks will take place as needed

CCRA Science Content Standard Setting Meeting June 5-6, 2019

Agenda—Day 2: Thursday, June 6, 2019

8:00 am Breakfast and sign in

9:00 am Introduction to Day 2

9:15 am Round 2

10:15 am Break

10:30 am Reconvene as Single Group
Review of PLDs and borderline definitions
Round 3

12:00 pm Lunch in Hotel Restaurant

1:00 pm Round 4

2:15 pm Break

3:00 pm Round 4 questions and discussions

4:15 pm Final Evaluation

4:30 pm Adjourn

All times are approximate
Breaks will take place as needed

APPENDIX M—FINAL CUTPOINTS

Table M-1. 2019 OK Standard Setting Report: Final Cutpoints—CCRA Science

<i>Performance Level</i>	<i>Theta Cut</i>	<i>At %</i>	<i>At or Above %</i>
Below Basic		53.31%	100.00%
Basic	0.1684	20.70%	46.69%
Proficient	0.8021	18.08%	25.99%
Advanced	1.5289	7.91%	7.91%

APPENDIX Q
PERFORMANCE LEVEL DISTRIBUTIONS

Table Q-1. Performance Level Distributions by Grade and Year*—ELA

Grade	Performance Level	% in Level 2020–21	% in Level 2018–19	% in Level 2017–18
3	1	43.63	30.66	33.63
	2	31.65	30.46	33.19
	3	20.55	29.26	26.84
	4	4.18	9.62	6.35
4	1	45.03	36.30	30.21
	2	32.69	33.43	33.99
	3	19.99	24.06	28.34
	4	2.29	6.21	7.45
5	1	31.68	24.56	22.42
	2	40.87	40.21	41.21
	3	21.38	27.05	22.63
	4	6.08	8.18	13.74
6	1	30.74	21.58	21.95
	2	43.59	42.20	40.12
	3	21.41	27.95	29.05
	4	4.26	8.28	8.87
7	1	47.50	35.30	31.97
	2	33.32	35.65	40.66
	3	15.13	20.89	19.86
	4	4.05	8.16	7.51
8	1	33.10	26.17	24.34
	2	43.00	43.38	42.97
	3	18.15	22.75	23.63
	4	5.75	7.71	9.06

*Tests were not administered in 2019-20 due to COVID-19.



Table Q-2. Performance Level Distributions by Grade and Year*—Mathematics

Grade	Performance Level	% in Level		
		2021–20	2018–19	2017–18
3	1	35.58	21.77	23.95
	2	35.14	35.30	34.57
	3	19.91	25.69	26.30
	4	9.37	17.24	15.18
4	1	37.48	26.21	26.94
	2	34.53	35.79	36.60
	3	18.11	25.85	25.29
	4	9.88	12.15	11.17
5	1	36.75	23.85	25.27
	2	41.10	45.37	45.15
	3	14.54	19.41	20.03
	4	7.61	11.37	9.55
6	1	37.03	27.31	29.49
	2	42.00	42.53	42.68
	3	16.26	22.50	23.31
	4	4.71	7.66	4.51
7	1	55.36	37.90	34.10
	2	24.74	29.13	31.68
	3	16.65	25.90	26.50
	4	3.25	7.07	7.73
8	1	65.19	46.58	51.86
	2	21.24	30.47	28.33
	3	8.69	13.05	10.16
	4	4.88	9.91	9.66

*Tests were not administered in 2019-20 due to COVID-19.



Table Q-3. Performance Level Distributions by Grade and Year*—Science

Grade	Performance Level	% in Level 2020–21	% in Level 2018–19	% in Level 2017–18
5	1	28.03	21.87	20.18
	2	39.78	39.57	39.15
	3	27.15	30.33	32.04
	4	5.04	8.23	8.63
8	1	45.56	39.11	39.61
	2	21.79	21.04	21.16
	3	26.41	30.68	28.84
	4	6.25	9.17	10.39
11	1	52.49	56.58	-
	2	23.75	19.54	-
	3	17.28	17.01	-
	4	6.49	6.87	-

**Tests were not administered in 2019-20 due to COVID-19.*



APPENDIX R
CLASSICAL RELIABILITY

Table R-1. Subgroup Reliabilities Grade 3—ELA

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,338	51	27.49	9.84	0.90	3.15
Male	23,225	51	25.97	9.92	0.90	3.16
Hispanic or Latino	8,610	50	23.31	9.34	0.88	3.21
American Indian/Alaskan Native	5,500	49	26.58	9.38	0.88	3.18
Asian	1,082	50	29.79	9.64	0.90	3.10
Black/African American	3,559	50	21.49	8.92	0.87	3.21
Pacific Islander	234	48	22.03	8.69	0.86	3.22
White/Caucasian	21,033	51	28.87	9.74	0.90	3.12
Two or More Races	5,547	50	26.87	9.80	0.90	3.16
Economically Disadvantaged	21,076	50	23.60	9.27	0.88	3.21
Individual Education Program	8,050	51	20.73	9.23	0.88	3.20
Plan 504	832	49	26.70	9.14	0.88	3.17
English Language Learners	6,204	50	21.60	8.56	0.86	3.23

Table R-2. Subgroup Reliabilities Grade 4—ELA

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,009	51	28.90	9.21	0.89	3.10
Male	23,012	51	27.72	9.57	0.89	3.12
Hispanic or Latino	8,702	49	25.22	9.15	0.88	3.18
American Indian/Alaskan Native	5,491	51	28.01	8.95	0.88	3.13
Asian	981	51	31.47	9.33	0.89	3.03
Black/African American	3,508	49	23.00	8.88	0.87	3.20
Pacific Islander	217	46	23.96	8.59	0.86	3.17
White/Caucasian	20,675	51	30.35	9.08	0.89	3.06
Two or More Races	5,453	51	28.73	9.14	0.88	3.11
Economically Disadvantaged	20,572	51	25.37	9.10	0.88	3.18
Individual Education Program	7,796	51	21.15	9.08	0.88	3.20
Plan 504	1,082	50	28.37	8.50	0.86	3.13
English Language Learners	6,103	48	23.00	8.45	0.86	3.21



Table R-3. Subgroup Reliabilities Grade 5—ELA

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,642	55	32.66	10.50	0.91	3.12
Male	23,319	55	31.33	10.95	0.92	3.12
Hispanic or Latino	8,810	54	28.22	10.62	0.91	3.11
American Indian/Alaskan Native	5,537	53	31.55	10.31	0.91	3.14
Asian	994	55	35.75	10.30	0.91	3.14
Black/African American	3,650	52	26.05	10.48	0.91	3.07
Pacific Islander	198	48	24.81	9.72	0.90	3.14
White/Caucasian	21,323	55	34.44	10.18	0.91	3.11
Two or More Races	5,455	54	32.44	10.40	0.91	3.13
Economically Disadvantaged	21,172	55	28.75	10.57	0.91	3.13
Individual Education Program	7,615	53	22.84	10.07	0.91	3.04
Plan 504	1,246	54	32.47	9.69	0.89	3.15
English Language Learners	4,947	53	23.03	8.65	0.87	3.08

Table R-4. Subgroup Reliabilities Grade 6—ELA

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,781	51	30.49	9.68	0.90	3.01
Male	23,986	51	29.21	9.85	0.91	3.02
Hispanic or Latino	9,122	51	26.96	9.76	0.90	3.10
American Indian/Alaskan Native	5,887	50	29.16	9.30	0.89	3.06
Asian	950	51	34.67	9.42	0.91	2.83
Black/African American	3,732	49	25.17	9.56	0.89	3.13
Pacific Islander	192	43	23.88	8.75	0.87	3.18
White/Caucasian	21,548	51	31.84	9.37	0.90	2.96
Two or More Races	5,341	51	29.97	9.66	0.90	3.01
Economically Disadvantaged	21,344	51	27.05	9.65	0.90	3.10
Individual Education Program	7,200	51	21.10	9.01	0.88	3.16
Plan 504	1,307	49	29.71	9.00	0.89	3.04
English Language Learners	4,231	47	20.94	7.80	0.83	3.20



Table R-5. Subgroup Reliabilities Grade 7—ELA

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,953	50	28.62	8.71	0.87	3.18
Male	23,750	51	27.08	9.28	0.88	3.19
Hispanic or Latino	8,961	49	25.24	8.71	0.86	3.23
American Indian/Alaskan Native	5,744	51	27.24	8.64	0.86	3.22
Asian	986	50	32.11	9.28	0.89	3.04
Black/African American	3,562	48	23.68	8.68	0.86	3.24
Pacific Islander	179	42	23.16	8.08	0.84	3.25
White/Caucasian	21,921	50	29.51	8.85	0.87	3.15
Two or More Races	5,356	49	28.05	8.87	0.87	3.19
Economically Disadvantaged	20,832	51	25.42	8.77	0.86	3.23
Individual Education Program	6,958	50	19.81	7.88	0.83	3.23
Plan 504	1,366	48	27.69	8.46	0.86	3.20
English Language Learners	4,013	47	20.09	7.13	0.79	3.26

Table R-6. Subgroup Reliabilities Grade 8—ELA

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,950	55	34.22	8.79	0.87	3.12
Male	23,904	57	32.11	9.49	0.89	3.18
Hispanic or Latino	8,926	55	30.39	9.22	0.88	3.19
American Indian/Alaskan Native	5,811	53	32.99	8.89	0.88	3.13
Asian	984	56	37.09	9.08	0.88	3.11
Black/African American	3,745	54	28.38	9.15	0.88	3.19
Pacific Islander	160	49	28.38	10.32	0.91	3.13
White/Caucasian	21,956	57	34.91	8.75	0.87	3.12
Two or More Races	5,159	54	33.31	9.01	0.88	3.17
Economically Disadvantaged	20,675	57	30.48	9.16	0.88	3.21
Individual Education Program	6,725	53	24.14	8.57	0.86	3.21
Plan 504	1,382	53	32.90	8.56	0.85	3.29
English Language Learners	3,484	49	24.10	7.78	0.83	3.20



Table R-7. Subgroup Reliabilities Grade 3—Mathematics

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,292	50	30.27	10.52	0.92	2.95
Male	23,206	50	31.36	10.72	0.93	2.90
Hispanic or Latino	8,543	50	27.01	10.27	0.91	3.05
American Indian/Alaskan Native	5,505	50	30.62	10.23	0.92	2.95
Asian	1,081	50	35.00	9.76	0.92	2.76
Black/African American	3,551	50	23.30	9.90	0.90	3.11
Pacific Islander	236	47	24.39	10.22	0.91	3.06
White/Caucasian	21,040	50	33.57	9.94	0.92	2.84
Two or More Races	5,545	50	30.75	10.44	0.92	2.94
Economically Disadvantaged	20,991	50	27.29	10.42	0.91	3.04
Individual Education Program	8,078	50	25.49	10.57	0.91	3.08
Plan 504	831	49	31.35	9.81	0.91	2.95
English Language Learners	6,146	50	25.66	10.00	0.91	3.08

Table R-8. Subgroup Reliabilities Grade 4—Mathematics

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	21,973	50	27.10	9.50	0.90	3.02
Male	22,999	50	28.56	10.10	0.91	2.99
Hispanic or Latino	8,644	50	24.86	9.29	0.89	3.06
American Indian/Alaskan Native	5,488	50	27.43	9.29	0.89	3.03
Asian	980	50	32.59	9.90	0.92	2.84
Black/African American	3,500	50	21.14	8.33	0.86	3.10
Pacific Islander	218	45	23.19	8.80	0.88	3.08
White/Caucasian	20,707	50	30.14	9.57	0.90	2.96
Two or More Races	5,441	50	27.92	9.69	0.90	3.00
Economically Disadvantaged	20,529	50	24.61	9.21	0.89	3.07
Individual Education Program	7,847	50	22.19	9.08	0.88	3.09
Plan 504	1,082	50	27.97	9.42	0.90	3.02
English Language Learners	6,043	50	22.99	8.58	0.87	3.09



Table R-9. Subgroup Reliabilities Grade 5—Mathematics

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,573	50	25.90	9.95	0.91	3.05
Male	23,250	50	27.24	10.32	0.91	3.04
Hispanic or Latino	8,713	50	23.62	9.59	0.90	3.09
American Indian/Alaskan Native	5,536	50	25.96	9.50	0.90	3.07
Asian	992	50	32.56	10.41	0.92	2.86
Black/African American	3,624	50	20.37	8.58	0.87	3.11
Pacific Islander	198	46	20.82	8.85	0.88	3.10
White/Caucasian	21,323	50	28.81	10.05	0.91	3.01
Two or More Races	5,442	50	26.44	9.80	0.90	3.06
Economically Disadvantaged	21,081	50	23.38	9.33	0.89	3.10
Individual Education Program	7,593	50	20.06	8.65	0.87	3.13
Plan 504	1,242	49	26.78	9.51	0.90	3.07
English Language Learners	4,845	50	19.88	7.94	0.84	3.13

Table R-10. Subgroup Reliabilities Grade 6—Mathematics

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,764	50	25.22	9.16	0.88	3.11
Male	23,959	50	26.61	9.76	0.90	3.05
Hispanic or Latino	9,040	50	23.12	8.74	0.87	3.13
American Indian/Alaskan Native	5,898	50	25.29	8.89	0.88	3.11
Asian	948	50	32.32	9.86	0.92	2.86
Black/African American	3,713	50	20.53	8.06	0.85	3.14
Pacific Islander	191	45	20.98	7.93	0.84	3.14
White/Caucasian	21,593	50	28.05	9.45	0.90	3.04
Two or More Races	5,345	50	25.60	9.28	0.89	3.09
Economically Disadvantaged	21,261	50	23.03	8.74	0.87	3.14
Individual Education Program	7,283	50	18.90	7.80	0.84	3.14
Plan 504	1,308	49	25.76	9.24	0.89	3.10
English Language Learners	4,157	48	18.72	6.69	0.78	3.16



Table R-11. Subgroup Reliabilities Grade 7—Mathematics

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,892	50	18.76	8.18	0.86	3.03
Male	23,746	50	19.20	8.80	0.88	3.03
Hispanic or Latino	8,874	50	16.83	7.22	0.83	3.02
American Indian/Alaskan Native	5,765	48	18.14	7.80	0.85	3.03
Asian	986	50	25.69	11.23	0.93	2.96
Black/African American	3,553	50	14.97	6.34	0.78	2.98
Pacific Islander	183	44	15.64	6.13	0.76	3.04
White/Caucasian	21,924	50	20.55	8.86	0.88	3.04
Two or More Races	5,359	49	18.60	8.21	0.86	3.03
Economically Disadvantaged	20,780	50	16.65	7.15	0.82	3.01
Individual Education Program	7,049	49	14.11	5.66	0.72	2.98
Plan 504	1,367	48	18.35	7.77	0.85	3.05
English Language Learners	3,923	46	14.06	5.21	0.68	2.97

Table R-12. Subgroup Reliabilities Grade 8—Mathematics

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,749	50	20.87	8.57	0.87	3.12
Male	23,709	51	20.85	9.12	0.89	3.09
Hispanic or Latino	8,759	50	18.75	7.73	0.84	3.13
American Indian/Alaskan Native	5,796	51	20.16	8.31	0.86	3.11
Asian	976	50	27.86	10.78	0.93	2.95
Black/African American	3,694	50	16.51	6.76	0.79	3.11
Pacific Islander	157	42	17.79	7.55	0.83	3.07
White/Caucasian	21,843	50	22.35	9.12	0.88	3.10
Two or More Races	5,120	51	20.57	8.59	0.87	3.11
Economically Disadvantaged	20,396	50	18.34	7.60	0.83	3.12
Individual Education Program	6,664	48	15.00	5.97	0.74	3.04
Plan 504	1,370	49	20.56	8.62	0.87	3.10
English Language Learners	3,348	50	15.41	5.67	0.70	3.10



Table R-13. Subgroup Reliabilities Science (OSTP)—Grade 5

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,532	45	23.17	8.14	0.86	3.01
Male	23,243	45	23.64	8.40	0.87	2.98
Hispanic or Latino	8,695	45	20.81	7.78	0.85	3.04
American Indian/Alaskan Native	5,543	44	23.01	7.82	0.85	3.01
Asian	991	45	26.45	8.63	0.89	2.93
Black/African American	3,619	44	18.52	7.17	0.82	3.05
Pacific Islander	196	40	18.20	6.91	0.81	3.04
White/Caucasian	21,307	45	25.30	8.17	0.87	2.96
Two or More Races	5,430	44	23.48	7.97	0.86	3.00
Economically Disadvantaged	21,025	45	21.06	7.77	0.85	3.04
Individual Education Program	7,612	45	18.41	7.26	0.82	3.05
Plan 504	1,240	44	23.39	7.88	0.86	2.99
English Language Learners	4,836	43	17.43	6.14	0.75	3.07

Table R-14. Subgroup Reliabilities Science (OSTP)—Grade 8

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	22,711	48	24.48	8.32	0.85	3.23
Male	23,676	48	24.20	9.13	0.88	3.21
Hispanic or Latino	8,760	48	22.10	8.06	0.84	3.27
American Indian/Alaskan Native	5,796	48	23.89	8.39	0.85	3.24
Asian	975	48	29.18	8.93	0.88	3.06
Black/African American	3,655	47	19.74	7.49	0.81	3.28
Pacific Islander	153	44	20.25	7.87	0.83	3.25
White/Caucasian	21,822	48	25.98	8.76	0.87	3.19
Two or More Races	5,111	47	24.05	8.64	0.86	3.22
Economically Disadvantaged	20,329	47	21.95	8.15	0.84	3.26
Individual Education Program	6,676	47	17.96	6.99	0.78	3.26
Plan 504	1,365	47	23.96	8.66	0.86	3.23
English Language Learners	3,349	43	17.66	6.19	0.72	3.28



Table R-15. Subgroup Reliabilities Science (CCRA)—Grade 11

Description	Number of Students	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
Female	20,956	62	26.03	9.94	0.87	3.56
Male	21,349	61	26.57	11.13	0.90	3.54
Hispanic or Latino	7,458	61	23.35	9.06	0.85	3.55
American Indian/Alaskan Native	5,275	59	25.16	9.69	0.87	3.56
Asian	1,045	59	31.47	11.78	0.91	3.52
Black/African American	3,199	55	21.49	8.18	0.81	3.53
Pacific Islander	138	45	20.37	7.72	0.80	3.49
White/Caucasian	20,966	62	28.16	11.00	0.90	3.55
Two or More Races	4,229	60	26.28	10.37	0.88	3.55
Economically Disadvantaged	16,469	61	23.70	9.42	0.86	3.54
Individual Education Program	5,343	59	19.83	7.39	0.78	3.50
Plan 504	1,311	62	27.57	11.45	0.90	3.53
English Language Learners	2,070	51	18.26	5.20	0.56	3.47

Table R-16. Reliabilities by Reporting Category—ELA Grade 3

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	19	20	9.66	4.12	0.78	1.95
2	7	8	3.97	2.03	0.68	1.14
3	11	11	7.02	2.54	0.69	1.42
4	6	6	2.57	1.59	0.51	1.11
5	7	7	3.44	1.73	0.51	1.22

Table R-17. Reliabilities by Reporting Category—ELA Grade 4

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	16	16	9.30	3.50	0.75	1.75
2	10	12	5.05	2.44	0.64	1.47
3	12	12	7.56	2.53	0.66	1.47
4	6	6	3.13	1.29	0.32	1.07
5	6	6	3.19	1.65	0.60	1.04



Table R-18. Reliabilities by Reporting Category—ELA Grade 5

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	16	16	9.64	3.47	0.75	1.74
2	12	12	7.36	2.85	0.74	1.45
3	10	10	6.39	2.39	0.70	1.30
4	6	6	3.61	1.60	0.57	1.05
5	6	6	3.26	1.64	0.55	1.11

Table R-19. Reliabilities by Reporting Category—ELA Grade 6

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	17	17	10.64	3.65	0.77	1.77
2	11	13	5.75	2.43	0.65	1.43
3	10	10	6.91	2.51	0.76	1.24
4	6	6	3.37	1.58	0.55	1.06
5	6	6	3.13	1.49	0.47	1.09

Table R-20. Reliabilities by Reporting Category—ELA Grade 7

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	18	20	10.05	3.80	0.73	1.97
2	11	11	6.62	2.54	0.67	1.46
3	7	7	4.53	1.84	0.64	1.11
4	6	6	2.22	1.25	0.24	1.09
5	8	8	4.39	1.73	0.43	1.30

Table R-21. Reliabilities by Reporting Category—ELA Grade 8

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	14	14	8.00	2.95	0.68	1.68
2	14	14	8.09	2.80	0.67	1.60
3	8	8	5.06	1.70	0.54	1.15
4	7	7	4.05	1.53	0.39	1.19
5	7	7	4.45	1.56	0.45	1.16



Table R-22. Reliabilities by Reporting Category—Mathematics Grade 3

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	23	23	15.52	5.22	0.87	1.89
2	7	7	4.55	1.61	0.53	1.11
3	14	14	7.23	3.21	0.74	1.63
4	6	6	3.49	1.87	0.71	1.01

Table R-23. Reliabilities by Reporting Category—Mathematics Grade 4

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	22	22	12.36	5.05	0.85	1.96
2	8	8	4.66	1.75	0.56	1.16
3	14	14	7.33	3.05	0.71	1.65
4	6	6	3.44	1.44	0.49	1.03

Table R-24. Reliabilities by Reporting Category—Mathematics Grade 5

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	23	23	12.26	5.35	0.86	2.02
2	9	9	5.01	2.37	0.71	1.27
3	12	12	6.21	2.46	0.63	1.50
4	6	6	3.05	1.58	0.54	1.07

Table R-25. Reliabilities by Reporting Category—Mathematics Grade 6

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	20	20	10.87	4.36	0.79	1.99
2	11	11	5.48	2.47	0.68	1.40
3	12	12	6.19	2.42	0.61	1.52
4	7	7	3.36	1.70	0.57	1.12

Table R-26. Reliabilities by Reporting Category—Mathematics Grade 7

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	9	9	3.53	2.28	0.69	1.27
2	15	15	5.47	2.86	0.65	1.69
3	15	15	5.16	2.86	0.66	1.66
4	11	11	4.60	2.13	0.55	1.42

Table R-27. Reliabilities by Reporting Category—Mathematics Grade 8

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	9	9	3.54	2.05	0.62	1.26
2	23	23	9.32	4.48	0.78	2.10
3	10	10	4.09	2.27	0.63	1.39
4	8	8	3.77	1.73	0.47	1.26

Table R-28. Reliabilities by Reporting Category—Science (OSTP) Grade 5

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	15	15	6.58	3.00	0.64	1.80
2	12	12	6.93	2.71	0.69	1.50
3	18	18	9.86	3.73	0.75	1.85

Table R-29. Reliabilities by Reporting Category—Science (OSTP) Grade 8

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	15	16	7.56	3.18	0.64	1.90
2	12	13	7.22	2.71	0.63	1.66
3	18	19	9.52	4.04	0.75	2.00

Table R-30. Reliabilities by Reporting Category—Science (CCRA) Grade 11

Reporting Category	Number of Items	Raw Score			Alpha	Standard Error
		Maximum	Mean	Standard Deviation		
1	30	31	13.26	5.85	0.82	2.51
2	30	31	13.03	5.33	0.78	2.50



APPENDIX S
DECISION ACCURACY AND CONSISTENCY RESULTS

Table S-1. Summary of Decision Accuracy and Consistency Results by Content Area and Grade—Conditional on Cutpoint

Content Area	Grade	Below Basic / Basic			Basic / Proficient			Proficient / Advanced		
		Accuracy (consistency)	False Positive	False Negative	Accuracy (consistency)	False Positive	False Negative	Accuracy (consistency)	False Positive	False Negative
ELA	3	0.91 (0.88)	0.05	0.03	0.92 (0.88)	0.04	0.04	0.96 (0.95)	0.03	0.00
	4	0.91 (0.88)	0.04	0.04	0.92 (0.88)	0.04	0.04	0.98 (0.97)	0.02	0.00
	5	0.93 (0.90)	0.04	0.03	0.91 (0.88)	0.04	0.05	0.94 (0.93)	0.05	0.01
	6	0.93 (0.90)	0.04	0.03	0.91 (0.88)	0.03	0.05	0.96 (0.95)	0.04	0.00
	7	0.90 (0.87)	0.02	0.09	0.88 (0.87)	0.01	0.11	0.95 (0.95)	0.02	0.03
	8	0.92 (0.88)	0.04	0.04	0.90 (0.86)	0.04	0.06	0.94 (0.93)	0.05	0.01
Mathematics	3	0.92 (0.89)	0.04	0.04	0.92 (0.89)	0.04	0.04	0.96 (0.94)	0.02	0.02
	4	0.93 (0.90)	0.05	0.03	0.92 (0.89)	0.04	0.04	0.94 (0.92)	0.04	0.02
	5	0.93 (0.90)	0.04	0.03	0.93 (0.90)	0.03	0.04	0.96 (0.94)	0.03	0.01
	6	0.92 (0.89)	0.05	0.03	0.93 (0.90)	0.03	0.04	0.97 (0.96)	0.02	0.01
	7	0.90 (0.87)	0.06	0.03	0.93 (0.90)	0.04	0.03	0.98 (0.97)	0.02	0.00
	8	0.92 (0.89)	0.03	0.04	0.93 (0.90)	0.03	0.04	0.95 (0.94)	0.05	0.00
Science	5	0.92 (0.89)	0.05	0.03	0.90 (0.86)	0.05	0.05	0.96 (0.94)	0.03	0.01
	8	0.91 (0.87)	0.05	0.04	0.91 (0.87)	0.04	0.05	0.95 (0.93)	0.03	0.01
	11	0.93 (0.90)	0.04	0.03	0.92 (0.89)	0.03	0.05	0.93 (0.93)	0.06	0.00



APPENDIX T
EVIDENCE SUPPORTING THE REPORTING STRUCTURE OF
OSTP AND CCRA ASSESSMENTS

REPORTING STRUCTURE ANALYSIS

Validity evidence for the reporting structure of OSTP and CCRA assessments in ELA and mathematics (Grades 3-8) and science (Grades 5, 8 and 11) was demonstrated in a study exploring the latent structure of the 2018-19 administration using Confirmatory Factor Analysis (CFA).

The blueprint for each assessment indicates that items were designed to measure one of five ELA standards (Oklahoma State Department of Education (SDE), 2019a), one of four mathematics strands (SDE, 2019b), or one of three science domains (SDE, 2019c). The model of performance on the assessments, therefore, supposes separate latent constructs or unobserved student abilities within each subject area corresponding to the reporting categories, which are indicators of general achievement within the domain.

Latent Factor Models

The relationship among items, reporting categories, and general achievement for each assessment can be represented according to four latent factor models. (1) The unidimensional model conceives item performance as simply correlated to general achievement within the domain; items are associated with a single domain factor. (2) The first-order model suggests that item performance is correlated with student ability on each of the intercorrelated reporting categories; items are associated with one of the three-to-six reporting categories. (3) The second-order model supposes that a general achievement factor drives and explains ability on each of the reporting categories, similar to the first-order model, having replaced inter-factor correlations with a general achievement factor. (4) Lastly, the bifactor model (Reise, 2012) expands on the first-order model with the replacement of inter-factor correlations with a residual general factor; each item is associated with this secondary factor, which is uncorrelated with all other factors.

Prototypes of each of the four latent factor models are presented in Figure 9-1. The general achievement factor (e.g., ELA, mathematics, science) is represented as θ_0 , each of the $1 \dots k$ reporting categories is represented as θ_k , and each of $1 \dots j$ items is represented as y_{jk} where j indexes item order with respect to reporting category k . The residualized general factor is simply $\theta_{bifactor}$.



Figure T-1. Prototypical Latent Factor Model Diagrams

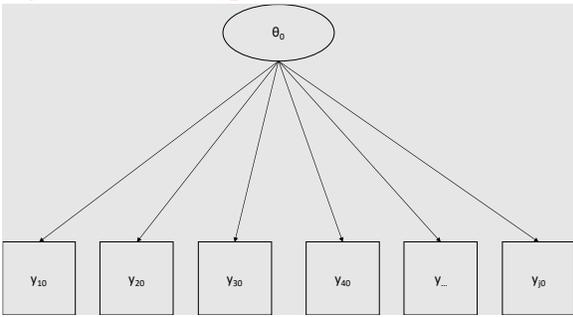


Figure 1a: Unidimensional Model

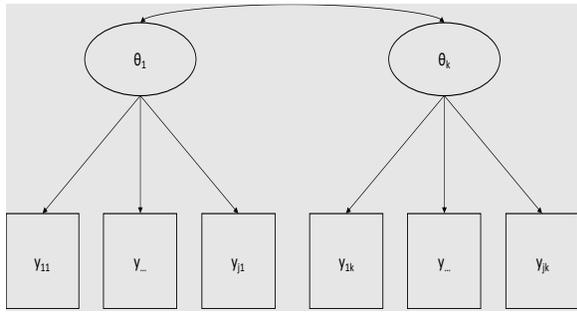


Figure 1b: First-Order Model

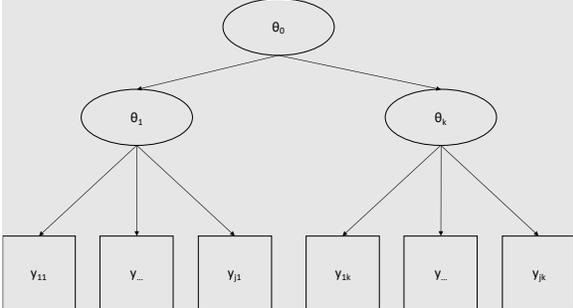


Figure 1c: Second-Order Model

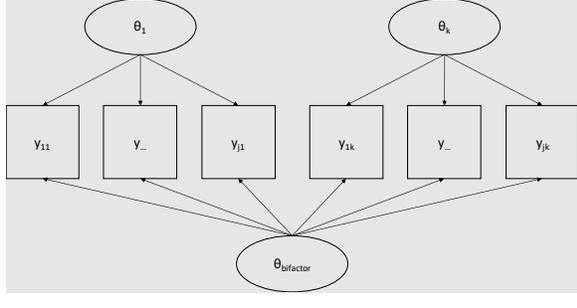


Figure 1d: Bifactor Model

These models were evaluated statistically using CFA procedures to provide evidence for the structure of student ability with data collected during the spring 2018–19 administration. Each of the four latent factor models was estimated for the single operational test form from each subject and grade using the lavaan package (Rosseel, 2012) in the R system for statistical computing (R Core Team, 2017) and the mean- and variance-adjusted Weighted Least Squares Mean-Variance (WLSMV) estimator, appropriate for categorical response variables (Finney & DiStefano, 2013). To maintain equivalence with the two-parameter (2PL) item response theory (IRT) model (Kamata and Bauer, 2008), latent factors were standardized, and all item loadings, thresholds, and error variances were estimated.

Latent Factor Model Evaluation

Prior to comparison among models, the degree of model-data fit was evaluated; i.e., how well the hypothesized model fit the actual student performance data. Model fit values calculated include the χ^2/df ratio and the Root Mean Square Error of Approximation (RMSEA). The χ^2/df ratio is a model fit statistic that describes the discrepancy between the observed and model-estimated item covariances; smaller values indicate better fit and desirable values approach 1.00. The RMSEA provides similar information, although it presents the degree of model misfit adjusted for the number of parameters in the model; values approaching zero suggest better fit. These goodness-of-fit indices have been shown to be differentially sensitive to types of misspecifications appropriate for evaluating large-scale educational assessments (Fan and Sivo, 2005, 2007; Hu & Bentler, 1998). Standard cutoff values for these

goodness-of-fit indices (e.g., Hu & Bentler, 1998, 1999), however, have been shown to have inadequate power to detect model misspecification (Gushta, 2012); therefore, values resulting from each model were compared to empirical sampling distributions resulting from a bootstrap resampling procedure (replications = 100; $\alpha = 0.05$) employing a target sample size of 20,000, which had previously been established as viable with the 2016-17 OSTP tests and was necessary for feasible execution and completion of the study.

Latent Factor Model Comparison

In addition to testing the fit of each of the four latent factor models, the degree to which any one of the models provide improved fit over the others was examined. Since the Unidimensional, First-Order, and bifactor models are all nested within the Second-Order model, simple likelihood ratio tests (LRT) were conducted between all pairs of models to determine whether the additional information provided by the more complex models improved model fit and, therefore, supported interpretation of more complex structures of student performance. Model complexity is defined according to the number of freely estimated parameters: “larger” models have more estimated parameters and fewer degrees of freedom compared to “smaller” models which estimate fewer parameters and have more degrees of freedom, with respect to the same data set. A significant LRT result indicates that the “larger” or more complex model fits the data better, and it is beneficial to estimate those additional parameters. A nonsignificant LRT result, on the other hand, suggests that neither model fits the data better; therefore, the more parsimonious model with fewer estimated parameters (i.e., the “smaller” model) is preferred.

Latent Factor Model Results

Prior to model evaluation and comparison, there were a few issues to be noted with model estimation: Second-Order models could not be estimated in Grades 4 and 7 ELA, due to the high intercorrelations among reporting categories (typically $r > 0.90$).

Model evaluation and comparison results are summarized in Table 9-1 (ELA), Table 9-2 (mathematics), and Table 9-3 (science). Model evaluation found that RMSEA and χ^2/df values did not exceed the empirically determined significance values; therefore, the models all fit the data sufficiently well to enable further comparison and interpretation. Model comparison, according to the results of all possible pairs of Likelihood Ratio Tests, found in all instances that the “largest” model fit significantly better than the other three models. Specifically, the bifactor model demonstrated the best fit for all grades and subjects.

The straightforward interpretation of these results is to say that the reporting structure of an overall scale score and reporting categories within each grade and subject is supported by preference of bifactor latent variable models. Once broad general ability (e.g., ELA) is accounted for, student performance on test items is additionally driven or explained by ability within each of the reporting categories.



Table T-1. Model Evaluation and Comparison Results by Grade, ELA

Grade	Model	N	df	RMSEA	χ^2/df	Notes
3	Uni	50832	1175	0.02	31.18	
	First	50832	1165	0.02	26.61	
	Bifactor	50832	1125	0.01	12.23	*
	Second	50832	1170	0.02	26.82	
4	Uni	51321	1175	0.02	15.35	
	First	51321	1165	0.02	14.56	
	Bifactor	51321	1125	0.02	12.89	*
	Second	51321				+
5	Uni	51488	1224	0.02	14.40	
	First	51488	1209	0.02	13.69	
	Bifactor	51488	1173	0.02	12.87	*
	Second	51488	1218	0.02	14.01	
6	Uni	51337	1175	0.01	5.38	
	First	51337	1165	0.01	5.02	
	Bifactor	51337	1125	0.01	4.64	*
	Second	51337	1170	0.01	5.06	
7	Uni	49461	1175	0.01	5.50	
	First	49461	1165	0.01	5.23	
	Bifactor	49461	1125	0.01	4.77	*
	Second	49461				+
8	Uni	46983	1224	0.02	15.11	
	First	46983	1209	0.02	14.84	
	Bifactor	46983	1173	0.02	8.13	*
	Second	46983	1218	0.02	14.83	

* Preferred model based on LRT results; + Model could not be estimated.



Table T-2. Model Evaluation and Comparison Results by Grade, Mathematics

Grade	Model	N	df	RMSEA	χ^2/df	Notes
3	Uni	50739	1175	0.02	17.52	
	First	50739	1169	0.02	16.57	
	Bifactor	50739	1125	0.02	13.75	*
	Second	50739	1171	0.02	16.58	
4	Uni	51224	1175	0.03	41.12	
	First	51224	1169	0.03	40.07	
	Bifactor	51224	1125	0.02	26.35	*
	Second	51224	1171	0.03	40.08	
5	Uni	51478	1175	0.03	59.34	
	First	51478	1169	0.03	51.45	
	Bifactor	51478	1125	0.02	17.32	*
	Second	51478	1171	0.03	51.55	
6	Uni	50760	1175	0.02	20.35	
	First	50760	1169	0.02	19.23	
	Bifactor	50760	1125	0.02	15.47	*
	Second	50760	1171	0.02	19.22	
7	Uni	48870	1175	0.03	46.43	
	First	48870	1169	0.03	41.30	
	Bifactor	48870	1125	0.02	15.31	*
	Second	48870	1171	0.03	41.26	
8	Uni	46514	1175	0.02	24.26	
	First	46514	1169	0.02	21.56	
	Bifactor	46514	1125	0.02	16.01	*
	Second	46514	1171	0.02	21.64	

* Preferred model based on LRT results; + Model could not be estimated.

Table T-3. Model Evaluation and Comparison Results by Grade, Science

Grade	Model	N	df	RMSEA	χ^2/df	Notes
5	Uni	51476	945	0.02	21.11	
	First	51476	942	0.02	20.02	
	Bifactor	51476	900	0.02	12.96	*
	Second	51476	942	0.02	20.02	
8	Uni	46495	945	0.02	12.32	
	First	46495	942	0.02	12.02	
	Bifactor	46495	900	0.01	8.66	*
	Second	46495	942	0.02	12.02	
11	Uni	43638	1710	0.02	18.32	
	First	43638	1709	0.02	18.17	
	Bifactor	43638	1650	0.02	15.04	*
	Second	43638	1708	0.02	18.18	

* Preferred model based on LRT results.



APPENDIX U
SAMPLE REPORTS



STUDENT/FAMILY REPORT

OKLAHOMA SCHOOL TESTING PROGRAM



USING THIS REPORT TO MEET WITH YOUR STUDENT'S TEACHER OR SCHOOL

As your student's first teacher, you are a critical part of their education. It is important to remember that your student's strengths, abilities and potential cannot be measured by a single test score. Each student grows at different rates both physically and academically. State tests help gauge how your student is growing in the knowledge and skills outlined in the Oklahoma Academic Standards. State test results, when combined with other information (i.e., report card grades, teacher feedback, classroom performance and local tests) can help you and the teacher understand where your student is making progress and where they may need extra support. Ask your student's teachers and/or school:

- Where is my student excelling? How can I support this success?
- What do you think is giving my student the most trouble? How can I help my student improve in this area?
- What can I do to help my student with upcoming work?
- What curriculum and learning experiences do you provide to support my student?

OKLAHOMA STATE DEPARTMENT OF EDUCATION (OSDE) RESOURCES

The **OSTP Parent Portal** - is an interactive web-based tool you can use to access information about your student's OSTP results. (Note: You will need your student's state ID (STN) number and date of birth to set up an account. Your student's state ID (STN) number is located on the front of this report.) <https://okparentportal.emetric.net/login>

The **OSDE Family Guides** page provides links to grade-level guides that illustrate what is expected of students at each grade level in different content areas, along with activities families can do at home to further support their student's learning. <https://sde.ok.gov/oklahoma-family-guides>

The **OSDE Family Engagement** page is home to tools and resources that support partnerships between families and schools. <https://sde.ok.gov/families>

The **OSDE Assessment Guidance** page provides information and guidance on interpreting and using data from student assessments. <https://sde.ok.gov/assessment-guidance>

The **Oklahoma School Testing Program (OSTP)** material page provides more information about the state tests your student took such as Parent, Student, Teacher Guides (PSTGs) and testing blueprints. <https://sde.ok.gov/assessment-material>

GLOSSARY OF TERMS

OPI Score: The Oklahoma Performance Index (OPI) score allows for a numerical comparison between students. For example, we can compare scale scores for students who took the 5th grade mathematics test this year with those who will take this test next year. Scale scores are not comparable across different subjects.

Performance Level: Reflect overall performance and are determined by where a student's OPI score falls within a defined range for each academic area. Oklahoma reports four performance levels: **Below Basic**, **Basic**, **Proficient**, or **Advanced**.

Performance by Category: Represent groups of similar student skills assessed within each grade and subject. For example, performance categories reported for grades 3-8 mathematics include Numbers and Operations, Algebraic Reasoning and Algebra, Geometry and Measurement, and Data and Probability. Each performance category uses an indicator to show student performance on the subset of items associated with the category. These indicators are **Below Standard**, **At/Near Standard** and **Above Standard**.

ADDITIONAL RESOURCES AND INFORMATION

Office of Assessment
Phone: (405) 521-3341

Office of Special Education
Phone: (405) 521-3351

Office of Curriculum and Instruction
Phone: (405) 521-4287



Dear Family,

This report showcases your student's performance on the spring 2021 Oklahoma School Testing Program (OSTP) Tests in key academic areas. State test results, when combined with other information - (i.e. homework, classwork, report card grades and local assessments), can help you and the teacher work together to support your student's growth.

Your student's score report helps you know:

- how your student performed in each academic area
- where your student is doing well and where they may need additional support
- how your student performed compared to others, and
- how you can support your student at home and at school

If you have any questions, please contact your local school or the Office of Assessment at <https://sde.ok.gov/office-assessments>.

Sincerely,

Joy Hofmeister
State Superintendent of Public Instruction

Grade 5

Student: FIRST106 M
LASTNAME106

Local ID: D00000106

State ID: D00000106

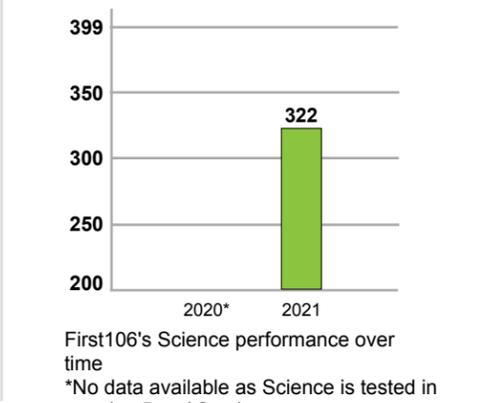
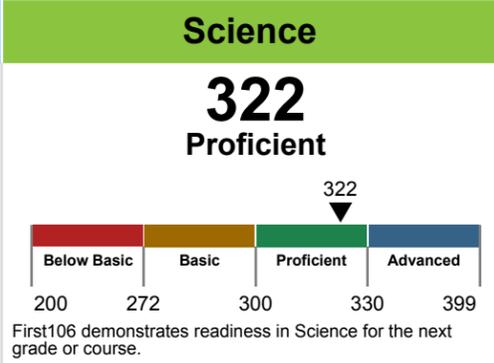
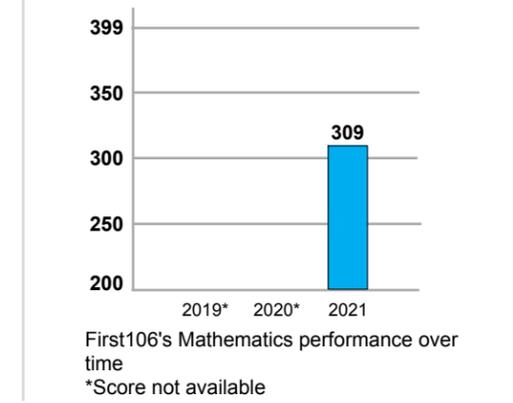
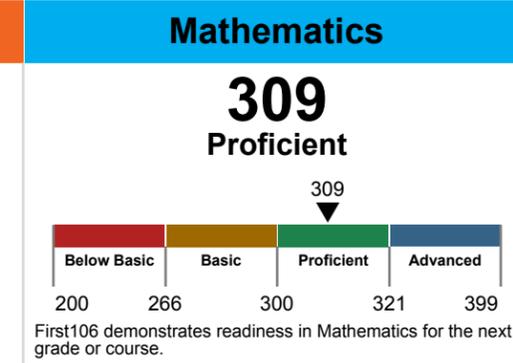
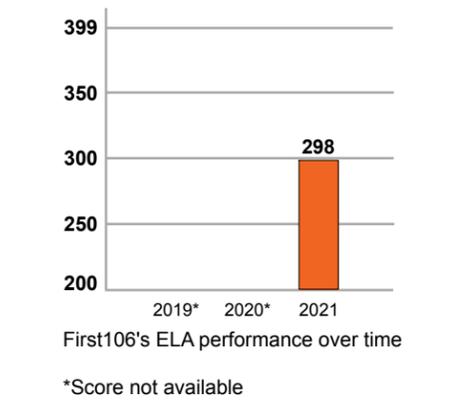
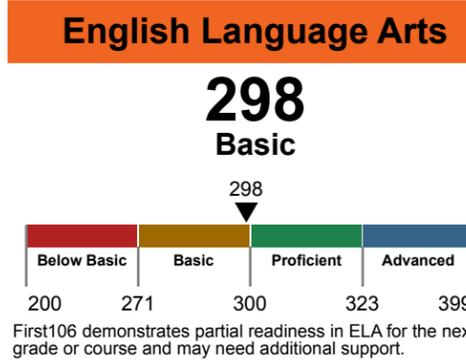
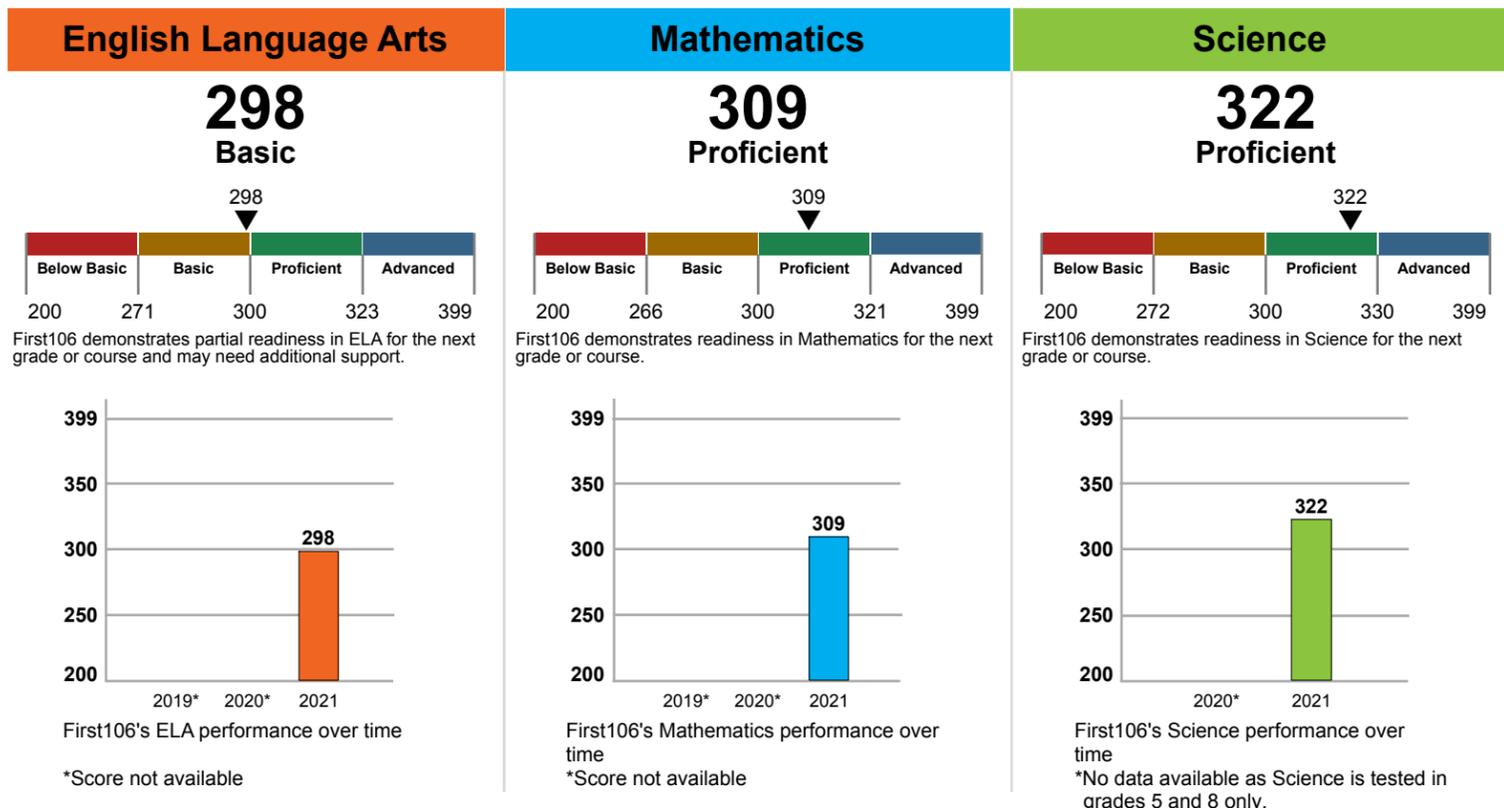
Birth Date: 06/11/2010

Class: DEMO

School: Demonstration School 2

District: Demonstration District A

Code: DEMONA-DE2



English Language Arts (ELA) ► BASIC

Students scoring Basic typically:

- inconsistently choose the best summary of the text, and have difficulty differentiating main ideas from details.
- compare and contrast details in literary and nonfiction/informational texts, but inconsistently classify genres.
- seldom identify the paraphrase of original text.
- inconsistently identify literary elements, literary devices, author's purpose, point of view and accuracy of facts.
- inconsistently compare and contrast texts and ideas within or between texts.
- inconsistently engage in a recursive writing process to create written works.
- create written works for various purposes and audiences, but inconsistently select and apply an organizational structure that fits the writing task.
- inconsistently use vocabulary knowledge and resources to interpret text through word parts, word relationships or context clues.
- inconsistently use appropriate vocabulary in written works.
- inconsistently identify and apply appropriate use of grammar and mechanics.
- ineffectively locate, record, and organize information on a topic in order to present findings.

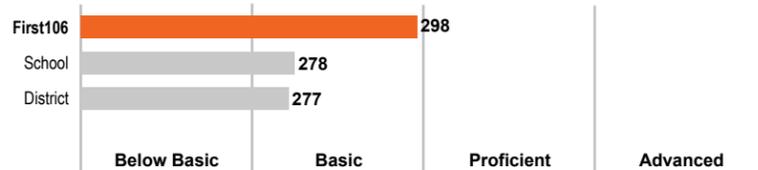
First106's ELA Performance by Reporting Category

Points Earned / Points Possible Ways to Support First106

- 13 / 16** **Reading/Writing Process ► At/Near Standard**
- Have your student use details from the stories and articles they are reading to relate what the text says (for instance, details about how the main idea shapes the story, sequence of events, facts and opinions being stated, etc.).
 - Encourage your student to write and refine their writing (for example, write a letter to address a local issue, ask for information, describe an object or event or share an opinion).
- 9 / 12** **Critical Reading/Writing ► At/Near Standard**
- Ask your student what they learned from reading and how they can use this in real life. Have them read the most interesting or useful sections of a passage aloud.
 - Encourage your student to select topics of interest to write about in a poem, letter, or story and then help them go back and make their writing better.
- 7 / 10** **Vocabulary ► At/Near Standard**
- Model learning new words by using them in conversations with your student.
 - Encourage your student keep an "Interesting Words" notebook. Have them use references to add a brief description and pictures to represent those words and then use their words in conversations and writing.
- 3 / 6** **Language ► Below Standard**
- Help your student to identify and correct mistakes in their own writing or to notice mistakes in other people's writing.
- 6 / 6** **Research ► Above Standard**
- Encourage your student to create questions about topics they would like to know more about such as space, an animal or a career and discuss where to find information to answer their questions about each topic.
- 1 / 4** **Writing Composite Score ►**
- Encourage your student to write on a daily basis (e.g., journaling, keeping a diary).
 - Discuss ways to expand writing by including details and examples.

For more information on supporting your student, please visit the OSDE Family Guides found at <https://sde.ok.gov/oklahoma-family-guides>.

ELA Performance Compared to School and District



Mathematics ► PROFICIENT

Students scoring Proficient typically:

- estimate and solve division problems with the remainder represented as a fraction or decimal.
- generate equivalent decimals and fractions, represent whole numbers or decimals and compare fractions and decimals, including mixed numbers.
- estimate, add and subtract decimals and fractions.
- describe patterns of change and graph these patterns as ordered pairs on a coordinate plane.
- evaluate expressions, equations and inequalities.
- solve volume and perimeter problems as well as simple surface area problems.
- determine reasonable values for the perimeters of shapes with curves.
- compare angles.
- recognize relationships within a measurement system.
- determine the mean, median, mode and range of a data set and analyze simple graphs.
- solve real-world problems and employ problem-solving strategies of identifying and using appropriate information.

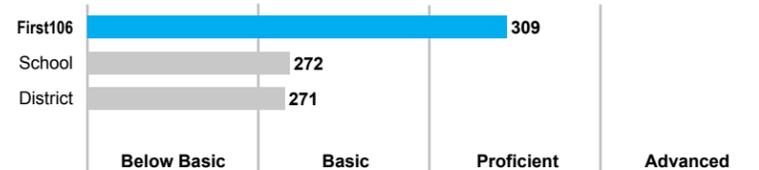
First106's Mathematics Performance by Reporting Category

Points Earned / Points Possible Ways to Support First106

- 15 / 23** **Number & Operations ► At/Near Standard**
- Have your student create math word problems using whole numbers with a focus on multi-digit division or adding and subtracting fractions with different denominators or decimals. (For example, Alpha printing company needs to ship 4,556 programs to the Oklahoma City Thunder basketball team. The printing company can fit 17 programs into a box. How many boxes will the printing company need to use?)
- 8 / 9** **Algebraic Reasoning ► Above Standard**
- Have your student create word problems that involve whole numbers, variables, and inequalities (for example, if $x + 6 < 12$, what values could x be?).
- 11 / 12** **Geometry & Measurement ► Above Standard**
- Challenge your student to find, draw, compare, and describe three-dimensional shapes they notice (for example, number of edges, number of faces, number of vertices, number and type of angles, etc.).
 - Encourage your student to measure and compare the volume of different three-dimensional figures (such as the volume of their favorite cereal box vs. a tissue box).
- 5 / 6** **Data & Probability ► At/Near Standard**
- Have your student collect data (such as their grades) and have them determine the mean, mode, median, and range of data.
 - Ask your student to find and explain a line or double bar graph in a newspaper or magazine.

For more information on supporting your student, please visit the OSDE Family Guides found at <https://sde.ok.gov/oklahoma-family-guides>.

Mathematics Performance Compared to School and District



Science ► PROFICIENT

Students scoring Proficient typically:

- describe, use and/or develop basic models at various scales to explain the movement of matter and energy between organisms, ecosystems and Earth's systems, and explain the outcomes of these interactions.
- apply scale, proportion, quantity and/or patterns when applying computational thinking to data as it pertains to distribution of water on Earth, conservation of matter and Earth's relationship with the sun, moon and stars.
- use evidence, data and/or models to engage in argument to explain the cause and effect relationships between an object and Earth's gravity, how scale and proportion affect the apparent brightness of the sun and other stars or how plants use matter (chiefly air and water) to grow.
- observe and measure phenomena to identify patterns that classify materials based on properties.
- describe cause and effect relationships when mixing substances within an investigation framework.

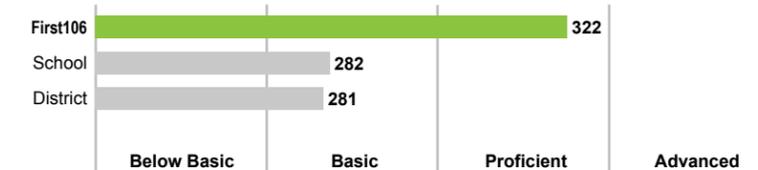
First106's Science Performance by Reporting Category

Points Earned / Points Possible Ways to Support First106

- 12 / 15** **Physical Science ► Above Standard**
- Challenge your student to find examples of matter changing and ask them to explain what is happening and how they can tell whether or not a new substance was formed (for example, rusting metal, toasting bread, dissolving sugar in tea, etc.).
 - Provide opportunities for your student to ask questions. Investigate and research to explain how properties can be used to identify different types of matter (such as how can you tell the difference between salt and sugar without tasting them?).
- 8 / 12** **Life Science ► At/Near Standard**
- Encourage your student to ask questions and think about and describe how changes in an ecosystem affect its stability. (For example, what happens to the animals if there is a wildfire? How does clearing land affect an ecosystem?)
 - Ask your student to think about how their body gets energy to grow taller, or to grow longer hair. How does the energy get from the sun into their body? Research answers together.
- 15 / 18** **Earth & Space Science ► Above Standard**
- Have your student describe how matter and energy transfer between the Earth's spheres: the atmosphere, biosphere, hydrosphere, and geosphere (for example, how do human changes to the spheres help explain why cities are often warmer than rural areas?).
 - When observing natural changes in the sky (night and day) help your student explore patterns they notice and research why they occur.
 - Help your student learn where the water that comes out of your faucet comes from and then explore ways that they can manage its use.

For more information on supporting your student, please visit the OSDE Family Guides found at <https://sde.ok.gov/oklahoma-family-guides>.

Science Performance Compared to School and District



Your student's Lexile score:
920L

The **Lexile measure** provides a score that describes the level at which your student can comfortably read challenging text and also describes the complexity of texts, taking into account such features as vocabulary and sentence complexity. This measure, along with consideration of your student's interests and experiences, is helpful in finding texts for independent reading. For more information on Lexile measures, please visit <https://sde.ok.gov/lexiles>.

Your student's Quantile score:
975Q

The **Quantile measure** provides a score that describes your student's level of mathematical ability and the difficulty of a skill or concept as it relates to other mathematical skills and concepts your student is learning. The score shows your student's readiness for instruction regarding a particular mathematical skill or concept. For more information on Quantile measures, please visit <https://sde.ok.gov/quantiles>.

APPENDIX V
PROCESSING AND REPORTING
BUSINESS REQUIREMENTS

Processing and Reporting Business Requirements

155852 – OSTP 2021 Oklahoma (Grade 3-8: Math, ELA, Science)
158852 – CCRA 2021 Oklahoma (Grade 11: Science Operational, US History Field Test)

Spring Testing 2021

Version Number	Date	Updated Content Description	Updated By Name
1.0	3/9/2021	Initial Document	Woreen Bogle
1.1	12/9/21	Removed reference to Driven to Read	Woreen Bogle
1.2			
1.5			
1.6			
1.7			

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I. Overview

This document describes the Processing and Reporting requirements for the Spring 2021 assessments in Oklahoma. Assessments being administered by Cognia in Oklahoma are the Oklahoma School Testing Program (OSTP) and the College and Career Readiness Assessment (CCRA).

A. Points of Contact

Title	Name
Client Services Lead Program Manager	Elizabeth Garcia
Client Services Senior Program Manager	Sarah Owens
Client Services Program Manager	Robin Petrowicz

B. Changes from 18-19

Due to COVID-19, the OK OSTP and CCRA assessments were cancelled in Spring 2020. Changes are as follows:

1. There are no paper Spanish tests in 20-21
2. Procedures put in place to handle possible duplicate Student IDs (STNs). Cognia will provide SDE a participation file prior to Preliminary reporting (round 1) and again prior to Final Reporting (round 2). The participation file is to aid the SDE in STN cleanup. After each round of cleanup, SDE will provide a return file with the corrected STNs. The participation file prior to Final Reporting will contain clean STNs from the round 1 cleanup and any additional students who were not included in the prior cleanup.
3. Need to flaw item 153088A on the Grade 5 Math Form 1. The Spanish version of the item Asset ID 740473 will also be flawed.
4. Participation file for ELA grades 5 and 8 (one year only) in Preliminary Reporting
5. Parent Portal will not be accessible in Preliminary Reporting due to the duplicate student ID issue. 20-21 only
6. Handoff of data to eMetric for the RSA reporting (Grade 3 Reading)
7. For Spring 2021 only: Genre is being reported for students who take Writing. This data is handed off to the SDE and to eMetric. There is a field being added to the data files to SDE and eMetric to display the genre and form taken.
8. Gifted and Talented will be reported in Data Interaction. The source will be the WAVE file.
9. The Student Results Layout will be used for all State level data files including participation files.
10. The media redacted file will be one file which contains all grades for both OSTP and CCRA
11. County Name will be added to the media redacted file
12. For Spring 2021 only: Writing composite score will not have a performance category reported on the student report.

C. Document References

- 1) Form Description files
- 2) Answer Doc files (paper scan)
- 3) Student Report Schema Notation File
- 4) Student Results Label Schema Notation file

- 5) Data File Layouts and Schema Documentation Files
 - a) OSTPXXXX_StudentResultsLayout.xlsx
 - b) CCRAXXXXRankingsFile.xlsx
 - c) OSTPXXXXeMetricReportingTransfer.xlsx
 - d) OSTPXXXXeMetricSummaryDataTransfer.xlsx
 - e) OK_MediaRedacted_Layout_20-21.xlsx
 - f) CCRAXXXX_StudentResultsLayout.xlsx
 - g) OKXXXXRosterOutboundSchemaDocumentation.xlsx
 - h) OSTPXXXXStudentLabelsSchemaDocumentation.xlsx
 - i) OSTPXXXXStudentReportSchemaDocumentation.xlsx
 - j) OKStudentDataDefinitions.xlsx
 - k) DemographicOverlayLayout.xlsx
 - l) eMetricPostAdminTransfer.xlsx
 - m) Pre-ID layout

D. Assumptions

In order to commit to delivering Data and Printed reports to the client, the following assumptions must be assumed.

- 1) All data files have been received from the client and vendor for processing
 - a) Data files adhere to all validations defined in the Layout Specifications
- 2) All requirements, rules and specifications have been approved and signed off by all parties
- 3) All report designs have been approved and signed off by all parties
- 4) Preliminary and final GRF files have been received by SDE as complete and accurate

E. Risks

A major risk to the 2021 administration of the OSTP and CCRA assessments is the effects of COVID-19.

Due to COVID-19 the 2020 administration of the Oklahoma assessments were cancelled.

II. General Information

A. Assessments

The test window for the assessments begin on April 6, 2021. The window for paper testers concludes on May 7, 2021. The online test window concludes on May 24, 2021.

Overview				
Operational	OSTP	03	ELA, Math	Online Operational (in English)
		04		Online Breach (in English)
		06 07		Online Spanish (Math and Science only)
	CCRA	05	Science	Paper Operational (in English)
		08		Paper Breach (in English)
		11		Online Operational (in English)
			Online Breach (in English)	

				Online Spanish Paper Operational (in English) Paper Breach (in English)
FIELD TEST	CCRA	11	US History	Online Field Test (in English) Paper Field Test (in English) Online Spanish Online Breach (in English) Paper Breach in (in English)

B. Reporting Phases

See the Reporting Schedule for specific dates included in each phase.

- 1) Pre-ID – This is the period before the test administration window begins
 - a) Using the Pre-ID file from SDE Cognia produces Pre-administration labels.
 - b) Pre-administration labels are provided only for those students indicating a Paper based test
 - c) A pre-administration label is produced for each subject a student is expected to take depending on the student’s grade.
 - d) Cognia provides eMetric with a data file of students that are identified as taking their tests online. The data are provided according to the OKStudentDataDefinitions file layout.
 - e) Pre-ID data is used to populate Outbound Rosters which accompany the pre-administration labels.
- 2) Expedited Reporting – This is the period after the test administration but before the Preliminary Reporting period.

Cognia provides eMetric with the OSTPXXXXeMetricReportingTransfer data file populated with only the Grade 3 Reading results. This is to satisfy the early Reading Sufficiency Act (RSA) reporting requirement.
- 3) Preliminary Reporting
 - a) Prior to handing off the preliminary student data files Cognia will provide a student level file for the purpose of Student ID cleanup to SDE. This is for 20-21. The file will demographic information for the students.
 - b) Cognia provides the SDE with preliminary student data files.
 - c) Cognia provides eMetric with preliminary student results data.
- 4) Final Reporting - The period following state cleanup and receipt of the Demographic Overlay file and final SSC files from SDE
 - a) Prior to handing off the final student data files Cognia will provide a student level file for the purpose of Student ID cleanup to SDE. This will cleanup any students who were not included in the preliminary file.
 - b) Cognia will provide SDE with the final state student results data files for OSTP and CCRA
 - c) Cognia will provide eMetric with the final data to populate Data Interaction and the Parent Portal
 - d) Cognia reporting team will provide Psychometrics data support for the Technical Report and Data Forensics deliverables.

C. Receivables

Both CCRA and OSTP data are included in the same file for each receivable below.

Receivable	Received from	Description	Method of Delivery
Pre-ID file	SDE	Wave and Non-Wave student data	sftp
Post Admin Extract	eMetric	Student Post-test data	Database backup
Demographic Overlay	SDE	Student Demographic file to be used as the source of student demographic information for students with a verified student ID	sftp
Student Status Code	SDE	Lists tests to be invalidated	sftp

D. Deliverables

Contract	Deliverable	File Layout	Method of Delivery	Recipient
PRETEST				
OSTP	Mock up PreID Student File	OKStudentDataDefinitions	sftp	eMetric
CCRA	Mock up PreID Student File	OKStudentDataDefinitions	sftp	eMetric
OSTP	Outbound Roster	N/A	Printed/shipped	Schools
CCRA	Outbound Roster	N/A	Printed/shipped	Schools
OSTP CCRA	Reporting Test Deck	eMetricReportingTransfer; eMetricSummaryTransfer	sftp	eMetric
EXPEDITED REPORTING				
OSTP	Student Results Data Grade 3 RSA	eMetricReportingTransfer	Sftp	eMetric
PRELIMINARY REPORTING				
OSTP CCRA	State Student Results (one file)	StudentResultsLayout	sftp	SDE
OSTP CCRA	Participation data file (one file)	StudentResultsLayout	sftp	SDE
OSTP CCRA	Points Possible table	eMetricReportingTransfer	Sftp	eMetric
OSTP CCRA	Student Results Data File	eMetricReportingTransfer	sftp	eMetric
OSTP CCRA	Summary Data File (a file per grade) CCRA-Science only	eMetricSummaryTransfer	sftp	eMetric
CCRA	District and School Ranking File sliced by district US History	RankingsFilelayout	sftp	SDE
FINAL REPORTING				
OSTP CCRA	Student Results Data File	eMetricReportingTransfer	sftp	eMetric
OSTP CCRA	Summary Data File (one file per grade)	eMetricSummaryTransfer	sftp	eMetric
OSTP CCRA	Media Redacted file (one file)	OK_Media_Redacted_Layout	sftp	SDE
OSTP	Individual Student Reports	N/A	printed pdf	Shipped to Districts
OSTP	Student Results Labels	N/A	printed pdf	Shipped to Districts

Contract	Deliverable	File Layout	Method of Delivery	Recipient
OSTP CCRA	Student Results Data File	StudentResultsLayout	sftp	SDE
CCRA	Participation Data File	StudentResultsLayout	sftp	SDE

III. Pre-Assessment Processing

Pre-Assessment activities are completed prior to the testing window. Using the pre-ID data, provided by SDE, Cognia produces and ships test administration labels and the Outbound rosters to districts.

A. Student Roster and Test Data Preparation

Pre-ID data is received from the SDE to prepare for the test administration. The Pre-ID data contains student information, including demographics, and program information for students eligible to take the assessments. The source of the pre-ID from the SDE is the WAVE database, the Student Information System in Oklahoma.

The SDE shares Student Information with the State of Texas, in the district of Texhoma, district code 70I061, located in Texas for grades three and four. The Oklahoma Student Information System includes the students located in Texas for Public School Funding purposes. The Students in the State of Texas are not included in any reporting or rostering activities.

- 1) Student information is provided by SDE in the WAVE file. Student data not available in WAVE are provided by the districts in separate data files to Cognia directly. The data from the non-WAVE districts is provided in a different layout from the WAVE data.
- 2) Students in Grades 03 and 04, in the School District of Texhoma (70I061) Texhoma Elementary School (105) are removed from data to handed off to iCore and eMetric. These students do not take OK assessments.
- 3) Students in Texhoma district in grades 5-8 are expected to take OK assessments.
- 4) Cognia provides the final Pre-ID data to eMetric prior to the test administration window
- 5) Cognia provides data for student test booklet labels to the iCore distribution group. These labels are printed and shipped to the district for all students taking paper tests
- 6) Data from the Pre-ID files are used to produce the Outbound Rosters. These rosters are printed and shipped along with the pre-administration labels districts and schools.

IV. Post Test Assessment Administration

The Testing window is closed prior to processing and reporting. The commencement of the testing window initiates the following activities to report test results.

A. Preliminary and Expedited Reporting

- 1) eMetric provides the post testing data to Cognia in the post admin extract layout.
- 2) Cognia Reporting team provides Psychometrics with data to support Scaling and Equating.
- 3) Cognia Reporting team provides Psychometrics with student level data for Grade 3 ELA. Psychometrics uses Grade 3 Reading items in Standards 2 and 4 to determine if a student achieves the RSA requirement. An indicator is provided back to the reporting team to indicate that the

student achieves or does not achieve the requirement. The technical report each year provides additional details about the Psychometrics for Grade 3 RSA.

- 4) During expedited reporting, key verification will be done for all grades and subjects. During this period only machine scores are available.
- 5) For Preliminary Reporting, machine scores and hand scores are available except for grades 5 and 8 writing prompts.

B. Clean Up Window

- 1) The SDE will perform post-test clean-up of Student Participation and Demographic record modifications using the preliminary data from Cognia
- 2) The following steps define the process to be followed:
 - a) Specific fields will be identified as editable
 - b) FAY/NFAY is a snapshot of the status at the time of delivery of the final cleanup file from the SDE
 - c) After cleanup by SDE, the updated GRF is returned to Cognia reporting team.
- 3) The eMetric Reporting Portal will have a note to direct users to SDE's Accountability Systems for a more accurate student status

C. Student Data Processing

- 1) Student IDs are provided by the SDE whenever possible. In the event the state does not provide a Student ID for a test, Cognia will assign a unique test ID for processing purposes
 - a) If the Student ID is blank, Cognia creates a unique number using the eMetric ID. It is stored as the booklet number. The Student ID remains blank.
 - b) All created IDs will be a ten-digit number which may not begin with 0 (zero) or "100".
- 2) Student data from the Overlay datafile are used for reporting student demographic data if the student has a valid verified student ID that links to the Overlay file.

D. Test Data

- 1) Every imported test record must be associated with a student record
- 2) Test Mode is captured in all test records as 1: Online or 2: Paper
- 3) Duplicate test records are merged/resolved prior to reporting:
 - a) All attempted duplicate records are reviewed and updated accordingly based on SDE feedback as necessary
 - b) In the event the student has a test record with no items attempted, Cognia does not suppress any records unless specifically directed to do so as part of the duplicate resolution

E. Scan Paper Delivery and Data Denotation

Each Paper Booklet is scanned and delivered immediately to the Cognia Reporting team. At the time of receipt, the reporting team performs procedures to accurately identify discrepancies in the data. The data is handed off in the agreed upon format specified in the Scan Delivery Layout and Scanning Specifications document.

- 1) Any and all discrepancies with the Scan File are resolved accordingly

- 2) The reporting team provides a report of all discrepancies back to the Scanning department for research and/or re-scanning

F. Data Validation

- 1) The Date of Birth field is set to blank if the value does not pass the 6 numeric value validation of (mmddyy).
- 2) All non-Alpha characters are set to blank for First Name, MI and DOB fields where there are non-Alpha characters in the fields
- 3) SDE may provide information on any unresolved test data records that have no student association
- 4) Ethnicity is reported as selected
 - a) If Hispanic/Latino ethnicity is selected, the record is reported as Hispanic/Latino regardless of any additional ethnicity value selected
 - b) If more than one ethnicity is selected and none of them Hispanic/Latino, the ethnicity is reported as Two or More Races
 - i) Valid Ethnicity Values include:
 - (1) Black/African American
 - (2) American Indian/Alaska Native
 - (3) Hispanic/Latino
 - (4) Asian
 - (5) Pacific Islander
 - (6) White/Caucasian
 - (7) Two or More Races

G. Blank Books

- 1) Records are suppressed from reporting if all of the following are blank:
 - a) First Name
 - b) Last Name
 - c) Bubbled Student ID
 - d) Student Label
 - e) All item responses

H. Login Discrepancy

- 1) A comparison is made between the location where a label was sent and where the label is returned from. A login discrepancy occurs if these are different locations.
- 2) In the event of a login discrepancy, the Label location is used
 - a) Schools/Districts have the opportunity to resolve during the clean-up period allowed

I. Spanish Tests

- 1) There are no paper Spanish Tests in 20-21. All Spanish tests are available online only. Spanish tests are available in grades 3-8 and CCRA.

J. Void Bubble

- 1) Preliminary reporting includes Void (that are not invalidated) records
- 2) For final reporting, all remaining VOID booklets will be suppressed.

K. Paper Booklet/Test Identity

1. If a label exists, label always trumps bubbled information.
If a valid label exists and the barcode matched to label data, assign State ID that was assigned to the barcode.

Apply demographic data from label data.

- Name, DOB, District Student ID
2. If a label does not exist, and Bubbled State Student ID links to Overlay
 - And School matches
 - And the first 3 characters of bubbled Lname and Fname (or the inversion of Names) matches.
(note: blank data indicates no conflict)
 3. If a label does not exist, and Bubbled State Student ID links to Overlay
 - And the first 3 characters of bubbled Lname and Fname (or the inversion of Names) matches.
(note: blank data indicates no conflict)
 4. Bubbled LocalID link to District Student ID in Overlay
 - And school matches
 - And first name and last name matches
 5. Bubbled State Student ID link to District Student ID in Overlay
 - And school matches
 - And first name and last name matches
 6. Apply overlay demographic data when assigned **state ID and school** matched
 7. SDE will participate in resolution of any unidentified book or student

L. Overlay Data

- 1) The Demographic Overlay file is provided by the SDE to Cognia for reporting purposes
 - a) The demographic overlay file is the most up-to-date demographic information submitted by available in the student information systems
 - b) In the event that a Student ID is not unique within a school, the Program Manager will be notified for research and resolution
 - c) A file will be delivered to the Program Manager with all requested resolutions
 - d) Demographics available in the Demographic Overlay file will be used in reporting a student if the Student ID exists in the Demographic Overlay file and has been verified. Otherwise, the demographics provided in the testing platform will be used.
- 2) A student record will be created for students without tests but are present in the Demographic Overlay file. A student may be built out more than once if they have a record in the

Demographic Overlay file at multiple schools. Tests records will be built out for each occurrence in the Overlay where the Student ID and School Combination does not exist in the Test Result.

M. Test and Overlay Variable reconciliation

- 1) Set the IEP value in the test record to 0 if Student IEP from the Overlay file is not set to '1' for students that link to the Overlay file or 'Y' for students whose data is coming from the test record.
 - a. If Student IEP is '1' or 'Y' and test IEP is '1' then test IEP remains set to '1'.
 - b. If Student IEP is '0' or 'N' and test IEP is '1' then test IEP is set to '0'.
 - c. If Student IEP is '1' or 'Y' and test IEP is not '1' then test IEP is set to '2'.
- 2) Set test Plan504 as follows:
 - a. If Student Plan504 is '1' or 'Y' and test Plan504 is '1' then test Plan504 remains set to '1'.
 - b. If Student Plan504 is '0' or 'N' and test Plan504 is '1' then test Plan504 is set to '0'.
 - c. If Student Plan504 is '1' or 'Y' and test Plan504 is not '1' then test Plan504 is set to '2'.
- 3) Set Test ELL as follows:
 - a. If Student ELL is '1' or 'Y' and test ELL is '1' then test ELL remains set to '1'.
 - b. If Student ELL is '0' or 'N' and test ELL is '1' then test ELL is set to '0'.
 - c. If Student ELL is '1' or 'Y' and test ELL is not '1' then test ELL is set to '2'.

N. Demographic Cleanup

- 1) NFAY is not available in Preliminary Reporting. SDE will update during the cleanup period and provide back to Cognia.
- 2) Grade
 - a. Student Grade is provided by SDE in the Overlay file
 - b. Where Student Grade is not available, the Student Grade is set to the Tested Grade
- 3) Class Name
 - c. Where Class Name is blank, report as 'Not Provided'
 - d. Else report the Class Name value
 - e. See more details in Demographic Reporting for rules on reporting Class Name when different class names exist for a student.

O. Duplicate Processing

Multiple Choice duplicate test items are identified when there is more than one record with the same verified Student ID. A record is considered to be attempted when five or more MC/PMC/TEI responses to any item(s) has been recorded. All duplicate records with less than five responses will be suppressed from reporting.

- 1) For all online test duplicate records in which there are five or more MC/PMC/TEI responses, the test record with the earliest Start Date will be used where there is a valid participation status
 - a) All records with a greater Start Date will be flagged as 'Do Not Report-Duplicate'

- 2) For all paper test duplicate records in which there are five or more MC/PMC/TEI responses, all paper tests will be reported in Preliminary Reporting and SDE will resolve all paper duplicates for Final Reporting.
- 3) For all test duplicate records where there are five or more MC/PMC/TEI responses on the Online test and five or more MC/PMC/TEI responses on the Paper test, the Online test will be the record of source
 - a) The duplicated Paper test will be flagged as ‘Do Not Report – Duplicate’
- 4) For duplicate online tests with less than five MC/PMC/TEI responses, the test with the lower **TestDate** will be reported. The other test will be suppressed from reporting.
- 5) For all test duplicate records where there are two or more Paper records with less than five MC/PMC/TEI responses, the Paper record with the earliest **Bubbled valid Test Date** will be the record of source
 - a) In the event of all duplicate paper tests that do not have a Bubbled Test Date, the Booklet number with the lowest sequence number will be the source of record
- 6) For duplicate cases with online and paper records with less than five MC/PMC/TEI responses, the online record is reported. The paper record is suppressed from reporting.
- 7) **Any duplicates not resolved are included in the data reported to eMetric. These duplicates are included in aggregations based on the participation status of the test and the schooltype.**

P. Merge Tests

- 1) If we have more than one Writing booklet and one ELA booklet for the same student,
 - a) If the writing scores are the same, the writing score associated with the lower booklet number is merged with the ELA booklet
 - b) If the scores are different between the Writing booklets, the ELA test will be reported without a Writing score. A “B” will be reported instead of a Writing score in Preliminary Reporting. SDE will decide which Writing score to merge with the ELA test for Final Reporting.
 - c) If the Writing booklets are from different grades, merge the Writing booklet with the grade that matches the ELA grade.
- 2) If we have multiple ELA booklets and one Writing booklet for the same student, all ELA tests are reported with the same Writing score from the Writing booklet
- 3) If we have an ELA booklet with no associated Writing booklet, the Writing score is reported as “B” for Blank.
- 4) If we have a Writing booklet with no matching ELA booklet, an ELA booklet is built out with blank ELA item responses.

Q. Processing Scoring Data

Scoring division will provide Reporting Services with the scores from all tests.

- 1) Each score record will be associated with a Booklet ID or a Test ID
 - a) If a score record is received without an associated Test or Booklet ID, resolution will be attempted with the Scoring Division
- 2) Every score record will contain a valid score value
 - a) A validation of score values will be performed
 - i) Multiple Choice responses must be a valid value to be considered attempted
 - (1) Valid values will be A,B,C,D or F,G,H,J, blank and * for items with multiple response when only one should be given
 - (2) Blank values will not be considered a response attempt

- ii) Technology Enhanced Items will be administered online only and scored based on the scoring rubric
 - iii) Multiple Part Selected Response Items will be combined when each part has a valid response attempt
 - (1) Valid values will be A,B,C,D or F,G,H,J or blank
 - (2) The two parts will be combined for a final response
 - iv) **Writing Composition** Score (20-21 only) will be based on a single holistic rubric
 - (1) Responses are 30% double scored, with a score range of 1-4. A 3rd score is required if scores are non-adjacent, or non-scorable codes do not match; the third score will be human scored. A final score is then calculated
 - v) Constructed response scores will be provided in ELA in grades 3,4,6, and 7.
- b) Score validation for each individual score is captured as follows

Raw Data Value	Description	Reported Value	Point Value
1-4 (per scorer)	Score	Final score	1-4
I	Illegible/Incomprehensible	I	0
F	Language Other than English	L	0
B, R	Blank response/ refusal	N	0
O	Off Topic	O	0

- 3) All unresolved scoring records will be included in a report to the Scoring Division, as well as the Program Manager for research and resolution
- 4) All scoring records will be resolved prior to reporting

V. Student Participation and Exclusions

A. Test Attempt Rules

- 1) Test Attempted indicates that a student has answered a minimum of five (5) operational MC/PMC/TEIs test item(s) within a content area, regardless number of sessions
 - a) Each of the five items must not be indicated as flawed or otherwise not scorable
 - b) Items not able to be converted to Braille must be identified and excluded from attempted rules
- 2) In grades 5 and 8 English Language Arts (ELA) tests even if the writing composition is present, the student would still need to have attempted at least five operational multiple-choice test item to be considered meeting attemptedness
- 3) If the student meets attemptedness for ELA then the student meets attemptedness for RSA in grade 3.
- 4) If the student doesn't meet test attemptedness then the test is reported with a Did Not Attempt status
- 5) In the event that there is no valid attempt, the record will use the Participation Status guidelines

B. Test Design

Each test will be delivered Online or Paper. Operational items will be included in Raw Score. Raw score items will be a single common block across all forms.

Grade	Subject	Form(s)	Items included in Raw Score	Item Types
03-05	Mathematics	Paper Operational Paper Breach Paper Spanish	If countstowardsstudents core=Yes in NTS	Selected response items (Single part) only.(Grade 4 and 5 TEIs)
06-08	Mathematics	Online Operational: A1 Online Breach Paper Operational Paper Breach Paper Spanish Online Spanish	If countstowardsstudents core=Yes in NTS	Selected response items (Single part) and TEIs.
03-08	ELA	Paper/Online Operational Paper/Online Breach Paper/online Spanish	If countstowardsstudents core=Yes in NTS	A Writing Composition is present at grades 5 and 8. All other items are selected response items (Single or Multiple parts).
05	Science	Paper Operational Paper Breach Paper Spanish	If countstowardsstudents core=Yes in NTS	Selected response items (Single part) and TEIs
08	Science	Online Operational Online Breach Online Spanish Paper Operational Paper Breach	If countstowardsstudents core=Yes in NTS	Selected response items (Single or Multiple parts) and TEIs.
11	Science	Online Operational Online Breach Online Spanish Paper Operational Paper Breach	If countstowardsstudents core=Yes in NTS	Selected response items (Single or Multiple parts) and TEIs.
11	US History	Online Field Test Paper Field Test Online English with Spanish TTS	Scores will not be available for Field Test item	Selected response items (Single or Multiple parts) and TEIs.

1) Item Reporting Categories

- a) Standards will be reported for all content areas
- b) ELA Tests for grade 5 and 8 will have writing subtest information reported
- c) Minimum item counts
 - i) Any content area attempt will be considered to have attempted all standards
 - ii) If less than 6 points are included in a standard, the student score will not be reported within that categoryP
 - iii) All Item Reporting Categories are defined by Content Design and Development. The reporting categories are mapped and found in the CDD Test Delivery Blueprints
 - iv) The Primary Standard in NTS is the source of the Reporting Category.
 - v) Writing Prompt is its own category. Suppression rule is not applied since the number of points is less than 6.

2) Braille Item Content

- a) Paper Braille tests will be transcribed onto an answer booklet

- i) Paper Braille tests will be identified with the IEP Braille accommodation
- b) Any test items that are not able to be transcribed Braille will be identified
 - i) School year 2020-2021 tests will not contain any items required to be excluded for Braille

C. Not Tested Reasons

Not Tested Reasons are supplied by the SDE in the Student Status Code file or is flagged in iTester for online testers or the scannable for paper testers. Throughout the reporting cycles Cognia receives updated versions of the SSC.

- 1) If a student test record is assigned more than one Not Tested reason, the following hierarchy will be applied to assign only one status to a student test record:
 - a) Did Not Attempt
 - b) No Longer Enrolled
 - c) State Alternate Testing (OAAP)
- 2) If a student has participated and has a valid attempt, any Not Tested Reason indicated is ignored.

D. Student Participation Status

Student Participation Status reflects the participation of the test assessment performed by an individual student. Valid Participation Status values are provided by the SDE.

- 1) If a student has more than one of the below statuses, the Participation Status for each subject is set based on the following hierarchy:
 - a) Void, not invalidated (preliminary reporting only)
 - b) Emergency Exemption
 - c) Do Not Report
 - d) Do Not Report – Duplicate
(*May be set by Reporting*)
 - e) Invalidated Test
 - f) Invalidated Breach Tests
(*Breach tests without an Operational test that have been Invalidated will be set by reporting*)
 - g) Low Grade Invalidation
(*set by Reporting, not by the SDE*)
 - h) State Alternate Testing (OAAP)
 - i) No Longer Enrolled
- 2) If the student does not have any valid test attempt and none of the above apply, the test record is reported with a status of Did Not Attempt.

VI. Calculations

A. Participation Status Summary

- 1) Student Level Calculations will be summarized by Participation Status
- 2) Raw scores are only produced and available in datafiles and do not appear on any Printed reports (Points Possible will be provided for each subcategory)

Description	MP Part Status	Item Scores (Reports)	OPI Score (Reports)	Performance Level (Reports)	Data File Raw Scores	Data File Item Scores	Data File OPI Score	Data File Performance Level	Data File Student Status Code
Valid Participant	Z	✓	✓	✓	✓	✓	✓	✓	
Did Not Attempt	A								DNA
Emergency Exemption	D								EE
Do Not Report	E*								DNR
Invalidated (Breach)	F								INV
No Longer Enrolled	G*								NLE
State Alternate Testing (OAAP)	I*								OAAP
Do Not Report- Duplicate	L*								DNR-D
Invalidated Breach	M								INV-B
Low Grade Invalidation	V								INV-G
Voided Booklet	X ¹								VOID
* Student records only appear in State results file. They do not appear in online or paper reports. ¹ Voided booklets will be provided in Preliminary Reporting State results datafile only and will not appear in Final Reporting									

B. Demographic Reporting

A student may have differing demographic information associated with each test record with a reported Student Status Code. However, only one student report (OSTP) and one student label are generated for a unique student in a given school and tested grade. One of the tests will be selected, according to the below selection hierarchy, to be the associated demographics for all tests reported for that student in the eMetric data files, Student Report (OSTP), and Student Labels.

Selection Hierarchy

1. Blank Student Status Code (Valid Participant).
2. Last Name is NOT null or blank.
3. First Name is NOT null or blank.
4. Class Name is provided.
5. Most recent TestDateTime.
6. Largest TestID value.

See Specific Reporting Rules section for demographics per report.

C. Scoring Items

- 1) Open response scores are reported for only non-flawed items
- 2) Reading Sufficiency Act

- a) Reading Sufficiency Act
<https://sde.ok.gov/sites/ok.gov.sde/files/documents/files/RSA%20Statutes-508C%20to%20508F.pdf>
 - b) Operational items in Standards 2 (Reading/Writing Process) and Standards 4 (Vocabulary) on the Grade 3 ELA test are used to determine whether a student meets the RSA requirement or not.
 - c) The RSA score is applied in Psychometrics and is based on a theta cut. Further information is provided in the Technical Report.
- 3) Lexile/Quantile
- a) Scores are assigned based on the student's earned OSTP scale score given grade and subject specific values from the MetaMetrics lookup provided by SDE
 - b) Lexile scores are reported based on the ELA scaled score when applicable
- 
OSTP ELA_Lexile
Conversion Table.xlsx
- c) Quantile scores are reported based on the Math scaled score when applicable
- 
OSTP Math_Quantile
Conversion Table.xlsx
- 4) Writing Scores
- a) Cut points are psychometrically determined making them consistent with other Reporting Categories and similarly interpretable
 - b) Performance level is determined based on a psychometric scale method
 - c) Final Score
 - i) If Scorer 1 score=Scorer 2 score then the final score is set to either.
 - ii) If Scorer 1 score is adjacent to Scorer 2 score then the final score is the higher of the 2 scores.
 - iii) If Scorer 1 and Scorer 2 both assign the same non-scorable codes, that value is the final trait score
 - iv) Otherwise, the final trait score is the third score or non-scorable value
 - d) Final Composite Score for grades 5 and 8 is calculated as follows:
 - i) Grade 5 is calculated as 5 times the final score, divided by 4
 - (1) The grade 5 score is rounded to the nearest whole value
 - (2) Possible score values 0, 1, 3, 4 or 5. These values are used for Psychometrics.
 - (3) Reports contain the scores in the range 1-4.
 - ii) Grade 8 is calculated as 7 times the final score, divided by 4
 - (1) The grade 8 score is rounded to the nearest whole value
 - (2) Possible score values 0, 2, 4, 5 or 7. These values are used for Psychometrics
 - (3) Reports contain the scores in the range 1-4.
 - e) Raw Score is calculated as a sum of the final calculated writing score and the operational multiple-choice raw score and used to get the final scale score and performance level
- 5) Reporting Category Scores
- a) Only calculated from Common, non-flawed items
 - b) Each Percent value is rounded to the nearest whole number
 - c) The Reporting Category associated with the Writing is reported using the final score.

D. Performance Levels

- 1) Performance Levels are assigned based on the Scale Scores by grade and subject
- 2) Four Performance Levels
 - a) Performance Level 1: Below Basic
 - b) Performance Level 2: Basic
 - c) Performance Level 3: Proficient
 - d) Performance Level 4: Advanced

E. Aggregate Calculations

- 1) Enrolled number of students (TotalN) includes students with the following participation status:
 - a) Valid Participant (Partstatus=Z)
 - b) Did Not Attempt (Partstatus=A)
 - c) Emergency Exemption (Partstatus=D)
 - d) Invalidated (Breach) (Partstatus=M)
 - e) State Alternative Assessment (OAAP) (Partstatus=I)
- 2) The number tested only includes Valid Participant status
- 3) Aggregations include Valid Participants. However, school inclusion rules also apply:
 - a) The 3rd character of the district code is used to determine the school inclusion rules for aggregations.
 - b) Schools whose district codes contain B or P are not included in the State Summary.
 - c) Other Placement students are not included in Class, School or District aggregations. Other Placement students are identified in the Student Status Code file from SDE.
- 4) Standards Summary only include Valid Participant who meet school inclusion rules only and do not include Braille tests if there are items that cannot be brailled.
- 5) All Valid Participants are included for Performance Levels and scaled score aggregations at the Class, School, District and State levels based on school inclusion rules.

VII. Specific Reporting Rules

- 1) School information is taken from iCore.

A. Student Results Label(s)

- 1) Student Results Labels are printed, packed and shipped to each District for dissemination to each School separated by tested Grade
- 2) Student Results Labels is created for each student and include all subjects tested at that particular school
- 3) If a student has subjects at different schools, results for the subjects are reported back to the school where the test was taken
- 4) When printed there will be 10 labels per page
- 5) Student Results Labels are grouped by tested Grade, tested District and School and ordered alphabetically by Student Last Name, FirstName, MiddleName, Student ID (STN)
- 6) If the First and Last Name are both blank, No Name Provided is set as the Student's name.
- 7) The sort is done so that No Name Provided are sorted to the top of each pack.

- 8) Labels are printed one per student per school with results from all tests taken at that school
- 9) Demographics that are not consistent between reported subjects with not tested reasons are reported based on the selection hierarchy presented in the Demographic Reporting above. The following demographic fields are taken from the selected test record after application of the selection hierarchy, if necessary.
 - i) First Name, Last Name MI
 - ii) Gender
 - iii) Date of Birth
 - iv) Student ID
 - v) Student Grade

B. OSTP Student Report

- 1) Student Reports are printed, packed and shipped to each District for dissemination to each School separated by tested Grade
- 2) Student Reports are created for each participating student
- 3) Packs are grouped by tested Grade, tested District and School and cpicode.
- 4) Within packs the reports are ordered alphabetically by Student Last Name, Student First Name, MI, Student ID. No Name Provided are sorted as to appear at the top of the pack
- 5) Report templates for grades 3, 4, 6 and 7 include ELA and Mathematics results
- 6) Report templates for grades 5 and 8 include ELA, Mathematics and Science results
- 7) Students that do not test in a subject related to their Grade tested receive text “No Score Available” instead of the subject results display on the front page.
- 8) Historical Scores:
 - a) Science scores are displayed for current year results only. Due to Science only being tested in grades 5 and 8, prior year results are always unavailable.
 - b) 3 years worth of scores are reported for ELA and Math where available. The current year and 2 previous years.
 - c) Years with no available data are left blank on the graph and an * on the year indicates Score Not Available
 - d) 2020 will be not have data available due to the cancellation of the administration. Therefore, 2020 will be marked with the * indicating Score Not Available.
- 9) Reading Sufficiency Act
 - a) Grade 3 ELA students that have met the RSA standard will have on the following text on their report: "Sophia HAS MET the Reading Sufficiency Act (RSA) criteria based on Standard 2.0 (Reading and Writing Process) and 4.0 (vocabulary) and is eligible for automatic promotion to 4th grade. For more information about RSA, please visit: <https://sde.ok.gov/parents-reading-sufficiency>"
 - b) Grade 3 ELA students that have not met the RSA standard will have the following text on their report: "Sophia HAS NOT MET the Reading Sufficiency Act (RSA) criteria based on Standard 2.0 (Reading and Writing Process) and 4.0 (Vocabulary). Please visit with Sophia's school regarding promotion or retention options. For more information about RSA, please visit <https://sde.ok.gov/parents-reading-sufficiency>"
- 10) In the absence of a Student First Name, the first name is replaced with “Your student” or “your student”
- 11) If a student has tested different subjects in different schools, a student report is sent to each testing school with the results for the subject taken at that school.

- 12) For 2021, no performance category will be reported for the writing composite score on the student report. The student's writing score will be reported along with the total possible points for writing in that grade.

C. Datafile Deliverables

- 1) Students from schools with the 3rd character of the district code equal to B or P are not included in the data file to the SDE.
- 2) Student Results Datafiles are provided to SDE in a comma delimited format (csv) format.
 - a) The file contains students with their Student Status Code or results for each subject that they are eligible for based on tested grade.
 - b) Demographics reported for students are either from the Demographic Overlay file provided by SDE if the student has a validated student ID or from the test records as described above.
 - c) Rows in the data file represent students' test records
 - d) Naming convention for the data files to SDE OSTPXXXXStudentResultsRelease[i].csv and CCRAXXXXStudentResultsRelease[i].csv
Where XXXX=academic year, i=1,2,3 etc.
 - e) WR_FinalScore is the final score. Final score is determined after all scores are available and arbitration is complete if necessary.
 - f) R1 score is the score given by scorer 1
 - g) R2 score is the score given by scorer 2
 - h) R3 score is the arbitrated score, if necessary.
- 3) Student Results Datafile is provided to eMetric
 - a) eMetricReportingTransfer layout. The following tables contain the students' results:
 - i) StudentData
 - ii) StudentScores
 - iii) Datafiles provided to eMetric only contain student records where status is Valid, Did Not Attempt, Emergency Exemption, Invalidated (Breach), Invalidated Breach and Low-Grade Invalidation.
 - b) eMetricSummary data file is provided to eMetric for both Preliminary and Final Reporting.
- 4) Student results data files and participation data files will follow the same layout. Participation data files to SDE will not have item and performance data populated. Demographics, form, accommodation information will be populated.
- 5) For Expedited Grade 3 RSA reporting, the RSA flag in the StudentScores table to eMetric is populated for tested students and students with the low grade invalidation participation statuses only. In final reporting, the RSA flag is only populated for tested students.
- 6) Summary Data is provided to eMetric to aid in their quality assurance process. The following files are posted to the ftp site for eMetric:
 - a) eMetricSummaryDataTransfer
 - i) Summary
 - ii) SummaryLookup
- 7) CCRA Rankings Summary
 - a) Includes US History Field Test Rankings
 - b) Calculations only include valid participants (Partstatus=Z)
 - c) Redaction applies to Rankings with less than 10 valid participants (Partstatus=Z)
 - d) The file is in comma separated variables (CSV) format
 - e) The files follow school inclusion rules.
 - f) Percentile Rank will be calculated based on percent of raw score average for the test and each subscore at the school and district level.

- i) Reporder 0 represents the ranking based on the overall raw score average for the entity
- ii) Reporders 1 and 2 represent the ranking based on the average subscore for each reporting category.
- g) Districts will receive slice files that include the district ranking as well as the rankings of all the schools in the district.
- h) SDE will receive a file that includes all district and school ranking information.

8) Media Redacted

Redaction is a general term describing the process of expunging sensitive data from the records prior to disclosure in a way that meets established disclosure requirements applicable to the specific data disclosure occurrence (e.g., removing or obscuring PII from published reports to meet federal, state, and local privacy laws as well as organizational data disclosure policies). (See disclosure limitation method for more information about specific techniques that can be used for data redaction.)¹

- 1) Cognia provides a Media Redacted Datafile to the SDE
 - a) The file is in comma separated file format (csv)
 - b) All grades are included in one file
 - c) The naming convention for the file is OKXXXXMediaRedacted.csv where XXXX is the academic year.
- 2) The Media Redacted file provides the number of students in each reporting category performance level and the percent to total
- 3) In an effort to minimize the identification of any individual student, the count and percent of values are redacted and masked with *** if the count is <10
- 4) Each file is sorted by tested Grade, CountyName, District, School, Subject, Reporting Category and Reporting Subcategory
- 5) Each file contains the tested Grade, County Name, District or School Code (as the OrganizationID), District or School Name and Administration Year, Subject, Reporting Category and Reporting Subcategory
- 6) Each file contains the Total Count, Valid Count and Percent to Valid Count Total of each Performance Level by Reporting Category
- 7) Each Reporting Category contains the Valid Count and Percent to Total for each Performance Level by Reporting Subcategory
 - a) If Total Count value and/or Valid Count value is < 10 then redact all Performance Level Count values and associated Percent values from Report Category Count and Percent, including Total Count and/or Valid Count
- 8) If Total Count and/or Valid Count value is ≥ 10 AND One Performance Level Count value is < 4
 - a) Redact where Performance Level Count value is <4 and associated Percent values from Report Category Count and Percent
 - b) Redact one additional random Performance Level Count value and associated Percent value from Report Category Count and Percent
- 9) If Total Count and/or Valid Count value is ≥ 10 AND more than one Performance Level Count value is < 4
 - a) Redact all Performance Level Count values <4 and associated Percent values from Report Category Count and Percent
- 10) If Performance Level Percent = 100%
 - a) Redact where Performance Level Percent is 100% and associated Count value from Reported Category Count and Percent
 - b) Redact one additional random Performance Level Percent <100% and associated Count value from Reported Category Count and Percent

- 11) If the Sum of two Performance Level Count values = Valid Count value
 - a) Redact one of the Performance Level Count values and associated Percent values from Reported Category Count and Percent
 - b) Redact one additional random Performance Level Count value equal to 0 and associated Percent value from Report Category Count and Percent

¹ <https://studentprivacy.ed.gov/glossary>

9) Content Design and Development

a) Assessment Content

- 1) CD provides Reporting with the Test Content delivery blueprint, both External/Public Blueprint and District Aggregate Reporting and Internal Target Blueprint which contains the following:
 - a) Reporting Category
 - b) Assessable Standards
 - c) Target Number of Clusters
 - d) Target Points
 - e) Percent of Total on Test
- 2) Reference Reporting Categories is mapped as follows

Grade	Subject	Content Standard	Reporting Category	Student Report Display
3	OSTP Math	N	Number & Operations	Number & Operations
3	OSTP Math	A	Algebraic Reasoning	Algebraic Reasoning & Algebra
3	OSTP Math	GM	Geometry & Measurement	Geometry & Measurement
3	OSTP Math	D	Data & Probability	Data & Probability
3	OSTP ELA	2	Reading/Writing Process	Reading & Writing Process
3	OSTP ELA	3	Critical Reading/Writing	Critical Reading & Writing
3	OSTP ELA	4	Vocabulary	Vocabulary
3	OSTP ELA	5	Language	Language
3	OSTP ELA	6	Research	Research
4	OSTP Math	N	Number & Operations	Number & Operations
4	OSTP Math	A	Algebraic Reasoning	Algebraic Reasoning & Algebra
4	OSTP Math	GM	Geometry & Measurement	Geometry & Measurement
4	OSTP Math	D	Data & Probability	Data & Probability
4	OSTP ELA	2	Reading/Writing Process	Reading & Writing Process
4	OSTP ELA	3	Critical Reading/Writing	Critical Reading & Writing
4	OSTP ELA	4	Vocabulary	Vocabulary

Grade	Subject	Content Standard	Reporting Category	Student Report Display
4	OSTP ELA	5	Language	Language
4	OSTP ELA	6	Research	Research
5	OSTP Math	N	Number & Operations	Number & Operations
5	OSTP Math	A	Algebraic Reasoning	Algebraic Reasoning & Algebra
5	OSTP Math	GM	Geometry & Measurement	Geometry & Measurement
5	OSTP Math	D	Data & Probability	Data & Probability
5	OSTP ELA	2	Reading/Writing Process	Reading & Writing Process
5	OSTP ELA	3	Critical Reading/Writing	Critical Reading & Writing
5	OSTP ELA	4	Vocabulary	Vocabulary
5	OSTP ELA	5	Language	Language
5	OSTP ELA	6	Research	Research
5	OSTP ELA	Writing Prompt	Writing Composite Score	Writing Composite Score
5	OSTP Science	PS1.1, PS1.2, PS1.3, PS1.4	Physical Science	Physical Science
5	OSTP Science	LS1.1, LS2.1, LS2.2, PS3.1	Life Science	Life Science
5	OSTP Science	ESS1.1, ESS1.2, ESS2.1, ESS2.2, PS2.1	Earth & Space Science	Earth & Space Science
6	OSTP Math	N	Number & Operations	Number & Operations
6	OSTP Math	A	Algebraic Reasoning	Algebraic Reasoning & Algebra
6	OSTP Math	GM	Geometry & Measurement	Geometry & Measurement
6	OSTP Math	D	Data & Probability	Data & Probability
6	OSTP ELA	2	Reading/Writing Process	Reading & Writing Process
6	OSTP ELA	3	Critical Reading/Writing	Critical Reading & Writing
6	OSTP ELA	4	Vocabulary	Vocabulary
6	OSTP ELA	5	Language	Language
6	OSTP ELA	6	Research	Research
7	OSTP Math	N	Number & Operations	Number & Operations
7	OSTP Math	A	Algebraic Reasoning	Algebraic Reasoning & Algebra
7	OSTP Math	GM	Geometry & Measurement	Geometry & Measurement

Grade	Subject	Content Standard	Reporting Category	Student Report Display
7	OSTP Math	D	Data & Probability	Data & Probability
7	OSTP ELA	2	Reading/Writing Process	Reading & Writing Process
7	OSTP ELA	3	Critical Reading/Writing	Critical Reading & Writing
7	OSTP ELA	4	Vocabulary	Vocabulary
7	OSTP ELA	5	Language	Language
7	OSTP ELA	6	Research	Research
8	OSTP Math	N	Number & Operations	Number & Operations
8	OSTP Math	A	Algebraic Reasoning	Algebraic Reasoning & Algebra
8	OSTP Math	GM	Geometry & Measurement	Geometry & Measurement
8	OSTP Math	D	Data & Probability	Data & Probability
8	OSTP ELA	2	Reading/Writing Process	Reading & Writing Process
8	OSTP ELA	3	Critical Reading/Writing	Critical Reading & Writing
8	OSTP ELA	4	Vocabulary	Vocabulary
8	OSTP ELA	5	Language	Language
8	OSTP ELA	6	Research	Research
8	OSTP ELA	Writing Prompt	Writing Composite Score	Writing Composite Score
8	OSTP Science	PS1.5, PS1.6, PS2.1, PS2.2, PS4.1, PS4.2	Physical Science	Physical Science
8	OSTP Science	LS1.7, LS4.1, LS4.2	Life Science	Life Science
8	OSTP Science	ESS1.4, ESS2.1, ESS2.2, ESS2.3, ESS3.1, ESS3.2, ESS3.4	Earth & Space Science	Earth & Space Science
11	CCRA Science	PS1-1, PS1-2, PS1-5, PS1-7, PS2-5, PS3-1, PS3-2, PS3-3, PS3-4, PS4-1, PS4-4	Physical Science	Physical Science
11	CCRA Science	LS1-1, LS1-2, LS1-3, LS1-4, LS1-5, LS1-6, LS1-7, LS2-1, LS2-2, LS2-3, LS2-4, LS2-5, LS2-6, LS2-8,	Life Science	Life Science

Grade	Subject	Content Standard	Reporting Category	Student Report Display
		LS3-1, LS3-2, LS3-3, LS4-1, LS4-2, LS4-3, LS4-4, LS4-5		
11	CCRA US History	1.2.A, 1.3.A, 1.3.D, 2.1.A, 2.1.B, 2.1.D, 2.1.E, 2.1.G, 2.2.B, 2.3.B, 3.1.A, 3.1.B, 3.1.C, 3.2.A, 3.2.B, 4.1.A, 4.1.D, 4.1.E, 4.2.A, 4.2.B, 4.2.D, 4.3.C, 5.1.B, 5.2, 5.3, 6.1.A, 6.1.B, 6.1.C, 6.1.D, 6.2.A, 6.2.B, 6.2.C, 6.4, 7.2.D, 8.1, 8.2, 8.3, 8.4, 8.5.A	US History	US History
11	CCRA Civics	1.1, 1.2.B, 1.2.C, 1.3.B, 1.3.C, 2.1.C, 2.1.F, 2.2.A, 2.2.C, 2.3.A, 2.3.C, 3.1.D, 3.2.C, 3.2.D,	Civics	Civics

Grade	Subject	Content Standard	Reporting Category	Student Report Display
		4.1.B, 4.1.C, 4.2.C, 4.3.A, 4.3.B, 5.1.A, 5.1.C, 6.3, 7.1.A, 7.1.B, 7.1.C, 7.2.A, 7.2.B, 7.2.C, 7.2.E, 7.2.F, 8.5.B, 8.6		

10) Shipping Product Code Summary

a) Reporting Products

Reporting Products is provided to iCore to identify the products that will be shipped to the client.

Contract Code	Description	Report For	Grade(s)	Report Subtype	Content Code	Qty
155852	OSTP Student Labels	1	03-08	03	00	1
158852	CCRA Student Labels	1	11	03	00	1
155852	OSTP Student Report	1	03-08	02	00	1

11) Appendix

Genre Form Information for Spring 2021

Form Name	Cluster ID	Item ID	Genre
2021 Gr 5 ELA F1	778468	760803	Narrative
2021 Gr5 ELA F2	778467	760986	Narrative
2021 Gr 5 ELA Breach	140621A	140927A	Informative
2021 Gr 5 ELA PBT F1	778468	460803	Narrative
2021 Gr 5 ELA PBT Breach	140621A	140927A	Informative
2021 Gr 5 ELA F3	778461	763352	Informative
2022 Gr 5 ELA F4	778462	762003	Informative
2023 Gr 5 ELA F5	778463	761899	Informative
2022 Gr 5 ELA F6	778464	761786	Opinion
2023 Gr 5 ELA F7	778465	761740	Opinion

2024 Gr 5 ELA F8	778466	761338	Opinion
2021 Gr 5 ELA PBT F1A	140637A	140929A	Opinion

Form Name	Cluster ID	Item ID	Genre
2021 Gr 8 ELA F1	779246	762991	informative
2021 Gr 8 ELA F2	779247	762993	informative
2021 Gr 8 ELA Breach	141269A	141500A	Argumentative
2021 Gr 8 ELA PBT F1	779246	762991	informative
2021 Gr 8 ELA PBT Breach	141269A	141500A	Argumentative
2021 Gr 8 ELA F3	779248	762511	informative
2022 Gr 8 ELA F4	762230	762233	Argumentative
2023 Gr 8 ELA F5	762215	762218	Argumentative
2022 Gr 8 ELA F6	779249	762043	Argumentative
2023 Gr 8 ELA F7	779250	762085	Narrative
2024 Gr 8 ELA F8	779251	761992	Narrative
2021 Gr 8 ELA PBT F1A		141514A	Informative

Addendum

- 5/18/2021 per Liz: The 2019 historical data will not be reported on the 2021 report. The data will be blank with *on the year. Footnote *Score not available.

APPENDIX W
COGNITIVE LABS

2015 OCCT Science Cognitive Lab Report

In September of 2015, Measured Progress conducted cognitive labs with 58 Oklahoma students on behalf of the Oklahoma State Department of Education. The cognitive labs were an opportunity for students to use a think aloud method to aid item design for future Oklahoma science assessments. Think aloud protocols are valuable in educational and assessment research due to the richness of data that may be gathered by the process.¹

Starting in the 2016-2017 school year, the Oklahoma science assessments will be aligned to the new Oklahoma Academic Standards for Science (OASS), adopted in 2014. The OASS are based on *A Framework for K-12 Education*² and therefore require the integration of Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts to show proficiency in each performance expectation (standard). The new standards are more rigorous than the prior standards and are heavily focused on scientific literacy and the explanation of phenomena.

The change in the standards and the expected accompanying changes in classroom instructional methods have called for a change in the design of Oklahoma's science assessments. The new science assessments will have a cluster-based format, a cluster being a set of three items linked with a common stimulus. In Grades 8 and Biology, some of these clusters will contain technology-enhanced items in addition to multiple-choice items.

Given this multitude of change, the SDE and Measured Progress desired to gain some preliminary information about students' interaction with the new test content, format, and item types. The guiding research questions for the cognitive labs were as follows:

- How are students thinking about items written to the new standards?
- As written, how well are the items measuring the intended constructs?
- How are students responding to new item types and groupings (technology-enhanced items, cluster format)?

By gathering data pertaining to these questions, the SDE and Measured Progress were able to adjust specifications and approaches for item and test development, to support the production of Oklahoma science tests that are accessible, valid, and reliable.

¹ Johnstone, C. J., Bottsford-Miller, N. A., & Thompson, S. J. (2006). *Using the think aloud method (cognitive labs) to evaluate test design for students with disabilities and English language learners* (Technical Report 44). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes. Retrieved 29 Sept 2015, from the World Wide Web: <http://education.umn.edu/NCEO/OnlinePubs/Tech44/>

² National Research Council. (2011). *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.



This report contains information about the cognitive lab design and an initial summary of the observations from the cognitive lab.

Cognitive Lab Design

The cognitive labs were conducted in Oklahoma on September 15 and 16, 2015. Students in Grades 6 and 9, and those who had just completed High School Biology, were eligible to participate in the cognitive labs. (These grades/courses were chosen in order to collect data from students who had just completed the grades/courses to be tested on the Oklahoma science tests.) Specific participation data is provided in the table below.

Table 1. Cognitive Lab Participation Data

Grade	Number of Students	Number of Schools
6	23	4
9	17	4
HS	18	4

During each cognitive lab session, a Measured Progress facilitator worked with an individual student. A session typically lasted 30–35 minutes. The facilitator followed a standardized protocol in order to guide the student through a series of nine science questions. The first three questions were introductory questions, to familiarize the student with the process of thinking out loud and to help the facilitator establish a baseline for how the student thinks about science. The remaining six questions were organized into two sets. Each set was a cluster of questions written to an OASS performance expectation, with the three questions in each set being linked to a common stimulus. The student completed the questions on either paper (Grade 6) or computer (Grade 9, Biology). The facilitator observed and recorded the student’s interaction with each question as the student thought out loud in answering the question, and the facilitator asked the student some follow-up queries after each question and set of questions (e.g., “Why did you make that selection?” “Was that question too easy, too hard, or just about right?” “Did you know how to drag the molecules to the boxes?” “What did you think about answering all three of the questions about the same topic?”).

For all cognitive lab sessions, the facilitators recorded their observations and the students’ responses in an interactive file version of the facilitator guide. After the cognitive labs, the data for all sessions were exported to Excel spreadsheets to facilitate analysis.

Complete copies of the facilitator guides, containing the cognitive lab protocol for each grade/course, can be found in Figure 1, Figure 2, and Figure 3.

Summary of Observations

An initial debrief among the cognitive lab facilitators revealed a set of recurring themes emerging from the cognitive lab data. These themes and the specific observations pertaining to each are presented below, along with the initial analysis of the observations and any actions recommended for addressing the observations.

Theme: Vocabulary and text complexity

<i>Specific Observations</i>	<i>Initial Analysis and Recommended Actions</i>
<ul style="list-style-type: none"> • Students in all grades seemed to frequently struggle with wording (vocabulary) and sentence structure, particularly if sentences were long or contained several phrases. This observation applied to both the stimulus and the individual items (stem and options). • Students in Grade 6 in particular seemed to find the graphics fairly complex to process. • Students tended to find the amount of information (made more complex by vocabulary and sentence structure in the stimulus and items) to be overwhelming. 	<p>Attention to vocabulary and reading load will be important, to avoid conflating students' reading ability with their science proficiency.</p> <ul style="list-style-type: none"> ✓ Adhere closely to test and item specifications regarding vocab level, word count, sentence structure, and text complexity. ✓ Use footnotes to define unfamiliar words. ✓ Use simpler wording for science terms/concepts when it does not compromise the construct being assessed. ✓ Perform a "second read" by editorial staff to focus on vocab and sentence structure.

Theme: Stimulus length, layout, and content

<i>Specific Observations</i>	<i>Initial Analysis and Recommended Actions</i>
<ul style="list-style-type: none"> • Students seemed overwhelmed by the amount of information in the stimulus. • Students did not always attend to all text and/or graphics in the stimulus, or they had difficulty processing the presentation of paragraphs and graphic elements. • Students noted that some information in the stimulus was not connected to the particular set of questions they answered, and thus felt it was unnecessary, distracting, and/or confusing. • Students had mixed reactions to the "hook" or reasoning for the situation presented in the stimulus. (Some saw this as unnecessary information; others needed and/or liked it for engagement.) • Students voiced preference for familiar topics over new or unique phenomena in order to 	<p>The stimulus needs to be presented in a clear and logical manner, first and foremost. While engagement is also a goal, there are conflicting factors related to formulating the context of the stimulus.</p> <ul style="list-style-type: none"> ✓ Present text and graphics in a logical "storyline" flow, and use clear language/pointers to transition between text and graphics. ✓ In the stimulus, include only that information that pertains to multiple items. Place unique, clarifying information for a single item into the lead for that item. (Note, however, this does <u>not</u> mean creating several new, additional scenarios item to item.) ✓ Review clusters in field test layout to ensure it is clear and concise and there is no

<p>perform better.</p>	<p>extraneous information in the stimulus.</p> <ul style="list-style-type: none"> ✓ Continue to present hooks to convey the relevance and meaning of the context presented, consistent with the intent and vision of the OASS and <i>A Framework for K-12 Science Education</i> – but keep hooks brief and concise. ✓ Continue to present a variety of stimulus contexts, including novel phenomena and problems, consistent with the vision of the OASS and <i>A Framework for K-12 Science Education</i> – but ensure they are presented clearly and accessibly. ✓ Provide practice opportunities/sample clusters to the field to allow teachers and students to familiarize themselves with the new test format and expectations.
------------------------	---

Theme: Item content and structure

<i>Specific Observations</i>	<i>Initial Analysis and Recommended Actions</i>
<ul style="list-style-type: none"> • Students struggled with items that contained science content words not presented in the stimulus. Additionally, students often tried to answer items by looking for an option that contained a content word presented in the stimulus. • Students sometimes seemed confused as to whether or not to refer back to the stimulus in order to answer the items. • Students sometimes struggled to find the actual item stem and understand what the item was asking; the all-bold style of the item text seemed overwhelming at times, particularly for technology-enhanced items. • Students, particularly in Grade 6, tended to like the structure of having a set of items to a common stimulus rather than many discrete items. 	<p>There was mixed understanding of the cluster format, and while some practical style and UDL principles can help make the items clearer, practice and exposure are needed for students to familiarize themselves with the new test format.</p> <ul style="list-style-type: none"> ✓ Update item style to apply bold text to the item stem only; all other information presented before the options will be plain text to help the stem clearly stand out. ✓ Focus on UDL principles in the construction of each item. ✓ Provide practice opportunities/sample clusters to the field to allow teachers and students to familiarize themselves with the new test format and expectations (e.g., students need to use stimulus in answering items, items are not constructed to parrot content words from the stimulus, etc.)

Theme: Technology-enhanced items

<i>Specific Observations</i>	<i>Initial Analysis and Recommended Actions</i>
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<ul style="list-style-type: none">• Students sometimes did not understand the relevance of the particular interaction type being used in the item.• Students could not answer composite items (technology-enhanced items with two different types of interactions in the same item).• Students often could not isolate the stem of the question and the direction prompt for how to complete the interaction; these blended together in the large amount of item text and the all-bold style.• Students in Grade 9 seemed to have more difficulty in understanding how to complete the interactions in the items (especially drop-down menus) than did the Biology students.	<p>While the variety of interaction types presented to students in the cognitive lab was an artifact of trying to gather information about many different interaction types, the observation of students not understanding the relevance of particular interactions for the construct being measured is important to keep in mind; item writers should always choose the interaction type that is most appropriate and enhancing to the construct being measured. Additional style, presentation, and practice measures can also help improve student interaction with these items.</p> <ul style="list-style-type: none">✓ Write items to contain one interaction type only.✓ Structure the technology-enhanced items to give the question prompt (content) first, and then provide a one-sentence direction on how to complete in the specific interaction in the item.✓ Update item style to apply bold text to the question prompt only; all other information (lead, direction on how to complete the interaction) will be plain text to help the stem clearly stand out.✓ Provide practice opportunities/sample clusters to the field to allow teachers and students to familiarize themselves with the interactions and format of this item type.
---	---

Simply based on the initial debrief and analysis, the cognitive lab results provided many actionable points that were immediately implemented to improve cluster and item development. More detailed data analysis will be completed to look for additional nuances and findings that may guide further refinements to test and item development. In making such changes, the SDE and Measured Progress aim to ensure the new science assessments will be accessible and valid for Oklahoma students.

Figure 1

Grade 6 Cognitive Lab Protocol Facilitator Form

Test Form: Grade 6 Science

School:

| Date:

Grade:

| Student ID:

Step 1: Introductory Script

Hi, (name of student). My name is (name of Facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?

Before we get started, I have two questions. First, what are your three favorite subjects in school?

(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response:

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?

(Facilitator Note: Indicate student's response.)

<input type="checkbox"/> A Lot	<input type="checkbox"/> A Little	<input type="checkbox"/> Not At All
--------------------------------	-----------------------------------	-------------------------------------

Notes:

Figure 2

Grade 9 Cognitive Lab Protocol Facilitator Forms (n=4)

measured progress OCCT Cognitive Lab Facilitator Form | Grade 9 Science Form A

Test Form: Grade 9 Science Form A

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of Facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response: _____

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes: _____

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measured progress OCCT Cognitive Lab Facilitator Form | Grade 9 Science Form B

Test Form: Grade 9 Science Form B

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of Facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response: _____

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes: _____

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measured progress OCCT Cognitive Lab Facilitator Form | Grade 9 Science Form C

Test Form: Grade 9 Science Form C

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of Facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response: _____

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes: _____

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measured progress OCCT Cognitive Lab Facilitator Form | Grade 9 Science Form D

Test Form: Grade 9 Science Form D

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of Facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response: _____

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes: _____

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Figure 3

Biology Cognitive Lab Protocol Facilitator Forms (n=4)

 OCCT Cognitive Lab Facilitator Form | EOI Biology Form A

Test Form: EOI Biology Form A

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response:

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes:

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 OCCT Cognitive Lab Facilitator Form | EOI Biology Form B

Test Form: EOI Biology Form B

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response:

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes:

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 OCCT Cognitive Lab Facilitator Form | EOI Biology Form C

Test Form: EOI Biology Form C

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

Student response:

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes:

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 OCCT Cognitive Lab Facilitator Form | EOI Biology Form D

Test Form: EOI Biology Form D

School: _____ | Date: _____

Grade: _____ | Student ID: _____

Step 1: Introductory Script

Hi, (name of student). My name is (name of facilitator). Today you are going to take part in a research project about science tests. When done with the study, I will give the results to the people who make tests and give them advice on how they could make science tests better. So your help is very important and I thank you for participating.

Today you will answer some test questions. No one in the school will see your answers and you won't get a score or a grade. Okay? You can stop at any time or you can decide to skip or not answer any of the questions.

Facilitator Note: Collect the student assent and permission forms. If he or she has not signed an assent form, have him or her sign it now.

Do you have any questions?
 Before we get started, I have two questions. First, what are your three favorite subjects in school?
(Facilitator Note: It's okay if the student names fewer or more than three.)

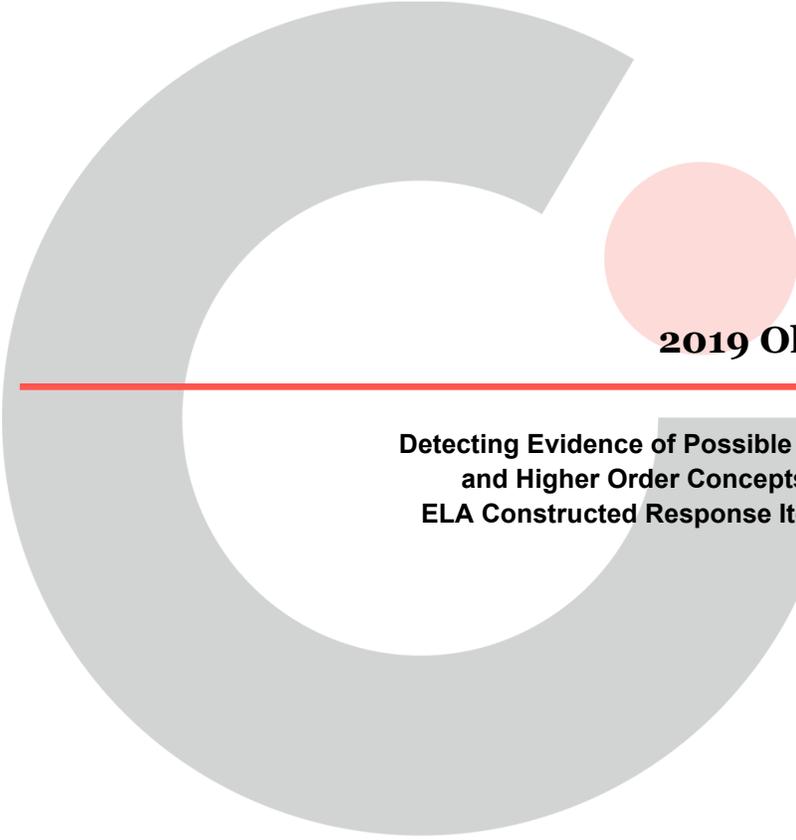
Student response:

And, second, do you like doing things on computers (including tablets or iPads) a lot, a little, or not at all?
(Facilitator Note: Indicate student's response.)

A Lot A Little Not At All

Notes:

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2019 Oklahoma Cognitive Labs

**Detecting Evidence of Possible Use of Higher Order Thinking Skills
and Higher Order Concepts in Responding to Oklahoma OSTP
ELA Constructed Response Items and Mathematics Item Clusters**

November 19, 2019

Steve Ferrara

cognia™



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- Appendix A: Definitions of HOTS and HOCs**
- Appendix B: Cognitive Lab Protocols**
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Purpose and Goals

In a cognitive lab, participants think out loud as they complete a task. The goal in asking participants to think aloud as they complete a task is to enable them to reveal their cognitive processing as they work to understand a task and complete it. In these cognitive labs, we asked Oklahoma 5th and 8th graders to think aloud while they responded to grades 4 and 7 OSTP items. Specifically, students responded to and thought aloud about either newly developed English Language Arts (ELA) short constructed response items (CRs) and multiple choice items or mathematics discrete multiple choice items and multiple choice item clusters, where mathematics item clusters were organized around a common stimulus. These new items and clusters were developed with the goal of requiring students to activate higher order thinking skills (HOTS) and higher order concepts (HOCs) in order to respond successfully. The goal of this cognitive lab study was to determine if the new items and item clusters actually did require HOTS and HOCs, as indicated by evidence of HOTS and HOCs in the student verbal protocols.

Development of ELA Constructed Response Items and Mathematics Item Clusters

The rationale behind developing constructed response (CR) items for ELA is to offer students an opportunity to “show what they know” rather than merely identify a correct answer. In including CR items, it is our goal to learn whether or not this type of item elicits HOTS and understanding of HOCs more than the standard multiple choice item.

Similarly, the goal of development of multiple choice (MC) item clusters in mathematics was to give students an opportunity to use HOTS and HOCs to solve mathematics problems based on a shared stimulus, and to determine whether or not students displayed HOTS and HOCs with cluster based items more than responding to discrete multiple choice items.

Item Development Procedures Relevant to the Cognitive Labs

The ELA and mathematics items included in the 2019 cognitive labs were developed in 2018 or previously and used operationally or field tested in spring 2019 or before.

Prior to item development, content specialists perform a series of tasks to help guide that development. To begin, a review of the performance level descriptors (PLDs—Appendix D of the technical report) is conducted. HOTS, represented by verbs in each level descriptor, and HOCs, represented by nouns in each level descriptor (see Appendix A), are identified and dissected at each performance level. Specifically, we reviewed the type of thinking a student was expected to perform in relation to a given concept for each item; for example, analyzing a stimulus to determine its theme. Once the analysis of the PLD is complete, the HOTS and HOCs are defined by reviewing commonly accepted definitions and adjusting them as needed to reflect any nuances in the Oklahoma program. This helps to ensure common understanding of these terms during item development.

After the initial groundwork is completed, content specialists use several tools, including the definitions for HOTS and HOCs, content standards and objectives, previous assessments, and the existing item bank to determine the focus for subsequent rounds of item development. Using this information, content specialists devise a more specific item development plan including the number of items related to a given standard and objective, which takes into consideration the HOTS and HOCs needed.

In both ELA and mathematics, stimuli should be rich enough to provide material for items across depth of knowledge (DOK) levels, item difficulty, content standards, and items that utilize HOTS and HOCs. Once the stimuli are created, reviewed, and approved by relevant parties, item development begins.

Content specialists refer to the above information when drafting items, paying careful attention to which HOTS and HOCs the students are utilizing when reaching the correct answer.

Cognitive Labs Design

The Cognia Senior Advisor for Measurement Solutions, Cognia's Oklahoma Content Manager, and one ELA and one mathematics content specialist from Cognia worked together to design, prepare for, and conduct the cognitive labs study.

Cognitive Lab Researchers

The content specialists conducted the think-aloud sessions with students. These specialists have classroom experience and have worked in assessment for over ten years. They also have detailed knowledge of the Oklahoma assessment program.

Item Selection and Cognitive Labs Protocols

The content specialists started by identifying items that would provide information related to the goals of the study. The ELA specialist identified one informational and one fiction passage and item set from grades 4 and 7. Each passage set contained three multiple choice items and one constructed response item. Items from the sets were selected based on similarity in content standards, DOK levels, and difficulty levels. Also considered were the IRT b values and the b scale location for each item. This was done to ensure that the items were within the appropriate difficulty range for the study. In mathematics, two cluster sets were chosen per grade. Then, discrete multiple choice items were chosen with similar content standards, depth of knowledge (DOK), and difficulty levels.

The ELA content specialist selected available multiple choice items for 4th and 7th grade from the passage sets that also contained constructed response items. The multiple choice and constructed response items selected for this cognitive lab have similar characteristics. These characteristics include DOK level, difficulty, target content standard, target HOTS/HOCs, and scale location values. For example, if a constructed response item required that a student evaluate the effects of a particular literary device, then a multiple choice item that asks a student to evaluate a set of answer choices and select which choice best evaluates the effect of a literary device on the passage.

The mathematics content specialist chose the available cluster multiple choice items for 4th and 7th grade in the Oklahoma item bank. Then, to mirror those cluster items, the mathematics specialist chose discrete multiple choice items that had the same Depth of Knowledge score, similar content, and similar scale location values. In addition, the chosen discrete multiple choice items targeted the same HOTS and HOCs as the cluster items did. For example, if one cluster item required the student to analyze the relationship between multiplication and division, a discrete multiple choice item was chosen that required analysis of this same relationship, when possible.

Definitions for HOTS and HOCs (see Appendix A) were developed based on the Oklahoma PLDs. HOTS were defined as verbs in each PLD, where verbs indicate content area skills and thinking processes (e.g., create a summary). In the ELA coding framework, "inferencing" appears as a unique HOTS (code 10) and as an integral component of Drawing Conclusions/Inferencing (code 6), Evaluating/Inferencing (code 7), and Reasoning/Inferencing (code 15). Inferencing is a skill that is part of the process of other HOTS. For example, it is often necessary to make an inference in order to draw a conclusion. As such, there are



cases where inferencing is paired with the label and concept of other HOTS. Once each term was clearly defined, the specialists provided examples of each HOTS and HOC in each content area.

The cognitive lab protocols (Appendix B) were created after the HOTS and HOCs work was finalized. Specialists included example items with the protocols to show students how to think aloud. The researchers followed these protocols when performing the cognitive labs. In each content area, two protocols per grade were created in which the order of presentation of the ELA item sets and mathematics item clusters was counter-balanced. The script indicates that, when a new item is presented, the researcher is to encourage the student to think aloud in general terms, with no specific directions on what to think or say. This is standard think-aloud practice, which is intended to illuminate the student's actual cognitive processing as it occurs, without influence by the researcher.

The researchers also wrote probe questions for each item so that, after the student completed independent thinking aloud, students could explain and illuminate their thinking. These probe questions were asked at the discretion of the researchers during the cognitive lab. Exit questions for the students, administered at the end of the think-aloud session, also were written as the final part of these protocols.

Participant Sampling Frame

School districts were identified to cover the diversity of Oklahoma's general student population. The schools selected for this cognitive lab were identified based on locale, one being identified as Suburb: Large and the other school district identified as Town: Distant, where Suburb: Large is defined as a *Territory outside a principal city and inside an urbanized area with a population of 250,000 or more*, and Town: Distant is defined as a *Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area*. Final selections were made based on willingness of participation by districts/schools.

Students were selected to participate based primarily on their proficiency scores in either ELA or mathematics. ELA participants had proficiency scores between 290 and 310. Mathematics participants had scores ranging between 300 and 320. The content specialists selected students for the ELA and mathematics groups based on their proficiency scores with the goal of creating groups that were as diverse as possible on group considerations. Other participant considerations included gender, age, racial/ethnic background, economic status, and locale. Students were selected using these characteristics to ensure diverse representation of the Oklahoma student population. Not included in this study were students whose first language was not English, students with IEPs, students with 504 plans, or students who had not attended school for a full academic year. These students were excluded due to potential barriers in accessing the material.

School District A

As of 2018, the estimated population of School District A community was just over 135,700 people spread over 22.2 square miles. The town is part of the Oklahoma City metropolitan area. School District A is comprised of approximately 70% white, 10% Hispanic or Latino, 3% American Indian, and 6% African American residents, and about 6% of its inhabitants report two or more races. The median household annual income is roughly \$65,000. Roughly 6.4% of the families whose children attend School District have income below the poverty level. (See https://nces.ed.gov/ccd/districtsearch/district_detail.asp?ID2=4020250 and <https://nces.ed.gov/Programs/Edge/ACSDashboard/4020250>.)

In School District A, of the 12 students participating in the ELA cognitive lab, two students were reported as American Indian, one student was reported as Asian, and five students were reported as two or more races (one student was reported Asian and Caucasian, one student as Hispanic or Latino and Caucasian, one student was reported as Hispanic or Latino and African America, one student was reported as



American Indian and Caucasian, and one student was reported as American Indian, Pacific Islander and Caucasian). Four students were reported as being economically disadvantaged. Of the 10 students participating in the mathematics cognitive lab, three students were reported as two or more races (two students were reported as Hispanic or Latino and Caucasian, and one student was reported as African American and Pacific Islander). Two students were reported as being economically disadvantaged.

School District B

As of 2018, the estimated population of School District B was just over 17,000 people spread over 80.4 square miles. The town is located about 25 miles away from Oklahoma City. School District B is comprised of approximately 61% white, 18% Hispanic or Latino, 10% American Indian, 6% African American residents, and about 5% of its inhabitants report two or more races. The median household annual income is roughly \$48,500. Roughly 19.1% of the families whose children attend School District have income below the poverty level. (See https://nces.ed.gov/ccd/districtsearch/district_detail.asp?ID2=4010650 and <https://nces.ed.gov/Programs/Edge/ACSDashboard/4010650>.)

In School District B, of the 11 students participating in the ELA cognitive lab, five students were reported as two or more races (two students were reported as Hispanic or Latino and Caucasian, one student was reported as American Indian and Caucasian, one student was reported as American Indian, African American and Caucasian, and one student was reported as African American and Caucasian). Six students were reported as being economically disadvantaged. Of the 10 students participating in the mathematics cognitive lab, three students were reported as two or more races (one student was reported as Hispanic or Latino and Caucasian, two students were reported as American Indian and Caucasian). Two students were reported as being economically disadvantaged.

Data Collection

Procedures

Prior to working with any students, student and parent/guardian permissions were acquired. The content specialist administered the think aloud protocol with one student at a time, sitting at a table with the student. First, there was an introduction with a sample item in which the content specialist modeled for the student how to think out loud while folding a piece of paper and then when solving an ELA or mathematics item. Next, there were two sample items for the student to practice thinking out loud. During this practice phase, the content specialist advised students about ways to think out loud, how to say more about his/her thinking, and answered any student questions. Next, the eight ELA items or 12 mathematics items were presented. During this phase, the content specialist followed the script and did not advise the student in any way about how to answer the questions. After some items, the content specialist asked probing questions to try to further elicit the students' thinking. Students were administered the items on computer using the same platform that students use in operational test administrations. In mathematics, students were given scrap paper, just as in operational administrations. Mathematics students in grades 68 also were also given a calculator, as this is allowed in operational administrations in those grades. After the end of the think-aloud session, the content specialist asked each student exit questions.

Setting and Adults

During the cognitive labs, in three out of the four schools, there were two representatives from the Oklahoma State Department of Education, the two Cognia content specialists, one Cognia content manager, and two students at a time in one large room. Students were spread as far apart as possible so that the ELA student would not hear the mathematics student and vice versa. In the fourth school, adults and students were assigned either to an ELA room or a mathematics room.



Recordings

In order to have a record of these cognitive labs, Go To Meeting and iPad recordings were used. The Go To Meetings took an audio recording of each student. The iPad was used as a back-up source in case anything happened to the Go to Meeting recordings. Based on parental permissions, some iPads were faced away from the student and took only an audio recording, rather than video. After the cognitive labs were completed, a professional transcription service typed the audio track for each student, to use for coding purposes (Appendix C).

Verbal Protocols Coding

The HOTS and HOCs Coding Frameworks

The Cognia content specialists created coding frameworks based on the identified HOTS and HOCs in ELA and mathematics (Appendix D). For each HOTS and HOC, a definition and example were provided. In ELA, for example, the higher order thinking skill, Explaining, was coded an 8 and the higher order concept, Genre, was coded a B. In mathematics, for example, the HOTS, Assessing, was coded as a 2 and the HOC, Similarity, was coded as an F.

Coders

For each content area, two coders were used. The content specialists involved in this cognitive lab each coded in their specialized content area. In addition, for each content area, an experienced scoring specialist was trained to code the protocols to validate the coding done by the content experts. These scoring specialists each have more than fifteen years of experience in assessment, degrees in their respective fields, and are trained to score open response items with accuracy.

Coding Procedures

The content specialists trained the ELA and mathematics scoring specialists on how to code the transcribed verbal protocols (Appendix D) from the cognitive labs. After this training, the content and scoring specialists each coded one student transcript separately and independently. When a student utterance indicated evidence of a HOTS or HOC, the coders assigned a numeric or alphabetical code. When a student did not show evidence of a HOTS or HOC, this line was coded as “no evidence.” Then, the content specialists met with the scoring specialists to review their independent codes. During these meetings, issues were identified and definitions and examples of HOTS and HOCs were revised for greater clarity. After this meeting, the content and scoring specialists continued to code the rest of the student transcripts independently. After all student transcripts had been coded by the content and scoring specialists, the ELA and mathematics content and scoring specialists met to come to consensus on the most appropriate codes for each student utterance. Finally, the content specialists combined the consensus codings for all students into a single file for analysis (Appendix E). In this final coding, each item in the cognitive lab was coded for primary and secondary HOTS and HOCs. In some instances, there was only one HOTS and/or HOC, and in these cases, the secondary code was coded “no evidence.”

Analysis

Each student verbal utterance that is codable using the HOTS framework is counted in the analyses as a piece of evidence of a HOTS. The total counts of pieces of evidence for each item in an ELA item set or mathematics item cluster enabled us to compare the HOTS that are evidenced in (a) ELA multiple choice and constructed response items, (b) mathematics discrete items versus item clusters.



Results

The results from coding the ELA and mathematics verbal protocols are summarized below.

ELA Multiple Choice and Constructed Response Items

Table 1. Counts of Evidence of HOTS and HOCs in 13 Verbal Protocols for *Termite Tower*, a Grade 4 ELA Item Set

		Item 1 (MC)	Item 2 (MC)	Item 3 (MC)	Item 4 (CR)
1	Analyzing	2	3	1	0
2	Applying	0	0	1	0
3	Assessing	0	0	0	0
6	Drawing Conclusions/Inferencing	0	0	0	0
7	Evaluating/Inferencing	0	0	0	0
8	Explaining	0	0	1	6
9	Generalizing	1	2	1	0
10	Inferencing	7	6	5	0
11	Interpreting	1	0	0	0
12	Justifying	0	0	1	0
13	Making Connections	0	0	0	1
14	Predicting	1	0	1	4
15	Reasoning/Inferencing	2	3	1	0
16	Supporting Positions Using Prior Knowledge	0	0	0	0
		14	14	12	11

Note. Codes 4 and 5 not used in this study. HOC evidence: Items 1 and 2 Key Details; Item 3 Research Question; Item 4 Main Idea.

The constructed response items in the *Termite Tower* item set target the HOTS, Inferencing, applied to the HOCs, meaning.

Table 1 displays evidence that the constructed response item for this item set enabled students in the cognitive labs to demonstrate evidence of Explaining and Predicting regarding the Main Idea of this informational reading passage. The three multiple choice items did not enable students to show evidence of HOTS where the constructed response item did. The constructed response item did not enable students to demonstrate evidence of HOTS that multiple choice items did: Analyzing, Generalizing, Inferencing, and Reasoning/Inferencing. These two results regarding the constructed response item are reasonably consistent with the item's HOTS and HOC targets.

The evidence suggests that, in *Termite Tower*, the constructed response item may provide unique, non-redundant information on HOTS that supplements information provided by the multiple choice items.

Table 2. Counts of Evidence of HOTS and HOCs in 13 Verbal Protocols for *An Earful*, a Grade 4 ELA Item Set

		Item 1 (MC)	Item 2 (MC)	Item 3 (MC)	Item 4 (CR)
1	Analyzing	3	1	3	4
2	Applying	0	1	1	0
3	Assessing	0	0	0	0
6	Drawing Conclusions/Inferencing	0	0	0	1
7	Evaluating/Inferencing	1	1	0	0
8	Explaining	8 ¹	7	8	4
9	Generalizing	0	0	0	0
10	Inferencing	0	0	0	0
11	Interpreting	0	0	0	0
12	Justifying	0	0	0	0
13	Making Connections	0	0	0	0
14	Predicting	0	0	0	0
15	Reasoning/Inferencing	0	0	0	1
16	Supporting Positions Using Prior Knowledge	0	0	0	0
		12	10	12	10

Note. Codes 4 and 5 not used here. HOC evidence: Items 1 and 4 Literary Elements; Item 2 Point of View; Item 3 Genre.

¹ One piece of evidence of Explaining is about the HOC, Best Summary; the other seven are about Literary Elements.

The constructed response item in the *An Earful* item set targets the HOTS, Identify, and the HOC, Literary Elements.

Table 1 displays evidence that the constructed response item for this item set enabled students in the cognitive labs to demonstrate evidence of Analyzing and Explaining about the HOC Literary Elements of this literary reading passage. The three multiple choice items also enabled students to show evidence of HOTS. Even though the constructed response did not target a HOTS, the evidence indicates that the students used HOTS as they processed the item. Little other evidence of HOTS appears for the items in this item set.

The limited evidence suggests that, in *An Earful*, the constructed response item provides information on HOTS that is redundant with evidence on HOTS provided by the multiple choice items.

Table 3. Counts of Evidence of HOTS and HOCs in Five Verbal Protocols for *Fit for Life*, a Grade 8 ELA Item Set

		Item 1 (MC)	Item 2 (MC)	Item 3 (MC)	Item 4 (CR)
1	Analyzing	1	1	1	0
2	Applying	0	0	2	0
3	Assessing	0	0	0	0
6	Drawing Conclusions/Inferencing	0	0	0	2
7	Evaluating/Inferencing	0	0	0	0
8	Explaining ¹	4	4	2 ¹	2
9	Generalizing	0	0	0	0
10	Inferencing	0	0	0	0
11	Interpreting	0	0	0	0
12	Justifying	0	0	0	0
13	Making Connections	0	0	0	0
14	Predicting	0	0	0	0
15	Reasoning/Inferencing	0	0	0	1
16	Supporting Positions Using Prior Knowledge	0	0	0	0
		5	5	5	5

Note. Codes 4 and 5 not used here. HOC evidence: Items 1 and 2 Main Idea; Item 3 Genre; Item 4 Literary Elements.

¹ One piece of evidence of Explaining is about the HOC, Literary elements; the other seven are about Literary Elements.

The constructed response item in the *Fit for Life* item set targets the HOTS, Create; the HOC, Best Summary.

Overall there is little evidence of HOTS for this item set because only five verbal protocols are available. Table 1 displays evidence that the constructed response item for this item set enabled students in the cognitive labs to demonstrate evidence of Drawing Conclusions/Inferencing and Explaining about the HOC Literary Elements of this literary reading passage. The three multiple choice items also enabled students to show evidence of Explaining.

This limited evidence suggests that, in *Fit for Life*, the constructed response item provides limited evidence of HOTS that is redundant with evidence on HOTS provided by the multiple choice items.

Table 4. Counts of Evidence of HOTS and HOCs in Five Verbal Protocols for *Carolina Crow Girl*, a Grade 8 ELA Item Set

		Item 1 (MC)	Item 2 (MC)	Item 3 (MC)	Item 4 (CR)
1	Analyzing	3	0	1	2
2	Applying	1	0	0	0
3	Assessing	0	0	0	0
6	Drawing Conclusions/Inferencing	0	0	1	2
7	Evaluating/Inferencing	1	1	0	0
8	Explaining	0	4	1	0
9	Generalizing	0	0	0	0
10	Inferencing	0	0	0	0
11	Interpreting	0	0	1	0
12	Justifying	0	0	0	0
13	Making Connections	0	0	0	0
14	Predicting	0	0	0	0
15	Reasoning/Inferencing	0	0	0	0
16	Supporting Positions Using Prior Knowledge	0	0	0	0
		5	5	4	4

Note. Codes 4 and 5 not used here. HOC evidence: Item 1 Genre; Item 2 Main Idea; Items 3 and 4 Literary Elements.

The constructed response item in the *Carolina Crow Girl* item set targets the HOTS Evaluate and the HOC Literary Devices.

Overall there is little evidence of HOTS for this item set because only five verbal protocols are available. Table 1 displays evidence that the constructed response item for this item set enabled students in the cognitive labs to demonstrate evidence of Analyzing and Drawing Conclusions/Inferencing about the HOC Literary Elements of this literary reading passage. One multiple choice item also enabled students to show evidence of Analyzing.

This limited evidence suggests that, in *Fit for Life*, the constructed response item provides limited evidence of HOTS that is redundant with evidence of HOTS provided by the multiple choice items.

Mathematics Discrete Items and Item Clusters

Table 5. Counts of Evidence of HOTS and HOCs in 10 Verbal Protocols for Grade 4 Mathematics Discrete Multiple Choice Items and the Two Multiple Choice Item Clusters, Reading Goals and Bean Plant Heights

		Discrete Items 13	Discrete Items 46	Item Clusters 1 and 2 (total 6 Items)
1	Analyzing/Applying	20	1	1
2	Assessing	3	14	15
5	Drawing Conclusions	0	0	0
6	Evaluating	0	0	6
7	Explaining/Reasoning	4	0	0
10	Interpreting	0	6	20
11	Justifying	0	0	0
12	Making Connections	0	0	0
13	Predicting	0	0	0
		27	21	42

Note. Codes 3, 4, 8, and 9 not used in this study. HOTS targeted by items in this study: Analyzing/Applying, Explaining/Reasoning, Interpreting, Evaluating, and Assessing. HOCs targeted by items in this study: Relationship between Multiplication and Division; Place Value; Reasonable Estimate; Fluency with Multiplication and Division Facts; Equivalent Expressions; Decomposition of Fractions; Models Used to Represent Fractions; and Data as Presented in Line Plots and Frequency Tables.

Table 5 displays evidence that the multiple choice item cluster enables students to exhibit HOTS at about the overall rate as the discrete multiple choice items. The six discrete items produced a combined total of 48 pieces of evidence while the six item cluster produced 42 pieces of evidence. Discrete items 46 produced 14 pieces of evidence of the HOTS Assessing; the item cluster produced 15. In contrast, the item clusters produced six pieces of evidence of Evaluating versus none in the six discrete items, and the cluster produced 20 pieces of evidence of Interpreting versus six in discrete items 46.

These two results regarding the multiple choice item clusters are consistent with the item's HOTS and HOC targets.

The evidence in Table 5 suggests that the item clusters *may* be able to provide unique, non-redundant information on HOTS that supplements information provided by the multiple choice items. However, it is not clear whether the evidence here suggests the unique opportunities afforded by item clusters or, simply, that this cluster explicitly targeted Evaluating while the discrete items did not.

Table 6. Counts of Evidence of HOTS and HOCs in 10 Verbal Protocols for Grade 7 Mathematics Discrete Multiple Choice Items and the Two Multiple Choice Item Clusters, *Similar Figures* and *Student Numbers*

		Discrete Items 13	Discrete Items 46	Item Clusters 1 and 2 (total 6 Items)
1	Analyzing/Applying	9	13	14
2	Assessing	0	0	17
5	Drawing Conclusions	0	3	4
6	Evaluating	0	0	1
7	Explaining/Reasoning	0	3	2
10	Interpreting	3	0	0
11	Justifying	0	0	0
12	Making Connections	2	0	0
13	Predicting	0	0	0
		14	19	38

Note. Codes 3, 4, 8, and 9 not used in this study. *HOTS and HOCs targeted by items: HOTS targeted by items in this study: Analyzing/Applying, Explaining/Reasoning, Assessing, Making Connections, and Drawing Conclusions. HOCs targeted by items in this study: Similarity, Proportionality; Transformation; Relationship between Variables as Presented in a Graph, Table, or Equation; Reasonable Estimate; Exponent; Distance from Zero on a Number Line; Absolute Value; and Division with Negative Numbers.*

Table 6 displays evidence that the multiple choice item cluster enables students to exhibit HOTS at about the same overall rate as the discrete multiple choice items. The six discrete items produced a combined total of 33 pieces of evidence while the six item cluster produced 38 pieces of evidence.

The six discrete items produced 22 pieces of HOTS evidence of Analyzing/Applying while the item cluster produced 14 pieces of evidence. The item cluster produced 17 pieces of evidence of Assessing while the discrete items produced none.

These two results regarding the multiple choice item clusters are inconsistent with the item's HOTS and HOC targets.

The evidence in Table 6 suggests that the item clusters *may* be able to provide unique, non-redundant information on HOTS that supplements information provided by the multiple choice items. However, it is not clear whether the evidence here suggests the unique opportunities afforded by item clusters or, simply, that this cluster explicitly targeted Assessing while the discrete items did not.

Conclusions and Recommendations

As is typical for most cognitive lab studies in educational assessment, the generalizability of results is limited because of the small numbers of items, schools, and students involved in the study (e.g., Leighton, 2017, pp. 7679). However, the value of these cognitive lab studies is in generating direct evidence of student cognitive processing as they respond to items, specifically regarding their use of HOTS and HOCs. And they do illuminate evidence that cannot be acquired by other means.

- (1) The verbal protocols indicate evidence of student cognitive processing and HOTS for the ELA multiple choice and constructed response items and the mathematics discrete multiple choice items and multiple choice item clusters.
This is good news for the OSTP program in general.
- (2) Although there is evidence that at least one constructed ELA item elicited HOTS that was not elicited by the multiple choice items (see Table 1), this evidence is only suggestive.
The limitations on this conclusion are (a) the small numbers of items, schools, and students involved; and (b) the ELA multiple choice and constructed response items and mathematics discrete items and item clusters were not developed to target the same standards, HOTS, and HOCs, which would enable a stronger conclusion.
- (3) Future item development should focus on specific HOTS/HOCs targets and the HOTS/HOC targets should be evaluated further.
This should include writing item specifications to explicate the HOTS and HOCs targets and hypothesized rationales regarding the likely effectiveness of eliciting the targeted HOTS and HOCs, to guide effectiveness evaluation.
- (4) Specifications for ELA constructed response items should indicate for which content standards, HOTS, and HOCs they are most likely to elicit cognitive processing and conceptual understanding that cannot be elicited using multiple choice items.
The evidence in this study suggests that constructed response items may elicit HOTS and HOCs that are redundant with more affordable multiple choice items.
- (5) The hypothesis that mathematics multiple choice item clusters may be more effective in eliciting HOTS and HOCs than discrete multiple choice items requires further examination and specification.
As above, the evidence in this study suggests that item clusters may elicit HOTS and HOCs that are redundant with discrete multiple choice items. Further study, or at least targeted hypotheses, are warranted about which common cluster stimuli, content standards, HOTS, and HOCs are likely to be most effective.

Reference

Leighton, J. P. (2017). Using think-aloud interviews and cognitive labs in educational research. New York: Oxford University Press.

Appendices

APPENDIX A
DEFINITIONS OF HOTS AND HOCs

Table A-1. Higher Order Thinking Skills (HOTS)—ELA*

HOTS	Code	Definition	Example
analyzing	01	Items that require students to dissect answer choices and stimuli to better understand them to determine an answer. To identify parts and relationships, and to interpret information to reach conclusions. Students see connections/draw conclusions	A student analyzes a passage to determine the main idea or theme
reasoning/inferencing	15	Items that require students to think in a logical way (process) using indirect and direct evidence; using text/indirect evidence to support ideas/conclusions	A student uses reasoning to understand a character's motivations
applying	02	Items that require students to apply knowledge or skills to respond to an item; applying can entail use of content area terms/vocabulary to make sense of an item and arrive at a response (info is within the item/stim vs. apply prior knowledge)	A student applies knowledge of grammar to revise a paper
assessing	03	thought driven - process oriented/ includes identifying characteristics	
creating (developing)	04	Items that require students to make (create/develop) something new based upon a stimulus	A student creates narrative based on a stimulus
designing	05	Items that require students to devise something new or formulate a plan	A student designs an outline for a report or paper
drawing conclusions/inferencing	06	Items that require students to integrate information they have read and information that they know to understand information or predict what might happen	A student uses information from a stimulus and prior knowledge to make a prediction.
evaluating/inferencing	07	Items that require students to carefully consider, analyze, or make judgements to determine essential information vs. interesting information	A student evaluates an argument for its soundness; evaluates answer choices to determine the correct or best answer

HOTS	Code	Definition	Example
explaining	08	Items that require students to respond to an item and explain their response; explanations usually entail a rationale for why the response is correct or best, describing how they arrived at the response, reference to information in a stimulus that supports the response, and other	A student reads answer choices, selects the correct/best one and provides reasoning for why that answer is correct/best
generalizing	09	Items that require students to make a broad statement based on specific information	A student reads a stimulus (stimuli) to determine a theme
inferencing - integrate with other HOTS leaving here for definition purposes	10	Items that ask students to "read between the lines," and use information from a stimuli to come to a conclusion	An item that asks a student to identify how the setting affects the plot; Item XY: Explain what would most likely happen if the king and queen were to die.
interpreting	11	items that ask students to explain the meaning of what is read	Items that ask student to summarize or paraphrase
justifying	12	items that require students to prove an answer is right or reasonable	Writing a persuasive paper; explaining why an answer is right
making connections	13	Items that require students to make a personal connection to a text or to make connections between texts	How are two characters similar
predicting	14	Items that require students to use infrencing skills and close reading to help determine what might happen.	A student reads a stimuli and based on clues from the text makes a reasonable prediction about what happens next.
reasoning/inferencing	15	Items that require students to think in a logical way using indirect and direct evidence	A student uses reasoning to understand a character's motivations
supporting positions using prior knowledge	16	Items that require students to use information learned/experienced to help make a point	A student writes a paper using information previously learned or prior experiences to support a claim or argument
utilizing multiple resources/texts	17	Items that require students to consider more than one stimuli to determine an answer	A student determines a common theme amongst 2+ stimuli

*Strikethroughs represent HOTS variables that were considered for analysis of the cog lab protocols and rejected for use in that analysis.

Table A-2. Higher Order Concepts (HOCs)—ELA*

HOCs	Code	Definition	Example
author's purpose	A	the reason an author composed something	Why did the author write the passage?
genre	B	The category of composition based on agreed characteristics	How does the reader know the passage is fiction/informational/etc.?
key detail	C	a detail that is essential to the stimuli; supports the main idea	item XX: Which detail supports the idea that towers help termites survive?
literary devices	D	Techniques used by the writer to create a specific effect or help readers understand the stimulus	How does the simile help the reader understand XYZ?
literary elements	E	The components of fiction (problem/solution/conflict/etc.)	How does the setting affect the plot?
main idea	F	What a stimuli is mainly about; the point that is being made about a topic	What is the main idea of the passage (paragraph/section/etc)
point of view	G	who is telling/narrating a story	How does the reader know the passage is written from a first-person point of view?
research question	H		Which research question would best help a student learn more information about ABC?
resources	I	-	Which resource would provide the most reliable information about XYZ?
best summary	J	Restating the main ideas of a section of text	What is the best summary of the passage (paragraph/section)?

*Strikethroughs represent HOCs variables that were considered for analysis of the cog lab protocols and rejected for use in that analysis.

Table A-3. Higher Order Thinking Skills (HOTS)—Mathematics*

HOTS	Code	Definition	Example
analyzing/applying	01	Items that require students to respond to an item and analyze their response or apply knowledge. Analysis requires examining carefully to bring out the essential elements or parts and could include a rationale for why an answer is correct and/or why other answers are incorrect. Application usually includes knowing how to do something in one context and using this in a related context or problem solving situation.	determining which segment lies on a line that represents a proportional relationship between x and y AND determining how to solve a word problem and then applying this method to find the answer
assessing	02	Items that require students to respond to an item by assessing; assessment usually includes knowing how to choose the best answer or to judge the value of.	Which expression is equal to $5/6$? ($1/6 + 2/6 + 3/6$) AND Which statement is true?
creating (developing)	03		
designing	04		
drawing conclusions	05	Items that require students to respond to an item by drawing a conclusion; conclusion usually includes knowing how to put information together to find the answer.	How did you determine which number is the greatest distance from zero?
evaluating	06	Items that require students to respond to an item by evaluating; evaluation usually includes deciding how to approach a problem.	How did you solve for the box in this equation?
explaining/reasoning	07	Items that require students to respond to an item and explain their response; explanations usually entail a rationale for why the response is correct or best, describing how they arrived at the response, reference to information in a stimulus that supports the response, and other. Items that require students to respond to an item and reason; reasons usually entail a rationale for why the response is correct or best, describing how they arrived at the response, or reference to information in a stimulus that supports the response.	How did you know the volume of prism F is greater than the volume of prism G? (this is a rationale for why the response is best) (need other examples for other parts of 9C). AND Making a reasonable estimate. AND How did you know if the estimate was reasonable or not reasonable?

HOTS	Code	Definition	Example
generalizing	08		
inferencing	09		
interpreting	10	Items that require students to respond to an item while interpreting; interpretations usually entail a choice about the best way to approach a problem or using information in a graph/data display to solve a problem.	How did you decide which operation to use when solving this problem? (this is inferred from their answers) AND Using a line plot to determine the number of students who are taller than 48 inches.
justifying	11		
making connections	12	Items that require students to respond to an item while making connections; connections usually entail using one thing as it relates to another.	using a graph to determine the correct equation modeled by the line on a graph
predicting	13		
supporting positions using prior knowledge	14		
utilizing multiple resources/texts	15		

*Strikethroughs represent HOTS variables that were considered for analysis of the cog lab protocols and rejected for use in that analysis.

Table A-4. Higher Order Concepts (HOCs)—Mathematics

HOCs	Code	Definition	Example
relationship between multiplication and division	A	Items that require students to show their understanding of the relationship between multiplication and division; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of this relationship.	How can the fact $8 \times 3 = 24$ be used to help solve $24 \div 3$?
reasonable estimate	B	Items that require students to make a reasonable estimate; can be observed in an explanation of the concept or inferred from successfully choosing the correct estimate.	determine which estimate is <u>closest</u> to the total number of books on 10 shelves
place value	C	Items that require students to show their understanding of place value; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of place value.	What is the value of 4 in 942? (40) OR Multiplying or dividing a number by 10, 100, or 1,000.
decomposition of fractions	D	Items that require students to show their understanding of decomposing fractions; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of decomposition.	$\frac{3}{4} = \frac{1}{4} + \frac{2}{4}$
models used to represent fractions	E	Items that require students to show their understanding of fraction models; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of models.	$\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$
similarity	F	Items that require students to show their understanding of similarity; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of similarity.	Triangles ABC and DEF are similar. [Graphic shown of two triangles with side lengths labeled, except for DE.] What is the length of segment DE?
transformations (reflections, translations, rotations)	G	Items that require students to show their understanding of transformations; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of transformation(s).	Figure PQRS is shown on a coordinate grid. What is the location of Point Q after it is translated 5 units to the right?

HOCs	Code	Definition	Example
proportionality	H	Items that require students to show their understanding of proportionality; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of proportionality.	determining which segment lies on a line that represents a proportional relationship between x and y
distance from zero on a number line	I	Items that require students to show their understanding of distance from zero on a number line; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of distance from zero on a number line.	Which number is the greatest distance from zero? 0.3, 1/4, -2, -0.75
absolute value	J	Items that require students to show their understanding of absolute value; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of absolute value.	Order these numbers from smallest to largest.
fluency with multiplication and division facts	K	Items that require students to show their fluency with multiplication and division facts; fluency can be inferred from successful application of facts.	$3 \times [\text{box}] = 12$ What is the value of box?
data as presented in line plots and frequency tables	L	Items that require students to show their understanding of data represented in line plots and frequency tables; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of data shown in a line plot or frequency table.	
equivalent expression	M	Items that require students to show their understanding of equivalent expressions; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of equivalency.	solving for box in $14 + 3 = [\text{box}] - 2$

HOCs	Code	Definition	Example
division with negative number(s)	N	Items that require students to show their understanding of division with negative numbers; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of division with negative numbers.	What is the value of $-12 \div 4$?
relationship between variables as presented in a graph, table, or equation	O	Items that require students to show their understanding of the relationship between variables; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of the relationship between variables.	determining which equation represents the relationship between mass, m , and volume, v , as shown on a graph
exponent	P	Items that require students to show their understanding of exponents; conceptual understanding can be observed in an explanation of the concept or inferred from successful application of exponents.	what is (-5) to the 4th power?

APPENDIX B
COGNITIVE LAB PROTOCOLS

OSTP COGNITIVE LABS
RESEARCHER SCRIPT AND PROCEDURES
ELA GRADE 4 FORM A

August 26, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items



Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is [say your name as you wish the student to address you.]. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the OSTP ELA test last spring? You answered test questions in ELA like this one:

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

Key = A

We’re studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I’m going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student’s response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer is to a test question. It includes all of your thoughts—a even if you don’t think they’re important We want to hear everything—even thoughts like “This is boring” or “I don’t like this.”

And don’t worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of question work, but we won’t share this with your principal, teachers, or

parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Wait for student's acknowledgment and answer questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper, one ELA item for the researcher to model thinking out loud. The ELA item and passage should be an easy item.

I'll ask you to think out loud as you take a few of the new test questions. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way. Ok. Now I'll fold it like this.*)

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

Modeling Part B

Here's another example of thinking out loud.

Demonstrate with the "American Buffalo" item below.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

That’s what thinking out loud for test items looks and sounds like. I’ll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we’re studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they’re about to practice and that you’ll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this reading question.

If the student says they're not ready to try, say *Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.*

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Read the passage. Then answer the questions that follow.

Inside a Termite Tower

- 1 The grasslands of southern Africa are home to some of the most unusual structures on Earth—termite towers! These large mounds of dirt are of many different sizes. Some are as tall as a man, but others rise twenty feet or more above the ground. These mounds may look like castle towers, but they actually mark the sites of termite colonies.

Cool Insects

- 2 These high-rise towers are built to be cool—really! They help keep termites from getting too hot during Africa's scorching summer days. Inside the mounds are large, hollow tubes. They are sort of like chimneys leading to the surface. Air flows in and carries away heat. These tubes work very well. The temperature at the center of the mound stays around 86° F. That is much cooler than the outside temperature, which can be more than 100° F!

A Termite City

- 3 Termite mounds may resemble tall apartment buildings, but termite colonies are actually located under the mound, below the surface. Here the insects live in a sort of termite city. The city is built in the shape of a large circle. Termites dig passageways and tunnels to link the city's many different rooms.

A Royal Chamber

- 4 One of the largest rooms is the royal chamber. It is where the king and queen spend their entire lives. Termite workers feed and take care of them as if they were royalty. They are very important to the termite colony. The king and queen keep the colony growing by reproducing. To do this, the queen lays 30,000 eggs each day!

A Nursery Room

- 5 What happens to all of those eggs? Workers move them to the nursery within the colony. After the eggs hatch, workers care for the young termites, which are called nymphs. The workers feed the nymphs until the nymphs can find food on their own.

The Garden Room

- 6 Where do termites find food? They grow it in their garden, of course! Termite garden rooms look like honeycombs, but instead of making honey, termites grow a type of fungus. Besides fungus, termites munch on wood, grass, and leaves found near the mound. The fungi grown by the termites help them to be able to eat these other foods more easily.

Tunnel Travelers

- 7 Termites almost always stay inside their tubes and tunnels. Why? Most termites have thin skin. They need protection from the wind and sun. Staying out of the sun is no problem for termites, though. These incredible insects can get everything they need without ever going above ground.



The boldfaced section headings help the reader

- A. read the passage more quickly.
- B. imagine what termite mounds look like.
- C. know what the next paragraph is about.
- D. pronounce difficult words in the selection.

Key = C

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question.

Explain the most likely reason the author wrote the passage. Provide details from the passage to support your answer.

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

OK, I think you're ready to think out loud with the new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

Inside a Termite Tower

You're going answer more test questions on "Inside a Termite Tower." Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

Inside a Termite Tower

- 1** The grasslands of southern Africa are home to some of the most unusual structures on Earth—termite towers! These large mounds of dirt are of many different sizes. Some are as tall as a man, but others rise twenty feet or more above the ground. These mounds may look like castle towers, but they actually mark the sites of termite colonies.

Cool Insects

- 2** These high-rise towers are built to be cool—really! They help keep termites from getting too hot during Africa’s scorching summer days. Inside the mounds are large, hollow tubes. They are sort of like chimneys leading to the surface. Air flows in and carries away heat. These tubes work very well. The temperature at the center of the mound stays around 86° F. That is much cooler than the outside temperature, which can be more than 100° F!

A Termite City

- 3** Termite mounds may resemble tall apartment buildings, but termite colonies are actually located under the mound, below the surface. Here the insects live in a sort of termite city. The city is built in the shape of a large circle. Termites dig passageways and tunnels to link the city’s many different rooms.

A Royal Chamber

- 4** One of the largest rooms is the royal chamber. It is where the king and queen spend their entire lives. Termite workers feed and take care of them as if they were royalty. They are very important to the termite colony. The king and queen keep the colony growing by reproducing. To do this, the queen lays 30,000 eggs each day!

A Nursery Room

- 5 What happens to all of those eggs? Workers move them to the nursery within the colony. After the eggs hatch, workers care for the young termites, which are called nymphs. The workers feed the nymphs until the nymphs can find food on their own.

The Garden Room

- 6 Where do termites find food? They grow it in their garden, of course! Termite garden rooms look like honeycombs, but instead of making honey, termites grow a type of fungus. Besides fungus, termites munch on wood, grass, and leaves found near the mound. The fungi grown by the termites help them to be able to eat these other foods more easily.

Tunnel Travelers

- 7 Termites almost always stay inside their tubes and tunnels. Why? Most termites have thin skin. They need protection from the wind and sun. Staying out of the sun is no problem for termites, though. These incredible insects can get everything they need without ever going above ground.



First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which sentence from the passage best supports the idea that towers help termites survive?

- A. "These large mounds of dirt are of many different sizes."
- B. "Inside the mounds are large, hollow tubes."
- C. "Air flows in and carries away heat."
- D. "Termites almost always stay inside their tubes and tunnels."

ID: 632843

Item-specific Probe (as Necessary)

- *How did you evaluate each answer choice to come to an answer? How did you decide that was the answer? (evaluate)*
- *How did you know what the question was asking? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which detail best supports the idea that termites help one another?

- A. Termite kings and queens stay inside their chambers.
- B. Termite towers have large tubes to help release heat.
- C. Termite workers feed nymphs until they can find food on their own.
- D. Termite cities have passageways and tunnels to link different rooms.

Key: C

Asset ID: 484668

Item-specific Probe (as Necessary)

- *How did you evaluate each answer choice to come to an answer? How did you decide that was the answer? (evaluate)*
- *How did you know what the question was asking? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which research question would best help a reader find information about the life cycle of termites?

- A. How big is a full-grown termite?
- B. How do termite nymphs turn into adults?
- C. How do termites speak with one another?
- D. How many different kinds of termites are there?

Key: B

Asset ID: 484672

Item-specific Probe (as Necessary)

- *Can you tell me more about your thought process as you came up with your answer? (explain)*
- *Were there any words in the question that made this item easy or hard? (analyze)*
- *Were there any words or ideas in the question that helped you to decide on your answer? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?



Fourth Item: CR

Ok, please answer this last question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from the passage to support your answer.

Scoring: The colony would die out since both are needed for the colony to survive; a new queen/king would be found; workers might try to find a different colony or start a new one.

Asset ID: 629614

Item-specific Probe (as Necessary)

- *How did you come up with your answer? (explain)*
- *How did you know what the question was asking? (analyze)*
- *Were there any words in the question that made this item easy or hard? (analyze)*
- *Where there any details in the passage that helped you come up with your answer? (evaluating)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

You've done an excellent job! You are doing some great thinking. Now we are going to move on to a new passage and set of test questions. You will read the passage and then continue thinking out loud on the questions the same way you just did.

Are you ready?



An Earful

You're going to read a passage about a boy and a school assignment. Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

An Earful

by Dale-Marie Bryan

kazoo—a toy musical instrument

- 1 "Your homework is to collect sounds," Mrs. Olson said. She handed out sheets of paper shaped like giant ears. Then she held up a shiny blue kazoo. "Everyone who gets an 'earful' will get one of these." The class laughed.



- 2 Later, Jacob glared out the school bus window. Not fair, he thought. How could he collect enough sounds on his family's farm? There were plenty of noises in town. If only he lived where tires squealed and sirens wailed.
- 3 Jacob scrambled off the bus when it screeched to a stop at his mailbox. But he wasn't in the mood to wave as it drove away.
- 4 When he threw open the gate, it groaned like a stubborn mule. That was how he felt about his homework.

- 5 On the porch, Jacob knelt beside the kittens curled on the rug. They sounded like tiny motors when they purred.
- 6 "I'm home!" Jacob called. He thumped his book bag down on a kitchen chair.
- 7 The rocker in the nursery stopped creaking.
- 8 "How was school?" his mother asked, walking in with his baby brother on her shoulder. She was patting his little back.
- 9 "I've got homework," Jacob grumbled.
- 10 The baby burped, and Jacob laughed. "That's what I think about it, too!"
- 11 "Have a snack before you do your chores," his mother said. She took the animal crackers down from the cupboard.
- 12 Jacob rattled the carton. Not many left. He crunched two tigers, three lions, and a seal, then gulped down some milk. If only animal crackers were real. He would have plenty of noises to list!
- 13 Goldie, Jacob's collie, woofed as Jacob walked toward the barn. Her puppies were yipping in a straw-filled stall. Jacob plinked dog food pellets into their pan, and the pups snuffled and crunched.
- 14 In the chicken house, Jacob shooed two cackling hens from their nests. He slipped their warm eggs into his jacket. Wouldn't it be funny if he forgot about the eggs and they hatched? He'd have a peeping pocket!
- 15 In the corral, a black cow napped in the sun. Jacob woke her when he poured corn into her pan. "Moo, thank you!" she seemed to say.
- 16 *Tap, clatter, clink.* Dad drove the tractor into the yard. The lid on the tractor's smokestack rattled when it chuffed and chugged to a stop.
- 17 "How was school?" Dad asked, stepping down from the cab.
- 18 Jacob shrugged. "OK, I guess," he said. "I have some homework."
- 19 Jacob put the eggs in the kitchen, then climbed to his tree house. He could see Dad's beehives by the hay field. Six hives usually meant plenty of humming. But today he couldn't hear it over the scolding of the blue jays and the chattering of the sparrows. How could a person think?
- 20 "QUIET!" Jacob shouted.
- 21 Suddenly, he sat up straight. Cows mooed and puppies yipped. Chickens cackled in their yard. When Goldie began barking below, Jacob grinned. There were plenty of noises on the farm. "I hear you!" he called. He hurried down from the tree. He had an earful of homework to do.

First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did before. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which is the best summary of Jacob's problem in the passage?

- A. He is unhappy living out in the country on a farm. He wishes he could live in the city instead.
- B. He has to collect sounds for a homework assignment. He thinks that will be difficult on a farm.
- C. He is unable to get his homework done after school. The animals on the farm where he lives are too noisy.
- D. He has to do some homework after school, but he has too many chores. There is not enough time to get everything done.

Key: B

Asset ID: 484648

Item-specific Probe (as Necessary)

- *Were there any words in the question that made this item easy or hard? (evaluate)*
 - *Tell me what you know about what a "summary" is.*
- *What information from the passage helped you decide on your answer? (analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

"An Earful" is narrated from what point of view?

- A. first person by Jacob
- B. third person by Jacob's teacher
- C. first person by an unnamed narrator
- D. third person by an unknown narrator

Key: D

Asset ID: 484640

Item-specific Probe (as Necessary)

- *Were there any words in the question that made this item easy or hard? (evaluate)*
 - (If relevant) *Tell me what you know about what "point of view" is.*
 - (If relevant) *Tell me what a "narrator" is.*
- *What information from the passage helped you decide on your answer? (analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

A reader can tell that this passage is fiction because it

- A. gives details about farm animals.
- B. shows events in order through time.
- C. happens on a farm and not in a big city.
- D. uses characters who are not real people.

Key: D

Asset ID: 484646

Item-specific Probe (as Necessary)

- *Were there any words in the question that made this item easy or hard? (evaluate)*
 - *(If relevant) Please tell me what "fiction" is.*
 - *(If relevant) Please tell me what a "character" is.*
- *What information from the passage helped you decide on your answer? (analyze)*
- *How did you come to your answer? (draw conclusions, explain)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Describe how Jacob's feelings about his homework change from the beginning of the story to the end of the story. Provide details from the passage to support your answer.

Scoring: At the beginning, Jacob is frustrated (annoyed, mad, unhappy, etc.) because he doesn't think there are any sounds on the farm and that he will do poorly on the assignment. By the end of the passage, Jacob realizes that there are many sounds on the farm, and he's excited (happy, not worried, etc.) because he feels confident he can do the assignment.

Item-specific Probe (as Necessary)

- *What information from the passage helped you decide on your answer? (analyze)*
- *How did you decide which information was important and which wasn't? (evaluate)*
 - *Which details helped you with your answer? (evaluate, identify)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about our items and the reading passages.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions on paper, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

- (1) *Did you enjoy thinking out loud?*
- (2) *Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?*
- (3) *Were the reading passages difficult for you, easy, or about average?*
- (4) *Tell me which test questions you found difficult or confusing... Please explain.*

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

- (1) Did you monitor the session enough to answer a couple of questions?
- (2) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?
- (3) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

ELA GRADE 4 FORM B

August 26, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items



Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is [say your name as you wish the student to address you.]. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the OSTP ELA test last spring? You answered test questions in ELA like this one:

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

Wait for the student’s response and comments.

Key = A

We’re studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I’m going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student’s response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer is to a test question. It includes all of your thoughts—a even if you don’t think they’re important We want to hear everything—even thoughts like “This is boring” or “I don’t like this.”

And don't worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of question work, but we won't share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Wait for student's acknowledgment and answer questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper, one ELA item for the researcher to model thinking out loud. The ELA item and passage should be an easy item.

I'll ask you to think out loud as you take a few of the new test questions. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way. Ok. Now I'll fold it like this.*)

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

Modeling Part B

Here's another example of thinking out loud.

Demonstrate with the American Buffalo item below.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

That’s what thinking out loud for test items looks and sounds like. I’ll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we’re studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they’re about to practice and that you’ll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this reading question.

If the student says they're not ready to try, say *Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.*

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Note to researcher: This passage is too long for practice. Tell the student *Please read the first two paragraphs. Then read other paragraph headers.* Point to the headers as needed.

Read the passage. Then answer the questions that follow.

An Earful

by Dale-Marie Bryan

kazoo—a toy musical instrument

- 1 "Your homework is to collect sounds," Mrs. Olson said. She handed out sheets of paper shaped like giant ears. Then she held up a shiny blue kazoo. "Everyone who gets an 'earful' will get one of these." The class laughed.



- 2 Later, Jacob glared out the school bus window. Not fair, he thought. How could he collect enough sounds on his family's farm? There were plenty of noises in town. If only he lived where tires squealed and sirens wailed.
- 3 Jacob scrambled off the bus when it screeched to a stop at his mailbox. But he wasn't in the mood to wave as it drove away.
- 4 When he threw open the gate, it groaned like a stubborn mule. That was how he felt about his homework.

- 5 On the porch, Jacob knelt beside the kittens curled on the rug. They sounded like tiny motors when they purred.
- 6 "I'm home!" Jacob called. He thumped his book bag down on a kitchen chair.
- 7 The rocker in the nursery stopped creaking.
- 8 "How was school?" his mother asked, walking in with his baby brother on her shoulder. She was patting his little back.
- 9 "I've got homework," Jacob grumbled.
- 10 The baby burped, and Jacob laughed. "That's what I think about it, too!"
- 11 "Have a snack before you do your chores," his mother said. She took the animal crackers down from the cupboard.
- 12 Jacob rattled the carton. Not many left. He crunched two tigers, three lions, and a seal, then gulped down some milk. If only animal crackers were real. He would have plenty of noises to list!
- 13 Goldie, Jacob's collie, woofed as Jacob walked toward the barn. Her puppies were yipping in a straw-filled stall. Jacob plinked dog food pellets into their pan, and the pups snuffled and crunched.
- 14 In the chicken house, Jacob shooed two cackling hens from their nests. He slipped their warm eggs into his jacket. Wouldn't it be funny if he forgot about the eggs and they hatched? He'd have a peeping pocket!
- 15 In the corral, a black cow napped in the sun. Jacob woke her when he poured corn into her pan. "Moo, thank you!" she seemed to say.
- 16 *Tap, clatter, clink.* Dad drove the tractor into the yard. The lid on the tractor's smokestack rattled when it chuffed and chugged to a stop.
- 17 "How was school?" Dad asked, stepping down from the cab.
- 18 Jacob shrugged. "OK, I guess," he said. "I have some homework."
- 19 Jacob put the eggs in the kitchen, then climbed to his tree house. He could see Dad's beehives by the hay field. Six hives usually meant plenty of humming. But today he couldn't hear it over the scolding of the blue jays and the chattering of the sparrows. How could a person think?
- 20 "QUIET!" Jacob shouted.
- 21 Suddenly, he sat up straight. Cows moored and puppies yipped. Chickens cackled in their yard. When Goldie began barking below, Jacob grinned. There were plenty of noises on the farm. "I hear you!" he called. He hurried down from the tree. He had an earful of homework to do.

What does Jacob mean when he asks, “How could a person think?” in paragraph 19?

- A. Jacob wonders if his parents are able to think while they have so many things to do.
- B. Jacob feels that his homework assignment means a completely new way of thinking.
- C. Jacob thinks his teacher will understand if he does not do his homework because so much is going on around him.
- D. Jacob finds the animals and birds on the farm so noisy that he cannot keep his mind on his homework.

Key = D

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let’s try one more, just to be sure that you’re comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question.

Determine a theme of the passage. Provide details from the passage to support your answer.

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you’ll have to encourage them to think out numerous times during the cog lab.

OK, I think you’re ready to think out loud with the new items. Do you think you’re ready? (I do.) Wait for student’s response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

An Earful

You're going answer more test questions on "Inside a Termite Tower." Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

An Earful

by Dale-Marie Bryan

kazoo—a toy musical instrument

- 1 "Your homework is to collect sounds," Mrs. Olson said. She handed out sheets of paper shaped like giant ears. Then she held up a shiny blue kazoo. "Everyone who gets an 'earful' will get one of these." The class laughed.



- 2 Later, Jacob glared out the school bus window. Not fair, he thought. How could he collect enough sounds on his family's farm? There were plenty of noises in town. If only he lived where tires squealed and sirens wailed.
- 3 Jacob scrambled off the bus when it screeched to a stop at his mailbox. But he wasn't in the mood to wave as it drove away.
- 4 When he threw open the gate, it groaned like a stubborn mule. That was how he felt about his homework.

- 5 On the porch, Jacob knelt beside the kittens curled on the rug. They sounded like tiny motors when they purred.
- 6 "I'm home!" Jacob called. He thumped his book bag down on a kitchen chair.
- 7 The rocker in the nursery stopped creaking.
- 8 "How was school?" his mother asked, walking in with his baby brother on her shoulder. She was patting his little back.
- 9 "I've got homework," Jacob grumbled.
- 10 The baby burped, and Jacob laughed. "That's what I think about it, too!"
- 11 "Have a snack before you do your chores," his mother said. She took the animal crackers down from the cupboard.
- 12 Jacob rattled the carton. Not many left. He crunched two tigers, three lions, and a seal, then gulped down some milk. If only animal crackers were real. He would have plenty of noises to list!
- 13 Goldie, Jacob's collie, woofed as Jacob walked toward the barn. Her puppies were yipping in a straw-filled stall. Jacob plinked dog food pellets into their pan, and the pups snuffled and crunched.
- 14 In the chicken house, Jacob shooed two cackling hens from their nests. He slipped their warm eggs into his jacket. Wouldn't it be funny if he forgot about the eggs and they hatched? He'd have a peeping pocket!
- 15 In the corral, a black cow napped in the sun. Jacob woke her when he poured corn into her pan. "Moo, thank you!" she seemed to say.
- 16 *Tap, clatter, clink.* Dad drove the tractor into the yard. The lid on the tractor's smokestack rattled when it chuffed and chugged to a stop.
- 17 "How was school?" Dad asked, stepping down from the cab.
- 18 Jacob shrugged. "OK, I guess," he said. "I have some homework."
- 19 Jacob put the eggs in the kitchen, then climbed to his tree house. He could see Dad's beehives by the hay field. Six hives usually meant plenty of humming. But today he couldn't hear it over the scolding of the blue jays and the chattering of the sparrows. How could a person think?
- 20 "QUIET!" Jacob shouted.
- 21 Suddenly, he sat up straight. Cows moored and puppies yipped. Chickens cackled in their yard. When Goldie began barking below, Jacob grinned. There were plenty of noises on the farm. "I hear you!" he called. He hurried down from the tree. He had an earful of homework to do.

First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which is the best summary of Jacob's problem in the passage?

- A. He is unhappy living out in the country on a farm. He wishes he could live in the city instead.
- B. He has to collect sounds for a homework assignment. He thinks that will be difficult on a farm.
- C. He is unable to get his homework done after school. The animals on the farm where he lives are too noisy.
- D. He has to do some homework after school, but he has too many chores. There is not enough time to get everything done.

Key: B

Asset ID: 484648

Item-specific Probe (as Necessary)

- *Were there any words in the question that made this item easy or hard? (evaluate)*
 - *Tell me what you know about what a "summary" is.*
- *What information from the passage helped you decide on your answer? (analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

"An Earful" is narrated from what point of view?

- A. first person by Jacob
- B. third person by Jacob's teacher
- C. first person by an unnamed narrator
- D. third person by an unknown narrator

Key: D

Asset ID: 484640

Item-specific Probe (as Necessary)

- *Were there any words in the question that made this item easy or hard? (evaluate)*
 - (If relevant) *Tell me what you know about what "point of view" is.*
 - (If relevant) *Tell me what a "narrator" is.*
- *What information from the passage helped you decide on your answer? (analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

A reader can tell that this passage is fiction because it

- A. gives details about farm animals.
- B. shows events in order through time.
- C. happens on a farm and not in a big city.
- D. uses characters who are not real people.

Key: D

Asset ID: 484646

Item-specific Probe (as Necessary)

- Were there any words in the question that made this item easy or hard? (evaluate)
 - (If relevant) Please tell me what “fiction” is.
 - (If relevant) Please tell me what a “character” is.
- What information from the passage helped you decide on your answer? (analyze)
- How did you come to your answer? (draw conclusions, explain)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR

Ok, please answer this last question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Describe how Jacob's feelings about his homework change from the beginning of the story to the end of the story. Provide details from the passage to support your answer.

Scoring: At the beginning, Jacob is frustrated (annoyed, mad, unhappy, etc.) because he doesn't think there are any sounds on the farm and that he will do poorly on the assignment. By the end of the passage, Jacob realizes that there are many sounds on the farm, and he's excited (happy, not worried, etc.) because he feels confident he can do the assignment.

Item-specific Probe (as Necessary)

- *What information from the passage helped you decide on your answer? (analyze)*
- *How did you decide which information was important and which wasn't? (evaluate)*
 - *Which details helped you with your answer? (evaluate, identify)*
- Student may be incorrect about Jacob's change in feelings: *Tell me why you said that Jacob's feeling changed [insert what the student said].*
- Student may not provide sufficient detail as prescribed in the highest score level of the rubric: *What other detail(s) support your answer?*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

You've done an excellent job! You are doing some great thinking. Now we are going to move on to a new passage and set of test questions. You will read the passage and then continue thinking out loud on the questions the same way you just did.

Are you ready?

Inside a Termite Tower

You're going to read a passage about termites. Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

Inside a Termite Tower

- 1** The grasslands of southern Africa are home to some of the most unusual structures on Earth—termite towers! These large mounds of dirt are of many different sizes. Some are as tall as a man, but others rise twenty feet or more above the ground. These mounds may look like castle towers, but they actually mark the sites of termite colonies.

Cool Insects

- 2** These high-rise towers are built to be cool—really! They help keep termites from getting too hot during Africa's scorching summer days. Inside the mounds are large, hollow tubes. They are sort of like chimneys leading to the surface. Air flows in and carries away heat. These tubes work very well. The temperature at the center of the mound stays around 86° F. That is much cooler than the outside temperature, which can be more than 100° F!

A Termite City

- 3** Termite mounds may resemble tall apartment buildings, but termite colonies are actually located under the mound, below the surface. Here the insects live in a sort of termite city. The city is built in the shape of a large circle. Termites dig passageways and tunnels to link the city's many different rooms.

A Royal Chamber

- 4** One of the largest rooms is the royal chamber. It is where the king and queen spend their entire lives. Termite workers feed and take care of them as if they were royalty. They are very important to the termite colony. The king and queen keep the colony growing by reproducing. To do this, the queen lays 30,000 eggs each day!

A Nursery Room

- 5 What happens to all of those eggs? Workers move them to the nursery within the colony. After the eggs hatch, workers care for the young termites, which are called nymphs. The workers feed the nymphs until the nymphs can find food on their own.

The Garden Room

- 6 Where do termites find food? They grow it in their garden, of course! Termite garden rooms look like honeycombs, but instead of making honey, termites grow a type of fungus. Besides fungus, termites munch on wood, grass, and leaves found near the mound. The fungi grown by the termites help them to be able to eat these other foods more easily.

Tunnel Travelers

- 7 Termites almost always stay inside their tubes and tunnels. Why? Most termites have thin skin. They need protection from the wind and sun. Staying out of the sun is no problem for termites, though. These incredible insects can get everything they need without ever going above ground.



First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did before. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which sentence from the passage best supports the idea that towers help termites survive?

- A. "These large mounds of dirt are of many different sizes."
- B. "Inside the mounds are large, hollow tubes."
- C. "Air flows in and carries away heat."
- D. "Termites almost always stay inside their tubes and tunnels."

Key: C
ID: 632843

Item-specific Probe (as Necessary)

- *How did you decide what was the best answer? (evaluate)*
- *Can you say in your own words what the question is asking? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which detail best supports the idea that termites help one another?

- A. Termite kings and queens stay inside their chambers.
- B. Termite towers have large tubes to help release heat.
- C. Termite workers feed nymphs until they can find food on their own.
- D. Termite cities have passageways and tunnels to link different rooms.

Key: C

Asset ID: 484668

Item-specific Probe (as Necessary)

- *How did you decide on the best answer? (evaluate)*
- *Can you ask the question using your own words? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which research question would best help a reader find information about the life cycle of termites?

- A. How big is a full-grown termite?
- B. How do termite nymphs turn into adults?
- C. How do termites speak with one another?
- D. How many different kinds of termites are there?

Key: B

Asset ID: 484672

Item-specific Probe (as Necessary)

- *Can you tell me more about your thought process as you came up with your answer? (explain)*
- *Were there any words or ideas in the question that helped you to decide on your answer? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from the passage to support your answer.

Scoring: The colony would die out since both are needed for the colony to survive; a new queen/king would be found; workers might try to find a different colony or start a new one.

Asset ID: 629614

Item-specific Probe (as Necessary)

- *How did you come up with your answer? (explain)*
- *Can you ask the question using your own words? (analyze)*
- *Were there any words in the question that made this item easy or hard? (evaluate)*
- *Where there any details in the passage that helped you come up with your answer? (evaluating)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about our items and the reading passages.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions on paper, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students



Researcher, please take notes on the student's response to these questions.

(5) *Did you enjoy thinking out loud?*

(6) *Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?*

(7) *Were the reading passages difficult for you, easy, or about average?*

(8) *Tell me which test questions you found difficult or confusing... Please explain.*

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

(4) Did you monitor the session enough to answer a couple of questions?

(5) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

(6) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

ELA GRADE 7 FORM A

August 26, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items

Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is [say your name as you wish the student to address you.]. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the OSTP test last spring? You answered test questions in ELA like this one:

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

Wait for the student’s response and comments.

Key: A

We’re studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I’m going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student’s response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer is to a test question. It includes all of your thoughts—a even if you don’t think they’re important We want to hear everything—even thoughts like “This is boring” or “I don’t like this.”

And don't worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of question work, but we won't share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Wait for student's acknowledgment and answer questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper, one ELA item for the researcher to model thinking out loud. The ELA item and passage should be an easy item.

I'll ask you to think out loud as you take a few of the new test questions. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way. Ok. Now I'll fold it like this.*)

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

Modeling Part B

Here's another example of thinking out loud.

Demonstrate with the American Buffalo item below.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

That’s what thinking out loud for test items looks and sounds like. I’ll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we’re studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they’re about to practice and that you’ll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this reading question.

If the student says they're not ready to try, say *Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.*

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Note to researcher: This passage is too long for practice. Tell the student *Please read to paragraph 5. Then read other paragraph headers.* Point to the headers as needed.

Read the passage. Then answer the questions that follow.

Ben Franklin: Fit for Life

by Trish Early

1 The balding older man rested the fingers of one hand on the opposite wrist. His lips moved silently, counting as he looked at his watch. Sixty heartbeats in a minute . . .

2 When he finished, he started to swing a dumbbell. After a few repetitions his face flushed and his body warmed, in spite of the chilly weather. At the end of 40 swings, the man took his pulse again—one hundred beats in a minute. The simple exercise had increased both his heart rate and body temperature. For Ben Franklin, those two things made it a great workout.

Keeping Fit

3 At 66, Franklin had lived a long life. In the 1700s, the average American lived only 40 years and had no understanding of the connection between exercise and good health. Franklin believed exercise to be "of the greatest importance to prevent diseases." Over his lifetime, he developed some new and interesting ideas about keeping fit.

4 In a letter to his son William, Franklin gave some fatherly advice about types of exercise. There is more exercise in one mile's riding on horseback than in five in a coach; and more in one mile's walking on foot than in five on horseback; to which I may add that there is more in walking one mile up and down stairs than in five on a level floor.

5 He suggested stair climbing to William when time was short or the weather bad. Much could be accomplished in a matter of minutes. Franklin measured the benefit of an exercise by increased pulse and body heat, not by its length of time or distance. Today's fitness experts use the word *cardiovascular* (heart and blood vessels) to describe this kind of exercise and recommend it for people of all ages.

Exercising and Inventing

- 6 When he was younger, Ben liked more strenuous exercise. As a boy he lived in the seaside city of Boston, where he “learned early to swim well and to manage boats.” In order to improve his swimming speed, he conducted an experiment:

I made two oval palettes, each about ten inches long and six broad, with a hole for the thumb, in order to retain it fast in the palm of my hand. They much resembled a painter’s palettes. In swimming I pushed the edges of these forward, and I struck the water with their flat surfaces as I drew them back. I remember I swam faster by means of these palettes, but they fatigued my wrists.

- 7 These wooden “palettes” were Ben Franklin’s first invention. They were similar to the swim paddles that competitive swimmers now use to build strength. However, his second idea—wooden “sandals” for the soles of his feet—caused problems for his swimming stroke. From this experiment Ben learned that a proper kick used the inside of the foot and ankle. The rigid wood could not bend and twist like modern flexible swim fins.

Swimming with Success

- 8 Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor, and once learned, was never forgotten. When he was in his twenties and living in England, Ben had such success teaching a co-worker to swim that he thought about opening a swimming school.
- 9 He studied and practiced all the motions and positions in a book called *The Art of Swimming*. He even created some strokes of his own. One day, the muscular barrel-chested young American amazed British friends by swimming three and one-half miles in the Thames River and “performing on the way many feats of activity both upon and under water.”
- 10 More than two hundred years later, this famous swim-and-water show was still attracting attention. The International Swimming Hall of Fame named Benjamin Franklin one of the United States’ first “ornamental swimmers” and also honored him for being a swim coach and teacher. He is the only Founding Father to be inducted into a sports hall of fame.
- 11 Ben Franklin, Colonial America’s most famous scientist and inventor, understood that exercise would not keep him young forever. So he created another unique way to turn back the clock. From his 70th birthday on, he counted his age backward. At the time of his death in 1790, Ben Franklin thought of himself as 56—not, in fact, 84!

Which book would be most helpful in finding more information about the advantages of cardiovascular exercise?

- A. *What the Heart Does for You*
- B. *The Healthy Heart Manual*
- C. *Faster Beats*
- D. *Short Sports*

Key = B

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question.

Paraphrase the advice Ben Franklin gave to his son in paragraphs 4 and 5. Provide supporting details from the passage.

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

OK, I think you're ready to think out loud with the new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

Ben Franklin: Fit for Life

You're going answer more test questions on "Ben Franklin: Fit for Life." Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

Ben Franklin: Fit for Life

by Trish Early

- 1 The balding older man rested the fingers of one hand on the opposite wrist. His lips moved silently, counting as he looked at his watch. Sixty heartbeats in a minute . . .
- 2 When he finished, he started to swing a dumbbell. After a few repetitions his face flushed and his body warmed, in spite of the chilly weather. At the end of 40 swings, the man took his pulse again—one hundred beats in a minute. The simple exercise had increased both his heart rate and body temperature. For Ben Franklin, those two things made it a great workout.

Keeping Fit

- 3 At 66, Franklin had lived a long life. In the 1700s, the average American lived only 40 years and had no understanding of the connection between exercise and good health. Franklin believed exercise to be “of the greatest importance to prevent diseases.” Over his lifetime, he developed some new and interesting ideas about keeping fit.
- 4 In a letter to his son William, Franklin gave some fatherly advice about types of exercise. There is more exercise in one mile’s riding on horseback than in *five* in a coach; and more in one mile’s walking on foot than in *five* on horseback; to which I may add that there is more in walking one mile up and down stairs than in *five* on a level floor.
- 5 He suggested stair climbing to William when time was short or the weather bad. Much could be accomplished in a matter of minutes. Franklin measured the benefit of an exercise by increased pulse and body heat, not by its length of time or distance. Today’s fitness experts use the word *cardiovascular* (heart and blood vessels) to describe this kind of exercise and recommend it for people of all ages.

Exercising and Inventing

- 6 When he was younger, Ben liked more strenuous exercise. As a boy he lived in the seaside city of Boston, where he “learned early to swim well and to manage boats.” In order to improve his swimming speed, he conducted an experiment:

I made two oval palettes, each about ten inches long and six broad, with a hole for the thumb, in order to retain it fast in the palm of my hand. They much resembled a painter’s palettes. In swimming I pushed the edges of these forward, and I struck the water with their flat surfaces as I drew them back. I remember I swam faster by means of these palettes, but they fatigued my wrists.

- 7 These wooden “palettes” were Ben Franklin’s first invention. They were similar to the swim paddles that competitive swimmers now use to build strength. However, his second idea—wooden “sandals” for the soles of his feet—caused problems for his swimming stroke. From this experiment Ben learned that a proper kick used the inside of the foot and ankle. The rigid wood could not bend and twist like modern flexible swim fins.

Swimming with Success

- 8 Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor, and once learned, was never forgotten. When he was in his twenties and living in England, Ben had such success teaching a co-worker to swim that he thought about opening a swimming school.
- 9 He studied and practiced all the motions and positions in a book called *The Art of Swimming*. He even created some strokes of his own. One day, the muscular barrel-chested young American amazed British friends by swimming three and one-half miles in the Thames River and “performing on the way many feats of activity both upon and under water.”
- 10 More than two hundred years later, this famous swim-and-water show was still attracting attention. The International Swimming Hall of Fame named Benjamin Franklin one of the United States’ first “ornamental swimmers” and also honored him for being a swim coach and teacher. He is the only Founding Father to be inducted into a sports hall of fame.
- 11 Ben Franklin, Colonial America’s most famous scientist and inventor, understood that exercise would not keep him young forever. So he created another unique way to turn back the clock. From his 70th birthday on, he counted his age backward. At the time of his death in 1790, Ben Franklin thought of himself as 56—not, in fact, 84!

First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you’re thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which statement best states the main idea of the selection?

- A. Franklin proved that being fit prolonged life by devising a new system for counting age.
- B. Franklin invented swim palettes and studied swimming motions as a means of building strength.
- C. Franklin took a scientific approach to exercise that included measuring heartbeats and body heat.
- D. Franklin worked to stay fit because he understood the connection between exercise and good health.

Key: D

Asset ID: 486302

Item-specific Probe (as Necessary)

- *How did you evaluate information from the passage to come up with your answer? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which question is answered in paragraph 8?

- A. When did Ben Franklin learn to swim?
- B. Why did people love swimming so much?
- C. How did swimming benefit both the rich and poor?
- D. Why did Ben Franklin think about opening a swimming school?

Key: D

Asset ID: 158766A

Item-specific Probe (as Necessary)

- *Explain why your answer is correct. (explain)*
- *What information helped you with your answer? (evaluate, analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

“Ben Franklin: Fit for Life” is considered a biography because

- A. it uses someone’s actual words.
- B. it tells about a person’s life.
- C. it is written in first person.
- D. it teaches a lesson.

Key: B

Asset ID: 158768A

Item-specific Probe (as Necessary)

- *Where there any words in the question that were confusing? (evaluate)*
 - *Tell me what a biography is.*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR

Ok, please answer this last question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Summarize Ben Franklin's beliefs about exercise. Provide supporting details from the passage.

Scoring: Franklin exercised as an older man, which suggests that he thought it was important. He believed that exercise helped prevent disease. Swimming in particular was something “everyone should learn.”

Asset ID: 630545

Item-specific Probe (as Necessary)

- *Where there any words in the question that were confusing? (evaluate)*
 - *What does it mean to summarize?*
- *How did you decide which information was important?*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

You've done an excellent job! You are doing some great thinking. Now we are going to move on to a new passage and set of test questions. You will read the passage and then continue thinking out loud on the questions the same way you just did.

Are you ready?

Carolina Crow Girl

You're going to read a passage about two people and a bird. Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

Carolina Crow Girl from *Carolina Crow Girl* by Valerie Hobbs



- 1 Carolina gave a hopeless shrug and sighed. She was always thinking about what was best for Crow, who couldn't, after all, tell her.
- 2 "Well, what I think," Stefan said in his serious, thoughtful way, "is that it's pretty hard to know anything for sure about a bird, Carolina. I mean, you can't think like a bird. You can't know what Crow wants. You never will. Humans can't do that."
- 3 Crow ruffled his wings. He looked from Carolina to Stefan, Stefan to Carolina, as if he knew they were talking about him.
- 4 Stefan shook his head. "He should be released, Carolina. His tail feathers are all grown in."
- 5 "He's thinking about it," she said. "You don't know."
- 6 "You think because he's not in a cage that he's free," Stefan said in a quiet, very firm voice. "But he's not. He's never been free."
- 7 "There's no such thing as absolute total freedom, Carolina. We all have things we can't do, or won't do, or aren't allowed to do. That's what it means to grow up." He

stopped then, embarrassed that he'd gone on so long. "But Crow, Crow belongs to an entire other world, and it's time to let him go there."

8 "I know. I know you're right. I'm sorry, Stefan, for what I said—"

9 They crossed the brick patio, the ground that was strewn with dry spiny leaves and seedpods, and came at last to the edge of the cliff. Side by side, they looked out into the ocean below and the sky that went on forever.

10 In the distance a line of pelicans played follow the leader, stringing low over the horizon. There were tiny sailboats in the distance and surfers sitting out the swell, their feet dangling free in the deep blue water. The world was full of space, and wind to move you through it.

11 Crow was perched lightly on the back of Carolina's hand. In the sunlight his feathers shone purple and green, magenta and gold. He was a beautiful bird. He'd been her bird, but only for a time. Truly, he belonged to no one but the wind.

12 She brought him to eye level on her bent arm. "It's time to be a bird," she said, looking him straight in the eye.

13 Crow tilted his head.

14 "You know what I'm saying, don't you? Don't you, Crow?"

15 Crow's black eyes glittered.

16 "It's time," she said, blinking back tears.

17 "Do it, Carolina," Stefan urged. "His family will find him."

18 "I love you, Crow," she whispered.

19 She took Crow into her hands. She could feel his heart beating, or else there were hearts in her hands that beat along with his. "Fly, Crow!" she whispered into his ear. Then she held her arms straight out and, biting her lip so hard she tasted blood, tossed him into the air. "Fly!"

- 20** Crow dropped below the level of the cliff, almost too fast for the eye to see. Then out came his wings, two beautiful many-colored wings. He dipped in a low arc over the pounding surf, then with great strong beats of his wings took the air.
- 21** Stefan cheered. He clapped his hands wildly. "Yea, Crow!" he cried.
- 22** Carolina dropped her arms, her empty hands, to her sides. She felt like laughing and crying both, and could do neither one. Crow wheeled in the air as if he'd been flying all his life, or dreaming of flying, and knew all the right moves. He seemed to be showing off. Then suddenly he veered left and sailed toward the cliff again. With a light bounce, he landed on her shoulder. Carolina turned her face and felt, for the space of three breaths, his soft feathers against her cheek. And then he was gone. With a single bob of his tail he leaped into the air and sailed away, off toward the trees. Carolina and Stefan watched until he became a tiny black speck in the air and disappeared.

First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did before. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

How can the reader tell that "Carolina Crow Girl" is realistic fiction?

- A. It presents factual information on a specific subject.
- B. It features a main character dealing with conflict.
- C. It describes events that happened in the past.
- D. It includes an animal that relates to humans.

Key: B
Asset ID 485467

Item-specific Probe (as Necessary)

- *Are there any words that make this question hard? (evaluate)*
 - *Tell me what fiction is.*
 - *Tell me what realistic means.*
- *What information from the passage helped you answer the question? (evaluate, analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you’re thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

The main purpose of paragraph 7 is

- A. to emphasize the difficulties in Crow’s life.
- B. to contrast Crow’s world with the human world.
- C. to explain how Carolina and Stefan acquired Crow.
- D. to show that Stefan has difficulty talking to Carolina.

Key: B

Asset ID: 158845A

Item-specific Probe (as Necessary)

- *What information from the paragraph helped you answer the question? (evaluate, assess)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

How is Stefan important to the plot?

- A. He prepares Crow for a different kind of life.
- B. He shows Carolina how to take care of Crow.
- C. He helps Carolina understand what she must do.
- D. He explains how Crow is different from other birds.

Key: C

Asset ID: 158833A

Item-specific Probe (as Necessary)

- *What information from the passage helped you with your answer? (evaluate, analyze)*
- *Were there any words that made it difficult to answer? (evaluate)*
 - *Tell me what the word “plot” means.*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Identify what the crow symbolizes in the passage. Provide evidence from the passage to support your answer.

Scoring: Freedom, growing up, becoming independent.

Item-specific Probe (as Necessary)

- *What information from the passage helped you with your answer? (evaluate, analyze)*
- *Were there any words that made it difficult to answer?*
 - *Tell me what “symbolizes” means.*
- *How did you come to your answer? (draw conclusions)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting,

justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about our items and the reading passages.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions on paper, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

(9) Did you enjoy thinking out loud?

(10) Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?

(11) Were the reading passages difficult for you, easy, or about average?

(12) Tell me which test questions you found difficult or confusing... Please explain.

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

- (7) Did you monitor the session enough to answer a couple of questions?

- (8) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

- (9) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

ELA GRADE 7 FORM B

August 26, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items



Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is [say your name as you wish the student to address you.]. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the OSTP test last spring? You answered test questions in ELA like this one:

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

Wait for the student’s response and comments.

Key = A

We’re studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I’m going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student’s response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer is to a test question. It includes all of your thoughts—a even if you don’t think they’re important We want to hear everything—even thoughts like “This is boring” or “I don’t like this.”

And don't worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of question work, but we won't share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Wait for student's acknowledgment and answer questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper, one ELA item for the researcher to model thinking out loud. The ELA item and passage should be an easy item.

I'll ask you to think out loud as you take a few of the new test questions. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way. Ok. Now I'll fold it like this.*)

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

Modeling Part B

Here's another example of thinking out loud.

Demonstrate with the American Buffalo item below.

Read the passage below. Then answer the question that follows.

The American Buffalo

- 1 The state animal of Oklahoma is the American buffalo. It is most closely related to the European bison and the Canadian woods bison. A bison is another name for a buffalo. A long time ago it could weigh as much as 5,000 pounds. But, over the years, the American buffalo has slimmed down. Today, it weighs from 800–2,000 pounds, and stands about six feet tall. People recognize the American buffalo by its thick, dark, brown, shaggy hair. It is a very impressive animal.
- 2 The American buffalo came to North America from Asia. The animals crossed a land bridge that once connected Asia to Alaska. Before long, millions of buffalo freely roamed the prairies of America. The large herds of the American buffalo were part of the landscape. This was quite a beautiful sight.
- 3 Buffalo were an important part of Native American life as Native Americans could not survive without them. They hunted them for food and used their hides to create shelter and clothing. Native Americans made sure they used every part of the animal. They were not wasteful. But things changed when the settlers arrived.

“The American Buffalo.” Copyright © 2016 by Measured Progress.

1. **The author of “The American Buffalo” most likely wrote this passage**
 - A. to inform the reader with details.
 - B. to persuade the reader with facts.
 - C. to entertain the reader with a story.
 - D. to share a personal experience with the reader.

That’s what thinking out loud for test items looks and sounds like. I’ll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we’re studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they’re about to practice and that you’ll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this reading question.

If the student says they're not ready to try, say *Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.*

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Read the passage. Then answer the questions that follow.

Carolina Crow Girl

from *Carolina Crow Girl*
by Valerie Hobbs



- 1 Carolina gave a hopeless shrug and sighed. She was always thinking about what was best for Crow, who couldn't, after all, tell her.
- 2 "Well, what I think," Stefan said in his serious, thoughtful way, "is that it's pretty hard to know anything for sure about a bird, Carolina. I mean, you can't think like a bird. You can't know what Crow wants. You never will. Humans can't do that."
- 3 Crow ruffled his wings. He looked from Carolina to Stefan, Stefan to Carolina, as if he knew they were talking about him.
- 4 Stefan shook his head. "He should be released, Carolina. His tail feathers are all grown in."
- 5 "He's thinking about it," she said. "You don't know."
- 6 "You think because he's not in a cage that he's free," Stefan said in a quiet, very firm voice. "But he's not. He's never been free."
- 7 "There's no such thing as absolute total freedom, Carolina. We all have things we can't do, or won't do, or aren't allowed to do. That's what it means to grow up." He

stopped then, embarrassed that he'd gone on so long. "But Crow, Crow belongs to an entire other world, and it's time to let him go there."

8 "I know. I know you're right. I'm sorry, Stefan, for what I said—"

9 They crossed the brick patio, the ground that was strewn with dry spiny leaves and seedpods, and came at last to the edge of the cliff. Side by side, they looked out into the ocean below and the sky that went on forever.

10 In the distance a line of pelicans played follow the leader, stringing low over the horizon. There were tiny sailboats in the distance and surfers sitting out the swell, their feet dangling free in the deep blue water. The world was full of space, and wind to move you through it.

11 Crow was perched lightly on the back of Carolina's hand. In the sunlight his feathers shone purple and green, magenta and gold. He was a beautiful bird. He'd been her bird, but only for a time. Truly, he belonged to no one but the wind.

12 She brought him to eye level on her bent arm. "It's time to be a bird," she said, looking him straight in the eye.

13 Crow tilted his head.

14 "You know what I'm saying, don't you? Don't you, Crow?"

15 Crow's black eyes glittered.

16 "It's time," she said, blinking back tears.

17 "Do it, Carolina," Stefan urged. "His family will find him."

18 "I love you, Crow," she whispered.

19 She took Crow into her hands. She could feel his heart beating, or else there were hearts in her hands that beat along with his. "Fly, Crow!" she whispered into his ear. Then she held her arms straight out and, biting her lip so hard she tasted blood, tossed him into the air. "Fly!"

20 Crow dropped below the level of the cliff, almost too fast for the eye to see. Then out came his wings, two beautiful many-colored wings. He dipped in a low arc over the pounding surf, then with great strong beats of his wings took the air.

21 Stefan cheered. He clapped his hands wildly. "Yea, Crow!" he cried.

22 Carolina dropped her arms, her empty hands, to her sides. She felt like laughing and crying both, and could do neither one. Crow wheeled in the air as if he'd been flying all his life, or dreaming of flying, and knew all the right moves. He seemed to be showing off. Then suddenly he veered left and sailed toward the cliff again. With a light bounce, he landed on her shoulder. Carolina turned her face and felt, for the space of three breaths, his soft feathers against her cheek. And then he was gone. With a single bob of his tail he leaped into the air and sailed away, off toward the trees. Carolina and Stefan watched until he became a tiny black speck in the air and disappeared.

Which would be the best source for more information about the habitat of crows?

- A. an encyclopedia entry on "Crows"
- B. an anthology of essays about birds
- C. a journal article entitled "Images of Crows in Art"
- D. a newspaper article about building a bird sanctuary

Key = A

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question.

Describe Carolina and Crow's relationship. Provide evidence from the passage to support your answer.

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

OK, I think you're ready to think out loud with the new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

Carolina Crow Girl

You're going answer more test questions on "Inside a Termite Tower." Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Read the passage. Then answer the questions that follow.

Carolina Crow Girl
from *Carolina Crow Girl*
by Valerie Hobbs



- 1 Carolina gave a hopeless shrug and sighed. She was always thinking about what was best for Crow, who couldn't, after all, tell her.
- 2 "Well, what I think," Stefan said in his serious, thoughtful way, "is that it's pretty hard to know anything for sure about a bird, Carolina. I mean, you can't think like a bird. You can't know what Crow wants. You never will. Humans can't do that."
- 3 Crow ruffled his wings. He looked from Carolina to Stefan, Stefan to Carolina, as if he knew they were talking about him.
- 4 Stefan shook his head. "He should be released, Carolina. His tail feathers are all grown in."
- 5 "He's thinking about it," she said. "You don't know."
- 6 "You think because he's not in a cage that he's free," Stefan said in a quiet, very firm voice. "But he's not. He's never been free."
- 7 "There's no such thing as absolute total freedom, Carolina. We all have things we can't do, or won't do, or aren't allowed to do. That's what it means to grow up." He

stopped then, embarrassed that he'd gone on so long. "But Crow, Crow belongs to an entire other world, and it's time to let him go there."

8 "I know. I know you're right. I'm sorry, Stefan, for what I said—"

9 They crossed the brick patio, the ground that was strewn with dry spiny leaves and seedpods, and came at last to the edge of the cliff. Side by side, they looked out into the ocean below and the sky that went on forever.

10 In the distance a line of pelicans played follow the leader, stringing low over the horizon. There were tiny sailboats in the distance and surfers sitting out the swell, their feet dangling free in the deep blue water. The world was full of space, and wind to move you through it.

11 Crow was perched lightly on the back of Carolina's hand. In the sunlight his feathers shone purple and green, magenta and gold. He was a beautiful bird. He'd been her bird, but only for a time. Truly, he belonged to no one but the wind.

12 She brought him to eye level on her bent arm. "It's time to be a bird," she said, looking him straight in the eye.

13 Crow tilted his head.

14 "You know what I'm saying, don't you? Don't you, Crow?"

15 Crow's black eyes glittered.

16 "It's time," she said, blinking back tears.

17 "Do it, Carolina," Stefan urged. "His family will find him."

18 "I love you, Crow," she whispered.

19 She took Crow into her hands. She could feel his heart beating, or else there were hearts in her hands that beat along with his. "Fly, Crow!" she whispered into his ear. Then she held her arms straight out and, biting her lip so hard she tasted blood, tossed him into the air. "Fly!"

20 Crow dropped below the level of the cliff, almost too fast for the eye to see. Then out came his wings, two beautiful many-colored wings. He dipped in a low arc over the pounding surf, then with great strong beats of his wings took the air.

21 Stefan cheered. He clapped his hands wildly. "Yea, Crow!" he cried.

22 Carolina dropped her arms, her empty hands, to her sides. She felt like laughing and crying both, and could do neither one. Crow wheeled in the air as if he'd been flying all his life, or dreaming of flying, and knew all the right moves. He seemed to be showing off. Then suddenly he veered left and sailed toward the cliff again. With a light bounce, he landed on her shoulder. Carolina turned her face and felt, for the space of three breaths, his soft feathers against her cheek. And then he was gone. With a single bob of his tail he leaped into the air and sailed away, off toward the trees. Carolina and Stefan watched until he became a tiny black speck in the air and disappeared.

First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

How can the reader tell that "Carolina Crow Girl" is realistic fiction?

- A. It presents factual information on a specific subject.
- B. It features a main character dealing with conflict.
- C. It describes events that happened in the past.
- D. It includes an animal that relates to humans.

Key: B

Asset ID 485467

Item-specific Probe (as Necessary)

- *Are there any words that make this question hard? (evaluate)*
 - *Tell me what fiction is.*
 - *Tell me what realistic means.*
- *What information from the passage helped you answer the question? (evaluate, analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

The main purpose of paragraph 7 is

- A. to emphasize the difficulties in Crow's life.
- B. to contrast Crow's world with the human world.
- C. to explain how Carolina and Stefan acquired Crow.
- D. to show that Stefan has difficulty talking to Carolina.

Key: B

Asset ID: 158845A

Item-specific Probe (as Necessary)

- *What information from the paragraph helped you answer the question? (evaluate, assess*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC



Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

How is Stefan important to the plot?

- A. He prepares Crow for a different kind of life.
- B. He shows Carolina how to take care of Crow.
- C. He helps Carolina understand what she must do.
- D. He explains how Crow is different from other birds.

Key: C

Asset ID: 158833A

Item-specific Probe (as Necessary)

- *What information from the passage helped you with your answer? (evaluate, analyze)*
- *Were there any words that made it difficult to answer? (evaluate)*
 - *Tell me what the word “plot” means.*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR



Ok, please answer this last question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Identify what the crow symbolizes in the passage. Provide evidence from the passage to support your answer.

Scoring: Freedom, growing up, becoming independent.

Item-specific Probe (as Necessary)

- *What information from the passage helped you with your answer? (evaluate, analyze)*
- *Were there any words that made it difficult to answer?*
 - *Tell me what “symbolizes” means.*
- *How did you come to your answer? (draw conclusions)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

You've done an excellent job! You are doing some great thinking. Now we are going to move on to a new passage and set of test questions. You will read the passage and then continue thinking out loud on the questions the same way you just did.

Are you ready?

You're going to read a passage about Ben Franklin. Please try to say out loud anything you think about the passage as you're reading. After you read it out loud, you'll answer four test questions and think out loud while you do that.

Note to researcher: This is too much to read for this purpose Tell the student *Please read to paragraph 5. Then read other paragraph headers.* Point to the headers as needed.

Read the passage. Then answer the questions that follow.

Ben Franklin: Fit for Life

by Trish Early

- 1 The balding older man rested the fingers of one hand on the opposite wrist. His lips moved silently, counting as he looked at his watch. Sixty heartbeats in a minute . . .
- 2 When he finished, he started to swing a dumbbell. After a few repetitions his face flushed and his body warmed, in spite of the chilly weather. At the end of 40 swings, the man took his pulse again—one hundred beats in a minute. The simple exercise had increased both his heart rate and body temperature. For Ben Franklin, those two things made it a great workout.

Keeping Fit

- 3 At 66, Franklin had lived a long life. In the 1700s, the average American lived only 40 years and had no understanding of the connection between exercise and good health. Franklin believed exercise to be "of the greatest importance to prevent diseases." Over his lifetime, he developed some new and interesting ideas about keeping fit.
- 4 In a letter to his son William, Franklin gave some fatherly advice about types of exercise. There is more exercise in one mile's riding on horseback than in five in a coach; and more in one mile's walking on foot than in five on horseback; to which I may add that there is more in walking one mile up and down stairs than in five on a level floor.
- 5 He suggested stair climbing to William when time was short or the weather bad. Much could be accomplished in a matter of minutes. Franklin measured the benefit of an exercise by increased pulse and body heat, not by its length of time or distance. Today's fitness experts use the word *cardiovascular* (heart and blood vessels) to describe this kind of exercise and recommend it for people of all ages.

Exercising and Inventing

- 6 When he was younger, Ben liked more strenuous exercise. As a boy he lived in the seaside city of Boston, where he “learned early to swim well and to manage boats.” In order to improve his swimming speed, he conducted an experiment:

I made two oval palettes, each about ten inches long and six broad, with a hole for the thumb, in order to retain it fast in the palm of my hand. They much resembled a painter’s palettes. In swimming I pushed the edges of these forward, and I struck the water with their flat surfaces as I drew them back. I remember I swam faster by means of these palettes, but they fatigued my wrists.

- 7 These wooden “palettes” were Ben Franklin’s first invention. They were similar to the swim paddles that competitive swimmers now use to build strength. However, his second idea—wooden “sandals” for the soles of his feet—caused problems for his swimming stroke. From this experiment Ben learned that a proper kick used the inside of the foot and ankle. The rigid wood could not bend and twist like modern flexible swim fins.

Swimming with Success

- 8 Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor, and once learned, was never forgotten. When he was in his twenties and living in England, Ben had such success teaching a co-worker to swim that he thought about opening a swimming school.
- 9 He studied and practiced all the motions and positions in a book called *The Art of Swimming*. He even created some strokes of his own. One day, the muscular barrel-chested young American amazed British friends by swimming three and one-half miles in the Thames River and “performing on the way many feats of activity both upon and under water.”
- 10 More than two hundred years later, this famous swim-and-water show was still attracting attention. The International Swimming Hall of Fame named Benjamin Franklin one of the United States’ first “ornamental swimmers” and also honored him for being a swim coach and teacher. He is the only Founding Father to be inducted into a sports hall of fame.
- 11 Ben Franklin, Colonial America’s most famous scientist and inventor, understood that exercise would not keep him young forever. So he created another unique way to turn back the clock. From his 70th birthday on, he counted his age backward. At the time of his death in 1790, Ben Franklin thought of himself as 56—not, in fact, 84!

First Item: MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did before. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which statement best states the main idea of the selection?

- A. Franklin proved that being fit prolonged life by devising a new system for counting age.
- B. Franklin invented swim palettes and studied swimming motions as a means of building strength.
- C. Franklin took a scientific approach to exercise that included measuring heartbeats and body heat.
- D. Franklin worked to stay fit because he understood the connection between exercise and good health.

Key: D

Asset ID: 486302

Item-specific Probe (as Necessary)

- *How did you evaluate information from the passage to come up with your answer? (evaluate)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which question is answered in paragraph 8?

- A. When did Ben Franklin learn to swim?
- B. Why did people love swimming so much?
- C. How did swimming benefit both the rich and poor?
- D. Why did Ben Franklin think about opening a swimming school?

Key: D

Asset ID: 158766A

Item-specific Probe (as Necessary)

- *Explain how you know your answer is correct. (explain)*
- *What information helped you with your answer? (evaluate, analyze)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: MC



Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

“Ben Franklin: Fit for Life” is considered a biography because

- A. it uses someone’s actual words.
- B. it tells about a person’s life.
- C. it is written in first person.
- D. it teaches a lesson.

Key: B

Asset ID: 158768A

Item-specific Probe (as Necessary)

- *Where there any words in the question that were confusing? (evaluate)*
 - *Tell me what a biography is.*
- *Explain how you chose your answer. (explain)*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: CR

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Summarize Ben Franklin’s beliefs about exercise. Provide supporting details from the passage.

Scoring: Franklin exercised as an older man, which suggests that he thought it was important. He believed that exercise helped prevent disease. Swimming in particular was something “everyone should learn.”

Asset ID: 630545

Item-specific Probe (as Necessary)

- *Where there any words in the question that were confusing? (evaluate)*
 - *What does it mean to summarize?*
- *How did you decide which information was important?*

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about our items and the reading passages.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We’ll do the student and teacher exit questions on paper, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student’s thinking about items, how much of the student’s thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

(13) Did you enjoy thinking out loud?

(14) Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?

(15) Were the reading passages difficult for you, easy, or about average?

(16) Tell me which test questions you found difficult or confusing... Please explain.

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

(10) Did you monitor the session enough to answer a couple of questions?

(11) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

(12) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

MATH GRADE 4 FORM 1

August 30, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items

Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

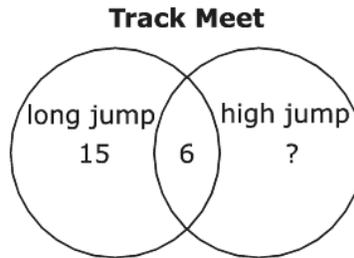
Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is Breanne. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the Oklahoma School Testing Program Math test last spring? You answered test questions in math like this one: [show student first item on computer screen].

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both.



How many students participated in only the high-jump?

Hide All

- (A) 9 students
- (B) 19 students
- (C) 21 students
- (D) 25 students

We're studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I'm going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student's response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer to a test question is. It includes all of your thoughts— even if you don't think they're important. We want to hear everything—even thoughts like, "This is boring" or "I don't like this."

And don't worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of questions work, but we won't share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Does this make sense so far?

Wait for student's acknowledgment and answer any questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper and one math item for the researcher to model thinking out loud. The math item should be an easy item.

I'll ask you to think out loud as you answer some math question in a few minutes. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way*. Ok. Now I'll fold it like this.)

First, I am going to fold it the long way like this. I will make sure to try to get it even and then will make the crease. Now I will fold it the other way making sure again to try to get each side even. Now I will check my work and make sure I folded it twice like I was supposed to. [check work] Yes, I did fold it twice.

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

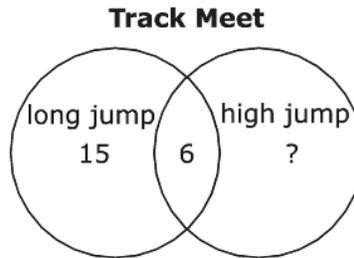
Modeling Part B

Here's another example of thinking out loud with a math problem.

Demonstrate with the math item below.

First, I will read the problem out loud. [Read problem]

There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both.



How many students participated in only the high-jump?

Hide All

- (A) 9 students
- (B) 19 students
- (C) 21 students
- (D) 25 students

I know that I need to figure out how many students participated only in the high-jump. The first sentence tells me that there were 40 total students. When I look at the Venn diagram, I can see that 15 students did the long jump, and 6 students are in the middle, which means they did both the long jump and the high jump. So first I will add 15 and 6, which is 21. Then, I can take the total, 40, and subtract 21 from that, which gives me 19 students who did the high jump only. I will double check my work to make sure I am correct. If I add 15 plus 6 plus 19, I get 40, which is the total they gave us, so yes, I am correct. I can see that 19 is answer B, so I will use the mouse to select B on the screen as my answer.

Key: B

That's what thinking out loud for test items looks and sounds like. I'll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we're studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they're about to practice and that you'll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this math question.

If the student says they're not ready to try, say *Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.*

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Please look at this test question. You will notice that there is something to the left of the question. We call that information a stimulus and it is needed to answer the question that is to the right of it. Please also read that part out loud.

There is scrap paper here for you if you want to use it at any time to figure something out. But, please also say out loud what you're doing as you write something.

Please read this question and then tell me everything you are thinking as you answer it.

Use this information to answer the following question.

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Key: D

Dean completed his reading goal for 2 weeks. What is the total number of pages Dean read?

Hide All

- A 127 pages
- B 150 pages
- C 240 pages
- D 250 pages

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question. You will see that this is just a regular question without the stimulus on the left. Half of the questions you will do with me will look like this. Please read this question out loud and then explain to me what you're thinking as you answer it.

A father has 3 children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, b , can be found using this equation.

$$3 \times b = 36$$

How many books will each child receive?

Hide All

- (A) 9 books
- (B) 12 books
- (C) 39 books
- (D) 108 books

Key: B

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

OK, I think you're ready to think out loud with some new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

You're going answer more math test questions. Please start by reading the question out loud. After you read the question out loud, you'll answer the test question and think out loud while you solve it.

First Item: Cluster MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three → questions.

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Key: B

Beth completed her reading goal for 10 days. What is the total number of pages Beth read?

Hide All

- A 25 pages
- B 150 pages
- C 1,500 pages
- D 2,500 pages

Item-specific Probe (as Necessary)

If a student answers A: How did you decide which operation to use when solving this problem? (Interpreting)

OR

How did you use the table to help answer this question? (Interpreting)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Second Item: Cluster MC

Ok, please answer this question and say out loud everything that you’re thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Jake is reading a book that has 389 pages. Based on Jake’s reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks?

Hide All

- A 59 pages
- B 89 pages
- C 279 pages
- D 330 pages

Key: A

Item-specific Probe (as Necessary)

What did you do first when solving this problem? And second? (Interpreting)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Third Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning.

This equation can be used to find the number of pages Maya read in the evening on the second day.

$$40 - 22 = \square + 8$$

Which value can be placed in the \square to make this equation true?

Hide All

- (A) 10 pages
- (B) 14 pages
- (C) 18 pages
- (D) 26 pages

Key: A

Item-specific Probe (as Necessary)

How did you solve for the box in this equation? (Evaluating)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fourth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number?

Hide All

(A) $21 \times 7 = \square$

(B) $21 + 7 = \square$

(C) $21 \div 7 = \square$

(D) $21 - 7 = \square$

Key: C

Item-specific Probe (as Necessary)

How did you choose your answer based on the information you were given? (making connections)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Fifth Item: Discrete MC

Ok, please answer this next question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums?

Hide All

- (A) 2,000 pages
- (B) 2,400 pages
- (C) 2,500 pages
- (D) 3,000 pages

Key: B

Item-specific Probe (as Necessary)

How did you estimate this answer? (evaluating)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Sixth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which number would make this equation true?

$$56 \div \square = 7$$

Hide All

(A) 9

(B) 8

(C) 7

(D) 6

Key: B

Item-specific Probe (as Necessary)

How did you solve for the box in this equation? (evaluating)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Seventh Item: Discrete MC

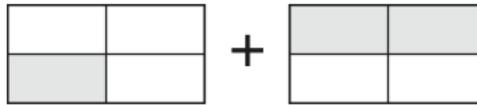
Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

This rectangle represents 1 whole unit.



What is the sum of the fractions represented by the shaded parts of the rectangles below?



Hide All

(A) $\frac{1}{8}$

(B) $\frac{3}{8}$

(C) $\frac{2}{4}$

(D) $\frac{3}{4}$

Key: D

Item-specific Probe (as Necessary)

How did you use the model to help you solve this problem? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

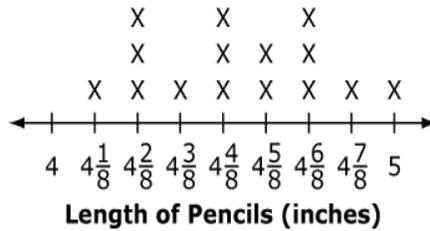
Thanks for your great thinking.

Eighth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot.



How many pencils were less than $4\frac{4}{8}$ inches long?

Hide All

- (A) 1
- (B) 5
- (C) 7
- (D) 8

Key: B

Item-specific Probe (as Necessary)

How did you use the line plot to figure out the correct answer? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

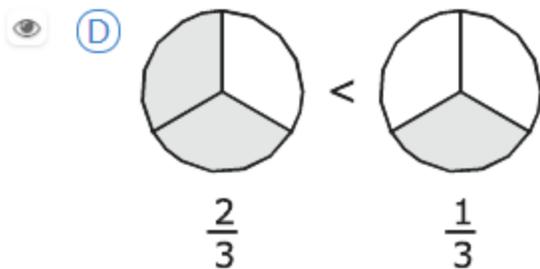
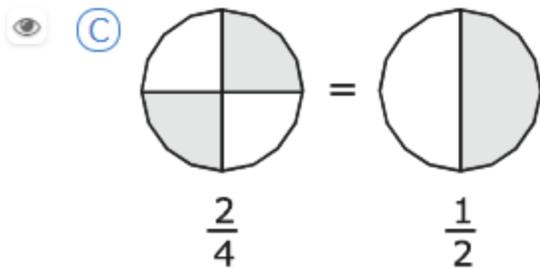
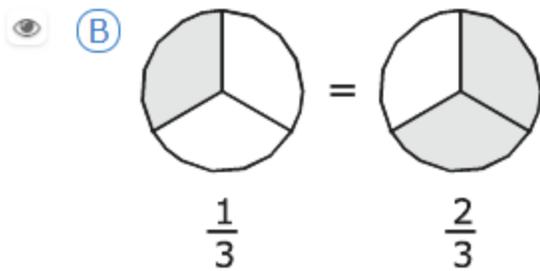
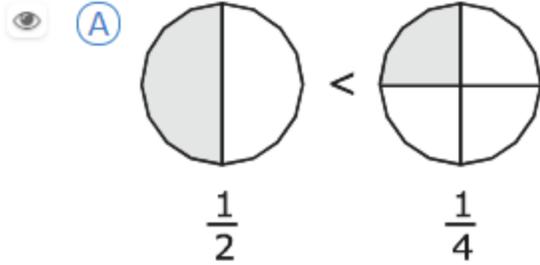
Ninth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which comparison is true?

Hide All



Key: C

Item-specific Probe (as Necessary)

How did you decide which comparison was true? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Tenth Item: Cluster MC

Ok, please answer this question and say out loud everything that you’re thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mr. Valdez’s class measured the heights of their bean plants. This table shows their data.

Student	Plant Height (inch)
Anna	$\frac{1}{2}$
Eva	$\frac{3}{4}$
Kent	$\frac{1}{2}$
Mariah	$\frac{3}{4}$
Peter	$\frac{1}{4}$

This is a fraction model that shows the height of Mariah’s bean plant.



Which expression is equal to the height of Mariah’s bean plant?

Hide All

- (A) $\frac{2}{4} + \frac{1}{4}$
- (B) $\frac{2}{4} + \frac{2}{4}$
- (C) $\frac{1}{4} + \frac{1}{4} + \frac{3}{4}$
- (D) $\frac{3}{4} + \frac{3}{4} + \frac{3}{4}$

Key: A

Item-specific Probe (as Necessary)

How did you determine which expression was equal to $\frac{3}{4}$? (assessing)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Eleventh Item: Cluster MC

Ok, please answer this question and say out loud everything that you’re thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

The students in Mr. Valdez’s class measured the heights of their bean plants. This table shows their data.

Student	Plant Height (inch)
Anna	$\frac{1}{2}$
Eva	$\frac{3}{4}$
Kent	$\frac{1}{2}$
Mariah	$\frac{3}{4}$
Peter	$\frac{1}{4}$

Mr. Valdez made this frequency table to show the same information as in the data table.

Plant Height (inch)	Number of Students
$\frac{1}{4}$	
$\frac{1}{2}$	
$\frac{3}{4}$	

What is the total number of plants that have a height greater than $\frac{1}{4}$ inch?

Hide All

- (A) 1
- (B) 2
- (C) 4
- (D) 5

Key: C

Item-specific Probe (as Necessary)

How did you use the table to figure out the correct answer? (applying)

Response-specific Probe (Optional) Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Twelfth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data.

Student	Plant Height (inch)
Anna	$\frac{1}{2}$
Eva	$\frac{3}{4}$
Kent	$\frac{1}{2}$
Mariah	$\frac{3}{4}$
Peter	$\frac{1}{4}$

Which list shows the plant heights, in inches, in order from least to greatest?

Hide All

- (A) $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$
- (B) $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}$
- (C) $\frac{3}{4}, \frac{1}{2}, \frac{1}{4}$
- (D) $\frac{3}{4}, \frac{1}{4}, \frac{1}{2}$

Key: A

Item-specific Probe (as Necessary)

What strategy did you use to order these fractions from least to greatest? (assessing)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about the math questions you just answered.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions out loud, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

(17) Did you enjoy thinking out loud?

(18) Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?

(19) Were the items with a stimulus on the left harder, the same, or easier than regular questions without the stimulus?

(20) Tell me which test questions you found difficult or confusing... Please explain.

Thank you so much for explaining your mathematical thinking to me! Your comments will help us with future test questions for Oklahoma.

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

(13) Did you monitor the session enough to answer a couple of questions?

(14) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

(15) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

MATH GRADE 4 FORM 2

August 30, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items

Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

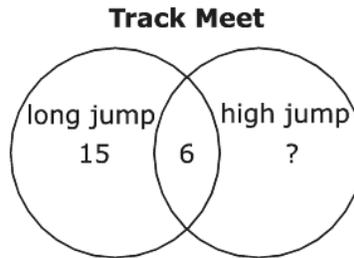
Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is Breanne. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the Oklahoma School Testing Program Math test last spring? You answered test questions in math like this one: [show student first item on computer screen].

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both.



How many students participated in only the high-jump?

Hide All

- (A) 9 students
- (B) 19 students
- (C) 21 students
- (D) 25 students

We're studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I'm going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student's response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer to a test question is. It includes all of your thoughts— even if you don't think they're important. We want to hear everything—even thoughts like, "This is boring" or "I don't like this."

And don't worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of questions work, but we won't share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Does this make sense so far?

Wait for student's acknowledgment and answer any questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper and one math item for the researcher to model thinking out loud. The math item should be an easy item.

I'll ask you to think out loud as you answer some math question in a few minutes. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way*. Ok. Now I'll fold it like this.)

First, I am going to fold it the long way like this. I will make sure to try to get it even and then will make the crease. Now I will fold it the other way making sure again to try to get each side even. Now I will check my work and make sure I folded it twice like I was supposed to. [check work] Yes, I did fold it twice.

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

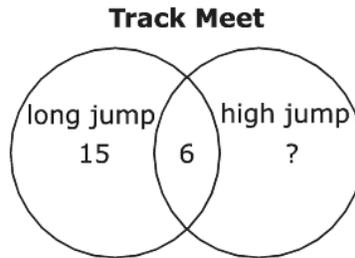
Modeling Part B

Here's another example of thinking out loud with a math problem.

Demonstrate with the math item below.

First, I will read the problem out loud. [Read problem]

There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both.



How many students participated in only the high-jump?

Hide All

- (A) 9 students
- (B) 19 students
- (C) 21 students
- (D) 25 students

I know that I need to figure out how many students participated only in the high-jump. The first sentence tells me that there were 40 total students. When I look at the Venn diagram, I can see that 15 students did the long jump, and 6 students are in the middle, which means they did both the long jump and the high jump. So first I will add 15 and 6, which is 21. Then, I can take the total, 40, and subtract 21 from that, which gives me 19 students who did the high jump only. I will double check my work to make sure I am correct. If I add 15 plus 6 plus 19, I get 40, which is the total they gave us, so yes, I am correct. I can see that 19 is answer B, so I will use the mouse to select B on the screen as my answer.

Key: B

That's what thinking out loud for test items looks and sounds like. I'll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we're studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they're about to practice and that you'll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this math question.

If the student says they're not ready to try, say *Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.*

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Please look at this test question. You will notice that there is something to the left of the question. We call that information a stimulus and it is needed to answer the question that is to the right of it. Please also read that part out loud.

There is scrap paper here for you if you want to use it at any time to figure something out. But, please also say out loud what you're doing as you're writing something.

Please read this question and then tell me everything you are thinking as you answer it.

A father has 3 children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, b , can be found using this equation.

$$3 \times b = 36$$

How many books will each child receive?

Hide All

- (A) 9 books
- (B) 12 books
- (C) 39 books
- (D) 108 books

Key: B

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question. You will see that this is just a regular question without the stimulus on the left. Half of the questions you will do with me will look like this. Please read this question out loud and then explain to me what you're thinking as you answer it.

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

Use this information to answer the following question.

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Dean completed his reading goal for 2 weeks. What is the total number of pages Dean read?

Hide All

- A 127 pages
- B 150 pages
- C 240 pages
- D 250 pages

Key: D

OK, I think you're ready to think out loud with some new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

You're going answer more math test questions. Please start by reading the question out loud. After you read the question out loud, you'll answer the test question and think out loud while you solve it.

First Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number?

Hide All

(A) $21 \times 7 = \square$

(B) $21 + 7 = \square$

(C) $21 \div 7 = \square$

(D) $21 - 7 = \square$

Key: C

Item-specific Probe (as Necessary)

How did you choose your answer based on the information you were given? (making connections)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Second Item: Discrete MC

Ok, please answer this next question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums?

Hide All

- (A) 2,000 pages
- (B) 2,400 pages
- (C) 2,500 pages
- (D) 3,000 pages

Key: B

Item-specific Probe (as Necessary)

How did you estimate this answer? (evaluating)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Third Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which number would make this equation true?

$$56 \div \square = 7$$

Hide All

(A) 9

(B) 8

(C) 7

(D) 6

Key: B

Item-specific Probe (as Necessary)

How did you solve for the box in this equation? (evaluating)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Fourth Item: Cluster MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Beth completed her reading goal for 10 days. What is the total number of pages Beth read?

Hide All

- A 25 pages
- B 150 pages
- C 1,500 pages
- D 2,500 pages

Key: B

Item-specific Probe (as Necessary)

If a student answers A: How did you decide which operation to use when solving this problem? (Interpreting)

OR

How did you use the table to help answer this question? (Interpreting)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Fifth Item: Cluster MC



Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks?

Hide All

- A 59 pages
- B 89 pages
- C 279 pages
- D 330 pages

Key: A

Item-specific Probe (as Necessary)

What did you do first when solving this problem? And second? (Interpreting)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Sixth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.

Reading Goals

Student	Goal
Beth	15 pages per day
Dean	125 pages per week
Jake	110 pages per week
Maya	40 pages per two days

Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning.

This equation can be used to find the number of pages Maya read in the evening on the second day.

$$40 - 22 = \square + 8$$

Which value can be placed in the \square to make this equation true?

Hide All

- A 10 pages
- B 14 pages
- C 18 pages
- D 26 pages

Key: A

Item-specific Probe (as Necessary)

How did you solve for the box in this equation? (Evaluating)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Seventh Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data.

Student	Plant Height (inch)
Anna	$\frac{1}{2}$
Eva	$\frac{3}{4}$
Kent	$\frac{1}{2}$
Mariah	$\frac{3}{4}$
Peter	$\frac{1}{4}$

This is a fraction model that shows the height of Mariah's bean plant.



Which expression is equal to the height of Mariah's bean plant?

Hide All

(A) $\frac{2}{4} + \frac{1}{4}$

(B) $\frac{2}{4} + \frac{2}{4}$

(C) $\frac{1}{4} + \frac{1}{4} + \frac{3}{4}$

(D) $\frac{3}{4} + \frac{3}{4} + \frac{3}{4}$

Key: A

Item-specific Probe (as Necessary)

How did you determine which expression was equal to $\frac{3}{4}$? (assessing)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Eighth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data.

Bean Plant Heights

Student	Plant Height (inch)
Anna	$\frac{1}{2}$
Eva	$\frac{3}{4}$
Kent	$\frac{1}{2}$
Mariah	$\frac{3}{4}$
Peter	$\frac{1}{4}$

Mr. Valdez made this frequency table to show the same information as in the data table.

Bean Plant Heights

Plant Height (inch)	Number of Students
$\frac{1}{4}$	
$\frac{1}{2}$	
$\frac{3}{4}$	

What is the total number of plants that have a height greater than $\frac{1}{4}$ inch?

Hide All

- (A) 1
- (B) 2
- (C) 4
- (D) 5

Key: C

Item-specific Probe (as Necessary)

How did you use the table to figure out the correct answer? (applying)

Response-specific Probe (Optional) Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Ninth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data.

Student	Plant Height (inch)
Anna	$\frac{1}{2}$
Eva	$\frac{3}{4}$
Kent	$\frac{1}{2}$
Mariah	$\frac{3}{4}$
Peter	$\frac{1}{4}$

Which list shows the plant heights, in inches, in order from least to greatest?

Hide All

- (A) $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$
- (B) $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}$
- (C) $\frac{3}{4}, \frac{1}{2}, \frac{1}{4}$
- (D) $\frac{3}{4}, \frac{1}{4}, \frac{1}{2}$

Key: A

Item-specific Probe (as Necessary)

What strategy did you use to order these fractions from least to greatest? (assessing)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Tenth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

This rectangle represents 1 whole unit.



What is the sum of the fractions represented by the shaded parts of the rectangles below?



Hide All

(A) $\frac{1}{8}$

(B) $\frac{3}{8}$

(C) $\frac{2}{4}$

(D) $\frac{3}{4}$

Key: D

Item-specific Probe (as Necessary)

How did you use the model to help you solve this problem? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

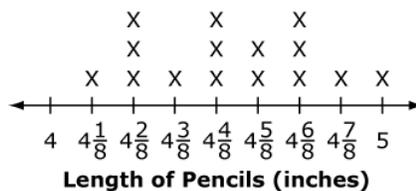
Thanks for your great thinking.

Eleventh Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot.



How many pencils were less than $4\frac{4}{8}$ inches long?

Hide All

- (A) 1
- (B) 5
- (C) 7
- (D) 8

Key: B

Item-specific Probe (as Necessary)

How did you use the line plot to figure out the correct answer? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting,

justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

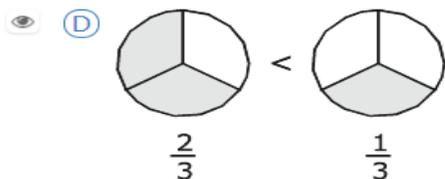
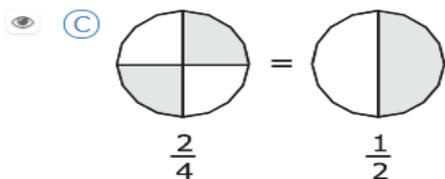
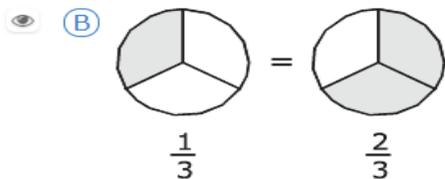
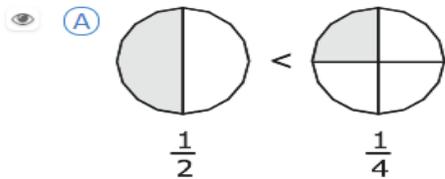
Twelfth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which comparison is true?

Hide All



Key: C

Item-specific Probe (as Necessary)

How did you decide which comparison was true? (applying)

Response-specific Probe (Optional)



Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about the math questions you just answered.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions out loud, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

(21) Did you enjoy thinking out loud?

(22) Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?

(23) Were the items with a stimulus on the left harder, the same, or easier than regular questions without the stimulus?

(24) Tell me which test questions you found difficult or confusing... Please explain.

Thank you so much for explaining your mathematical thinking to me! Your comments will help us with future test questions for Oklahoma.

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

(16) Did you monitor the session enough to answer a couple of questions?

(17) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

(18) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

MATH GRADE 7 FORM 1

September 3, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items

Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is Breanne. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the Oklahoma School Testing Program Math test last spring? You answered test questions in math like this one: [show student first item on computer screen].

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a “t”?

Hide All

(A) $\frac{1}{7}$

(B) $\frac{2}{7}$

(C) $\frac{2}{5}$

(D) $\frac{1}{2}$

We’re studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I’m going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student’s response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer to a test question is. It includes all of your thoughts— even if you don’t think they’re important. We want to hear everything—even thoughts like, “This is boring” or “I don’t like this.”

And don’t worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of questions work, but we won’t share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Does this make sense so far?

Wait for student’s acknowledgment and answer any questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper and one math item for the researcher to model thinking out loud. The math item should be an easy item.

I’ll ask you to think out loud as you answer some math question in a few minutes. So far, so good?

Wait for student’s response and comments.

Here’s what I mean about thinking out loud... I’m going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way*. Ok. Now I'll fold it like this.)

First, I am going to fold it the long way like this. I will make sure to try to get it even and then will make the crease. Now I will fold it the other way making sure again to try to get each side even. Now I will check my work and make sure I folded it twice like I was supposed to. [check work] Yes, I did fold it twice.

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

Modeling Part B

Here's another example of thinking out loud with a math problem.

Demonstrate with the math item below.

First, I will read the problem out loud. [Read problem]

Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a "t"?

Hide All

(A) $\frac{1}{7}$

(B) $\frac{2}{7}$

(C) $\frac{2}{5}$

(D) $\frac{1}{2}$

I know that I need to figure out the probability that Matthew will choose a t. So, first I will count the total number of letters in Matthew. [Count on fingers.] M-a-t-t-h-e-w. That is 7 total letters. There are two ts in Matthew, so the probability of choosing a t is 2 out of 7, which is the fraction 2/7. I can see that 2/7 is answer B, so I will use the mouse to select B on the screen as my answer.

Key: B

That's what thinking out loud for test items looks and sounds like. I'll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we're studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they're about to practice and that you'll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this math question.

*If the student says they're not ready to try, say **Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.***

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Please look at this test question. You will notice that there is something to the left of the question. We call that information a stimulus and it is needed to answer the question that is to the right of it. Please also read that part out loud.

There is scrap paper here for you if you want to use it at any time to figure something out. But, please also say out loud what you're doing as your writing something.

Please read this question and then tell me everything you are thinking as you answer it.

Use this information to answer the following question.

The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

Which number is equivalent to Bailey's number?

Hide All

- A 0.13
- B $0.\overline{33}$
- C 1.3
- D $3.\overline{33}$

Key: B

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question. You will see that this is just a regular question without the stimulus on the left. Half of the questions you will do with me will look like this. Please read this question out loud and then explain to me what you're thinking as you answer it.

Eighteen students in a classroom will each roll a fair number cube with sides labeled 1 through 6 one time. How many times is a number greater than 3 expected to be rolled?

Hide All

(A) 3

(B) 6

(C) 9

(D) 12

Key: C

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

OK, I think you're ready to think out loud with some new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

You're going answer more math test questions. Please start by reading the question out loud. After you read the question out loud, you'll answer the test question and think out loud while you solve it.

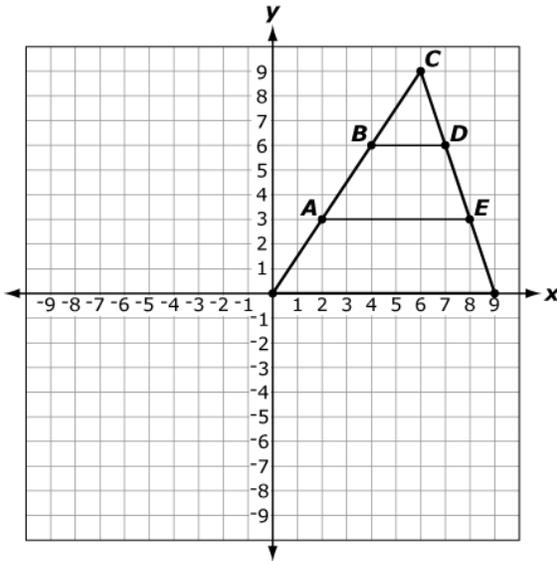
First Item: Cluster MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Points A , B , C , D , and E lie on the sides of a triangle, as shown.



Triangle BCD is similar to triangle ACE . The length of segment BD is 3 units and the length of segment AE is 6 units.

If the length of segment AC is 7.2 units, what is the length, in units, of segment BC ?

- Hide All
- (A) 3.6 units
 - (B) 4.2 units
 - (C) 8.7 units
 - (D) 14.4 units

Key: A

Item-specific Probe (as Necessary)

How did you find the length of segment BC ? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

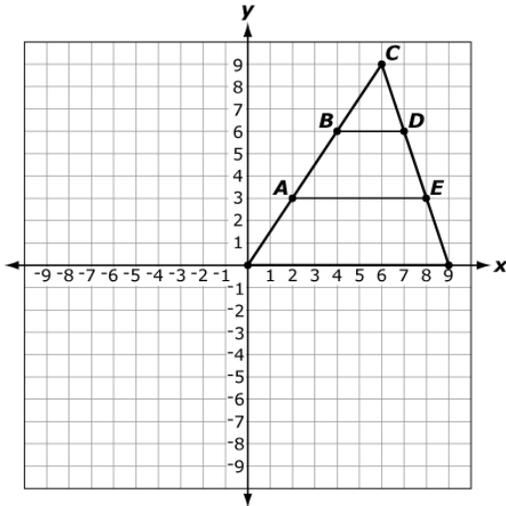
Second Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Points A , B , C , D , and E lie on the sides of a triangle, as shown.



Trapezoid $ABDE$ is translated 11 units to the left and then reflected over the x -axis to form image $A'B'D'E'$. What are the coordinates of the vertices of trapezoid $A'B'D'E'$?

Hide All

- (A) $A'(9, 3)$, $B'(7, 6)$, $D'(4, 6)$, $E'(3, 3)$
- (B) $A'(9, -3)$, $B'(7, -6)$, $D'(4, -6)$, $E'(3, -3)$
- (C) $A'(-9, 3)$, $B'(-7, 6)$, $D'(-4, 6)$, $E'(-3, 3)$
- (D) $A'(-9, -3)$, $B'(-7, -6)$, $D'(-4, -6)$, $E'(-3, -3)$

Key: D

Item-specific Probe (as Necessary)

How did you determine the coordinates of the vertices of trapezoid $A'B'C'D$? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

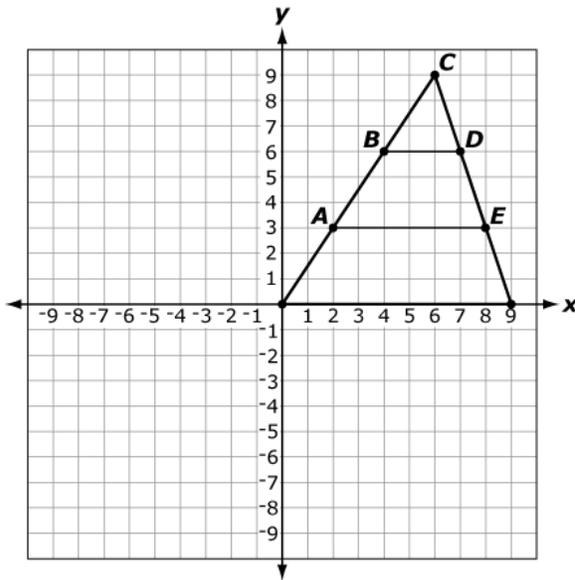
Third Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Points A , B , C , D , and E lie on the sides of a triangle, as shown.



Which segment lies on a line that represents a proportional relationship between x and y ?

Hide All

- (A) \overline{CE}
- (B) \overline{BD}
- (C) \overline{AC}
- (D) \overline{AE}

Key: C

Item-specific Probe (as Necessary)

How did you determine which segment lies on a line that represents a proportional relationship between x and y ? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

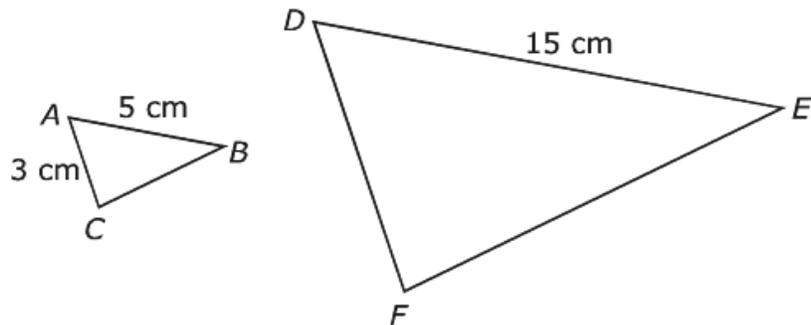
Thanks for your great thinking. Ready to try the next test question?

Fourth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Triangle ABC is similar to triangle DEF , as shown below.



What is the length of \overline{DF} ?

Hide All

- (A) 9 centimeters
- (B) 10 centimeters
- (C) 12 centimeters
- (D) 13 centimeters

Key: A

Item-specific Probe (as Necessary)

How did you determine the length of DF ? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

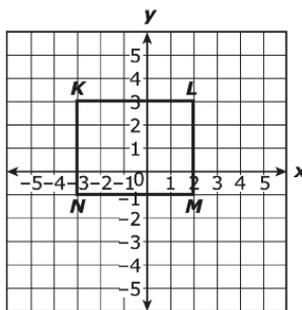
(As needed) What about this question made it hard to think out loud?

Fifth Item: Discrete MC

Ok, please answer this next question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Yanni drew the rectangle $KLMN$ on this graph.



Yanni will reflect the rectangle over the x -axis. Which ordered pair describes the location of point K after it is reflected over the x -axis?

Hide All

- (A) $(-3, -3)$
- (B) $(-3, 1)$
- (C) $(1, 3)$
- (D) $(1, -3)$

Key: A

Item-specific Probe (as Necessary)

How did you determine the coordinates of point K after being reflected over the x -axis? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

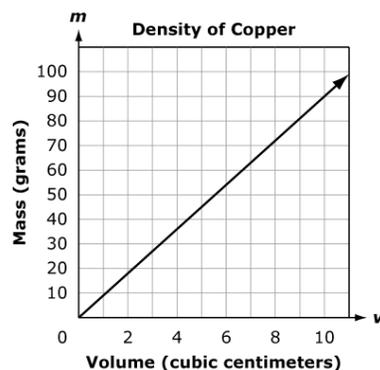
(As needed) What about this question made it hard to think out loud?

Sixth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters).



Based on the graph, which equation represents the relationship between the mass, m , and the volume, v , of copper?

Hide All

- (A) $m = 9v$
- (B) $m = 0.1v$
- (C) $m = 9 + v$
- (D) $m = 0.1 + v$

Key: A

Item-specific Probe (as Necessary)

How did you use the graph to help you determine the correct equation? (making connections)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Seventh Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used (20)(50) to estimate they had ticket sales of \$1,000.

Which statement best describes this situation?

Hide All

- (A) The manager's estimate is reasonable because that value is close to the actual value of the ticket sales.
- (B) The manager's estimate is reasonable because that value is the exact value of the ticket sales.
- (C) The manager's estimate is not reasonable because that value underestimates the actual value of the ticket sales by about \$500.
- (D) The manager's estimate is not reasonable because that value overestimates the actual value of the ticket sales by about \$500.

Item-specific Probe (as Necessary)

How did you know if the estimate was reasonable or not reasonable? (explaining)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking.

Eighth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

What is the value of $(-3)^4$?

Hide All

(A) -81

(B) -12

(C) 12

(D) 81

Key: D

Item-specific Probe (as Necessary)

How did you find the value of $(-3)^4$? (assessing)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Ninth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which value is the greatest distance from zero on a number line?

Hide All

(A) $|-0.8|$

(B) $|0.6|$

(C) $|\frac{3}{4}|$

(D) $|- \frac{1}{2}|$

Key: A

Item-specific Probe (as Necessary)

How did you determine which number is the greatest distance from zero? (drawing a conclusion)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting,

justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Tenth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

Shawn divides his number by -9 .

Which is the best estimate of his answer?

Hide All

- (A) -100
- (B) -10
- (C) 10
- (D) 100

Key: D

Item-specific Probe (as Necessary)

How do you know your answer is the best estimate? (assess)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting,

justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Eleventh Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

What is the value of Rachel's number to the 3rd power?

Hide All

- (A) -343
- (B) -21
- (C) 21
- (D) 343

Key: A

Item-specific Probe (as Necessary)

How did you find the value of Rachels' number to the 3rd power? (assessing)

Response-specific Probe (Optional) Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Twelfth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions. →

The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

Which of the following students has the number that is the greatest distance from zero on a number line?

Hide All

- (A) Kim
- (B) Leon
- (C) Nina
- (D) Patrick

Key: A

Item-specific Probe (as Necessary)

How did you determine which number is the greatest distance from zero? (drawing a conclusion)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting,

justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about the math questions you just answered.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions out loud, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

(25) Did you enjoy thinking out loud?

(26) Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?

(27) Were the items with a stimulus on the left harder, the same, or easier than regular questions without the stimulus?

(28) Tell me which test questions you found difficult or confusing... Please explain.

Thank you so much for explaining your mathematical thinking to me! Your comments will help us with future test questions for Oklahoma.

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

(19) Did you monitor the session enough to answer a couple of questions?

(20) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

(21) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

OSTP COGNITIVE LABS

RESEARCHER SCRIPT AND PROCEDURES

MATH GRADE 7 FORM 2

September 3, 2019

The focus of this cognitive lab study is to gather evidence of student cognitive processing that would be useful for responding to recommendations in the HumRRO study *HumRRO Independent Alignment Review* (2016, No. 089) and meeting USDE requirements for peer review.

The goals of this study are to determine if:

- ELA constructed response items provide an opportunity for students to demonstrate higher DOKs and higher order thinking skills (HOTS) that better match the DOK of the standards/objectives the items are assessing, when compared with discrete multiple choice items.
- Math multiple choice clusters provide a better match to curriculum experiences, provide better opportunity for students to demonstrate HOTS, and better match the DOK of the standards/objectives the items are assessing, when compared to discreet multiple choice items

OSTP items that elicit higher order thinking skills require students to do more than recall facts, apply simple algorithms, and demonstrate understanding of basic concepts. These items involve the following skills and processes, as indicated in the OSTP performance level descriptors (in alphabetic order): **applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.** We will use these specified skills and processes to guide think aloud sessions and to code the verbal data that students produce.

A sacred rule for think-alouds: When students are thinking aloud, encourage them to think aloud. Don't say anything that would guide or otherwise help their thinking. Probes are likely to affect the explicitness of subsequent think-alouds rather than the quality of the student's thinking.

PROTOCOL SECTIONS AND PROCEDURES

The protocol is organized in four sections:

Section 1. Introductions, getting the student settled in, modeling thinking aloud for the student, the student practicing thinking out loud

Section 2. Student think-alouds

Section 3. Exit questions for the student and the teacher

Section 4. Appendix

There are six steps to the entire process:

Step 1. Orient the student to the task

Step 2. Model thinking out loud

Step 3. Guide the student through practicing thinking out loud so that (a) the student can get as comfortable as possible, and (b) you can reinforce the things the student does right

Step 4. Encourage the student to think out loud as he/she reads, understands, and responds to each item (provide only the standard encouragements)

Step 5. After the student indicates completion of an item, use both pre-prepared probe questions and spontaneous ones to clarify what the student said during the think aloud

Step 6. Follow the same process for the other items



Step 7. Complete exit interview questions with student and teacher (separately)

Notes to Researcher

The seven steps are scripted in the three sections below. Directions to you, the researcher, appear in standard Calibri typeface. *Italics* indicate scripted things you should read/paraphrase for the student.

Key to helping students think aloud: After you've modeled thinking aloud, your job is to encourage students to think aloud and reinforce them when they do think out loud. Please do not intervene when students struggle with thinking aloud; simply assure them that they're doing fine and encourage them to "think out loud" if they're not verbalizing. Please resist the natural adult/educator impulse to support a struggling student by, for example, vocalizing, elaborating, or otherwise supporting student attempts at thinking out loud. We want to record student thinking, not their thinking with our support. It is a given that some students will be more able to think out loud than other students.

SCRIPT

Researcher's name and date:

Start time/stop time:

Student's name and grade:

School and teacher's name:

SECTION 1. INTRODUCTIONS, ORIENTATION TO THE TASK, MODELING, AND PRACTICE

Step 1. Help the Student Get Comfortable; Give the Purpose of the Cog Labs

Hi, my name is Breanne. I'm glad that you're going to help us out today as we try out some new test questions. Please tell me your first name. (Wait for the response.) Thanks, [say the student's name].

Do you remember taking the Oklahoma School Testing Program Math test last spring? You answered test questions in math like this one: [show student first item on computer screen].

Note to researcher: Here and throughout, we display here the stimuli and items that students will view on screen so that you can guide students to the correct part of the think-aloud process.

Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a "t"?

Hide All

- (A) $\frac{1}{7}$
- (B) $\frac{2}{7}$
- (C) $\frac{2}{5}$
- (D) $\frac{1}{2}$

We're studying new types of test questions. We want to see if they will work well with students like you. As part of the study, I'm going to ask you to think out loud. Have you ever heard of thinking out loud?

Wait for student's response and comments. Respond to comments as necessary.

Thinking out loud is when you say what your brain is thinking as you do something—like deciding what the answer to a test question is. It includes all of your thoughts— even if you don't think they're important. We want to hear everything—even thoughts like, "This is boring" or "I don't like this."

And don't worry: What you say and do is strictly anonymous. We will use what you say and do to evaluate how well these new types of questions work, but we won't share this with your principal, teachers, or parents. No one will ever know what you say and do or even that you were involved in these cognitive labs.

Does this make sense so far?

Wait for student's acknowledgment and answer any questions.

Step 2. Model Thinking Out Loud, Twice

Modeling Part A

Required material: Piece of paper and one math item for the researcher to model thinking out loud. The math item should be an easy item.

I'll ask you to think out loud as you answer some math question in a few minutes. So far, so good?

Wait for student's response and comments.

Here's what I mean about thinking out loud... I'm going to fold this paper twice.

Demonstrate and say out loud what you're doing as you do it. As you decide to fold length-wise or width-wise, say out loud what you're deciding, as in *I think I'll fold it this way* (and demonstrate). Don't say out

loud what you've done after doing it. Say it **before** you do it (e.g., *I think I'll do...*) and **as** you're doing it (e.g., *I'm folding it this way. Ok. Now I'll fold it like this.*)

First, I am going to fold it the long way like this. I will make sure to try to get it even and then will make the crease. Now I will fold it the other way making sure again to try to get each side even. Now I will check my work and make sure I folder it twice like I was supposed to. [check work] Yes, I did fold it twice.

*Did you notice that I said out loud what I was doing **as** I folded the paper? Did you notice what I said **as** I folded the paper and **when I thought** about how to fold it?*

Wait for student's response and comments.

That's thinking out loud. I'll give you a chance to practice in a moment.

Modeling Part B

Here's another example of thinking out loud with a math problem.

Demonstrate with the math item below.

First, I will read the problem out loud. [Read problem]

Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a "t"?

Hide All

(A) $\frac{1}{7}$

(B) $\frac{2}{7}$

(C) $\frac{2}{5}$

(D) $\frac{1}{2}$

I know that I need to figure out the probability that Matthew will choose a t. So, first I will count the total number of letters in Matthew. [Count on fingers.] M-a-t-t-h-e-w. That is 7 total letters. There are two ts in Matthew, so the probability of choosing a t is 2 out of 7, which is the fraction 2/7. I can see that 2/7 is answer B, so I will use the mouse to select B on the screen as my answer.

Key: B

That's what thinking out loud for test items looks and sounds like. I'll give you a chance to practice in a moment. Do you have any questions?

Respond to questions, reassure the student about previous points (e.g., anonymity, no one right way to do things, we're studying new test questions, not kids or teachers).

Note: If the student asks for another demonstration, remind them that they're about to practice and that you'll help them as they practice.

Step 3. Help the Student Practice Thinking Aloud, Twice

Are you ready to try? OK, try this math question.

*If the student says they're not ready to try, say **Please give it a try and do the best you can. This is just practice, so it's your chance to figure out how to answer a test question and think out loud at the same time. I'll help you as needed.***

Student Practice Part A

Don't forget—We're not testing you. We're studying these new types of questions to see how well they work with other students like you. Just do the best you can.

Please look at this test question. You will notice that there is something to the left of the question. We call that information a stimulus and it is needed to answer the question that is to the right of it. Please also read that part out loud.

There is scrap paper here for you if you want to use it at any time to figure something out. But, please also say out loud what you're doing as your writing something.

Please read this question and then tell me everything you are thinking as you answer it.

Eighteen students in a classroom will each roll a fair number cube with sides labeled 1 through 6 one time. How many times is a number greater than 3 expected to be rolled?

Hide All

A 3

B 6

C 9

D 12

Key: C

As the student practices thinking out loud, offer the standard encouragement phrases as needed (see Appendix).

That was great! Let's try one more, just to be sure that you're comfortable and ready.

Student Practice Part B

Please think out loud as you answer this next question. You will see that this is just a regular question without the stimulus on the left. Half of the questions you will do with me will look like this. Please read this question out loud and then explain to me what you're thinking as you answer it.

Use this information to answer the following question.

The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

Which number is equivalent to Bailey's number?

Hide All

A 0.13

B $0.\overline{33}$

C 1.3

D $3.\overline{33}$

Key: B

Use standard encouragements and reassure the student as necessary. Some students may not say much, so you'll have to encourage them to think out numerous times during the cog lab.

OK, I think you're ready to think out loud with some new items. Do you think you're ready? (I do.) Wait for student's response; reassure the student as necessary.

SECTION 2. STUDENT THINK ALOUDS

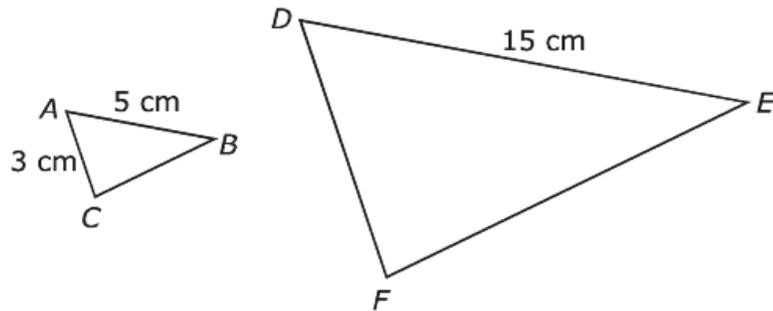
You're going answer more math test questions. Please start by reading the question out loud. After you read the question out loud, you'll answer the test question and think out loud while you solve it.

First Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Triangle ABC is similar to triangle DEF , as shown below.



What is the length of \overline{DF} ?

Hide All

- (A) 9 centimeters
- (B) 10 centimeters
- (C) 12 centimeters
- (D) 13 centimeters

Key: A

Item-specific Probe (as Necessary)

How did you determine the length of DF ? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

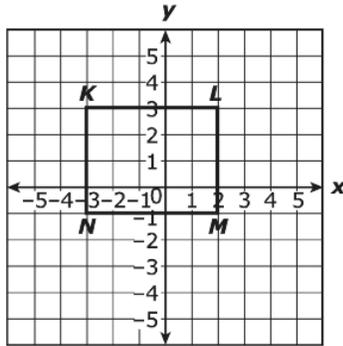
(As needed) What about this question made it hard to think out loud?

Second Item: Discrete MC

Ok, please answer this next question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Yanni drew the rectangle $KLMN$ on this graph.



Yanni will reflect the rectangle over the x -axis. Which ordered pair describes the location of point K after it is reflected over the x -axis?

Hide All

- (A) $(-3, -3)$
- (B) $(-3, 1)$
- (C) $(1, 3)$
- (D) $(1, -3)$

Key: A

Item-specific Probe (as Necessary)

How did you determine the coordinates of point K after being reflected over the x -axis? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

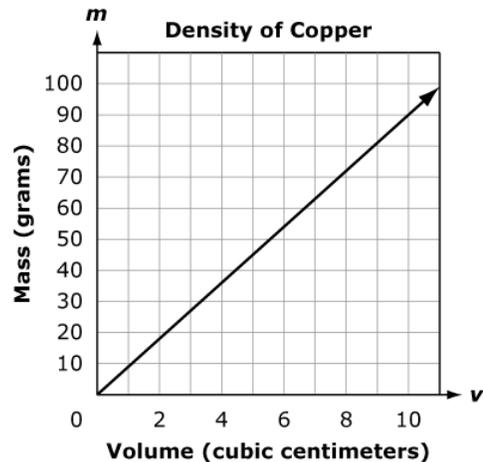
(As needed) *What about this question made it hard to think out loud?*

Third Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters).



Based on the graph, which equation represents the relationship between the mass, m , and the volume, v , of copper?

Hide All

- (A) $m = 9v$
- (B) $m = 0.1v$
- (C) $m = 9 + v$
- (D) $m = 0.1 + v$

Key: A

Item-specific Probe (as Necessary)

How did you use the graph to help you determine the correct equation? (making connections)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting,

justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

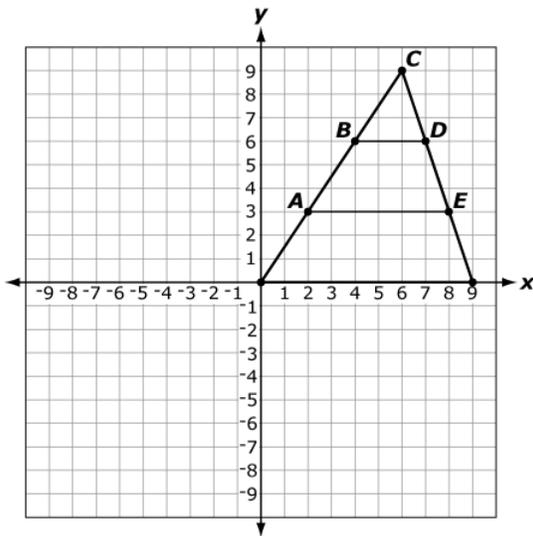
Fourth Item: Cluster MC

Ok, please look at the first test question on your screen. Go ahead and answer question 1, just as you did when you took the test last spring. And please remember to say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Points A , B , C , D , and E lie on the sides of a triangle, as shown.



Triangle BCD is similar to triangle ACE . The length of segment BD is 3 units and the length of segment AE is 6 units.

If the length of segment AC is 7.2 units, what is the length, in units, of segment BC ?

Hide All

- (A) 3.6 units
- (B) 4.2 units
- (C) 8.7 units
- (D) 14.4 units

Key: A

Item-specific Probe (as Necessary)

How did you find the length of segment BC ? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's thought processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

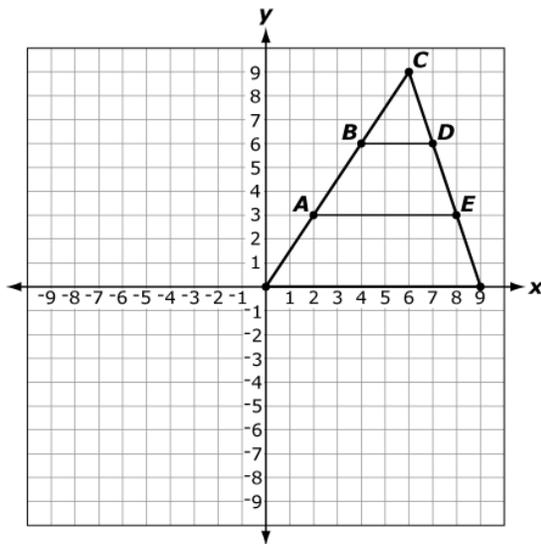
Fifth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking—just like you did a moment ago!

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Points A , B , C , D , and E lie on the sides of a triangle, as shown.



Trapezoid $ABDE$ is translated 11 units to the left and then reflected over the x -axis to form image $A'B'D'E'$. What are the coordinates of the vertices of trapezoid $A'B'D'E'$?

Hide All

- A $A'(9, 3), B'(7, 6), D'(4, 6), E'(3, 3)$
- B $A'(9, -3), B'(7, -6), D'(4, -6), E'(3, -3)$
- C $A'(-9, 3), B'(-7, 6), D'(-4, 6), E'(-3, 3)$
- D $A'(-9, -3), B'(-7, -6), D'(-4, -6), E'(-3, -3)$

Key: D

Item-specific Probe (as Necessary)

How did you determine the coordinates of the vertices of trapezoid $A'B'C'D$? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

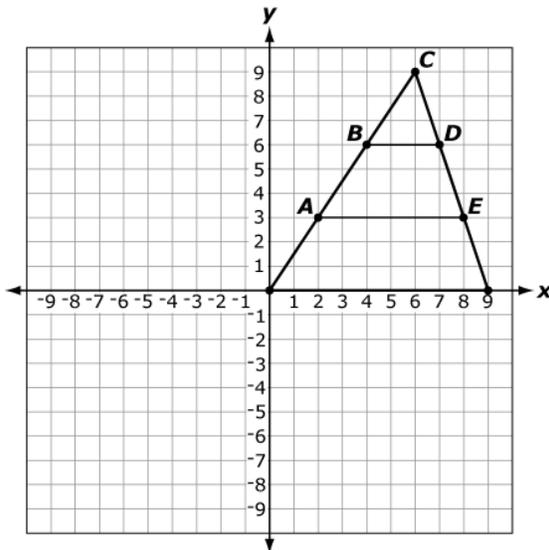
Sixth Item: Cluster MC

Ok, please answer this question and say out loud everything that you’re thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

Points *A*, *B*, *C*, *D*, and *E* lie on the sides of a triangle, as shown.



Which segment lies on a line that represents a proportional relationship between *x* and *y*?

- Hide All
- (A) \overline{CE}
 - (B) \overline{BD}
 - (C) \overline{AC}
 - (D) \overline{AE}

Key: C

Item-specific Probe (as Necessary)

How did you determine which segment lies on a line that represents a proportional relationship between *x* and *y*? (applying)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. Ready to try the next test question?

Seventh Item: Cluster MC

Ok, please answer this question and say out loud everything that you’re thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

The students in Mrs. Garcia’s class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

Shawn divides his number by -9 .

Which is the best estimate of his answer?

Hide All

- (A) -100
- (B) -10
- (C) 10
- (D) 100

Key: D

Item-specific Probe (as Necessary)

How do you know your answer is the best estimate? (assess)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student’s thinking about the current item or any subsequent item, and (b) should focus on illuminating the student’s think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Eighth Item: Cluster MC

Ok, please answer this question and say out loud everything that you’re thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

The students in Mrs. Garcia’s class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

What is the value of Rachel’s number to the 3rd power?

Hide All

- A -343
- B -21
- C 21
- D 343

Key: A

Item-specific Probe (as Necessary)

How did you find the value of Rachels’ number to the 3rd power? (assessing)

Response-specific Probe (Optional) Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Ninth Item: Cluster MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Use this information to answer the following three questions.

The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.

Student	Number
Bailey	$\frac{1}{3}$
Kim	$ -8 $
Leon	$ \frac{-3}{4} $
Nina	$ 5 $
Patrick	$ \frac{7}{3} $
Rachel	-7
Shawn	-940

Which of the following students has the number that is the greatest distance from zero on a number line?

Hide All

- (A) Kim
- (B) Leon
- (C) Nina
- (D) Patrick

Key: A

Item-specific Probe (as Necessary)

How did you determine which number is the greatest distance from zero? (drawing a conclusion)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking.

Tenth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used (20)(50) to estimate they had ticket sales of \$1,000.

Which statement best describes this situation?

Hide All

- (A) The manager's estimate is reasonable because that value is close to the actual value of the ticket sales.
- (B) The manager's estimate is reasonable because that value is the exact value of the ticket sales.
- (C) The manager's estimate is not reasonable because that value underestimates the actual value of the ticket sales by about \$500.
- (D) The manager's estimate is not reasonable because that value overestimates the actual value of the ticket sales by about \$500.

Item-specific Probe (as Necessary)

How did you know if the estimate was reasonable or not reasonable? (explaining)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking.

Eleventh Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

What is the value of $(-3)^4$?

Hide All

(A) -81

(B) -12

(C) 12

(D) 81

Key: D

Item-specific Probe (as Necessary)

How did you find the value of $(-3)^4$? (assessing)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Twelfth Item: Discrete MC

Ok, please answer this question and say out loud everything that you're thinking.

Remember to use only the standard encouragements (see the appendix) as needed or periodically if the student is functioning well independently.

Which value is the greatest distance from zero on a number line?

Hide All

(A) $|-0.8|$

(B) $|0.6|$

(C) $|\frac{3}{4}|$

(D) $|\frac{1}{2}|$

Key: A

Item-specific Probe (as Necessary)

How did you determine which number is the greatest distance from zero? (drawing a conclusion)

Response-specific Probe (Optional)

Use your judgment to decide whether this type of probe has the potential to elicit additional evidence about HOTS.

Your probe (a) should not influence the student's thinking about the current item or any subsequent item, and (b) should focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Selected from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explain, generalizing, inferencing, interpreting, justifying, making connections, predicting, support positions using prior knowledge, and utilizing multiple resources/texts.

Generic Probes

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why?

(As needed) What about this question made it hard to think out loud?

Thanks for your great thinking. You are almost done! I want to ask you a couple of final questions about the math questions you just answered.

SECTION 3. EXIT INTERVIEW QUESTIONS

Note to researcher: We'll do the student and teacher exit questions out loud, as this is an interview, not a survey. The goal of these questions is to get additional information that would help us understand the student's thinking about items, how much of the student's thinking we actually observed, whether it was the item or thinking aloud when a student struggled, and whether we got information about higher order thinking.

Students

Researcher, please take notes on the student's response to these questions.

(29) Did you enjoy thinking out loud?

(30) Did you find it easy to think out loud or did it make it more difficult for you to answer the test questions?

(31) Were the items with a stimulus on the left harder, the same, or easier than regular questions without the stimulus?

(32) Tell me which test questions you found difficult or confusing... Please explain.

Thank you so much for explaining your mathematical thinking to me! Your comments will help us with future test questions for Oklahoma.

Teachers

If there is time, try to ask the teacher these questions and any others you think would help us understand the student's thinking, the items, and higher order thinking that may have been on display. If the teacher did not monitor the session, these questions may not be relevant.

(22) Did you monitor the session enough to answer a couple of questions?

(23) Did the student's answers to the test questions and thinking aloud seem typical for this student? Better than usual? Not as good as usual? Please explain why you think so?

(24) Did you observe anything about the student's thinking out loud that would help us understand how well the test questions are working?

APPENDIX

Standard Encouragements

You can select from:

- *That's it.*
- *Keep going.*
- *You're doing well.*
- *There is no one right way to think out loud.*
- *You're doing it right.*
- *I like the way you're thinking out loud!*
- *There are no correct answers, only what you're thinking as you work through the test question.*

Note: Some students have trouble thinking out loud, especially if they're struggling with responding to the test item. Most get comfortable after some practice. The idea is to encourage them to say out loud what they're thinking, as they're thinking it, **without telling how to think about the item.**

If the student says little, just sits there, or looks at you for guidance, try the following:

Please go ahead and answer that question and say out loud what you're thinking.

Tell me what's making it difficult to answer that question and think out loud. If the student says something like I don't know how to answer this question, your reply can be *Please read the test question out loud. OK, now read the passage out loud [or describe the visual display]. Now, think out loud while you do your best to answer the test question, just as if you were taking the test by yourself.*

Probes

Probes should not open new ideas for the student; simply follow up on what the student says aloud. If the student asks questions like "Was that right?" respond with *You're doing great! Please continue.*

Probes should address only specific focuses of the cog lab and what the student said aloud. Be cautious about influencing what and how the student thinks; reviewers will pick on that and it will undermine the study.

Three types of probes: generic to all items (pre-prepared), specific to an item (pre-prepared), specific to a student's response (on the fly)

Specific to an Item

See each item above

Focus on the word(s), concept(s), and skill(s) that signal students have to engage in higher order thinking.

Specific to a Student's Response

Your on-the-fly question(s), if you choose to pose them, should (a) not influence the student's thinking about the current item or any subsequent item, and (b) focus on illuminating the student's think processes while responding to an item.

Example: For a CR item that requires an explanation, you might probe the student about something that was missing from the explanation, such as supporting evidence.

Select from this list one HOTS to probe that is relevant to this item: applying, assessing, creating (developing), designing, drawing conclusions, evaluating, explaining, generalizing, inferencing, interpreting, justifying, making connections, predicting, supporting positions using prior knowledge, and utilizing multiple resources/texts.

Generic to All Items

Did you find this question easy, medium, or difficult?

Was it hard to think out loud while you were answering this question? If yes, why? (As needed: What about this question made it hard to think out loud?)

APPENDIX C
TRANSCRIPTIONS OF VERBAL PROTOCOLS

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: There we go. Okay. So, I'm ----- and you're -- -, right?	
Student I: -----.	
Interviewer: ----. I'm sorry. So, do you know why you're here?	
Student I: Kind of.	
Interviewer: Kind of? Well, let me give you some background. So, we're studying how different--how your brain thinks about different types of questions in a test. And so, to figure that out, we've asked some students to come here and do some talking out loud when they do some problems and test questions for us so we can kind of see how their brain works. All of the stuff that you do would be confidential, nobody would know--unless you want to tell people about it, and you could. We're going to do what's called thinking out loud; have you ever done that before?	
Student I: Sometimes.	
Interviewer: Yeah, it's kind of reading out loud, except you're just doing what's in your head and thinking out loud. I'll give you some examples here. So, let's say, for example, somebody said to me, "Fold this paper two times and think out loud," this is what I would say. I would say, "Okay, I have to fold this paper, and I'll fold it long style, because I like the long styles. And I have to fold it twice, so I'm going to fold it one more time like this, and then I'm going to crease it really hard." And there I have folded my paper two times. So, did you see like I'm telling you what I'm thinking as I'm doing it?	
Student I: Uh-huh.	
Interviewer: That's exactly what you're going to be doing. I'll show you some more examples here. So, did you remember seeing something like this on test back then?	
Student I: Uh-huh.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Okay. So, I'm going to say that I've read the passage already, and when you do, you'll read the passage and then we'll answer the questions together. But for thinking aloud, this is how it works when you do this. So, it would be I've read the passage, okay now, the question says, "The author of the American Buffalo most likely wrote the passage, and now I have to figure this out." So, I've read the passage to inform the reader of the details. Okay, so this is a non-fiction passage and it's telling me stuff and giving me details. So, it could be that one.</p> <p>To persuade the reader with facts. This passage has a lot of facts, but it's not trying to convince me of anything. So, I'm going to leave that one just in case, to make sure I'm in double-check, "To entertain the reader with a story." Okay, this is, for sure, not a story. It doesn't have any characters or any parts. So, I know that one is not the answer.</p> <p>Alright, and my last option here, as I'm thinking out loud to share a personal experience with the reader. Sharing a personal experience with the reader is like an autobiography or memoir. And I don't think that's what this is... it's giving me details, so I know it's not that one.</p> <p>Okay, so, I'm going to think, "To inform with details or to persuade with facts." I don't think there was any persuasion in this one, so that's not it, it was this one. I'm going to say that "A" is my answer, and then I would click Next.</p> <p>Okay, and here's my next item. "Based on the information in the passage, The American Buffalo, explain what might happen if people lose interest in the American Buffalo. Include details from the passage to support your response." Well, I remember when I read the passage right down here at the end, they talked about people and taking care of the buffalo, and it said, "People are working to help the buffalo, they want to protect them, they want to see their numbers increased." Okay, so if people aren't interested in the buffalo, then I would say the buffalo wouldn't be protected, they'd be hunted again, and their numbers would decrease, and they may become extinct, and my evidence is right down here, they want to protect them, they want to see their numbers increase. And then I would click "Finish".</p> <p>Does that make sense?</p>	
Student I: Uh-huh.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. Now, I'll give you a chance to practice. Do you have any questions before we get going?	
Student I: No.	
Interviewer: Okay. So, here's how this works. So, you'll have the passage, just like you did over here, if you can read the passage, and then you can read it your head, or sometimes people like to read it out loud. It's up to you, whatever you want to do. And then, when you get to the questions, we'll work through those together. Does that sound okay?	
Student I: Uh-huh.	
Interviewer: And I'll let you have the mouse too, if you want that. Okay, why don't you tell me what the question says there?	
Student I: Which of these section headings help the reader.	
Interviewer: And which one do you think is the right answer? And tell me how you're thinking, so it can help me understand what your brain is doing.	
Student I: Well, I don't think it's to help the reader read the passage more quickly.	
Interviewer: Okay. Why?	
Student I: Because when you don't know about the _____ [00:09:24] up here, and that there's a royal chamber, there's a termite city.	
Interviewer: Okay. What about the next one?	
Student I: Imagine what termite mounds look like. Probably not that one, because the picture is right here.	
Interviewer: Uh-huh. Keep going, you're doing a great job.	
Student I: Know what the next paragraph is about-- well, there is a next paragraph.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. And then go to the next one.	
Student I: Pronounce difficult words in the section.	
Interviewer: What do you think the answer could be?	
Student I: Maybe B.	
Interviewer: Okay. And tell me why you think that one might be a good choice?	
Student I: Because right here, it says, "Inside the termite tower," and this one "Imagine the termite tower."	
Interviewer: Okay. Great. So, go ahead and click that one. And then push "Next." Right. Let's do this one together. What is the question asking?	
Student I: Explain the most likely reason _____ [00:10:36] the passage. Provide details to support your answer.	
Interviewer: What do you think about that one?	
Student I: Well, maybe because he thinks they're cool.	
Interviewer: Okay. And is there anything in the passage that helps you know that he thinks that they're cool or...	
Student I: Maybe Paragraph 2, "Cool Instincts."	
Interviewer: Okay. That's great; that's a good job. Click "Finish" and then "Turn in", and then "Turn in" again. And then you have only one or two parts that we need to do. So, just like you did on the last one, you'll read the passage, and I think the next one is the same passage, and you can just answer the questions. But as you go through, just tell me like, "I think it's this one because of this..." or, "I know it's not that one because..." just tell me everything your brain is thinking. You're doing a good job. I just want you to click "Operation 1" and then scroll down. Awesome, so yeah, it's the same passage.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: Which sentence from the passage best supports the idea that termites _____ [00:11:56]. Well, maybe C, the airflow carries away heat.	
Interviewer: Okay. And why do you think that one?	
Student I: Because everyone needs cool air so they don't die.	
Interviewer: Okay, that's a good choice. Are any of these others a possibility, do you think?	
Student I: No.	
Interviewer: Why not?	
Student I: Because I don't know how A could be, because the large amounts of dirt are many different sizes, I don't know how that would help them survive.	
Interviewer: Yeah, that makes sense.	
Student I: Or B, inside their mounds are large hollow tubes or termites almost always stay in their tubes and tunnels.	
Interviewer: And tell me why you don't think they would.	
Student I: I don't think they would because those are just facts and not like details about how they survive.	
Interviewer: Okay. Good thinking. So, click your answers. That was some good thinking; I like that, makes sense to me. Alright, what's this one?	
Student I: Which detail supports the idea that termites help one another? Termite workers feed kids until they can find food on their own.	
Interviewer: And why do you think that one?	
Student I: Because it's helping them find their food.	
Interviewer: And what about the other options? Why didn't you think those would work?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student I: Because it doesn't really say--"A" doesn't really say how the termites help the king and the queen termites, because it just says termite kings and queens stay inside the chambers. And then the termite tower has large tubes that help release heat, that doesn't say how they helped one another. "Termite cities have passageways and tunnels to link different rooms," it doesn't say anything about how they help each other, it just says that they link to different rooms.</p>	
<p>Interviewer: Awesome. Why don't you go ahead and click the answer that you think? And there you go. Good job.</p>	
<p>Student I: Which research question would best help the reader find information about the cycle of termites?</p>	
<p>Interviewer: What do you think?</p>	
<p>Student I: Maybe how termites turn into adults?</p>	
<p>Researcher: And why do you think that one?</p>	
<p>Student I: Maybe because no one really knows... or how the termites speak to one another.</p>	
<p>Interviewer: Okay. Well, tell me what you think, why do you think that one? What made you pick that one? Or think about that one, I mean?</p>	
<p>Student I: Maybe because it sounds interesting that they talk.</p>	
<p>Interviewer: Yeah, yeah. Okay. What do you think the right answer is? Which one would you want to pick?</p>	
<p>Student I: Probably "C".</p>	
<p>Interviewer: Go ahead. And you think that one because you thought it sounded interesting to you.</p>	
<p>Student I: Uh-huh.</p>	
<p>Interviewer: Okay.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student I: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from the passage to explain your answer. Well, in the passage, it said they have about 30,000 eggs-- lay about 30,000 eggs a day. So, maybe once those eggs hatch, one of them would become a queen.</p>	
<p>Interviewer: Okay, that sounds like a good answer. Is there anything in the passage besides that that helped you know or just the number of eggs?</p>	
<p>Student I: No.</p>	
<p>Interviewer: Okay. Good job. And so, click on "Finish". That's great. You're doing a great job. So, then we have a new passage here, and then we'll do the same thing with the questions. Thanks. [00:17:08] - [00:21:51] [Static]</p>	
<p>Interviewer: Alright, let's look at this next question. What is it asking us about?</p>	
<p>Student I: Which is the best summary of Jacob's problem?</p>	
<p>Interviewer: What do you think about those? What is the best summary of Jacob's problem in the passage? What do you think?</p>	
<p>Student I: Well, he has homework to do, and he has to read through those [?].</p>	
<p>Interviewer: That's a good answer. Which one of those choices do you think fits best?</p>	
<p>Student I: Maybe "D".</p>	
<p>Interviewer: "D"? Okay, tell me why.</p>	
<p>Student I: Because I said he has some homework after school, but he had to ____ [00:22:48] too.</p>	
<p>Interviewer: Alright. Thank you.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: _____ [00:22:59] is narrated from what point of view?	
Researcher: What do you think?	
Student I: I think third person or unknown narrator.	
Interviewer: And why do you think that?	
Student I: Because it's not Jacob or Jacob's teacher, because if it was Jacob, he would have said, "I scrambled off the bus." And if it was Jacob's teacher--which I don't think it is, because "I would email about this person," right?	
Interviewer: Right. Good point.	
Student I: And then first person and then the narrator would be like Jacob, but like it's like the third person... that unknown narrator is that Jacob scrambled off the bus.	
Interviewer: Okay. Great. That's some good thinking. Thank you. Good job. You really thought that one through.	
Student I: A reader can tell that this passage is fiction because it... uses characters that are not real people, because all of these are things that actually do happen because some people live on farms and not in the big city, and show some things in order of time is something that I've been told sometimes and gives hidden details about farm animals is non-fictional.	
Interviewer: Great.	
Student I: Describe how Jacob's feelings about his homework changed from the beginning of the story to the end of the story, and provide details from the passage to support your answer. Well, he had to do his homework and collect sound. And since he had to do the homework sounds, he wants to live in the city instead, because the city would be like... because there are so many sounds like taxis out there, because he thinks nothing really goes on in his house. But at the end of the story, there is like the cats meow, the dogs go yike-yike and make a ton of noise, and then he knows what to do about his homework.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. That's great. Awesome. Okay, I have just a couple more questions for you. What is your reading teacher's name?	
Student I: Ms. _____ [00:26:29].	
Interviewer: Can you spell it?	
Student I: M-R-S C-O-P...	
Interviewer: _____ [00:26:42], do you think?	
Student I: Yeah, I think so.	
Interviewer: And did I spell your name right, C-O-L-B-Y?	
Student I: No.	
Interviewer: Oh, tell me how to spell it.	
Student I: C-O-B-I-E.	
Interviewer: I wasn't even close. I'm sorry.	
Student I: That's fine.	
Researcher: Okay, now here are some other quick questions for you. So, did you enjoy thinking out loud?	
Student I: Yeah.	
Interviewer: You do? Why did you think it was okay?	
Student I: Because I got to think out, and because sometimes tests and things, if you think in your head, sometimes, numbers and letters get mixed up. And when you're outside and reading, you don't really get your letters and everything mixed up.	
Interviewer: That's a good point. Did you think it was easier or hard to answer the questions?	
Student I: Probably easier.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Easier? And what about the reading passages, were they really easy, or hard, or just right?	
Student I: Just right.	
Interviewer: Okay. And was there any test question that you thought was really hard or confusing?	
Student I: No.	
Interviewer: They all felt the same?	
Student I: Yeah.	
Interviewer: Okay. Alright, my friend, you did a fabulous job. I can tell you're a very good reader. Nice work. I'm going to have Ms. Sarah bring you back, and I appreciate all your help. Thank you so much. Have a great rest of your day.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: I'm going to turn this on, so I can hear you.</p> <p>Okay. So, do you know what we're doing today?</p>	
<p>Student II: Uh-huh.</p>	
<p>Interviewer : You do? Okay. So, I'll just tell you again, make sure. We're studying how your brain thinks about different types of test questions. And so, what we're having you do is read different passages and then answer questions. But while you answer the questions, we're having you tell us all your thoughts, so we can understand what your brain is doing.</p> <p>I'll give you an example here. So, if somebody said, "I want you to think out loud and fold this piece of paper." Here's what I would do. I would start talking to myself. I'd say, "Okay. They want me to fold this paper two times. I'm going to fold it hot dog style and let's see. I have to fold it one more time. I guess I'll fold it hot dog style twice. That seems like a good idea.</p> <p>So, now I fold it. I make it squishy or make my creases. Okay. So, then I folded it two times." Did you see how I was doing that? Like I was telling you what I was doing as I was doing it?</p>	
<p>Student II: Uh-huh.</p>	
<p>Interviewer : All right. I'll give you one more example before I let you try. Are you ready?</p>	
<p>Student II: Uh-huh.</p>	
<p>Interviewer : Okay. So, I've already read this passage. So, I'm going to just go to the answers and here's what I would say if I was thinking out loud. I would say, "Okay. The author of the passage of 'The American Buffalo' most likely wrote this passage 'to inform the reader with details', 'to persuade the reader with facts', 'to entertain the reader with a story', 'to share a personal experience with the reader.'</p> <p>Okay. So, I have to decide. I know it's not this one because sharing a personal experience with the reader is</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
like an autobiography or a memoir and that’s not what this passage is.”	
Student II: It’s a non-fiction story.	
Interviewer : Yeah. Yeah, so I’m going to get rid of that one. “To entertain the reader with a story”, stories have characters and plots, right?	
Student II: Uh-huh.	
Interviewer : And there are no characters and plots in this one. I mean, it was interesting, but it didn’t have a story.	
Student II: I think I might’ve got that wrong on the state test.	
Interviewer : Oh, that’s okay.	
Student II: I don’t really remember what I answered this one for.	
Interviewer : It’s okay. This is just for practice. All right, then this one says “to persuade the reader with facts.” Well, this has a lot of facts, right?	
Student II: Uh-huh.	
Interviewer : But it’s not trying to--	
Student II: Persuade.	
Interviewer : Persuading me, yeah. So, I don’t think it’s that one. So, oops! Get rid of that one.	
Student II: Okay.	
Interviewer : So, I have “to inform the reader with details”, okay? I’m going to make sure that makes sense and there’s lots of details in here, right?	
Student II: Uh-huh.	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewer : Because it talks about how much they weigh and how tall they are.	
Student II: Those are facts.	
Interviewer : Yeah. And it's information that maybe I didn't know.	
Student II: Yeah.	
<p>Interviewer : So, I'm pretty sure that's the answer. So, I click that one and I go to "Next".</p> <p>And now I have this one. All right. "Based on the information in the passage, explain what might happen if people lose interest in 'The American Buffalo'. Include details in the passage to support your answer.'</p> <p>All right, this could be a little harder. Let's see. I remember when I read the passage down here it talked about how people were helping the buffalo. So, that means they're interested in the buffalo. So, what they're doing is they're protecting them. They want the numbers to increase.</p> <p>Okay. So, that's the information. But the question says if they lose interest, so it's the opposite.</p>	
Student II: There's still people trying to hunt them though.	
Interviewer : Yeah.	
Student II: It could lose the interest of the people hunting and it could lose the interest of some people helping.	
Interviewer : Right.	
Student II: So, they would basically be able to live on the ground for the rest--	
Interviewer : Yeah.	
Student II: --of their lives--	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer : Yeah.	
Student II: --and not be killed.	
Interviewer : Yeah. So--	
Student II: And then, the population would get higher.	
Interviewer : Yeah. But if people didn't care about them, then maybe too many people would hunt them--	
Student II: Yeah.	
Interviewer : --and they'd go down.	
Student II: Hunters lose interest too because it's saying everyone would lose interest.	
Interviewer : Okay. Okay, so then I would type my answer. But you don't have to type your answer.	
Student II: Okay.	
Interviewer : And then, I would click "Finish".	
Student II: For that question?	
<p>Interviewer : Yeah. That's a good one.</p> <p>Okay. Now it's going to be your turn to practice a couple of times, so. And these next two questions are just practice.</p>	
Student II: You got a 50.	
<p>Interviewer : All right. So, here's a passage and it's just like you did the test last year. So, you can use my mouse to go up and down. You can read the passage. And then, when you get to the questions, we'll work on them together. We'll practice talking out loud. Does that make sense?</p>	
Student II: Uh-huh.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer : Okay. So, I'm going to let you have the mouse and there you go.	
Student II: Thanks. (Dead air/Background noise 00:04:28-00:09:02)	
Interviewer : Okay. Are you ready?	
Student II: Uh-huh.	
Interviewer : All right, so let's look at this first question. What is it asking us to do here?	
Student II: "What does Jacob mean when he asks, 'How could a person think?' in paragraph 19?"	
Interviewer : Okay. How are you going to answer this question?	
Student II: Jacob— (Mumbles) If his parents are able to think why they have so many things to do. Uh-uh.	
Interviewer : Why not?	
Student II: Because he wonders if his parents are able to think which he's not worried about his parents right now.	
Interviewer : Okay. Okay, good. Yeah, nice thinking. Now what's this next one?	
Student II: "Jacob feels that his homework assignment means a completely new way of thinking." Hmm, maybe, maybe not.	
Interviewer : Maybe? Why do you feel like it might work?	
Student II: Because he feels like his homework is hard and he may have to think differently.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer : Okay, all right.	
Student II: “Jacob thinks his teacher will understand if he does not do his homework because how much is going on around him.” No.	
Interviewer : Why not?	
Student II: Because teachers don’t understand people saying it’s too loud and it’s supposed to be loud for his homework.	
Interviewer : Yeah, gotcha. Go ahead.	
Student II: And “Jacob finds the animals and birds on the farm so noisy that he cannot keep his mind on homework.” No.	
Interviewer : Okay. And why not?	
Student II: Because they are saying that he—he’s not saying it’s too loud for him. But he’s trying to hear. He’s like, “Be quiet!” because he wants to think, but no.	
Interviewer : Okay. Okay, so you think your answer is B?	
Student II: Yeah.	
Interviewer : So, then you’d click it. Good job! And then, click “Next”. Then what’s this next practice one asking?	
Student II: “Determine the theme of the passage. Provide details from the passage to support your answer.”	
Interviewer : Okay. What are you going to do here? What do you think?	
Student II: Do I have to type?	
Interviewer : You can type or you can just tell me too if that’s easier for you	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: Okay. I'll just tell you. The theme would probably be like he thinks it's too hard to find like out what's going to happen—how much noise is on his farm when there's a lot of noise on the—what's it called? The city.	
Interviewer : Yeah, city. Yeah	
Student II: Yeah, city. I was going to say town.	
Interviewer : Well, that works too.	
Student II: Towns are quieter though.	
Interviewer : Well, probably a little bit. But that's okay. Keep going. What else do you think?	
Student II: Basically, like he thinks it's too quiet here. But then when the door creaks when he opens it, that's noise. His dog's barking. That's noise. The birds are tweeting. That's noise. These, he can't hear those because the birds are tweeting.	
Interviewer : Right. Right. Right, so that's a good answer. You really thought that through. Okay. So, you can take your mouse and click "Finish".	
Student II: (Dead air/Background noise 00:12:00-00:12:03), It's so hard to use these.	
Interviewer : Yeah. Those are weird. And if you'd click, "Turn in". What do you guys usually use? Like Chromebooks or--	
Student II: Chromebooks?	
Interviewer : What do you take your test on usually?	
Student II: Oh, like our state test or normal tests?	
Interviewer : State tests.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: State tests we use—what’s it called? Do I click on that one?	
Interviewer : Oh yeah. Click that. Yeah.	
Student II: What’s it called? It’s the—I forgot what it was called.	
Interviewer : That’s okay.	
Student II: But it’s that thing on the—Dashboard.	
Interviewer : Oh.	
Student II: We took it on computers. It’s on the dash. It’s on the first page when you log in.	
<p>Interviewer : Okay, gotcha. Okay, all right. So, we have two more things to do. So, click—take your mouse and click on “Session 1”. And then, scroll down.</p> <p>(Dead air/Background noise 00:12:50-00:12:54)</p> <p>And then, “Continue”. And then, “Continue” again. All right, so you’re going to continue doing the same thing you just did. So, you can read the passage again if you want or we can just keep going with the questions.</p>	
Student II: I’ll keep doing the questions because I’ll have you help me type it in.	
Interviewer : Okay, great. Let’s talk about it. What does it say here?	
<p>Student II: “Which is the best summary of Jacob’s problem in the passage? ‘He’s unhappy living out on the country farm. He wishes he could live in the city instead.’”</p> <p>No, because he’s not worried about that. He’s worried about how he’ll do his homework.</p>	
Interviewer : Okay	
<p>Student II: So, no. “He has to collect sounds for a homework assignment. He thinks it will be difficult on a farm.” Probably.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer : Okay.	
Student II: “He isn’t able to get his homework done after school. The animals are the farm where he lives are too nosey.” No.	
Interviewer : Why not?	
Student II: Because he needs noise for his homework.	
Interviewer : Right, okay. Good point.	
Student II: And then, “He has to do some homework after school, but he has too many chores. There is not enough time to get anything done.” No, because he’s not worried about his chores. He’s worried about his homework--	
Interviewer : Okay.	
Student II: --and it’s apparently too quiet.	
Interviewer : Right. Right. Right. So, that’s the answer. Okay. What’s this next one?	
Student II: “Narrated from which point of view?” It’s third person.	
Interviewer : Why do you think so?	
Student II: Because his teacher isn’t talking and she doesn’t know what’s happening in his life at home.	
Interviewer : Right.	
Student II: And--	
Interviewer : Okay.	
Student II: --it’s not like the teacher said. And it was like she said, “Your homework is to collect sounds.” Ms. Olsen said, not I said.	
Interviewer : Gotcha. That makes sense to me.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
What about the other two?	
Student II: What other two? Like--	
Interviewer : Why was that wrong?	
Student II: This one was because Jacob did not say “I said—” blah, blah, blah.	
Interviewer : Okay.	
Student II: Third person, Jacob’s teacher didn’t say--	
Interviewer : Right.	
Student II: --“I said—“blah, blah, blah. And first person by an unnamed narrator maybe, but it’s not first person because it’s like, “I personally think this should’ve been happening—”	
Interviewer : Right.	
Student II: “—instead of that.”	
Interviewer : Okay. Okay, nice.	
Student II: “You can tell a passage is fiction because it A) gives details about farm animals B) shows events in order through time C) happens on a farm, not in a big city D) uses characters who are not real people.” Okay. So, it’s not “gives details about farming also because it’s not saying “This animal has like black and white spots all over them.”	
Interviewer : Okay, yeah. I see your thinking. Go ahead.	
Student II: And this one, it’s not this because events is not going in time like timelines or anything.	
Interviewer : Okay.	
Student II: (Dead air/background noise 00:15:55-00:16:00). I’m at this one.	
Interviewer : Oops! Here you go.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: “It’s on the farm, not in a big city” maybe, not really though.	
Interviewer : Why not?	
Student II: Because farms are real and so are the big city. And it’s fiction. It’s fake.	
Interviewer : Gotcha.	
Student II: So, “uses characters who are not real people”, that would work because--	
Interviewer : Okay.	
Student II: --it’s saying because these characters aren’t real unless Ms. Olsen is a real person.	
Interviewer : Yeah, okay.	
Student II: And that’d be realistic to fiction, but it’s not fiction.	
Interviewer : Yeah. Yeah, okay. That makes sense. Good job.	
All right, what’s this one?	
Student II: “Describe how Jacob’s feelings about his homework can change from the beginning of the story to the end of the story. Provide details from the passage to support your answer.”	
It’s super hard for him at first because he doesn’t know any—how he could find so many sounds. But in the city, he thinks there’s a lot of sounds because of the firetrucks, ambulance, police cars, road like pavement--	
Interviewer : Sure.	
Student II: --and all that.	
Interviewer : Yeah.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: And he thinks it's super quiet where he lives. But around the end of the story it says he kind of understands it now and he can do it better because he hears the birds, his dog.	
Interviewer : Right.	
Student II: He remembered the bees from when he's--	
Interviewer : Sure.	
Student II: --before the birds--	
Interviewer : Okay.	
Student II: --started chirping and the door--	
Interviewer : Yeah	
Student II: --the gate I mean, and the cat. Oh!	
<p>Interviewer : You're okay. It's okay. Awesome! That's really good thinking. Nice!</p> <p>All right, so now you can click "Finish" and turn it in. And turn it in and--</p>	
Student II: One more.	
<p>Interviewer : Oh, one more. Okay. Let's see what this one does. Okay.</p> <p>(Dead air/Background noise 00:17:58-00:18:02)</p> <p>"Inside a Termite's House". So, that's the same kind of thing. So, I'll let you read and then we'll talk about it.</p>	
Student II: That sounds gross.	
Interviewer : I know.	
<p>Student II: Okay.</p> <p>(Dead air/Background noise 00:18:09-00:22:20)</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer : All right. You ready?	
Interviewer : All right. Well, talk me through it here. What do you think?	
<p>Student II: “Which sentence from the passage best supports the idea that towers help termites survive? A) These large mounds of dirt are of many different sizes and B) Inside the mounds, large hollow tubes, C) Air flows and carries away the heat or D) Termites always stay inside their tubes and tunnels.”</p> <p>D is not true because at the end it said that they can get anything they need by going above ground.</p>	
Interviewer : Okay.	
Student II: “Air flows and carries away the heat.” Maybe.	
Interviewer : Okay.	
Student II: “Inside the mounds are large, hollow tubes.” I don’t think so.	
Interviewer : Okay. Why not?	
Student II: Because it’s saying that there’s large hollow tubes. And there are, but I don’t think that’s going to help them survive--	
Interviewer : Okay. That seems reasonable.	
Student II: --because they can’t get their food from tubes--	
Interviewer : Sure, okay.	
Student II: --or more cool from tubes.	
Interviewer : I’m with you.	
Student II: “The large mounds of dirt are of many different sizes.” Nope.	
Interviewer : Because?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: Because that's not helping them survive and more like air flow. And the air flow is helping them survive.	
Interviewer : Okay, great. Good job. Nice thinking. All right, what's this one? Okay.	
Student II: If the termite kings and queens stay inside their chambers, B) Termite towers have large tubes to help release heat. Maybe. I don't think that is right though because it's just saying they stay inside their chambers. That's not going to help--	
Interviewer : Oh sure.	
Student II: --one another.	
Interviewer : Okay.	
Student II: (Dead air/Background noise 00:24:28-00:24:32) C) "Termite workers ____ [00:24:35] until they can find food on their own." Maybe. And "Termites have different passageways and tunnels leading to different routes." That's true, but that doesn't help one another.	
Interviewer : Okay.	
Student II: No.	
Interviewer : There you go. All right, which one?	
Student II: B? No, that's not helping. They're not helping each other.	
Interviewer : Okay.	
Student II: That's C) they're helping them.	
Interviewer : Right, okay.	
Student II: So, C.	
Interviewer : Okay. Termites, okay. Nice!	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student II: (Dead air/Background noise 00:25:10-00:25:14)</p> <p>“Which research question could best help maybe to find information about the life cycle of termites?”</p>	
<p>Interviewer : Okay.</p>	
<p>Student II: “How termites turn into adults”—I don’t think this one’s right because it’s just saying how big is a full grown--</p>	
<p>Interviewer : Okay.</p>	
<p>Student II: --termite. Maybe that—“How do termites speak with one another?” Maybe. I don’t know the life cycle because it says how they speak to each other--</p>	
<p>Interviewer : Okay.</p>	
<p>Student II: --and “How many different kinds of termites there--” That’s going to—not going to help the life cycle.</p>	
<p>Interviewer : Okay.</p>	
<p>Student II: So, it would be B.</p>	
<p>Interviewer : Okay. Keep going. Good job!</p>	
<p>Student II: And “Based on the information in the passage, explain—” so, I would have to explain what would most likely happen to the termite colony if the king or queen were to die. “Provide details from the passage to support your answer.”</p> <p>They’d probably nominate a new king or queen.</p>	
<p>Interviewer : Nominate a new king or queen?</p>	
<p>Student II: Yeah. But before that they would—I don’t know what would happen. They would probably just nominate a new king or queen--</p>	
<p>Interviewer : Okay.</p>	

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Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: --to do what they did.	
Interviewer : Was there anything in the passage that helped you know that?	
Student II: Uh-huh. It said they produce up to like 13,000--	
Interviewer : Okay.	
Student II: --eggs--	
Interviewer : Okay.	
Student II: -- a day.	
Interviewer : Okay. That's a good one. That's a good answer. Awesome. All right, so click "Finish".	
Student II: Okay.	
Interviewer : Let's see if there's anything else. "Turn in." "Turn in."	
(Dead air/Background noise 00:26:45-00:26:50)	
Student II: Eh.	
Interviewer : Okay. Let's see.	
Now I have just a couple of questions for you, is that okay?	
Student II: Uh-huh.	
Interviewer : Okay, all right. So, Student II, did you enjoy thinking out loud?	
Student II: Yeah.	
Interviewer : Tell me why.	
Student II: Because it helped me think/focus better.	
Interviewer : Okay. That's a good answer.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>(Dead air/Background noise 00:27:05-00:27:15)</p> <p>Did you find it easy to think out loud or did it make it more hard for you to answer the test questions?</p>	
<p>Student II: A little bit easier.</p>	
<p>Interviewer : A little bit easier?</p> <p>(Dead air/Background noise 00:27:25-00:27:29)</p> <p>How about the reading passages? Were they difficult, easy or, about right?</p>	
<p>Student II: About right.</p>	
<p>Interviewer : About right?</p> <p>All right, and one more question here. Tell me which test question you found difficult or confusing.</p>	
<p>Student II: The ones where you had to write.</p>	
<p>Interviewer : The ones where you had to write?</p>	
<p>Student II: Uh-huh.</p>	
<p>Interviewer : How come?</p>	
<p>Student II: They were just a little more confusing because it asked longer questions and were problems that were kind of confusing. But the short word problems were easy.</p>	
<p>Interviewer : I know what you mean. Okay. So, the problems were harder. Okay. So, you said the _____[00:28:05] because the problems were harder. They were—what else did you say? Remind me.</p>	
<p>Student II: The longer ones were hard--</p>	
<p>Interviewer : Longer?</p>	
<p>Student II: --because they were hard and it was confusing--</p>	
<p>Interviewer : Okay.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student II: --because it's harder to remember everything they said because you have so much to think about.	
Interviewer : All right, okay. Okay, "Next". Perfect. You did a fabulous job! You are hired to be a thinker out louder. You're all done. So, it's almost time for lunch, huh?	
Student II: Uh-huh.	
Interviewer : Pretty soon?	
Student II: I got to skip most of my class.	
Interviewer : Huh?	
Student II: I got to skip most of my class.	
Interviewer : Which class?	
Student II: My favorite class.	
Interviewer : Oh no!	
Student II: One of my favorite classes anyway.	
Interviewer : Which one?	
Student II: It was U.S. History.	
Interviewer : I love that one too. I'm sorry.	
Student II: It's fine.	
Interviewer : Well, thank you for coming and helping me out anyway.	
Student II: No problem.	
Interviewer : Have a good rest of the day. _____[00:28:58]	
Student II: You too. Bye.	
[End of audio]	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>Interviewer: Okay. So, let me get over here. Yeah. So, you remember seeing stuff like this?</p> <p>Yeah, all right. So, I have already read the passage. So, I remember what it's about.</p> <p>Now I'm going to think out loud with these questions here. So, I'm going to read it. It says, "The author of the 'American Buffalo' most likely wrote this passage." Okay. So, why did the author write the passage?</p> <p>Okay. A says, "to inform the reader with details." Okay. So, this is the informational passage and it's telling me—it's got lots of details. So, I think it's that one. But I better make sure there's not a better answer.</p> <p>Okay. So, "to persuade the reader with facts". There's lots of facts in here like the buffalo weight, how tall they are. But I don't think it's persuading me to do anything. It's not trying to make me like want to go help them or anything. So, I don't think that's the right answer. I'm going to cross that one off.</p> <p>Okay, "to entertain the reader with a story". Well, I know this is not a story because stories have characters and plots. And this is just giving me information, so I know that's not right.</p> <p>What does D say? D says, "To share a personal experience with the reader." Okay. So, those kind of stories are like autobiographies, or memoirs, or something. So, I don't think that this is what this is. So, the answer is A. I'm going to click A.</p> <p>Okay. Let's see, "Next". Okay. What is this next question?</p> <p>"Based on the information in the passage, 'The American Buffalo' explain what may happen if people lose interest in 'The American Buffalo'. Include details from the passage just per your response."</p> <p>Okay. So, this is asking me what will happen if people aren't interested in the buffalo. So, I remember paragraph 5 said that people are helping the American Buffalo and they're working to help it. So, I think they're</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>interested. They protect them. They want their numbers to increase.</p> <p>Okay. So, these people are interested. So, if they were not interested, I bet that they wouldn't care. They wouldn't care about them, so they wouldn't protect them and their numbers would probably go down.</p> <p>So, my answer is if people lose interest in the American buffalo, people will maybe hunt them and they might have become extinct. And my evidence is in paragraph 5 here with these sentences.</p> <p>I'll click "Finish" and "Submit". Does that make sense?</p> <p>Okay. Now I'm going to have you practice a couple of times soon as the computer gets going there.</p> <p>Okay. So, this is the practice edition. Let's go down. So, your job, that would be to read the passage. And then, when you're done reading the passage, let's go through the questions together and we'll practice thinking out loud. Is that okay?</p> <p>I'll give you the mouse here, so you can scoot it up and down. I'll get it back up to the top right there. Thank you.</p>	
<p>Student III: (Dead Air/Background noise 00:03:10-00:07:12]</p>	
<p>Interviewer: Okay. So, let's look at this first question together. What is it asking us about? What does it say?</p>	
<p>Student III: "What does Jacob mean when he asks, 'How could a person think?' in paragraph 19?"</p>	
<p>Interviewer: Okay. So, now when you do your think about, you tell me all the things that you're thinking in order to get to your answer. So, what—how would you figure out what the answer is here?</p>	
<p>Student III: I would look at paragraph 19.</p>	
<p>Interviewer: Okay. So, go ahead and do that.</p>	



Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: (Dead air/Background noise 00:07:40-00:08:10)	
Interviewer: Okay. What answer do you think is the right answer here?	
Student III: It's not A.	
Interviewer: Why do you think it's not A?	
Student III: Because I—if I—because in paragraph 9 it says how can a person think when like everything's really loud and stuff. And then, this like about his parents thinking.	
Interviewer: Okay. Okay, that makes good sense. Nice thinking.	
Student III: (Dead Air/Background noise 00:08:45-00:08:58) And it's not B either because it's like the same thing as the other one.	
Interviewer: Okay. It's not talking about that?	
Student III: Yeah.	
Interviewer: Okay.	
Student III: (Dead Air/Background noise 00:09:05-00:09:25) He doesn't really talk about his teacher--	
Interviewer: Okay.	
Student III: --in the paragraph. So, it'll be D--	
Interviewer: Okay.	
Student III: --because it talks about like how noisy it is.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yeah. Okay, good. Oh, you're okay. Good point. That's awesome. Okay. Let's look at this one together. What is it asking about?	
Student III: "Determine the theme of the passage. Provide details from the passage to support your answer."	
Interviewer: Okay. What is a theme? Do you remember?	
Student III: Like I know it, but I don't know how to explain.	
Interviewer: Okay. That's okay. What do you think the theme is of the story?	
Student III: Like (Dead air/Background noise 00:10:10-00:10:35)	
Interviewer: Are you stuck on this one?	
Student III: Yeah.	
Interviewer: Okay. That's okay. Let's click "Finish".	
Student III: Okay.	
<p>Interviewer: Okay. And we'll turn it in and turn it in again. Okay. Now we're going to do two more easy ones. So, click on "Operational Session" and you're doing a great job by the way. I like the way you did your thinking on that one.</p> <p>Let's go down. Click "Continue". Okay. So, now we're going to do the next one. Okay. Go ahead.</p> <p>All right. So, now we have the same story, but some different questions. Do you want to read the story again or do you want us to keep going with the questions?</p>	
Student III: Questions.	
Interviewer: Okay. Let's go through them together. What's the question asking?	
Student III: "Which is the best summary of Jacob's problem in the passage?"	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. Let's look at the summaries. Which one do you think it is?	
Student III: (Dead air/Background noise 00:11:26-00:36:00) B.	
Interviewer: Why do you think it's B?	
Student III: Because the story talks about how he—for his homework he has to find sounds and stuff. And then, like he says it'll be difficult because like he doesn't live in the city where there's a lot of sounds. He lives on a farm. And then, it says that in B.	
Interviewer: Okay. That's great. That's really good thinking. Okay. You can go on to the next one.	
Student III: (Dead air/Background noise 00:12:05-00:12:10).	
Interviewer: How would you answer this one? What is it asking us to do?	
Student III: Asking about the narrator—from what point of view.	
Interviewer: Okay. What do you think?	
Student III: (Dead air/Background noise 00:12:34-00:12:40).	
Interviewer: Can it remind you of what point of view it is?	
Student III: Like if you see like kind of like his.	
Interviewer: Oh, right. Right. Right. Okay. So, which one do you think it could be?	
Student III: I think it's B.	
Interviewer: Why do you think that?	
Student III: Because in paragraph 1 it says like that the teacher's talking.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student III: And it also might be C or D.	
Interviewer: Hmm, how are you going to decide?	
Student III: (Dead Air/Background noise 00:13:15-00:13:30). I think it's D.	
Interviewer: And why do you think that's D?	
Student III: Because like it can't be B because it didn't— if it was like B, it would've said "Ms.—" She would just be talking.	
Interviewer: Right. Right, okay. So, you say you think it's D?	
Student III: Yeah.	
Interviewer: Okay. You go ahead and click that one. You're doing a great job. What's the next one?	
Student III: (Dead air/Background noise 00:14:00-00:14:06) I think that it says that this passage is ____ [00:14:10] because it's— (Dead air/Background noise 00:14:15-00:14:20). I think it's D because it didn't really use people that are real.	
Interviewer: Oh okay.	
Student III: If it was about like real people--	
Interviewer: Oh sure. And can these be in fiction, or non-fiction, or--	
Student III: Like these could be fiction, but these could actually be non-fiction.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Oh sure. Okay. So, that one's the only one that could be--	
Student III: Yeah--	
Interviewer: Okay.	
Student III: --because if it was non-fiction they would be like real people.	
Interviewer: Good thinking. I like it. That's a good thinker. Here.	
<p>Student III: (Dead air/Background noise 00:14:55-00:15:05)</p> <p>“How did ___[00:15:10] feel about this homework assignment from the beginning of the story to the end of the story? Provide details from the passage to support your answer.”</p>	
Interviewer: Okay. Hmm.	
<p>Student III: So, at the beginning of the story, he was like he didn't like have—he thinks he didn't have anything else like but sound because he thinks that farm has no sounds and the city has more sound. But at the end, he found out that there's a lot of sound on his farm.</p>	
Interviewer: Okay, great. Were there any sentences in the paragraphs that help you know that?	
Student III: I think it was 18 or 20.	
Interviewer: Yeah.	
<p>Student III: (Dead air or Background noise 00:15:57-00:16:05)</p> <p>In 21--</p>	
Interviewer: Yeah.	
Student III: It said like Jacob said there was plenty of noises on the farm.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: And in paragraph like 3 or 8—in paragraph 2, he said like there’s like no sounds on the farm. There would be more sounds in the city.	
<p>Interviewer: That’s good thinking. Really nice job. All right, let’s go on to the next one. Let’s see what’s next. So, we’ll go over here to “Finish”. We’ll turn that one in and turn that one in. And oh, one more there. (Dead air/Background noise 00:16:50-00:16:55)</p> <p>Nice work! Okay. Ooh, “Inside a Termite Tower”. Okay. So, a new passage and new questions. I’ll let you read, okay?</p>	
Student III: (Dead air/Background noise 00:17:03-00:21:35)	
<p>Interviewer: Okay, all right. Let’s look at these questions together. What have we got here?</p> <p>All right, what’s the question?</p>	
Student III: “Which sentence from the passage supports the idea that towers help termites survive?”	
Interviewer: Okay. What do you think?	
Student III: I think C because like if it falls out and like it falls in. And like there’s heat outside and like it’ll like feel better than outside.	
Interviewer: Oh.	
Student III: It won’t be like hot.	
Interviewer: Let’s talk about some of the other choices too.	
Student III: Okay.	
Interviewer: How do you know those are wrong?	
Student III: D doesn’t talk about like how it would help them. It just says like they stay in there.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Sure.	
Student III: They stay out of the element.	
Interviewer: Sure, okay.	
Student III: Then A, same thing. It talks about how they survive because the question tell how does it help them.	
Interviewer: Right, okay.	
Student III: And then, B— (Dead air/Background noise 00:23:10-15) --it just says how, and like the frequency of what it does.	
Interviewer: Okay.	
Student III: So, that's why I think it's C.	
Interviewer: Okay, all right. I think that's excellent thinking on that one too as well. All right, what's this one?	
Student III: "Which detail is the worst idea that termites help when needed?"	
Interviewer: Okay.	
Student III: (Dead air/Background noise 00:23:36-00:24:53) I think it might be A.	
Interviewer: It might be A?	
Student III: Yeah, because like they help each other like get stuff for the king and queen.	
Interviewer: Okay.	
Student III: It's not C because the—it says like how the termites help when—C says how the workers help the termites.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student III: So, it won't be C--	
Interviewer: Okay.	
Student III: (Dead air/Background noise 00:25:20-00:25:23) --either. And B doesn't say how they helped. It just says how they release heat. And so, it might be D. But I chose A.	
Interviewer: Okay. (Dead air/Background noise 00:25:43-00:25:48) And why do you think it's not D?	
Student III: (Dead air/Background noise 00:25:50-00:25:54) Because like--	
Interviewer: Go ahead.	
Student III: It's like because it didn't talk about it in the passage. It didn't say how they help or anything. But the passage, like it talks about how they help to like queens and kings. They get food and stuff.	
Interviewer: Okay.	
Student III: So, I think it's B.	
Interviewer: All right, good thinking. Great job. All right.	
Student III: Which research question helped you to find out about the life cycle of termites?	
Interviewer: Okay.	
Student III: (Dead air/Background noise 00:26:35-00:26:40) I think it's B, is that right? It says like how to turn it—like the little ones like turn to like keep them together and stuff. And like C	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>doesn't talk about their life cycle—like how they grow and everything. And then, D just talks about how different kinds--</p>	
<p>Interviewer: Sure.</p>	
<p>Student III: And B just asks how like they turn—like how big termites can grow big--</p>	
<p>Interviewer: Sure, okay.</p>	
<p>Student III: --because like B, it like—let's see.</p>	
<p>Interviewer: It's kay.</p>	
<p>Student III: They're like babies kind of, but they keep growing.</p>	
<p>Interviewer: Okay.</p>	
<p>Student III: Right. It'll tell like how they keep growing.</p>	
<p>Interviewer: Okay. Okay, I think that's a great answer. Good job, great. Let's see here.</p>	
<p>Student III: "Based on the definition, explain what would most likely happen to the colony if the king and queen were to die. Provide details from the passage to support your answer."</p>	
<p>Interviewer: Hmm. Okay. What do you think about that one?</p>	
<p>Student III: (Dead air/Background noise 00:27:50-00:28:49) Maybe like one of them stays and they both try it. Then they learn that another person could be. Like another termite could be king and queen. Like if one dies, then like probably the other one would just stay there--</p>	
<p>Interviewer: Oh okay.</p>	
<p>Student III: --till they die.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You're thinking it sounds like they didn't make it. So, you think that if both of them are to die, then maybe what would happen again? Tell me again.	
Student III: Like another one would be.	
Interviewer: Another one would come up?	
Student III: Yes.	
Interviewer: But if only one of them died--	
Student III: Yes.	
Interviewer: --then just one of the other would come up.	
Student III: Yeah.	
Interviewer: Okay, awesome. Good job! (Dead air/Background noise 00:29:30-00:29:35) Turn that one in. Sweet! You're all done. Okay. Now I have just a couple of questions for you. They're really easy though. Okay. So, did you like thinking out loud?	
Student III: Yeah.	
Interviewer: A little bit?	
Student III: It was okay.	
Interviewer: Okay. Do you think it made it easier or harder to think out loud when you had to answer questions?	
Student III: It made it easier because I could talk about it and keep it in your mind.	
Interviewer: Oh okay. What about the passages? Were the passages easy, or hard, or, just right?	
Student III: They were like in the middle. It was like good because if it was too easy, then you wouldn't learn anything.	
Interviewer: Okay. Too easy would be, okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
All right, last one on here. Was there any test question that you thought was really hard or was harder than the others?	
Student III: I think the theme one.	
Interviewer: The theme one was hard? Why is that one hard for you?	
Student III: Like _____ [00:30:50].	
Interviewer: Okay. So, unsure. That's awesome. That's good thinking. You did really a good job at this. Thank you very much for spending some time with me. I appreciate it.	
Student III: Thanks.	
Interviewer: You're all done. I like that bracelet. That's cool.	
Student III: Thank you.	
Interviewer: I'm going to let Sarah (SP) take you out. Hopefully. She _____ [00:31:10], You're good. Bye.	
Student III: Thank you.	
Interviewer: Have a good one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: ____ [00:00:01] this way. Okay, actually, let's kind of put it out there so I can hear what they're saying.</p> <p>Okay, so what we're doing is trying to study how kids' brains think on different types of item questions. So, to do that, to figure out what your brain is thinking, we're doing something called, 'thinking out loud.' And that means that basically anything that you're thinking, you just say it out loud, so that we can hear it.</p> <p>I'll give you an example. Like if I had this piece of paper, and somebody said, ---- I want you to think out loud and fold this paper.' Here's what I would do. I would say, 'Okay, you want me to fold this paper twice?' I fold it hot dog style, the long way, and make a crease. And I'm going to, I think I'm going to fold it, you know, I think I'm going to fold it this way. I'm going to make a triangle, because that's kind of a different shape. And I'm going to make it that way. So, I folded the paper twice. I folded it hot-dog, and then I folded a triangle.</p> <p>That's basically thinking out loud. You're just saying what you're doing while you're doing it. Does that make sense?</p>	
<p>Student: Mm-hmm.</p>	
<p>Interviewer: I'll give you another example, here on this test. Do you remember seeing these passages?</p>	
<p>Student: Yeah.</p>	
<p>Interviewer: Yeah. All right. So, I've read this passage, but I'm practice my thinking out loud with you here. Right, so, 'The author of The American Buffalo most likely wrote this passage, which . . . to inform readers with details, to persuade the reader with facts, to entertain with a story, to share a personal experience with the reader.'</p> <p>All right, I don't think it's this one. And the reason I don't think it's this one, is because a personal experience would be like a memoir or an autobiography, and that's not what this is. It's not sharing that kind of information, so that's not the answer.</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>'To entertain the reader with a story.' Okay, but stories have plots, and characters, and dialogue, and I know that this doesn't have any of those things, so it's not that one.</p> <p>'To persuade the reader with facts.' Huh. This one has lots of facts in it, but I don't think it's persuading me to do anything. It's just giving me information. So, I don't think it's that one. It has facts, but it doesn't have this part. So, that's not the answer.</p> <p>All right, that leaves me with 'to inform the reader with details.' I think that's right, because there's lots of details in here. And it's giving me information that I might not have known before, so I'm going to pick A.</p> <p>And then I _____ [00:02:47] click Next.</p> <p>See how I was thinking out loud there.</p>	
<p>Student: Yeah.</p>	
<p>Interviewer: All right. I'll do one more for you, just to give you an example.</p> <p>'Based on the information in the passage, The American Buffalo, explain what might happen if people lose interest in the American buffalo. Include details from the passage to support your response.</p> <p>Okay, so I remember when I read this, down here in paragraph 5, it talked about what people were doing. So, it says, 'People are working to help the buffalo' so it means they're interested and want to protect them, they want to see their numbers increase, the herd is protected. So, I can tell that people care about the buffalo in this one. But the question, it says, 'If they lose interest or they don't care' to the buffalo, then what might happen is the buffalo might not be protected, and their numbers might go down. They might decrease. And I know that because here, they're caring about it, but in this one, if they don't care, it would be the opposite. So, if I was going to type that, that's what I would type.</p> <p>And then I'd click Finish.</p> <p>Does that make sense?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: Yeah.	
Interviewer: Right. Now, I want to give you a chance to practice a couple times. I'm going to have you, so first of all, you're going to read the passage, all the way over here, like this. And then, when you get to the questions, we'll just talk about them together a little bit. But then we'll go on to the real thing. Does that sound okay?	
Student: Yeah.	
Interviewer: Okay. Awesome. I'll let you have the mouse, too. [inaudible background conversation 00:04:22 to 00:06:53] Okay. All right. Let's look at this first question. What is it asking about?	
Student: Would this section heading help the reader?	
Interviewer: Hmm. What do you think the answer is there?	
Student: I don't think it is A.	
Interviewer: Why not?	
Student: For me, the passage _____ [00:07:14] quickly. And when you re-read passages like this, you can't really read them quickly, so you can get, like the details and facts and everything.	
Interviewer: Okay.	
Student: So, it's not that one.	
Interviewer: Okay.	
Student: 'Imagine what termite mounds look like.' Well, it shows us picture right here, and it doesn't really tell us a lot about termite mounds.	
Interviewer: Okay.	
Student: So, not that one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student: 'Know what the next paragraph is about.' Well, not really, but D is, 'Always pronounce difficult words in this selection.' So, probably the best answer, yeah, I think it would be this one.	
Interviewer: Okay, awesome. Then click Next. That's some good thinking. Here, let's practice one more time. What's this one ask about?	
Student: 'Explain the most likely reason the author wrote the passage. Provide details from the passage to support your answer.'	
Interviewer: Okay. Hmm. What do you think about this one?	
Student: I think this passage talks a lot about termites and what they do. It doesn't really talk that much about the termite mounds. So, then I think it would talk about the facts of termites and what termites do.	
Interviewer: Okay.	
Student: So, then, do I just read them [cross talking]?	
Interviewer: No, you can just tell me. That's fine. Did you want to, was there anything in the passage that helped you know that, or come to that answer?	
Student: There was some things in the passage in here that I didn't know about, like termite mounds can rise about 20 feet.	
Interviewer: Yeah. That's a pretty interesting fact.	
Student: Termites, they have like their own little garden.	
Interviewer: Uh-huh. Yup.	
Student: See right here, 'Termite garden rooms look like honeycombs.' And then, 'termites almost always stay in their tubes.'	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. So that was your, that's why you, your evidence. Okay.	
Student: Yeah.	
<p>Interviewer: That's great. Then you click Finish. And you'd click the green one for Turn It In. And then Turn It In again. Okay, and it looks like we two more to go. So, let's click on Operational Session, oh, see it down there, and click here, and then click into _____ [00:10:19].</p> <p>Right. So now we're going to do the real work. So, it's the same passage. Do you want to re-read the passage, or do you want to just keep answering questions?</p>	
Student: I'd like to just keep answering questions.	
Interviewer: Okay. Let's talk about it. What does this first one want us to do?	
<p>Student: Which sentence from the passage best supports the idea that towers help termites survive? Well, let's look at the answers.</p> <p>First answer, 'These large mounds of dirt are many different sizes.'</p> <p>B. 'Inside the mounds are large hollow tubes.'</p> <p>C. 'Air flows and carries away heat.'</p> <p>D. 'Termites almost always stay inside their tubes and tunnels.'</p>	
Interviewer: Okay.	
<p>Student: So, it says, 'Which sentence from the passage best supports the idea that towers . . .?' Well, if termites almost always stay in their mounds, it's going to be really hot, so when air flows in and carries away heat. So that one is a 'maybe.'</p>	
Interviewer: Okay.	
<p>Student: We already know that this, it was in the passage, but it doesn't tell an idea of how do termites survive. So, it's not that one.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>'Inside the mounds are large hollow tubes.' So, maybe there's a lot of termites and they're all going to have to fit. We'll see.</p> <p>'These large mounds of dirt are many different sizes.' These two are almost the same, but I think the best answer of these two is B. So, and then the best answer between these two, I think, since they're always going to stay inside their tube, I think it'll be really hot, so then 'Air flows and carries away the heat.'</p>	
<p>Interviewer: Good thinking. Nice job.</p>	
<p>Student: Which detail best supports the idea that termites help one another? Well, let's read the _____ [00:12:41].</p> <p>'Termite kings and queens stay inside their chambers.' 'Termite towers have large tubes that help release heat.' 'Termite workers feed . . .' what's that word?</p>	
<p>Interviewer: Nymphs.</p>	
<p>Student: Oh, 'nymphs until they can find food on their own.' 'Termite cities have passageways and tunnels to link different rooms.'</p> <p>So, 'Which detail best supports the idea termites help one another?' So, I am focusing on the word 'help' . . .</p>	
<p>Interviewer: Okay.</p>	
<p>Student: . . . and 'best.' So, then . . .</p>	
<p>Interviewer: That's a good strategy.</p>	
<p>Student: This one, it talks about how the tubes help the termites, but it doesn't talk about how termites help each other. So, it's not . . .</p>	
<p>Interviewer: Gotcha.</p>	
<p>Student: . . . that one.</p>	
<p>Interviewer: Okay.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: 'Termite kings and queens stay inside their chambers.' This one, it doesn't talk about termites help each other.	
Interviewer: Okay.	
Student: So, it [cross talking] _____ [00:13:53]. 'Termite workers feed nymphs until they can find food on their own' or 'Termite cities have passageways and tunnels to link different rooms.' I think, between both of those, this one would be better. So, then the nymphs can grow and . .	
Interviewer: Sure.	
Student: Yeah.	
Interviewer: Okay.	
Student: 'Which research question would best help a reader find information about the lifecycle of termites?' So, which research question . . . The life cycle of termites. 'How big is full-grown termite?' 'How do termite nymphs turn into adults?' 'How do termites speak with one another?' 'How many different kinds of termites are there?'	
Interviewer: Okay.	
Student: Well, there might be different kind of termites, I'm not sure. But I don't think it would be that question since it only talks about one type of termite. So, I don't think it's that one.	
Interviewer: Okay.	
Student: 'How do termites speak with one another?', 'How do termite nymphs turn into adults?', 'How big is full-grown termite?'. In here, it doesn't really talk about that much how a full-grown termite, how big it is. And so, it won't be that one.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: 'How do termite nymphs turn into adults?', 'How do termites speak with one another?' Also, in the passage, it didn't talk about how do termites speak with one another.	
Interviewer: Sure.	
Student: So, I think it would be, 'How do term-'	
Interviewer: Okay. Nice job.	
Student: Then this, 'Based on the information in the passage, explain what would most likely happen to the termite colony, if the king or queen were to die. Provide details from the passage to support your answer.'	
Interviewer: Okay.	
Student: So, '... explain what would most likely happen to the termite colony, if the king or queen would die.'	
Interviewer: What do you think?	
Student: Well, king and queens, they kind of protect the entire termites and all them. And if the queen, the king and queen were to die, there would probably be a different termite king and queen.	
Interviewer: Oh, yeah, okay.	
Student: Different, different people to be king or queen.	
Interviewer: Okay.	
Student: So, then I think that if the king or queen were to die, they would find some different termites being a king or queen.	
Interviewer: Okay. That's really good thinking. Anything else you want to add? [Cross talking] good.	
Student: I think I'm good.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Okay. Awesome. Why don't you click Finish? And you can click the Turn It In. And Turn It In.</p> <p>Okay, so now I have just a couple questions for you. Is that okay?</p>	
<p>Student: Mm-hmm.</p>	
<p>Interviewer: Okay. So, did you like 'thinking out loud'?</p>	
<p>Student: Mm, yeah, it was-.</p>	
<p>Interviewer: You did? It was okay? What made it okay?</p>	
<p>Student: Whenever I think out loud, every time I say something, it like gives me more ideas about what the passage or the question is about.</p>	
<p>Interviewer: That's a good idea. And good thinking. Besides that, ____ [00:17:28.] Okay. Did you think it was easy to think out loud, or was it hard to think out loud when you were answering the questions?</p>	
<p>Student: I think it was more easy.</p>	
<p>Interviewer: Okay. Just because you could share your ideas a little bit better?</p>	
<p>Student: Yeah.</p>	
<p>Interviewer: Okay. What about the passages? Were the reading passages easy or hard or just right?</p>	
<p>Student: They were just right.</p>	
<p>Interviewer: Just right?</p>	
<p>Student: Mm-hmm.</p>	
<p>Interviewer: Okay. And the last question, was there any test question that you found hard or confusing?</p>	
<p>Student: Mm. Some of them were pretty easy, because I think answering questions out loud will be easier, because then you share your ideas, think harder.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Okay. _____ [00:18:23] thinking made it easier. Okay. Wups. I cannot spell today. I need to go have some lunch. Made it easier.</p> <p>You are an excellent thinker-out-louder. Thank you so much for helping me with this.</p>	
<p>Student: Thank you.</p>	
<p>Interviewer: And I think your earrings are beautiful, by the way.</p>	
<p>Student: Thank you.</p>	
<p>Interviewer: And so, we'll take you back _____ [00:18:52] what a fabulous job.</p> <p>[Inaudible background conversation/background noise 00:18:57 to 00:19:24]</p>	
<p>[End of audio]</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Just like her number. Okay. So if somebody said, “Okay. ---, I want you to do a think-aloud and I want you to fold this paper two times,” so I would fold the paper and I would tell you what I was doing or what I was thinking about while I did it. So it would sound like this: “All right. I have to fold the paper two times. I’m going to fold it hamburger style because I like little squares. And then, I guess I’m also ready for lunch, so I’m going to go hot dog style, too. So I’m folding it long ways like that.”</p>	
<p>Student: You could fold them equally. You can’t do that.</p>	
<p>Interviewer: It takes longer. So that’s how thinking aloud works. I’ll show you what I mean with a real test item, too. So I read this passage before, so I kind of know what it’s about. I’m going to think aloud and answer these questions. Okay. So the question reads “The author of the American Buffalo most likely wrote this passage to inform the reader with details, to persuade the reader with facts, to entertain the reader with a story, to share a personal experience with the reader.”</p> <p>Okay. Let me think these through--to inform the reader with details. That could be the answer because it has lots of details, and it’s telling me about something that I might not have known about. So that could be the one, but I’m going to double check to make sure. Okay. To persuade the reader with facts.</p>	
<p>Student: That could be one, too.</p>	
<p>Interviewer: That’s one, too. It’s got lots of facts, but is it really persuading me? I’m not sure.</p>	
<p>Student: No.</p>	
<p>Interviewer: That might be it. I’m going to keep looking just to make sure. Okay. To entertain the reader with a story.</p>	
<p>Student: You could easily take the rest of the eye and it would go away because it’s not even--</p>	
<p>Interviewer: This one?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: Yeah.	
Interviewer: Yeah. I think you're right because the story tells characters and stuff.	
Student: It's not just entertaining. It's telling you details and facts about the American buffalo.	
Interviewer: I'm going to get this one out of here because I know it's not a story. To share a personal experience with the reader. Personal experience stories are like biographies or autobiographies and memoirs, and that's not this. So that one's out of there. All right. So I'm going to decide. So I think it's still going to be A because, like you were saying, I don't think it's really persuading me to do anything.	
Student: It's just telling you details and facts.	
<p>Interviewer: Yeah. So I'm going to say it's A, and I'm going to click next. All right. Now I'm going to think aloud with this one. "Based on the information in the passage, the American Buffalo, explain what might happen if people lose interest in the American buffalo. Include details from the passage to support your response." Okay. So when I read this, I remember that paragraph five talked about people helping them.</p> <p>So that means that they care about them. But the question is saying "if they lose interest," which means they don't care about them. So if people didn't care about American buffalo or they lost interest, they might not want to protect them. So maybe people will hunt them again. Maybe if people are hunting them, then their numbers will go down. Maybe they'll become extinct.</p>	
Student: Probably they'd keep hunting them.	
Interviewer: Yeah. So that would be how I would think aloud. And then I click finish. Does that make sense?	
Student: Mm-hmm.	
Interviewer: Okay. Now I'm going to have you practice. You have two practice questions, and I think you'll do really well. I can already tell you're a smart guy. Okay. So	

Transcribed Responses	(Reserved for Cognition Analysis; Leave Blank)
<p>the first one you had is a passage about the termite tower. So I'm going to have you go ahead and read the passage. And then when you get to the questions, let's talk through them together so we can make sure we practice right. Here. I'll let you have the mouse, too, so you can move things up and down.</p>	
<p>Student: It _____ [00:03:57]. These are the structures on a termite towers. These large mounds of dirt are many different sizes. Some are as tall as a man, but others rise 20 feet or more above the ground. These mounds may look like castle towers, but they mark the sites of termite colonies.</p> <p>Cool insects. These high rise towers are built to be cooling. They help termites from getting too hot during Africa's scorching summer days. Inside the mounds are large hollow tubes. They are sort of like chimneys leading to the surface. Air flows in and carries away heat. These tubes work very well. The temperature at the center of the mound stays around 86 Fahrenheit. That is much cooler than the outside temperature, which can be more than 100 Fahrenheit.</p> <p>A termite city. Termite mounds may resemble tall apartment buildings, but termite colonies are actually located under the mound below the surface. Here, the insects live in a sort of termite city. The city is built in the shape of a large circle. Termites dig passageways and tunnels to link these cities to many, many different rooms.</p> <p>The royal chamber. One of the largest rooms is the royal chamber. It is where the king and queen spend their entire lives. Termite workers feed and take care of them as if they were royalty. They are very important to the termite colony. The king and queen keep the colony growing by reproducing. To do this, the queen lays 30,000 eggs each day. That's a lot.</p> <p>A nursery room. What happens to all those eggs? Workers move them to the nursery with the colony. After the eggs hatch, workers care for the young termites, which are called nymphids. The workers feed the nymphids until the nymphids can find food on their own.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>A garden room. Where do termites find food? They grow it in their garden room, of course. Termite garden rooms look like honeycombs, but instead of making honey, termites grow a type of fungus. Besides fungus, termites munch on wood, grass, and leaves found near the mound. The _____ [00:07:08] ground by the termites help them to be able to eat these other foods more easily.</p> <p>Tunnel travels. Termites almost always stay inside their tubes and tunnels. Why? Most termites have skin that needs protection from the wood and sun. Staying out of the sun is no problem for termites, though. These incredible insects can get everything they need without ever going above ground. That’s weird.</p>	
Interviewer: Yeah. Isn’t it?	
Student: Oh, gees. That’s tall.	
Interviewer: It almost looks like an ant hill.	
Student: But that’s bigger.	
Interviewer: Yeah. Much bigger.	
Student: It kind of looks like a tornado just forming and touching the ground.	
Interviewer: Yeah. There you go.	
Student: The tornado’s just going straight up.	
Interviewer: Let’s look at these questions. Let’s see what they say.	
Student: The bold face section headings help the reader. Read the passage more quickly? No because that’s just--you’re just reading the passage. Imagine what termite mounds look like? That could be one. Know what the next paragraph is about? Not really but--oh, they have those headings, like these things right here. Pronounce difficult words in the selection? Not really. It’s just these two.	
Interviewer: What are you going to do? Which one are you going to pick? How are you going to decide?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: Well, they are kind of talking about the termite mounds, but it's just mostly talking about how they live underground. So it's know what the next passage is about.	
Interviewer: Okay.	
Student: I'm going to go with G.	
Interviewer: There you go. Good job. All right. Let's practice with this next one.	
Student: I don't know if I read the passage. Well, they say down here that they build cities, and they have a royal chamber. And the queen lays about 30,000 eggs each day.	
Interviewer: Yeah. That's a lot.	
Student: Who knows in a year what that's going to be like? More than a million.	
Interviewer: Yeah. I think you're right. Wait. Tell me what they're asking us again, here. What do we want to do?	
Student: Explain the most likely reason the author wrote the passage. Provide parts of the passage to support your answers.	
Interviewer: Okay. And then what were you thinking the answer was?	
Student: That they are telling the people about what's the next paragraph going to be of because there's these headlines right here.	
Interviewer: Okay. Good. Click finish when you're done and then turn in. There's another one. So it looks like we have two more things to go, so let's click on the first one there.	
Student: Just continue?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Mm-hmm. Continue again. Okay. So this is the same passage that you just read, so if you want to read it again, you can. Or we can just keep going on with the items.	
Student: I'd just rather go on.	
Interviewer: Okay. Let's talk through them. What do you think?	
Student: What sentence best supports the idea the towers help termites survive? These large mounds of dirt are many different sizes. Not really, it's just saying what the size is. Inside the mounds, there are large hollow tubes. That mostly helps them so they can breathe. I don't know if termites breathe or not. Air flows in and carries away heat. Yeah. It does, but yeah.	
Interviewer: Okay. Keep thinking. Mm-hmm.	
Student: Termites almost always stay inside their tubes and tunnels.	
Interviewer: Mm-hmm. Okay. I've guess you've got to decide which one to choose.	
Student: That's hard. That's three answers.	
Interviewer: That's okay. Let's think them through.	
Student: I don't think I'm going to go with B.	
Interviewer: Okay. Why do you want to get rid of that one?	
Student: Inside the mound are large hollow tubes. That's just like saying what's inside, not really helping them.	
Interviewer: That makes sense.	
Student: Air flows and carries away heat. That's something. Termites also always stay inside their tubes and tunnels. Which that also talks about what they're doing.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: What do you think? You're doing a great job. You're really thinking really well. So what is your brain thinking now?	
Student: They mostly stay in the tubes and tunnels so they can work underground, can build what they need to build.	
Interviewer: That sounds reasonable.	
Student: Because you have to build the things. That's how it gets--I wonder how long it takes for them to build a tunnel.	
Interviewer: That's a good question. I don't know. All right. Which one do you want to go with?	
Student: I think to help them survive they need air flow and to carry away heat. So I'm going to go with C.	
Interviewer: Okay. That's a good one. All right. Next thinking. What's this next one?	
Student: Which detail best supports the idea about termites helping one another? Termite kings and queens stay inside their chambers. That's not really one because they're not helping. Termite towers have large holes to help them release--well, that's not helping one another.	
Interviewer: Okay. That makes sense.	
Student: Termite workers feed nymphs until they can find food on their own. Well, that's one way to help one another. Termite cities have passageways underground. Well, that's not one. So it's the nymphs.	
Interviewer: Okay. Good thinking. Thanks. All right. This one.	
Student: Which research question would best help a reader find information about the lifecycle of termites? How big is a full grown termite? That's not really the lifecycle. How do termite nymphs turn into adults? That's one, the lifecycle. How do termites speak with one another? That's not really about the lifecycle of them.	



Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
How many different kinds of termites are there? Well, we don't know if there's different kinds of termites or not. I'm going to go with B because it's talking how termites turn into adults. I think that's lifecycle.	
Interviewer: That makes sense. All right. What's this one?	
Student: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die? Provide--they'd probably build another--I don't know if termites vote like how we vote for like presidents.	
Interviewer: Oh, yeah. That's an idea. They might vote for something, find somebody new.	
Student: Yeah. Like if the king or queen dies.	
Interviewer: Is there anything in the passage that helps you know that?	
Student: Not really but there's nothing really to say about that. It just says that the king and queen--their entire lives, the queen lays eggs and the king really doesn't--I don't know what he does.	
Interviewer: All right. Well, then click finish. That was good thinking. I liked it. Okay. So turn that one in. Turn that one in. Okay. One more. You're doing a great job	
Student: That's a different passage.	
Interviewer: All right. A new passage. So you're going to do the same thing. So when you're ready to answer the questions, we'll talk through them together. Awesome. Thanks.	
Student: A toy musical instrument. Kuzo or kazo?	
Interviewer: Kazoo.	
Student: An earful. That's something a parent would say. "Your homework is to collect sounds," Ms. Rollyson said. She handed out sheets of paper shaped like giant ears. Then, she held up a shiny blue kazoo. "Everyone who gets	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>an earful will get one of these.” The class laughed. I’d see why she gave them a sheet that had ears.</p>	
<p>Interviewer: Let’s keep reading.</p>	
<p>Student: Later, Jacob glared out the school bus window. “Not fair,” he thought. How would he collect enough sounds on his family’s farm? “There are plenty of noises in town. If only lived where tires squealed and sirens wailed.” Well, if you do have animals, that’s a sound you could probably listen to.</p>	
<p>Interviewer: That’s true. Good. Keep going.</p>	
<p>Student: Jacob scrambled off the bus when it screeched to a stop at his mailbox. He wasn’t in the mood to wave as he drove away. He’s probably upset that he doesn’t have any sounds, probably.</p>	
<p>Interviewer: I bet you’re right.</p>	
<p>Student: When he threw open the gate, it groaned like a stubborn mule. That was how he felt about the assignment. There’s a sound.</p>	
<p>Interviewer: Yeah. There’s one, right?</p>	
<p>Student: On the porch, Jacob knelt beside the kittens curled up on the rug. They sounded like tiny motors when they purred. There’s another sound. Oh, my god. “I’m home,” Jacob called. He thumped his book down in a kitchen chair. That’s kind of a sound. The rocker then noticeably stopped creaking. That’s a sound. “How was school?” his mother asked, walking in with his baby brother on her shoulder. She was patting his little back. “I’ve got homework,” Jacob grumbled. The baby burped, and Jacob laughed. “That’s what I think about it, too.”</p> <p>“Have a snack before you do your chores,” his mother said. She took the animal crackers down from the cupboard. Jacob rattled the curtain. “Not many left.” He crunched two tigers, three lions, and a seal, then gulped down some milk. If only animal crackers were real, he would have plenty of noises to list. Goldie, Jacob’s collie, woofed as Jacob walked toward the barn.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Her puppies were yipping in a straw filled stall. Jacob flung dog food pellets into their pen, and the puppies sniffled and crunched. In the chicken house, Jacob shooed two cackling hens from their nest. He slipped their warm eggs in his pocket. Wouldn't it be funny if he forgot about the eggs, and they hatched? He'd have a peeping pocket.</p> <p>In the coral, a black cow napped in the sun. Jacob woke her when he poured corn in her pen. "Moo, thank you," she seemed to say. Tap, clatter, clunk. Dad drove the tractor into the yard. The lead on the tractor smokestack rattled when it chugged and chugged to a stop. "How was school?" Dad asked, stepping down from the cab. Jacob shrugged. "Okay, I guess," he said, "I have some homework." Jacob put the eggs in the kitchen, then climbed to his treehouse.</p> <p>He could see Dad's beehives by the hay field. Six hives usually meant plenty of honey, but today, he couldn't hear it over the scolding of the blue jays. He tried _____ [00:20:26]. "How could a person think? Quiet!" Jacob shouted. Suddenly, he sat up straight. Cows moed and puppies yipped. Chicken cackled in the yard.</p> <p>When Goldie began barking below, Jacob grinned. There were plenty of noises on the farm. "I hear you," he called. He hurried down from the tree. He had an earful of homework to do. Now, he's saying he has an earful of homework to do? That kind of sounds like what the page would sound like?</p>	
<p>Interviewer: All right. What is this first question?</p>	
<p>Student: Which is the best summary of Jacob's problem in this passage? He is unhappy living out on the farm. He wishes he could live in the country. Well, that's not really one. He just wants to live in the city so he can have lots of noises. He has to collect sounds for a homework assignment. He thinks that will be difficult. That is a problem, so I'm going to keep that. He is unable to get his homework done after school.</p> <p>The animals on the farm where he lives are too noisy. Well, that's not a problem. It's kind of a problem. He has to do some homework after school, but he has too many chores. There is not enough time to do it. Well, it is a problem. There's three problems.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Let's see if we can figure out which one. Talk it through.	
Student: He does think that it will be difficult on the farm to do that. It'd be pretty easy because you'd just put "A cow moos." He's unable to get his work done. The animals where he lives are too noisy. That's not really one because he can do his homework. He has to do some homework after school, but he has too many chores. There is not enough time to get everything done. Well, he just finished his chores, so it'd be B.	
Interviewer: Okay. Nice.	
Student: "An Earful" is narrated from which point of view? First person by Jacob, a third person by Jacob's teacher. That's a no. First person by an unnamed narrator, well, yeah. Unnamed, no, that's not one.	
Interviewer: Why not?	
Student: Well, it could be because we don't know about one person.	
Interviewer: Hey, remind me why you clicked off B? Why was that not the answer?	
Student: Because it was a third person. Because it was Jacob's teacher. Jacob's teacher doesn't go to his house. That'd just be weird.	
Interviewer: Okay. Yeah. I see what you're saying.	
Student: Third person by an unknown narrator. That could be one, but it sounds like he's talking. So we'll get off D. No, actually, that might be one because it says right here "Later, Jacob glared out the school bus window. 'Not fair,' he thought." Yeah. That sounds like it might be an unknown narrator. It's probably not an unnamed narrator. So we'll get rid of him because it doesn't really say that. It says, "Jacob scrambled off the bus when he screeched to a stop at his mailbox." So it sounds like it's third person.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student: A reader can tell that this passage is fiction because it gives details about farm animals, shows events in order through time, happens on a farm and not in a big city, usually characters are not real. Well, fiction is real, right? I think so. No, non-fiction's not real. Well, it's not give details about farm animals. Uses characters who are not real people. Happens on a farm and not in a big city. That is true. It could happen. Shows events in order through time. It's not really showing order through time. No, B. It always does that. No. Now, it's changed to C.</p>	
<p>Interviewer: There you go.</p>	
<p>Student: I thought I was not going to be able to do it. Describe how Jacob's feeling about his homework changed from the beginning of the story to the end of the story. Provide details from the passage to support your answer.</p>	
<p>Interviewer: Okay.</p>	
<p>Student: It sounds like he has lots of noises, so he can do his homework, first off. And his teacher gives him a paper that he has to do about, and he gets a shiny blue kazoo if he--he has to do his chores. He goes up to his treehouse, but he started listening to noises. But he can't really think because it's too loud. But there's so many noises he can list there.</p>	
<p>Interviewer: Anything else?</p>	
<p>Student: Not really. Oh, the creaking of the baby. Okay. I think that's it.</p>	
<p>Interviewer: Okay. Good. Okay. Now, I have just a couple questions for you. Is that okay?</p>	
<p>Student: Mm-hmm.</p>	
<p>Interviewer: I've got to put the date here. This is Wayland. Okay. My first question is did you enjoy thinking out loud?</p>	
<p>Student: Yeah. It was fun.</p>	
<p>Interviewer: You did? Why did you like it?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: It's showing somebody what you did and how you think.	
Interviewer: Okay. Let me write that down. Oops. Okay. Did you find it easy to think out loud, or did it make it more difficult to answer test questions?	
Student: It was pretty easy.	
Interviewer: Okay. How about the passages? Were the reading passages difficult, easy, or about average?	
Student: They were easy.	
Interviewer: Okay. And the last question is which test question did you find confusing? Did you find any of them confusing?	
Student: No, I could really figure them out.	
Interviewer: Okay. We're all good. All right. That's all I have. Thank you so much.	
Student: You're welcome.	
Interviewer: You did a great job. I enjoyed having you spend time with me here.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay, so first question Student VI. Did I spell your name right, -----?	
Student VI: Okay and you have Ms. ----- for ELA I'm guessing?	
Interviewer: Everybody does. Okay, so do you know what we're doing?	
Student VI: The test?	
Interviewer: Yeah. Well kind of like a test. So what we're trying to learn is how students' brains work when they take the test, like what kind of thoughts they have so we can decide if one kind of question is better for your brain than another kind. So to figure that out because we can't see your brain, so we do what's called a think aloud. Have you ever heard of that before?	
Student VI: Yeah.	
Interviewer: Yeah. So that's what I'm going to ask you to do today and I'll show you what I mean just to make sure you get it in a second, but yeah, it's pretty easy. I'll just show you right now. Okay so if somebody was to say Interviewer I want you to think aloud. Will you fold this piece of paper? Here's what I would do. I would say okay here's my piece of paper. I have to fold it two ways. I'm going to do a hotdog fold because I like them when their skinny and let's see I have to fold it another way. I don't know I'm feeling kind of crazy. Maybe I'll make a triangle like this, this kind of fold. So I folded it two times and now I have that. Does that make sense?	
Student VI: Um-hum.	
Interviewer: It's like I'm kind of telling you what I'm thinking as I'm doing it. It's the same kind of thing with this test here, so I'll show you what I mean here. Let's see. Remember this, seeing this stuff?	
Student VI: Yeah.	
Interviewer: Okay so I've read this passage before and here's what I would do if I was going to do a think aloud with the question and this is what you'll do too. So I would	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>read the question. The author of the American Buffalo most likely wrote the passage to inform the reader with details to persuade the reader with facts, to entertain the reader with a story, to share a personal experience with the reader. Okay so I have to decide. I like this answer because it has lots of details and it's telling me something so I'm thinking that one's it, but I'm going to double check just to make sure. Okay so B says to persuade the reader with facts. Ooh there's lots of facts in here, but did it really persuade me? I don't think so either, so I'm going to click that one away. To entertain the reader with a story? Okay stories have characters and plots and dialogue and stuff and this one doesn't, so I don't think it's a story so let me get rid of that one. To share a personal experience with the reader? Well okay, so that kind of story would be like an autobiography or a memoir and this is definitely not either one of those so my answer is going to be A. And then I would click next. All right, here's one more I want to show you.</p>	
<p>Student VI: Okay.</p>	
<p>Interviewer: Okay so the question is, based on the information in the passage, the American Buffalo explained what might happen if people lose interest in the American Buffalo. Include details from the passage to support your response. All right, so I'm thinking out loud how to answer this. Okay so I remember in paragraph five down here they talked about people wanting to protect the buffalo because they want their numbers to increase, they're protected. Let's see if there anything else. No. Okay so my answer is going to be if people lose interest in the American Buffalo I think that their numbers might decrease because there's no one there to take care of them.</p>	
<p>Student VI: Okay.</p>	
<p>Interviewer: Does that make sense?</p>	
<p>Student VI: Yeah.</p>	
<p>Interviewer: Okay so then I would click finish, finish. Okay I'm going to give you a chance to practice two times just like I did, so I'll get you in here. All right, so what you'll do is you'll read the story and some people have read it out loud but other people like to read it in their head. It</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
doesn't matter to me how you want to do it, whatever's easiest.	
Student VI: Okay.	
Interviewer: And then, when you get to the questions, we'll talk through the answers together. Does that sound okay?	
Student VI: Okay.	
Interviewer: All right, awesome Student VI. Thank you.	
Student VI: [air]	
Interviewer: Okay, all right, so let's look at the first question. What is it asking you?	
Student VI: What does Jacob mean when he says how could a person think?	
Interviewer: Okay. So how are you going to figure this out?	
Student VI: Well it says it's in paragraph 19, so I'm just going to go through and read paragraph 19 again.	
Interviewer: Okay. That's a good strategy.	
Student VI: So he's talking about how he heard some sounds and then he brought the eggs inside and climbed into his treehouse.	
Interviewer: Okay. So which answer do you think will be the one that answers the question asked?	
Student VI: A says Jacob wonders if his parents were able to think why he had some many things to do. I don't think that one could be it.	
Interviewer: Tell me why you think that.	
Student VI: Because it doesn't really talk about his parents at all.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. That seems reasonable.	
Student VI: B says Jacob felt that his homework assignment needs a completely new way of thinking. I think that could be it.	
Interviewer: Want to keep looking?	
Student VI: Yeah.	
Interviewer: Okay.	
Student VI: C says Jacob thinks his teacher will understand if he does not do his homework because there's so much going on around him. I don't think that's it because he's looking around and trying hard to listen for sounds.	
Interviewer: Okay, good thoughts.	
Student VI: And then D says Jacob finds animals and birds on their farm so noisy that he cannot keep his mind on his homework. That's not true because he's looking for his house.	
Interviewer: Okay, okay so which one are you going to select here for your key?	
Student VI: I think I want to go with B.	
Interviewer: Okay. So you click on B. Oops, I'll give you some room there, perfect. Okay let's try this one.	
Student VI: Okay. What is the theme of the passage? Provide details from the passage to support you answer.	
Interviewer: Hmm, okay. Can you remember what theme is?	
Student VI: Kind of like the main idea of the story. I think the main idea is about a kid goes to school and then his teacher assigns him with the homework that he has to find different noises around his home and then he goes home and as soon as he gets home he does his chores and then he tries to find animal sounds.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Okay awesome. Well that's exactly what I mean by thinking aloud. You did a great job. So click on finish and then we're going to go to the operational ones. Yep, turn in and then turn in again. Okay, now you're going to scoot over to this one.</p>	
<p>Student VI: Okay.</p>	
<p>Interviewer: Scroll down there a little bit.</p>	
<p>Student VI: Continue?</p>	
<p>Interviewer: Um-hum. You got it. Okay. So it's the same story. If you want to read it again you can or we can just keep going on the questions.</p>	
<p>Student VI: We'll just keep going on the questions.</p>	
<p>Interviewer: Okay. Let's talk through it. What do you think here?</p>	
<p>Student VI: Well it says he's unhappy living at the country at a farm. He wishes he could live in the city, but it sounds like he really likes the farm because it sounds like he has his own personal treehouse and everything.</p>	
<p>Interviewer: Good point, okay.</p>	
<p>Student VI: Then B says he has to collect sounds for a homework assignment. He thinks that will be difficult on a farm. Well it did say around the first, second and third paragraph that he thought it was going to be difficult.</p>	
<p>Interviewer: Okay.</p>	
<p>Student VI: And then number C says he is unable to get his homework done after school. The animals on the farm where he lives are too noisy. I don't think that could be it because he went straight to his treehouse and then he started working on it, so I don't think that's it.</p>	
<p>Interviewer: Okay.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student VI: And D says he has to do some homework after school, but he has too many chores. There's not enough time to get everything done. Well it tells he went to his treehouse to do his homework, so it has to be B.	
Interviewer: That makes sense. That's some good thinking. Thanks. All right, what does this one say?	
Student VI: An earful is narrated from what point of view? A says first person by Jacob. No because in paragraph one it says your homework is to collect sounds said Ms. Olson. Third person, Jacob's teacher. No because Jacob's teacher was the first person.	
Interviewer: Okay.	
Student VI: _____ [00:12:03] by a main character. No because it says her name right here. Third person by _____ [00:12:14].	
Interviewer: Do you want to change your mind and go back and look?	
Student VI: Yeah.	
Interviewer: Okay. You can.	
Student VI: Well it's going to have to be first person by, wait, no it's B because I hear in third person it's an earful.	
Interviewer: Okay.	
Student VI: This one.	
Interviewer: Okay. Good job, next one.	
Student VI: A reader can tell that this passage is fiction because (A) it gives details about farm animal. No because giving details about farm animals would be nonfiction. And then B says shows events in order through time. I'm not sure about that one. C says half is on a farm and is not in a big city. No because that could happen, so that'd be realistic fiction. And then you just...characters were not real people. I think it's D.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student VI: Describe how Jacob's feelings about this homework changed from the beginning of the story to the end of the story. Provide details from the passage to support your answer. I think he's feeling kind of nervous about his homework because he can't find any animal sounds. I think he realizes at the end of the story it's just all around him so.	
Interviewer: And did you have any details in the passage that helped you to know that?	
Student VI: Yeah. I believe it was starting in paragraph 9 or 10. That's when it started making different sounds.	
Interviewer: Okay. Good job, nice job. Click finish. And then turn in and then turn in again and then there's just one more. And then you scoot down. Yep, you're doing it. So a brand new passage, and when you're done reading, we can go through the questions again.	
Student VI: Okay.	
Interviewer: Thanks.	
Student VI: [air] Okay I'm done.	
Interviewer: Okay. Let's look at these questions here.	
Student VI: What sentence from the passage best supports the idea that Towers hoped to maximize? He says his first mounds of dirt are in many different sizes. I don't think that could be it.	
Interviewer: Why do you think no?	
Student VI: Well I guess it could but depending on the size of the house they would have ____ [00:17:19]. And B says inside the mounds are large hollow tubes. I also think that could be it because that could be where maybe they sleep and stuff.	
Interviewer: All right, okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student VI: And C air flows and carries away heat. Oh, I think C's it, though, because it carries away heat and it says they have thin skin so.	
Interviewer: Okay. That's good thinking.	
Student VI: I'm going to go with C.	
Interviewer: Nice job.	
Student VI: Which detail best supports the idea that termites help one another? A says termite kings and queens stay inside their chambers. A, no, because the king and queens don't do anything it said in one of the paragraphs. They just said the other ones serves them. B says termite towers have large tubes to help release heat. No because the termites don't do anything to help with that.	
Interviewer: That makes sense.	
Student VI: And C is termite workers feed _____ [00:18:22] until they can _____ [00:18:26] food on their own. I think this one because it says they help them.	
Interviewer: Okay. That makes sense to me.	
Student VI: The last one says termite cities have passageways and tunnels filling differently. I think it's C.	
Interviewer: Okay. Good thinking, nice job.	
Student VI: Which _____ [00:18:44] question would best help the reader find information about the lifecycle of termites? (A) How big is a full-grown termite? That may help. (B) How do termite _____ [00:18:59] turn into adults? Okay that's probably it but. (C) how do termites speak with one another. That's not it. And D how many different kinds of termites are there? I think it's B.	
Interviewer: Okay. Tell me why you think that.	
Student VI: Because it saying the lifecycle of the baby termites so how do termite _____ [00:19:23] turn into adults.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. That makes sense.	
Student VI: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Well it said the queen, I don't remember the number, but it said it produces a lot of termites every day, so if the queen would die there wouldn't termites anymore.	
Interviewer: That makes sense to me. That's great. Let's see, is there anything else?	
Student VI: No.	
Interviewer: Okay, turn in, turn in. Awesome, okay, so before you go I have a couple of questions.	
Student VI: Okay.	
Interviewer: They're really easy though.	
Student VI: Okay.	
Interviewer: First of all, did you enjoy thinking out loud?	
Student VI: Yeah.	
Interviewer: How come?	
Student VI: Well it helped me think better.	
Interviewer: Okay. Next question, did you find it easy to think out loud or does it make it more difficult for you to answer the test questions?	
Student VI: It made it more easy.	
Interviewer: Okay. We're the reading passages difficult for you, easy or about right?	
Student VI: They were about right.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay and the last one, tell me which test questions you found difficult or confusing.	
Student VI: Well the ones with the boxes where you had to explain to answer.	
Interviewer: How come?	
Student VI: Well you had to explain a lot of details about the passage.	
Interviewer: Okay. So you had to explain using details from the passage?	
Student VI: Yeah.	
Interviewer: Okay. Student VI, you did a fabulous job.	
Student VI: Thank you.	
Interviewer: I really appreciate that you came out of a class to help me do this. What class did you get to miss?	
Student VI: Science.	
Interviewer: Do you like science?	
Student VI: It's okay.	
Interviewer: I know that's how I felt. I liked History and I liked English a lot too.	
Student VI: Yeah, English is my favorite.	
Interviewer: Is it really?	
Student VI: Yeah.	
Interviewer: I can tell, I can tell. All right, well I'm all done with you. You can go back to the fun class of science.	
Student VI: Thank you.	

Transcribed Responses	(Reserved for Cognition Analysis; Leave Blank)
Interviewer: No thank you. You have a great rest of the day.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Let’s put that down. Do you know why we’re here, why we called you in?	
Student: No, not really.	
Interviewer: Okay. So let me tell you. So we’re trying to learn about how kids think about different types of test questions. And one of the ways we can figure that out is if we talk with kids, like you, to see how they think when they solve a problem or answer a test question. And the way they do that is called thinking out loud. Have you ever heard of thinking out loud?	
Student: Yeah.	
<p>Interviewer: Yeah. It’s kind of like you’re reading out loud, except you’re just saying everything your thoughts are. So before we start, I will show you what I mean just to make sure you understand. So if somebody said I want you to think out loud while you fold this paper two times, this is what I would say. All right. I have to fold this paper two times. You know what? I like the hotdog fold. I’m going to go with the long fold. And then I have to fold it one more time.</p> <p>So let’s see. I think I will fold it--I’ll just fold it straight across like that. I’ll make another hamburger--or make a hamburger. So now I have a hotdog fold and a hamburger fold, so I’ve folded it two times. See how I was telling you everything I was doing? So that’s basically what you’re going to do. Let me show you how it will sound when you do test questions, like this. So I’ve read this passage before, so I kind of know what it’s about. So I’m just going to go right into my think aloud with the question.</p> <p>So the question says, “The author of the American Buffalo most likely wrote this passage--” and now I have to figure out why. To inform the reader with details, maybe, that sounds good. To persuade the reader with facts, maybe, there’s lots of facts. To entertain the reader with a story, okay, stories have characters and plots and dialogue. And this didn’t have any of that, so I don’t think that’s the right answer.</p> <p>Let’s see. To share a personal experience with the reader, okay, books that share a personal experience are like</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>autobiographies or maybe memoires. And this is not a memoire. So I know that that's not the answer.</p> <p>All right. So I have it down to two. Okay. So to inform the reader with details, I still like that one. To persuade the reader with facts, to persuade, this isn't really persuading me to do anything, though. So I don't think that one's right. I'm going to stick with A, and then I'm going to click next.</p> <p>Oh, here's another one. Based on the information in the passage "The American Buffalo," explain what might happen if people lose interest in the American buffalo. Include details from the passage to support your response. Okay. So I remember when I read this passage that down here on paragraph five they talked about people trying to safe them.</p> <p>So here's what would happen if they save them. They want to keep their numbers up and people from hunting them. But this question is asking what if people don't care about the buffalo, if they lose interest. So if people lose interest, then their numbers might go down because people are hunting them. That's what I think. I'm going to click finish. Does that make sense?</p>	
Student: Mm-hmm.	
<p>Interviewer: Now I'm going to give you a chance to practice. So you have a practice one, and then we'll have two passages. So for this first one. I will have you read a passage. And sometimes, people like to read them out loud, but you can read it to yourself. That's totally fine. And then when you're done reading, let's work on the questions together. Does that make sense?</p>	
Student: Mm-hmm.	
<p>Interviewer: Okay. I'll give you the computer. Here's the mouse. Oops. Sorry about that.</p>	
Student: You're good.	
<p>Interviewer: Here we go. Thank you. (Silence from 00:04:00-00:09:05)</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: Okay.	
Interviewer: Okay. So let's look at this first question. What is it asking us?	
Student: What does Jacob mean when he asks, "How could a person think?" in paragraph 19?	
Interviewer: You can go ahead. How are you going to figure that one out?	
Student: Basically, when he was doing his chores, when he just goes up in his tree house and he just is thinking out loud because he has a farm and all the animals are making noises. He's trying to think out loud.	
Interviewer: Okay. So which answer would you pick there?	
Student: I think D because there's so many animals around that he can't do his homework.	
Interviewer: And what made you know that these were not right?	
Student: Because, on the first one, his parents weren't around. His mom was inside with the baby, and his dad was outside doing work. So I knew that one wasn't right. And then on B, Jacob feels that his homework assignments means a completely new way of thinking, it wasn't really about that because it was talking about how he felt when the animals were making noise and stuff. And then on C, Jacob thinks his teacher will understand if he does not do his homework because so much is going around. It didn't talk at all in the story about his teacher.	
Interviewer: That makes sense.	
Student: I think it's D because the animals and birds were making noise, and he was doing his homework. And he was thinking out loud because he couldn't really do it all because the animals were all making noise.	
Interviewer: That makes sense. All right. Good job. Why don't you click next over there? That's some good thinking. What does this one say now?	



Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: Determine the theme of the passage. Provide details from the passage to support your answer.	
Interviewer: What's theme, again? Can you remember?	
Student: No. It's actually like a theme, something like a title that is talking about the passage maybe.	
Interviewer: Okay. So how would you answer this one? Determine the theme of the passage. Provide details from the passage to support your answer. Hmm.	
Student: Maybe it could be like at the end how it asks on the last question, on the 19 paragraph, how he was doing his homework and stuff like that. I think maybe you could put that he was maybe doing his homework, and he was trying to think out loud. But the animals were just making too much noise. So he had to kind of think out loud as well because the animals were.	
Interviewer: That makes sense. Good job. All right. So take your mouse and click finish. It's being a stinker. There we go. Okay. Turn in. Turn in. Okay. Are you ready to do a couple more?	
Student: Yeah.	
Interviewer: Okay. Awesome. Oops. One more click. Okay. Now we're going to do this again. Okay. So it's the same passage and then some more questions. Do you want to read the passage again, or do you want to keep going?	
Student: I think we can keep going.	
Interviewer: All right. I'll let you put the mouse back in charge there. All right. What is this first one?	
Student: Which is the best summary of Jacob's problem in the passage? Okay. He's unhappy living out in the country on a farm. He wishes he could live in the city instead. Well, it didn't really talk about him living in the city, and he didn't talk about anything in the city. Basically, because they're living on the farm and everyone's trying to do farm work and stuff like that. B) he has to collect sounds from a homework assignment. He	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>thinks that will be difficult on the farm. He didn't really talk about it being on the farm.</p> <p>He didn't really have to do it on the farm. He could have done it in the house or something because his mom didn't ever say "You can't do it in the house" or anything. Nobody said that. So I don't think it's that one. C) he is unable to get his homework done after school. The animals on the farm where he lives are too noisy. Maybe because he was barely even being able to think because the animals were being noisy, so he had to think out loud. Maybe that one.</p> <p>He has to do some homework after school, but he has too many chores. There is not enough time to get anything done. Probably not that one because he was done with his chores by the time he was doing his homework. So I don't think it's that one. So I think my answer is C.</p>	
<p>Interviewer: Okay. Go ahead and click that one. That's some good thinking there. Awesome job. Why is it so crabby? There we go. All right. Next one.</p>	
<p>Student: "An Earful" is narrated from which point of view. I'm not very good at narrating.</p>	
<p>Interviewer: Well, let's give it a shot and see if you can come up with something. I bet you can. Do you remember what narrated means?</p>	
<p>Student: No, not really.</p>	
<p>Interviewer: Okay. Do you remember what point of view means?</p>	
<p>Student: No.</p>	
<p>Interviewer: You know what? Let's just skip this one and go to the next one. That's okay.</p>	
<p>Student: A reader can tell this passage is fiction because it--maybe because how like all his animals are maybe doing all of them. But A) gives details about farm animals, no, because that would be--wait. Fiction is wrong, like not right, right? And non-fiction is true?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Mm-hmm.	
Student: Well, gives details about the farm, that's not really talking about anything wrong in the story because talking about farm animals is kind of like a fact. If it's like a fact, it'd probably be non-fiction because non-fiction books mainly tell facts about the book and about the thing. So probably not A. B) shows an event in order through time, maybe, but not really. Maybe.	
Interviewer: Okay. Let's keep going.	
Student: Yeah. Happens on a farm and not in a big city. Well, city and on a farm is not really fiction or anything because it doesn't really matter if it's on a farm or not. So probably not C. D) uses characters who are not real people. Maybe. It didn't really say if they were actually true people.	
Interviewer: Which one do you think you want to pick?	
Student: Maybe B?	
Interviewer: Okay.	
Student: Probably because it shows time by time how it's going through the passage. So probably B.	
Interviewer: Okay.	
Student: Can I click on it?	
Interviewer: Yeah. Absolutely. Nice work. All right. What's this one?	
Student: Describe how Jacob's feeling about his homework challenge from the beginning of the story to the end of the story. Provide details from the passage to support your answer. Well, probably about his feelings that he didn't really want to do his homework because he kept telling his parents "I have homework tonight." And it probably meant he wasn't really wanting to do his homework because he was telling them about it like that. And then probably at the end of the story, he had to do his homework. So he's thinking about it. But when the	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>animals were making too much noise, it made him not think anymore and it made him be annoyed and not really know what he was doing. And it made him sidetrack and offline. So probably that's what I would put.</p>	
<p>Interviewer: Okay. That seems great. Okay. Click on finish. And then turn in and turn in. And I think you have just one more. Yup. You got it. Okay. So a new story. So I'll let you read it. And then when you're ready to do questions, we'll talk again. (Silence from 00:18:44-00:22:49).</p>	
<p>Student: Okay.</p>	
<p>Interviewer: All right. Let's get these done here. All right. Go ahead.</p>	
<p>Student: Which sentence from the passage best supports the idea that towers help termites survive? If there's an answer probably from sun because it says they have such thin skin. A) These large mounds of dirt are many different sizes. That doesn't really matter about how it helps them. Inside the mounds are large hollow tubes.</p> <p>That makes them get through them but probably not because it doesn't matter how large they are or if they have tubes or not. They could just fall down there or something. C) Air flows in it and carries away heat. Maybe because that might put in heat. Wait.</p>	
<p>Interviewer: What are you thinking?</p>	
<p>Student: Maybe they put little holes. Maybe we could keep that because yeah. It needs air, but it also needs to flow away the heat. If they are under heat, it will just fry them because they have such thin skin. D) Termites almost always stay inside their tubes and tunnels. Probably D because they can't really be outside because either it's too cold or it's too hot. So they don't really have a perfect temperature for their skin. So probably D.</p>	
<p>Interviewer: Okay. So that makes sense to me. Go ahead and mark that one. Awesome.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student: Which detail best supports the idea that termites help one another? Probably building maybe the tower of termites.</p>	
<p>Interviewer: We'll see.</p>	
<p>Student: A) Termite kings and queens stay inside their chambers. Didn't really talk about king and queens and how they have termites and stuff, so probably not that. And it didn't really talk about chambers either. B) Termite towers have large tubes to help release the heat. Maybe because sometimes that could also put in the heat. So if they put little holes, it could also bring out the heat. But it could also put in the heat. So maybe that one.</p> <p>C) Termite workers feed nymphs until they can find food on their own. They might put something over their skin shell, but it doesn't really talk about that. I'm just thinking that maybe. D) Termite cities have passageways and tunnels to link different rooms. Probably not because I would think since it said to get water or something, making little tunnels through the holes so they don't get burned or anything. Yeah. It does that in the tunnels.</p> <p>So I think my best answer might be--I don't know. It's kind of hard. Because I don't think it's D, but I definitely know it's not A. And I don't think it's D because that's not the best answer. So B, termite towers have large tubes to help release the heat. It's still going off and on. Mostly since the sun goes down on the thing instead of going up, that's what makes it more hot. And the heat doesn't really go up as well, unless it rains and it evaporates. C) termite works feed nymphs until they can find food on their own. I don't really know what nymphs mean.</p>	
<p>Interviewer: Do you think you could figure it out from the passage?</p>	
<p>Student: Maybe.</p>	
<p>Interviewer: Should we go back and check?</p>	
<p>Student: Sure. (Silence 00:27:11-00:27:26). Yeah. It's right here. Okay. The nursery room. What happens to all those eggs? Workers move them to the nursery with the colony. After the egg hatches, workers care for the young</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>termites, which are called nymphs. The workers feed the nymphs until the nymphs can find food on their own.</p> <p>I think it's actually this since it actually says it in the passage--passage. And it says that they're whatchacallit feeds the nymphs until their old enough to go into their own, to get food and water and stuff and find their own stuff and live on their own and stuff like that. So I think it is C.</p>	
<p>Interviewer: All right. That's some great thinking. You worked hard on that one.</p>	
<p>Student: Which research question would best help a reader find information about the lifecycle of termites? A) how big is a full grown termite. It doesn't really talk about how termites--and how big they get or what full grown is and how big they can get or anything. So I don't think it's A. How to termite nymphs turn into adults? I don't really know because it didn't say that in the passage, so I'm just trying to go with what the passage says instead of just random questions.</p>	
<p>Interviewer: Sure.</p>	
<p>Student: So probably not that one. How do termites speak with one another? It didn't really say about that in the passage, so probably not that one. And D) how many different kinds of termites are there? It didn't really say about that one either. But like I said, I kind of think--so I'm off. I think it might be A, but I don't really know because it doesn't really say in the passage or anything. So these are kind of like off and on questions.</p>	
<p>Interviewer: I hear what you're saying.</p>	
<p>Student: I don't really want to do A because I don't feel like it might be A.</p>	
<p>Interviewer: Okay. Which one do you feel like makes the most sense?</p>	
<p>Student: Well, C, that would just make it fiction because animals can't talk. So I know it's not C and A. So I feel like B and D, how to termite nymphs turn into adults? I don't really know, but I feel like if that would be</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>the best of the cycle, maybe that could be it. How many different kinds of termites are there? That could also be it because, if there's different kinds, they'd just make the cycle bigger and have difference.</p> <p>So that's a tough one, but I know it's not these two. I kind of want to do B because, if it's how do they turn into adults, it's like going in a cycle. So it would be like egg and then baby and then how they grow up in the cycle. That's like kind of going through their whole life because it says how do you turn into them. I bet it's B. I'm going to go for B.</p>	
<p>Interviewer: All right. Good choice. All right. Last one.</p>	
<p>Student: Based on information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from the passage to support your answer. I would probably say, if one of them or if both of them were to die, they would probably pick one of their oldest or more worked and most--maybe the oldest, so the adult, the baby. So they'd probably pick maybe one of those, if they were able to do that, probably. Yeah.</p>	
<p>Interviewer: That makes sense to me.</p>	
<p>Student: Yeah. But it could also be like maybe they'd just not have any other king or queen and maybe wait until one's born. Maybe there could be another one. Since if the queen dies, does that mean no more termites can be maybe alive or something? Because I think the queen only makes babies, I think. I don't even know if girl termites can have babies unless they turn into the queen. Probably that.</p>	
<p>Interviewer: That's some good thinking. All right. Great job.</p>	
<p>Student: Thank you.</p>	
<p>Interviewer: Want to click finish? Sweet. Yes. Okay. I just have a couple interview questions for you. Ms. -----, did you enjoy thinking out loud?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: I think it's better working out loud than it is in your head.	
Interviewer: Yeah. How come?	
Student: It's just because you get everything out, and it just makes more sense because you don't have to-- because you can memorize if it's out loud. So if you don't know, then some other people could help you know it and be like, "Oh, yeah. That's what you were thinking," instead of just thinking in your head. And you forgot the answer. And you just pick a random question, and then you got that wrong. And you knew the other answer was right. So probably that. Yeah.	
Interviewer: Okay. Great. Did you think it was easy or hard to answer questions when you were thinking aloud?	
Student: A lot of them were easy because it was just off and on on them. But once you would read back in the passages, you would see them. And you would think in your mind. And you'd be like okay, and you would say it out loud and it makes more sense. So probably about like that.	
Interviewer: Okay. Let's see here. Oops. I can't write today. Okay. Were the reading passages difficult, easy, or average?	
Student: Passages aren't that easy for me, but today it kind of was a little bit easier because, if you think out loud, it's a little bit easier because you know what you're about to say, stuff like that. So if you say it out loud, you already have it thinking in your mind. And then you could just say it out loud, and it'd already be right and stuff. But I think if you weren't thinking out loud, it would erase your mind and you wouldn't be thinking as much. But if you also think in your mind, it also would give you that, and you could be thinking about it. But that's making you use your brain more but still is the same, kind of.	
Interviewer: That makes sense. Okay. And here's my last one. Tell me which test questions you found difficult or confusing.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student: Probably the ones that are like the best answer and most likely because most of them they'd be off and on on two questions. There wouldn't just be one straight answer, so you'd have to go on and off on the answers like that. But it would still kind of make sense since how you would just stick on one because you would read the other wrong one again, and it would kind of make sense. And you'd go back in the paragraph, and you'd see the answer. And you would actually know which answer was right.</p>	
<p>Interviewer: Yup. That makes sense to me. Okay, my friend. You did a great job.</p>	
<p>Student: Thank you.</p>	
<p>Interviewer: You're an excellent thinker out louder. So you are free to go. You have only a little bit left. What are you going back to, which class?</p>	
<p>Student: Fifth grade last class, so Ms. Walker's class.</p>	
<p>Interviewer: What's that one?</p>	
<p>Student: Math.</p>	
<p>Interviewer: Do you like math?</p>	
<p>Student: It's not my favorite, but my mom says I'm really good at it.</p>	
<p>Interviewer: Really?</p>	
<p>Student: Last year I got an above average grade in math. Math is pretty easy. I can just think better. But if I think out loud for math, I bet it would be even easier probably for me.</p>	
<p>Interviewer: You should give it a shot and see what happens.</p>	
<p>Student: Because reading I'm not that good.</p>	
<p>Interviewer: I think you did a fabulous job.</p>	

Student 7_School A Grade 5 ELA

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student: Since it's out loud, it kind of makes more sense, what you're talking about.	
Interviewer: Well, I think you did a great job. I'm really impressed. You have some good skills there. All right. Well, I think Ms. Sarah will bring you back.	
Ms. Sarah: She can just go to class.	
Interviewer: Oh, you can just go to class, I guess. Thank you so much. It was really nice to meet you.	
Student: Bye. Thank you.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Go like this. Maybe the microphone's there. Okay, great. So, do you know what we're doing today?	
Student I: No.	
Interviewer: A little bit? Okay, well, let me give you a scenario. So, what we're trying to do is figure out how students' brains think when they do different types of test questions, okay? And the only way that you can really figure out how your brain thinks is if you talk out loud while you're solving a problem. Have you ever done talking out loud?	
Student I: We're not allowed to talk during our tests.	
Interviewer: Oh, just because – well, not reading. Do you read out loud sometimes?	
Student I: At home I do	
<p>Interviewer: Yeah. So, it's the same kind of thing except instead of reading it, you're just saying what your head is thinking. I'll show you what I mean.</p> <p>Like if somebody said, "---- you need to think aloud and fold this paper in two, this is what I would do." And say, "Okay, I have to fold this paper into two. I'm going to do a hotdog fold because that's pretty easy and I have to do one more fold so, I'm going to do – I guess I'll do a hamburger fold because that's also pretty easy.</p> <p>So, I've done two folds – hamburger and hotdog. And I have glued my paper twice," okay? So, can you see how I was kind of like telling you what I was doing while I was doing it?</p>	
Student I: Yes.	
Interviewer: Same kind of thing. I'll show you on like a test question, too. So, if I was to go to this – I'm sure it's all familiar to you.	
Student I: Mm-hmm.	
<p>Interviewer: Okay. So, if I was to have – I've read this passage so, I would read this passage to myself and then, I would go to the questions. And here's what a think aloud would be. So, I would say, "In the book there, how is Mr. Egan important to the plot? Okay, so, he helps the narrator understand the value of cooperating with others? Maybe. He provides the organizational skills needed for the narrator and Charlie to be successful? I don't think so. Because I remember down here, he just kind of let them go on their own. Where did it say that? It said it – he divided</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>the responsibilities. So, Mr. Egan really didn't help them so, that's not the answer."</p> <p>Then, I'm going to look at this one. "He serves as the adult sponsor. If there are problems that the students have that they can't resolve themselves." Okay, well, I know it said up here that he's the librarian, he's the sponsor. But I remember, also, that down here, Mr. Egan wasn't around. Like he was at a meeting so, he wasn't there to help so, forget that one.</p> <p>"He attempts to help the narrator and Charlie become friends by signing up to work together." Well, he did sign up to become – to work together – but they were definitely not friends. Because down here, he's like, "No, this is your mess. You figure it out. But _____ [00:03:05] just try to be nice." So, I don't think they became friends so, I know that one's not it either.</p> <p>So, my answer is that – and I think I can say down here – "It wasn't so much about running the book fair as it was a lesson in how important it is to communicate and work with others when necessary." So, that's kind of cooperating. That's my answer. Okay? So, that's one example of thinking aloud.</p> <p>Here's another one. Okay, so, "Explain why the author most likely wrote the passage. Provide evidence from the passage just for your response." Okay, well, authors write stories for lots of different reasons. Sometimes they write to teach you something, like give you information. Sometimes they want to convince you to do something. Sometimes they just want to tell you a story or they want to teach you a lesson.</p> <p>So, this one, this story had characters and a plot. It had a problem and a solution. So, I'm going to say that this one is fiction. That means it's entertaining me [interruption]...</p>	
<p>Student I: And it's not factual.</p>	
<p>Interviewer: Yeah, it's not factual. And down here at the end, they kind of gave me a lesson, too. So, the author really wrote the story to entertain – or to teach a lesson and entertain the reader. And then, I would come over here and I'd click Finish and then, I would turn it in. Does that make sense?</p>	
<p>Student I: Yes.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yeah. You think you can do it? I know you can do it. Want to practice a couple times?	
Student I: Yeah.	
Interviewer: Okay. So, here's what we'll do. I'll get you going in here, I'll let you have the mouse. So, what you can do is read the passage. And most kids like to read it to themselves but if it helps you to read it out loud, that's fine, too. It doesn't matter to me one way or the other. So, I'll have you read the passage and then, we'll talk about the questions a little bit together before we get the real thing started. Is that okay?	
Student I: Okay.	
Interviewer: Give you that, give you some of those. Awesome, thank you.	
[PAUSE]	
Student I: I'm done.	
Interviewer: All done? Okay. Alright, so, let's look at this first question here. Why don't you read it out loud to me there?	
Student I: Sorry [interruption]...	
Interviewer: It's okay. No, you're good.	
Student I: Which book would be most helpful in finding more information about the advantages of...	
Interviewer: Cardiovascular.	
Student I: ... cardiovascular exercise?	
Interviewer: Mm-hmm. So, if you were going to answer this question, tell me how you would decide what the answer would be. What would be your first step?	
Student I: I don't like to read like A to B. I like to read [inaudible].	
Interviewer: Yeah, that's fine, too.	
Student I: So, like, I know short sports. That doesn't even make sense.	
Interviewer: Okay.	
Student I: That wouldn't be like a good...	
Interviewer: Okay, and tell me why you think that.	
Student I: Because they didn't say anything about the sports being short in here.	
Student I: And they said that the cardio was like about – was like how – he was talking about how he used exercise to keep him young and alive.	
Interviewer: Okay.	
Interviewer: Sure, okay. That makes sense.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: And faster beats. In the beginning, he talked about all the beats.	
Interviewer: Mm-hmm.	
Student I: _____ [00:10:49] [Reading to self] ... I'm going to take his pulse again, 100 beats in one minute – in a minute. This simple exercise had increased both his heart rate and body temperature.	
Interviewer: Okay.	
Student I: Okay. So, I'm just going to leave that untouched.	
Interviewer: Okay.	
Student I: The healthy heart _____ [00:11:07].	
Interviewer: Mm-hmm.	
Student I: I would say what I'm thinking?	
Interviewer: Mm-hmm. Yeah, absolutely, just talk [interruption]...	
Student I: I don't even know what that means.	
Interviewer: Okay. That's okay.	
Student I: Exercising [reading to self - inaudible] keeping fit, okay.	
Interviewer: So, you weren't sure what the healthy heart manual meant?	
Student I: Yeah, like just _____ [00:11:37].	
Interviewer: Okay. So, if you were taking a test, would you try to think it through or would you just skip over it?	
Student I: I would try to think it through and like...	
Interviewer: Okay.	
Student I: ... figure out like how are we going to do passage.	
Interviewer: Okay. That's a good strategy.	
Student I: [Whispering] I found the answer.	
Interviewer: Say that again?	
Student I: I said I found the answer.	
Interviewer: Okay. Do you think it's the answer to the question, too?	
Student I: Yes.	
Interviewer: Okay. So, then, what would you do?	
Student I: Because they both say "cardiovascular – this is cardiovascular input." Parentheses, it says, "Heart and blood vessels." I mean, it's like this is saying like this is kind of what it is.	
Interviewer: Mm-hmm.	
Student I: So, it has to be healthy on the manual [interruption]...	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay, great. So, then, you click Next. Did a great job. Alright, so, what's this one?	
Student I: Paraphrase?	
Interviewer: Mm-hmm.	
Student I: Paraphrase that advice Ben Franklin gave to his son in paragraph 4 and 5 provide supporting details for the passage. So, I'm going to go back and read it. [Reading – whispering] Okay, so...	
Interviewer: But you don't have to type anything, you can just tell me with your words.	
Student I: Oh, okay.	
Interviewer: Yeah. That would take two months to type.	
Student I: Basically, he was just – basically, he was just telling him that it's better to be on feet than like trying to say you're exercising when you're like on a horse because it's not the same thing. Because like [clearing throat] walking, it like makes you sweat and when you sweat, you start to lose weight. But like you're...	
Interviewer: Gotcha.	
Student I: ... like you're like _____ [00:14:23]. I don't know how to explain it.	
Interviewer: Yeah. No, I think I got you.	
Student I: And then, so, he was saying like it's better to walk up and down stairs than to just walk straight down the stairs. Because if you're like walking straight downstairs, you're just – it's like normal, like you just get it – it's regular walking. But if you walk up and down, then it takes more energy, which means you're going to [interruption] shed more.	
Interviewer: Sure. Good, okay, great. Alright, then, you can click Finish and then, Turn In – and then, Turn In. Great. Now, we have two more to go. Can you hang in there with me? Awesome.	
Student I: Am I doing the same thing?	
Interviewer: Yeah. So, click on Operational Session 1 and then, scroll, yeah, and Continue. Whoop, have to do it one more time. Okay, so, now that you've practiced, you have the same passage here and just different questions. So, if you'd like, you can read the passage again or we can just keep going with the questions.	
Student I: I'm going to just keep going with the questions.	
Interviewer: Okay, let's do it.	
Student I: ... and talk [00:15:23]?	
Interviewer: Yup, yup. Alright, what does this one say?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: Which statement best states the main idea of the selection?	
Interviewer: Mm-hmm.	
Student I: “Franklin worked to stay fit because he understood the connection between exercise and good health.”	
Interviewer: Okay.	
Student I: That could be something.	
Interviewer: Okay.	
Student I: “Franklin took a significant approach to exercise – to exercise that included measuring heartbeats and body heat.” I think that’s more like on the – what is it? More on this side where like telling you about like one thing.	
Interviewer: Okay.	
Student I: “Franklin invented swim pallets and studied swimming motions as a means of building strength.” Okay, it’s not that one because that’s like only about a section of the [interruption]...	
Interviewer: Okay, yeah. That makes sense.	
Student I: “Franklin provided that being fit prologue...” – what does that mean?	
Interviewer: Prolonged.	
Student I: “Prolonged life by...”	
Interviewer: Devising.	
Student I: ... devising a new system for counting age.” Oh, my.	
Interviewer: [Laugh]	
Student I: “Franklin provided that being fit prolonged life by devising a new system for counting age.” Prolonged have to mean like a long life.	
Interviewer: Mm-hmm, mm-hmm. Is there any place in the passage that you saw him talking – or that talked about counting age?	
Student I: “At 66, Franklin lived a long life. In the 1700s, the average [clearing throat] American lived only 40 years and had no understanding of the connection between exercise and good health.” And down here, it says, “At the time of his death in 1990, Ben Franklin thought of himself as 56, not, in fact, 84.” So, they’re saying that because of the way he exercised – exercised and carried himself – he didn’t think of himself as an 84-year-old. He thinks of a 56-year-old.	
Interviewer: Okay, alright. So, would you say that’s the best – states the main idea? Which one do you – which one	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
do you want to – do you think fits the best? How are you going to decide?	
Student I: Eenie-meenie-minie-mo.	
Interviewer: [Laughter] I hear you. You’re doing a great job.	
Student I: Okay, it’s not that one. So, that’s...	
Interviewer: Okay. And why do you think no?	
Student I: Because it’s only about the first part and they said the main idea, which means like about the whole passage.	
Interviewer: Okay, okay, alright.	
Student I: So, it’s not going to be that one.	
Interviewer: Good thinking there.	
Student I: [Mumbling] I think it’s going to be B.	
Interviewer: Mm-hmm. And tell me why you think that.	
Student I: Because first, my teachers always told me to go with my first instinct. And also, because the top one is only about like the age. They want like the main idea. Like I get that like it’s about like how you like do your age or whatever. But like they want like with the whole paragraph...	
Interviewer: Excellent.	
Student I: ... I mean, what the essay is about.	
Interviewer: Awesome.	
Student I: So, I think that it’s going to be B.	
Interviewer: Alright, that’s great. That’s great thinking, yup.	
Student I: _____ [00:18:45] try to fail.	
Interviewer: [Laugh] Next one.	
Student I: Which question is answered in paragraph 8?	
Interviewer: So, you go to paragraph 8.	
<p>Student I: Swimming – we’ll fix this. Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor and once learned, was never forgotten. When he was in his 20s and living in New England, Ben had such success teaching a coworker to swim that he thought about opening a swimming school.</p> <p>So, why did Ben Franklin think about opening a swimming school? Okay, it could possibly actually be in here.</p> <p>How did swimming benefit both rich and poor? Never said how it benefitted them. It just said it did.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student I: Why did people – no, that’s not it.	
Interviewer: Why do you say no?	
Student I: [Laugh] Because it’s just why do people love swimming so much if...	
Interviewer: Just not related?	
Student I: Yeah. It said “people” and Ben is just one person.	
Interviewer: Mm-hmm, gotcha, okay.	
Student I: When did Ben Franklin learn to swim? It never told us when he learned to swim. It just told us that he did.	
Interviewer: Okay, great. Nice thinking. You’ve got this. You’re a pro.	
Student I: Ben Franklin: Fit for Life is considered a biography because it uses someone’s actual words, it tells about a person’s life, it is written in the first person, it teaches a lesson. Okay, it’s not this one because even though it teaches a lesson doesn’t mean that it’s a biography.	
Interviewer: Okay.	
Student I: It’s written in first person. Okay, it could possibly be C. It’s ____ [00:20:35]. 66, no, it’s not. Because it would’ve said, “When I was 66,” he would’ve used “I” words.	
Interviewer: Sure, okay, yup, okay.	
Student I: It tells about a person’s life that uses someone’s actual words. It tells about a person’s life [interruption] so, that’s the answer. Because it’s by someone else and she’s telling about Ben Franklin’s life and how he got fit.	
Interviewer: Excellent, nice work. Next. Okay.	
Student I: Summarize Ben Franklin’s belief about exercise. Provide details from the passage. Want me to type it?	
Interviewer: No, you can just tell me.	
Student I: Okay. Ben Franklin believed that if you exercise, you can live a longer life because your heart is pumping more and you’re like better in shape so you can carry yourself better.	
Interviewer: Okay.	
Student I: He believed that swimming was also a great way to exercise because it was good for the rich and poor and you never forgot how to do it.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: He believed that when you are exercising that your heartbeat speeds up and your body temperature goes up, which is why you sweat.	
Interviewer: Mm-hmm.	
Student I: And he also proved that with him exercising, he lived a longer life than the average American back in his time.	
Interviewer: Wow, that's great. Okay. If you're finished, you push Finish. That was really good thinking.	
Student I: Oh, and also, he made clear to his son that they should always – they should do more of the exercising, like double the exercise, instead of for just doing like one little bit of it.	
Interviewer: Okay.	
Student I: Turn in?	
Interviewer: Yeah, turn in. Turn in. Okay, there's one more. You think you can do it?	
Student I: Mm-hmm.	
Interviewer: You're jamming on this. Alright, scoot down. Continue. Alright. So, here's a different passage. So, again, you can read it out loud, you can read it to yourself. And then, whenever you want, we can go through the questions.	
Student I: Okay.	
Interviewer: Alright, awesome.	
Student I: [Reading to self] I'm done.	
Interviewer: Awesome. Okay, let's look at these questions. Whoo, alright, what's the first one?	
Student I: How can the reader tell that Caroline Kroger is realistic fiction?	
Interviewer: Okay, what do you think?	
Student I: That includes an animal that relates to humans? I don't know.	
Interviewer: Okay.	
Student I: It describes events that happened in the past. No. This happened in the future. Well, present.	
Interviewer: Okay.	
Student I: It features a main character dealing with conflict. It presents factual information on specific subjects. It does not.	
Interviewer: Okay.	
Student I: It features a main character dealing with conflict and includes an animal that relates to human. I don't think a crow relates to humans. I think that's a different animal.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: So, I think that is going to be B.	
Interviewer: Alright.	
Student I: Because her conflict was that Sephron...	
Interviewer: Stephan.	
Student I: Yeah, Stephan – I don't know if it was a girl or a boy – wanted her to let the bird go and she didn't really want to but then, she was like, "That's the right thing to do." So, she ended up letting him go and then, he came back and then, he flew off again.	
Interviewer: Awesome, great job.	
Student I: The main purpose of paragraph 7 is [reading to self]. To show that Stephan has definitely – has difficulty talking to Caroline. To explain how Caroline and Stephan acquired Crow. To contrast Crow's world with the human world. To emphasize the difficulties in Crow's life. All of them.	
Interviewer: Okay.	
Student I: I don't know.	
Interviewer: How are you going to think through it now?	
Student I: So, "acquired" means come in contact, right?	
Interviewer: Mm-hmm, to get.	
Student I: To get? Well, they didn't get him, right? They already had him.	
Interviewer: Mm-hmm, okay.	
Student I: So, I don't think that's the answer. To show Stephan has difficulty talking to Caroline. No, she does not have – he does not have difficulty talking to her. Because he said he went too far, he didn't mean to.	
Interviewer: Okay, okay.	
Student I: To contrast Crow's world with the human world. "There is no such thing as absolute total freedom, Caroline. We all have things we can't do or won't do or aren't allowed to do." That's what he means to Caroline. He stopped then, embarrassed that he had been gone so long." But Crow belongs to an entire other world. Comparing and contrasting the worlds because he says it right here.	
Interviewer: Okay, excellent.	
Student I: So, it has to be right.	
Interviewer: Okay.	
Student I: How is Stephan important to the plot?	
Interviewer: Okay.	
Student I: He explains how Crow is different from other birds. He helps Caroline understand what she must do. He shows Caroline how to take care of Crow. He	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
prepares Crow for a different kind of life. He was trying to get her to take – to let him go so, it wasn't that one. And he didn't prepare him for anything. There's nothing to prepare him for.	
Interviewer: Okay.	
Student I: He explains how Crow is different from other birds. He did not.	
Interviewer: Okay, alright.	
Student I: He helps Caroline understand what she must do.	
Interviewer: Excellent.	
Student I: Identify what the crow symbolizes in the passage. Provide evidence to support your answers. Okay.	
Interviewer: Keep it up, you're doing a great job. You really are.	
Student I: I think that the crow symbolizes the fact that she's scared of letting go. But the crow could really come back at any time. Because whenever she had let him go the first time, he came back and sat on her shoulder for the last time and took off again.	
Interviewer: Okay.	
Student I: And I think the reason why she can't cry or laugh is because she doesn't know how to feel. Like she knows it was the right thing to let him go but she doesn't – she didn't want to let him go.	
Interviewer: Okay.	
Student I: And so, I think the crow just symbolizes like – I don't know, I think the crow was like a special part in her life. And so, just like it's like letting go of a loved one, someone dying. That's basically what letting go for her was.	
Interviewer: Okay. Great thinking. Alright, want to finish out there? Alright, I just have a couple of easy questions for you. Awesome. Alright, did you enjoy thinking out loud?	
Student I: Yes.	
Interviewer: Okay, tell me why.	
Student I: It was way easier. I didn't think everything – I didn't say everything that I thought because sometimes in my head, I'd be like, "This makes no sense. Why do we have to do this?"	
Interviewer: No, that's okay.	
Student I: But like then I know it's like you have to because like it gets your grades better and it helps you get jobs and live your life.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Sure, okay. When you were answering the questions, was it easier or harder to answer them when you were thinking out loud?	
Student I: It was easier when you were doing it.	
Interviewer: Okay. What about the reading passages? Were they difficult, easy, or about average? Reading the stories. Would you say the stories were easy or hard or medium?	
Student I: They were like medium.	
Interviewer: Okay.	
Student I: Some words I had trouble on.	
Interviewer: Yeah. That happens to me, too.	
Student I: Like when I would like forget a passage, like my letters would go everywhere and then, like – I don't know.	
Interviewer: Yeah, I hear you. Okay, last one. Tell me which test questions you found difficult or confusing. Did you find any of them difficult or confusing?	
Student I: That one where – I don't know which one it was. You remember the one where we had to figure out – where I said it was all of them?	
Interviewer: Oh, yeah. Can we go back? No, we can't. I'll go back and figure it out.	
Student I: Okay.	
Interviewer: But it was the multiple choice one, wasn't it?	
Student I: Yes.	
Interviewer: Okay.	
Student I: And then, the very last question, number 4, for the last passage we just did, it was kind of confusing to tell what the bird symbolized.	
Interviewer: Okay. So, was it hard because the word "symbolizes" was weird? Or because you just weren't sure like what...?	
Student I: I wasn't sure like what the bird really symbolized.	
Interviewer: Okay.	
Student I: I just knew that it was like a special part of her life.	
Interviewer: Okay. You did an amazing job. You have a great brain. You really do. I don't have anything else for you. You did great. You are ready to go to class.	
Student I: That's it? No math or nothing?	
Interviewer: No, no. Do you want to do math?	
Student I: It was kind of hard but...	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: I saw some of those math questions. You don't want to go through math.	
Student I: So, this was just for reading?	
Interviewer: Just for reading. Like I said, you did a great job. I can tell your brain is really strong.	
Student I: [Inaudible]	
Interviewer: Yeah.	
[Multiple speakers]	
Student I: They're not mine, they're my mother's. _____ [00:35:17] yet.	
Interviewer: Oh, does he know you have them?	
Student I: Yeah [laughter].	
[Multiple speakers]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: What we talk about here. All right, so my first question is do you know what we're doing here?	
Interviewee: No ma'am.	
Interviewer: You don't know?	
Interviewee: I think it's cuz Ms. Beene called me in there and she gave me this date and I signed it and my mama signed it so.	
Interviewer: Okay, well, let me tell you what it is. So we're trying to figure out how students' brains think when they take different test questions. So to figure that out we need people to kind of explain their thinking as they're doing the problems, so it's called talking out loud. It's kind of like reading out loud except instead of reading you're just saying what your brain is thinking. Everything, like this is boring or I don't know or is this almost over, any of that stuff. You say it and then it helps us know what you're kind of thinking about as you're trying to answer the question. It's kind of weird, but it's cool at the same time. All the information, all your stuff is confidential. We won't show it to your teachers or your principal or anything. It's just private. Any questions?	
Interviewee: No ma'am. We can start this.	
Interviewer: Okay, all right, so I'll show you what I mean by thinking out loud just to give you some examples. So, if somebody said to me, Interviewer, fold this paper two times. Here's what I would do thinking out loud. I would say, okay, I have to fold this twice. I'm going to fold it hotdog style because that's pretty easy and I have to fold it one more time so I'll just fold it in half. So now I've got two folds, I folded it twice, there. So do you see how I'm kind of like telling you what I'm doing as I'm doing it?	
Interviewee: Yes ma'am.	
Interviewer: So same kind of thing. I'll show the test question here too, so you can get another idea. Okay, remember how this all looks?	
Interviewee: Yes ma'am.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: All right, so if I've read the passage, I'm going to come over here to the question and I'm going to say, in the book fair, how is Mr. Egan important to the plot? All right, so I'm going to think this through. Then he helps the narrator understand the value of cooperating with others. Well, it could be that one. That sounds good. He provides the organizational skills needed for the narrator and Charlie to be successful. Okay, well I remember that he is not even here for part of the story. Like, he leaves them, so they divide their responsibility. And then, down here, Mr. Egan has to go to a meeting, so he's not even there, so he's not helping them with that. He serves as the adult sponsor if there are problems. Well, okay again, he's the adult sponsor. It said it up here. I read that, but like I said in the last one, he took off for a conference, so he didn't resolve any problems. So it's not that one. All right, he attempts to help the narrator and Charlie to become friends by assigning them to work together.</p> <p>Well, okay, so they do assign Charlie and the narrator to work together. But down here I remember it said this guy was going to say, no, this is your mess, figure it out. But then he said instead, well, I'll help you, but I don't think they became friends. It doesn't sound like they became friends, so I don't think it's that one. So I'm going to say that my answer is A, and I'm going to click next. All right, here's one more. All right, explain why the author most likely wrote the passage. Well I know the author is right for teaching people things to inform with facts and details, sometimes authors write to convince me to do something or buy something, and I also know that authors will write stories to teach a lesson or to entertain me. So I know that this wasn't really giving me any information and I know that this one isn't really persuading me to do anything or to buy anything, so what I would say is that the author wrote the passage because he wanted to teach a lesson and entertain us at the same time. And I know that because it says down here it was a lesson in how important it is to communicate and work alongside others and that's what I would have typed if I was going to type it. Does that make sense?</p>	
<p>Interviewee: Yes ma'am.</p>	
<p>Interviewer: Okay. I'm going to give you a chance to practice. Are you ready?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewee: Yes ma'am.	
Interviewer: All right, so we'll have a little practice session and then two other ones. So the first one, you'll read the passage right here, and then when you're ready, we'll talk through the answers together.	
Interviewee: Okay.	
Interviewer: Some people like to read out loud. Some people like to read just in their head. It's up to you whatever you think is easiest for you. I will just give you the computer and the mouse and let you go and just let me know when you want to work it out.	
Interviewee: Yes ma'am.	
Interviewer: All right, cool.	
Interviewee: [air] All right.	
Interviewer: Okay, let's look at this first question. All right, why don't you read that first one to me there.	
Interviewee: Which would be the best source for more information about the habitat of crows?	
Interviewer: All right, so if you're going to answer this question on a test, how would you go about solving it? What would your brain think?	
Interviewee: I'd just re-read it if I didn't understand it the first time.	
Interviewer: Okay.	
Interviewee: So it says which would be the best source for more information about the habitat of crows? I know the habitat is in the encyclopedia entry on crows. I'm not sure.	
Interviewer: Okay.	
Interviewee: So I'm just going to leave that one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All right.	
Interviewee: And then I'll just go, anthology of essays about birds, I don't even know what anthology means.	
Interviewer: Okay.	
Interviewee: Are journal article and title images crows in art? Probably not.	
Interviewer: Why not? I mean I think you got a good answer there, why not?	
Interviewee: Because a journal article and title images of crows aren't like that's not habitat. That's just pictures of the crows.	
Interviewer: All right. That makes sense.	
Interviewee: So a newspaper article about building a bird sanctuary, that's a good answer, though.	
Interviewer: Tell me why you think that's a good answer.	
Interviewee: Because it's a habitat and like you're building something for a crow to stay in. So anthology of essays about birds...	
Interviewer: So an anthology is just like a bunch of different things put together, so it's like a book of essays.	
Interviewee: That's also good, so I'm just going to leave that and leave this too.	
Interviewer: Okay.	
Interviewee: Encyclopedia entry on crows, I don't even think that's like, I'm not really sure but.	
Interviewer: Okay.	
Interviewee: I think this would be the best answer.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All right, good. All right, so then you click next. All right, with this one, what is it asking?	
Interviewee: Describe Carolina and crow's relationship. Provide evidence from the passage to support your answer, so I'm going to go back down and Carolina gave _____ [00:10:43]. She was always thinking about what was best for crow who couldn't after all tell her, so they're obviously together because she was having trouble letting him go and she was like...in essence, she was saying I love you crow and all that, so I'm pretty sure their bond was pretty good from her taking him in from _____ [00:11:19]. Describe Carolina and crow's relationship. Provide evidence from the passage to support your answer.	
Interviewer: Okay. You don't have to type. You can just tell me in your words. That's fine. All right, so that's great. So then you would click finish. And then turn that one in, turn it in. So then we just have two more. Can you hang in with me there?	
Interviewee: Yes ma'am.	
Interviewer: All right, let's see what this next one is. Okay, same story. Do you want to read it again or you want to keep on going with the questions?	
Interviewee: I'll keep on going.	
Interviewer: Okay.	
Interviewee: How can a reader tell that Carolina and Crowe girl is realistic fiction? Because, I mean, people take crows in all the time, like rescues. They take them in. They help their wings, or if they like have an illness, they help that. So it's realistic fiction because that and like I'm not really sure how it's fiction but.	
Interviewer: Okay, well let's look at these answer choices here.	
Interviewee: Okay. It presents factual information on a specific subject. Not really. I don't give enough facts. It doesn't give anything like, like the last one, if it gave facts in habitat, I would know about the habitat.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Right.	
Interviewee: And I would've chose the answer right. It views the main character is dealing with conflict. Yes, it does, but well we're going to leave that as the answer.	
Interviewer: Okay yep.	
Interviewee: It describes the events that happened in the past. No.	
Interviewer: Why not?	
Interviewee: Because it's happening now. They're letting him go now and it's not going back in past.	
Interviewer: All right.	
Interviewee: It includes an animal that relates to humans. Not really.	
Interviewer: Why?	
Interviewee: Because it includes the animal that relates to humans. No, it's a Pidgin. It would be different if it was like a monkey or something like that but no.	
Interviewer: All right.	
Interviewee: It features a main character dealing with conflict.	
Interviewer: Okay, awesome. Good thinking.	
Interviewee: Does it happen in the past? No, so B is my final answer.	
Interviewer: All right, good, next.	
Interviewee: The main purpose of paragraph seven is? Well, I'm going to scroll down to paragraph seven to re-read it.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewee: There's no such thing as absolute total freedom Carolina. We all have things we can't do or won't do or aren't allowed to do. That's what it means to grow up. He stopped being embarrassed that he had gone on so long, but crow belongs to an entire other world and it's time to let him go there. So that was really about how she wasn't trying to let him go and that he belongs to another, like he don't belong with us. He belong with his peoples. The main purpose of paragraph seven is to emphasize the difficulties in crow's life. Not really.</p>	
<p>Interviewer: Okay.</p>	
<p>Interviewee: To contrast crow's world with the human world. I'm not sure.</p>	
<p>Interviewer: Okay.</p>	
<p>Interviewee: To explain how Carolina and Stephan acquire crow. No, not at all, not at all.</p>	
<p>Interviewer: Okay.</p>	
<p>Interviewee: To show that Stephan has difficulty talking to Carolina. No and no.</p>	
<p>Interviewer: Okay.</p>	
<p>Interviewee: There is no such thing as absolute total freedom. There's a lot of things we can't do. See I didn't pick this one because there's no difficulties on here.</p>	
<p>Interviewer: Okay.</p>	
<p>Interviewee: It didn't show how he got rescued. It didn't show his wing was broke. It didn't show none of that. So the best answer would be to contrast crow's world with the human world.</p>	
<p>Interviewer: Nice, okay, great job. Nice thinking.</p>	
<p>Interviewee: How is the following important to the plot? Stephan is important to the plot. He convinced her to let crow go because you don't need to hold on to a bird for that long. It's healed. He's ready to go.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Interviewee: He prepares crow for a different kind of life. No because it's really Carolina doing all the work, but Stephan is there to help Carolina out because you know.	
Interviewer: Okay.	
Interviewee: A crow is different from other birds. Yes.	
Interviewer: Okay, tell me why.	
Interviewee: Just because he's pushing her constantly, like telling her to let it go. He deserves to another world. He does not belong here and Stephan said he should be released Carolina. His tail feathers are all grown in, just think about it. She said, you don't know. So he's pushing here.	
Interviewer: Okay.	
Interviewee: He explains how crow is different from other birds. No, not at all. He shows Carolina how to take care of the crow. No. I'm pretty sure Carolina already know how to take care of him because she's the one with the most bond, so he helps Carolina.	
Interviewer: Awesome.	
Interviewee: Identify what the crow symbolized in the passage. Provide evidence from the passage to support your answer. Okay, identify what the crow symbolized in the passage. Like the last one, realistic fiction, it symbolizes attachment because she's attached to crow. Carolina is attached to crow, so crow has to be like an attachment or something and to let go like a piece or like a symbol or something like that so.	
Interviewer: Okay, awesome. So you can click finish. That was really great thinking. Okay turn in, turn in, okay one more. You're doing a great job. All right, so then same kind of thing, just read the passage and we'll talk the questions together.	
Interviewee: Yes ma'am.	



Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewer: All right, awesome.	
Interviewee: [air]	
Interviewer: All right, what's this first question?	
Interviewee: Which statement best states the main idea of this selection. That's pretty, well me looking at it, there's a whole bunch of main ideas, but we'll go over the first one.	
Interviewer: Okay.	
Interviewee: Franklin provided proof that being fit prolonged life by devising a new system for counting age. This is what this must be about. It was about this and this. Actually, they're all about really keeping fair, exercising and inventing and swimming with success. That's about you got to be fit to swim, so I'm just going to keep that. Franklin invented swim palace and studies from emotions as a means of building strength. Okay, that was, but that was just a fact. That's not really an opinion. I mean not really a main idea.	
Interviewer: Okay.	
Interviewee: So we're going to X that one. Franklin took a scientific approach to exercise that included measuring heartbeats and body heat. Okay, he did do that, but that was only one. Most of these talk about keeping fit and exercising and inventing swimming with success all about the first one.	
Interviewer: Okay.	
Interviewee: This one was only in paragraph one or this one keeping fit, so I'm going to X that one out. That's not even the main idea.	
Interviewer: Okay.	
Interviewee: Franklin worked to stay fit because he understood the connection between exercise and good health. Okay, these two are good, so I'm going to re-read it. Franklin proved that being fit prolonged life by devising	



Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
a new system for counting. Oh, what am I doing? No, this is not it because this one down here is about by devising a new system. This is when he made that new system for counting, so that's not it.	
Interviewer: Okay.	
Interviewee: Oh my gosh, I don't know how I didn't get that.	
Interviewer: That's okay.	
Interviewee: Franklin worked to stay fit because he understood the connection between exercise. That one's it.	
Interviewer: All right, awesome, good job.	
Interviewee: Which question is the answer in paragraph eight? Hold on, let me go back, swimming with success. Ben loves swimming and thought everyone should learn. It was a skill that could benefit both rich and poor and, once learned, was never forgotten. When he was in his 20s and living in England, Ben had such success teaching a coworker to swim that he thought about opening a swimming school. Okay so when did Ben Franklin learn to swim. No, that's not it because if we go back and re-read it that's not it because he's teaching him how much swimming benefits you.	
Interviewer: Right.	
Interviewee: And like how fun it is how Ben loved it. It's not teaching him how Ben learned. Do people love swimming so much? No, that's not it because that's an opinion. You can't answer that. That's an opinion. How does swimming benefit both the rich and poor. Not really. Why did Ben Franklin open a swimming pool? Hold on. I kind of got lost.	
Interviewer: You're good.	
Interviewee: [air] How does swimming benefit both the rich and poor. No, not really. [air] So from all of these answers, the most sensible one will be D.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewee: Because I mean, if you go back, when did Ben Franklin learn to swim. There's no...this did not...he's 20. He didn't learn how to swim when he was 20 and it says Ben loves swimming, so that's not it.	
Interviewer: Okay.	
Interviewee: And why do people love swimming so much? It's only talking about Ben and how rich and poor. It's not talking about anybody else except for the coworkers.	
Interviewer: Okay.	
Interviewee: How does swimming benefit both the rich and poor. All right, so I re-read that one and it said it was a skill that could benefit both rich and poor and once learned was never forgotten. So it wasn't really going into detail how it benefits the rich and poor, so the most sensible one would be D.	
Interviewer: All right, nice.	
Interviewee: Ben Franklin Fit for Life was considered a biography he was someone who actually learns, it talks about a person's life, it is written in first person, it teaches a lesson. That's not written in first person.	
Interviewer: Okay, how do you know?	
Interviewee: Because the older man rests the fingers of one hand on opposite wrist. His lips move silently counting as he looked at his watch, 60 heartbeats in a minute. It says his. If it was in first person, it would be I.	
Interviewer: Gotcha.	
Interviewee: And it also says the older man. It would be like I rested my fingers of however that goes.	
Interviewer: Yeah, yeah, yeah. I'm with you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewee: It teaches a lesson. No, that's not what a biography is. I'm pretty sure if it teaches a lesson that's a moral.	
Interviewer: Okay.	
Interviewee: It tells about a person's life. It does. That's sensible. It uses some factual words. I mean, yeah, but it's not telling about their life. A biography is telling about the life. Autobiography is telling about their self.	
Interviewer: Okay.	
Interviewee: So if it was in first person it would be autobiography, but it's not.	
Interviewer: Okay, excellent.	
Interviewee: Tell me why Ben Franklin believes about exercise. Provide supporting details from the passage. All right, so he thinks that exercise is needed because, if you go back, he was telling them about his...it was talking about like it said Ben Franklin had lived a long life and in the 1700s the average American lived only 40 years and had no understanding between the connection of exercise and good health. So Ben Franklin worked out and worked out, and it says that he once sent his son Matthew a letter. And since he sent that letter he was talking about how like if it was raining outside you could run up the stairs and exercise is important and how you need to just keep on exercising and exercising. And how one mile is riding a horseback and then five in the coach and it keeps on talking about it. It keeps on talking about keeping fit. And, if you go down, it says exercising is inventing. When he was younger did like more strenuous exercises. As a boy, he lived in the seaside city of Boston where he learned early to swim well and to manage both in order to improve his swimming speed he conducted an experiment. Well, this is really talking about how he conducted the experiment, so that was really it. The first one was really it about how today's fitness experts use the word cardiovascular, heart and blood vessels to describe the kind of exercise recommended for people of all ages so.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Awesome. That's really great. Okay, finish that one up. I don't think there's anything else. Sweet, all right, now I have just a couple questions for you.	
Interviewee: Yes ma'am.	
Interviewer: First of all, who is your ELA teacher, your reading teacher or English?	
Interviewee: My reading teacher is, actually I'm not really sure, hold on.	
Interviewer: That's okay, ----- or -----?	
Interviewee: Oh, Mr. -----.	
Interviewer: Mr. -----?	
Interviewee: Yes ma'am and my English teacher is Ms. - -----.	
Interviewer: Ms. -----, how do you...	
Interviewee: -----.	
Interviewer: Oh, okay, one more thing here. Okay, so did you enjoy thinking out loud during the exercise?	
Interviewee: Yes ma'am.	
Interviewer: Why did you like it?	
Interviewee: Because I got to say it out loud and like in normal tests you can't just be like, oh, this is boring or something like that. You can't do that.	
Interviewer: You say it in your head.	
Interviewee: Yeah.	
Interviewer: You can kind of be honest about it?	
Interviewee: Yes ma'am.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Did you find it easy to think out loud or did it make it more difficult to answer test questions?	
Interviewee: I didn't think it was difficult at all. I think it was easier.	
Interviewer: Easier, okay. Were the reading passages difficult, easy or about average?	
Interviewee: Easy.	
Interviewer: Easy?	
Interviewee: I was only getting stumbled up on words because I was thinking about it too much and just...	
Interviewer: What books do you like to read on your own? Do you do much reading on your own?	
Interviewee: No ma'am.	
Interviewer: No? I get that. All right and the last one is tell me which test questions you found difficult or confusing.	
Interviewee: Some of them didn't make sense. It was like the main idea one about Ben Franklin. It said something.	
Interviewer: It was a multiple choice question, wasn't it?	
Interviewee: Yes. He was talking about...I'm not sure what it was.	
Interviewer: Like just kind of reading through the different trying to decide or?	
Interviewee: Yeah trying to decide because some of them didn't make sense and my final answer one I was kind of hesitant.	
Interviewer: Okay, so you weren't sure. I don't know. For somebody who doesn't like to read you really did a great job so thank you so much. I don't have anything else. You're done.	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewee: Thank you.	
Interviewer: You can go live the dream. What class are you going to next?	
Interviewee: Next hour?	
Interviewer: Yeah.	
Interviewee: -----.	
Interviewer: Oh, perfect timing.	
Interviewee: You have a good day.	
Interviewer: You too. Thank you, my friend. I appreciate everything.	
Interviewee: You all have a good day too.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All so, do you know what we are doing?	
Student III: Uh.	
Interviewer: Kind of/not really?	
Student III: We are like—you guys are going over it, and uh, seeing how you can improve the questions—	
Interviewer: Yeah.	
Student III: —to help the kids out more.	
Interviewer: Yeah. So, and to help us do that what we are asking is students like you to think out loud, so we can kind of see in a weird way like what is your brain doing as you think through and help us, that will help us make sure that our questions are doing what they are supposed to be doing. If that makes sense?	
Student III: Mm-hm	
Interviewer: So to do that, it is called thinking out loud. I do not know if you have ever done thinking out loud?	
Student III: I have.	
Interviewer: You have, okay. I will give you an example anyway just to make sure that you have the same meaning. So, if somebody said, "Hey Mary Kate, think out loud and fold this paper in two." I would say, "Okay. I am going to fold this paper hamburger-style so that I have got like kind of smaller rectangles, and I will fold it hamburger-style again so now I have got two folds and they are both hamburgers and that just makes four rectangles." So what I was doing there was like telling you what I was doing as I was doing it. It is the same kind of thing with this. I will give you a couple examples here. So, let say I read the passage, and then I say okay, in the book there how is Mr. Eagen important to the plot? So now I am going to think out loud. "Okay, he helps the narrator understand the value of cooperating with others. Mmm, maybe. He provides the organizational skills needed for the narrator and Charlie to be successful. Um no, because I remember down here it said that—where was it? Mr. Eagen would postpone the meeting. He would meet with him anyway, so he met with	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>them later. So, I do not think he gave them organizational skills to be successful, and also, they were not successful because Charlie down here freaked out. He was not prepared at all. So that is not it. Um, he serves as the adult sponsor if there are problems that the students cannot resolve on their own. Well, it said up here that he is the sponsor, but like I just said on the other one he was not even around at one time so that is not it. He attempts to help the narrator and Charlie become friends by assigning them to work together. Well, he did assign them to work together, but they are not really friends at the end, and you can even say like—you know, the narrator saying no, this is your mess, figure it out, but then he changed his mind and is like okay, I will help you. So, they are not really friends at the end so I do not think that is it. So the answer here, I think, is A, and I can know that even more because it says it was a lesson about communicating and working together when necessary so that is cooperating. All right, so that is my answer. My next question. Okay, explain why the author most likely wrote the passage. Provide evidence. Okay. So authors write stories for lots of reasons. Sometimes they write to inform the reader about something new that they do not know. They could try to persuade them to do something or maybe buy something for teaching a lesson or entertaining. And if I look at this passage, it is not persuading me to do anything, so that is not the reason. And, it is not really telling me about something new so my answer is that the author most likely wrote the passage to entertain me with a story and at the end it taught me a lesson and the lesson was that it is important to communicate and work alongside others when necessary. Finish." Does that make sense?</p>	
<p>Student III: Mm-hm.</p>	
<p>Interviewer: Okay. So now, I am going to let you go through and practice two times and then we will get the real thing so if you read the passage. Sometimes people like to read it out loud. A lot of people like to read it in their head. Whatever you prefer is fine with me.</p>	
<p>Student III: Okay.</p>	
<p>Interviewer: And then when you get to the questions just let me know and we will work together through them.</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Student III: All right.	
Interviewer: Does that sound good?	
Student III: Mm-hm.	
Interviewer: Okay. ____ [00:04:16]	
[Silence from 00:04:16 to 00:11:13.]	
Interviewer: All set?	
Student III: Yeah, I am finished reading.	
Student III: Uh, which book would you most hope for in finding more information about the advantages of cardiovascular exercise?	
Interviewer: Okay, how would you answer this one? What would you think through?	
Student III: Well, it would not be Faster Beats, because Faster Beats would just pertain to—as you exercise more your heart beats faster and your temperature increases, so it would not be that.	
Interviewer: Okay.	
Student III: Short Sports would not be anything, because the only sport in this is swimming and in swimming takes time.	
Interviewer: Mm. Mm-hm.	
Student III: To do.	
Interviewer: Okay.	
Student III: So.	
Interviewer: That is good thinking.	
Student III: It would not be that.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: And uh, I think it would be the Healthy Heart Manual, because it does not describe anything for what the heart does for you.	
Interviewer: Mm. Mm-hm.	
Student III: And the—[Loud tone]—this, so it would not be that. So it would be B.	
Interviewer: Excellent. Next?	
Student III: Paraphrase the advice Ben Franklin gave to his son in Paragraph 4 and 5. Provide the supporting details from the passage. So 4 and 5. Well, he suggested to his son about—gave him advice about types of exercises he could do.	
Interviewer: Mm-hm.	
Student III: So like, he said one mile walking is more exercise than five miles riding on horseback.	
Interviewer: Mm-hm. Mm-hm.	
Student III: And, he also suggested stair-climbing to him, because if he had—was short on time or it was bad weather outside.	
Interviewer: Sure. Mm-hm.	
Student III: So uh, the advice he gave him was to help his son live a longer life into a—let me think. And to have a... Like a better lifespan than most people—	
Interviewer: Okay.	
Student III: —people during that time.	
Interviewer: Great.	
Student III: Would have.	
Interviewer: Excellent.	
Student III: So.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All right. That is awesome. So, you would click finish. You have got it. You are a great thinker. You have got this down pat. Okay, so then we have two more sessions. So click the one. _____ [00:13:48] All right, so it is the same passage, different questions. Do you want to read the passage again, or do you want to just keep going.	
Student III: I will just keep going.	
Interviewer: Okay.	
Student III: Which statement best states the main idea of this selection? Franklin provided that being fit prolonged life by devising a new system for counting age—no, did not—no, actually. No. No.	
Interviewer: Why not?	
Student III: Because, he is the—he counted his age backwards.	
Interviewer: Okay.	
Student III: Exercising throughout your life would not make you count your age backwards.	
Interviewer: Sure. Okay.	
Student III: So.	
Interviewer: Okay.	
Student III: Franklin being—_____ [00:14:31] swim paddles and studied swimming of oceans as a means of building strength. Uh. I will think about that.	
Interviewer: Okay.	
Student III: Franklin took a scientific approach to exercise. That included measuring heart beats and body heat.	
Interviewer: Yeah.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: Franklin would stay fit, because he understood the connection between exercise and good health. So. I do not—it would not be that, because him inventing that would not build strength—would not build strength as much as him just swimming regularly.	
Interviewer: Okay.	
Student III: Then, this would just be him—would just be telling us that he, uh—it was just his—his scientific solution to doing that.	
Interviewer: Mm-hm.	
Student III: But, I think the main idea is Franklin worked to stay fit because he understood the connection between good health—exercise and good health.	
Interviewer: Okay. Awesome.	
Student III: Which paragraph is the answer to _____ [00:15:39] Paragraph 8? Uh... Would it not be—would not be A, because it does not answer that	
Interviewer: Mm-kay.	
Student III: Then, why did people love swimming so much? Not many people knew how to swim back then.	
Interviewer: Mm-kay.	
Student III: How did swimming benefit both the rich and poor? Uh, it would not... I cannot—when you say benefit them once learned, but this whole paragraph states why he was thinking about opening up a swimming school.	
Interviewer: Okay. Awesome. That is good thinking.	
Student III: Consider it a biography, because uh... Does not use actual words.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: From him. Uh, does not really tell about his life.	
Interviewer: Okay.	
Student III: Actually... It tells about his late life.	
Interviewer: Okay.	
Student III: Not his entire life, really.	
Interviewer: Okay.	
Student III: I will think about that.	
Interviewer: Okay.	
Student III: It is written in first-person. It is not written in first-person.	
Interviewer: How do you know?	
Student III: Because, it states in a third-person—saying Ben Franklin and things like that.	
Interviewer: Okay.	
Student III: States it third-person view.	
Interviewer: Okay.	
[Loud tone.]	
Student III: It teaches a lesson and it teaches you about exercise, but it does not really teach you an actual lesson.	
Interviewer: Okay. That makes sense.	
Student III: So, it would be about his—it would be about his late life.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: His late belief about exercise. His belief about exercise was that he—exercising more often would help you live a longer lifespan.	
Interviewer: Mm-hm.	
Student III: So, if you did not exercise that much you would not have as much of a lifespan as say your friend who does exercise most the time. So.	
Interviewer: Mm-hm.	
Student III: If you started exercising, you would have more of a lifespan, like he did, since usually back then people would live to their 40s.	
Interviewer: Right.	
Student III: And, he lived to 85, 84.	
Interviewer: Sure. Great. That is great thinking. All right. Turn that one in. Turn that one in. One more.	
Student III: I should have brought my stuff. [Laughs.]	
Interviewer: I know. I was just thinking that too.	
Student III: It is fine.	
Interviewer: All right. So a new passage, and there are different questions.	
Student III: All right.	
Interviewer: I will let you go back to reading.	
[Silence from 00:18:37 to 00:24:40.]	
Student III: All right.	
Interviewer: Okay. What do you have?	
Student III: How can we tell the reader—how can the reader tell that Caroline Crow Girl is realistic fiction?	
Interviewer: Mm-kay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: It presents factual information on a specific subject. I will think about that.	
Interviewer: Okay.	
Student III: It features a main character dealing with a conflict most stories do, really.	
Interviewer: Okay.	
Student III: So, it is not really that.	
Interviewer: Okay	
Student III: It describes events that happened in the past. Nope. Because that would be an historical fiction.	
Interviewer: Okay.	
Student III: It includes an animal that relates to humans. Well, the crow really is not in relations to a humans. Like, it is not a cousin really, like, the chimpanzee or monkeys.	
Interviewer: Mm-hm.	
Student III: So, it would not really be that, so it would be "presents factual information on a specific subject".	
Interviewer: Mm-hm.	
Student III: What is the main purpose of Paragraph 7? Uh. Uh, to emphasize the difficulties in Crow's life? No, not really. Does not really state that.	
Interviewer: Okay.	
Student III: To contrast Crow's world with the human world? Maybe.	
Interviewer: Okay.	
Student III: To explain how Caroline needs to find a quiet crow? No.	
Interviewer: How do you know?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: Because, it never really tells us how they got Crow.	
Interviewer: Okay.	
Student III: Anywhere in the story.	
Interviewer: Okay.	
Student III: So, it really does not tell how they got Crow.	
Interviewer: Mm-hm.	
Student III: To show how—that Stephan has to—no. He does not have difficulty to talk to him—talk to her, so.	
Interviewer: Okay.	
Student III: It would be B.	
Interviewer: Okay.	
Student III: How is Stephan important to the plot? He prepares Crow for a different kind of life? No. He really does not. It is Crow's natural instincts that help. Uh, he shows Caroline how to take care of Crow. Nowhere in the story he helps.	
Interviewer: Okay.	
Student III: That—he helps Caroline to understand what she must do. Maybe. He explained how Crow is different from—Crow really is not different from other birds, he is just a different species of bird.	
Interviewer: Mm-hm.	
Interviewer: Mm-hm.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: Identify how Crow—Identify what the crow symbolizes in passage. Provide evidence from the passage to support your answer. What Crow symbolizes. Huh.	
Interviewer: Mm-hm.	
Student III: Crow symbolizes like a different world.	
Interviewer: Mm-hm.	
Student III: Compared to the human world, because most humans have to grow up and get a job where crows and different types of birds, once they grow up they are free to what they want to do, which their instincts tell them to fly around, to uh, what is the word? Not hibernate, but uh—	
Interviewer: Habitat?	
Student III: No, not habitat.	
Interviewer: Okay.	
Student III: It is uh... I forgot the word.	
Interviewer: That is okay. Keep going. You are doing great.	
Student III: But it—but, he has a choice to what he wants to do for the rest of his life after he grows up, but humans have to get up, go to a job, then have a family and stuff if they want to live that happy life.	
Interviewer: Mm-hm.	
Student III: But Crow, him and his—and all birds have a choice to what they do.	
Interviewer: Okay. Great. Awesome. Is there anything else?	
Student III: _____ [00:28:41]	
Interviewer: No? Okay. Quick question for you. Did you enjoy thinking out loud?	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Student III: Yes.	
Interviewer: You did?	
Student III: Yes, I did.	
Interviewer: Okay. Tell me why.	
Student III: I enjoyed it, because I actually had something to talk about instead of talking to myself and getting what I was wanting to say out.	
Interviewer: Mm-hm.	
Student III: As I talked.	
Interviewer: Okay, so better than talking inside your head, maybe?	
Student III: Yeah.	
Interviewer: Just kind of getting it out.	
Student III: Yeah. Interviewer: Okay. Did you find it easy to think out loud, or did it make it more difficult for you to answer the question?	
Student III: I found it—I found it easier, because I could discuss it more than I could in talking to myself in my head.	
Interviewer: Uh-huh. Okay. What about the reading passages? Where they difficult, easy, or average?	
Student III: Uh, the first one was pretty easy to me.	
Interviewer: Okay.	
Student III: And the second one was about average.	
Interviewer: Okay. Easy and Crow was average, you said?	

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Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student III: Uh, yes.	
Interviewer: Okay. And then, tell me which questions you found difficult or confusing?	
Student III: None of them were really difficult or confusing to me.	
Interviewer: Okay.	
Student III: But, if I were to say another kid—I would say the paragraph ones are pretty hard for—if it was for other kids, but those were not really hard to me.	
Interviewer: Okay. That is all I needed. You did a great job. You are a really super-smart reader. Thank you.	
Student III: Mm-hm.	
Interviewer: You can go back—	
Student III: Yeah, no problem	
Interviewer: —and live the dream the rest of the day. [Laughs.] Appreciate your time.	
Student III: Yeah, no problem.	
Interviewer: All right. Take care.	
Student III: You too.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. Quick question. Do you know what we're doing today? Have they explained it to you at all, or not really?	
Student IV: I read the letter and they explained it _____ [0:00:08].	
Interviewer: Okay. I'll tell you, yeah. So, what we're trying to do is figure out how Student IVs' brains think about different questions when they do tests. And, so to do that, we're trying to do an experiment where you think out loud since we obviously can't see what you're thinking. Have you ever done think out louds before? No?	
Student IV: A little bit.	
Interviewer: Okay. So, you know what reading out loud is, right?	
Student IV: Um-hmm.	
<p>Interviewer: So, it's the kind of thing, except instead of reading a book, you're just saying everything that's in your head. It's pretty easy. I'll show you what I mean here just so you know. Another thing to know is that everything that we do is confidential. I won't share it with your parents or your teachers or your principal or nobody will know.</p> <p>So, all right, so here's what thinking out loud is. So, if somebody said, "----, I want you to do a think out loud and fold this paper two times." Here's what I would say, I would say, okay. I have this paper; I'm going to fold it twice. I think I'm going to fold it, I'll fold it hotdog style, the long way, and then I don't know, I'm kind of feeling different. So, maybe I'll fold it triangle, like halfway through a triangle, like that. So, I folded it two times, I folded it hotdog and kind of triangle. There we go. That's what thinking out loud is.</p> <p>I'll give you another example here with this, samples and the practices. So, if I was thinking out loud doing this, I would say, okay, I have to read this passage, and I read it. So, I'm going to just keep going. So, the first question is in the book fair, how is Mr. Eagan important to the plot? All right. I'm going to read my choices. He helps the narrator</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>understand the value of cooperating with others. He provides organizational skills needed for the narrator and Charlie to be successful. He serves as an adult sponsor if there are problems that the Student IVs can't resolve. He attempts to help the narrator and Charlie to become friends by assigning them to work together. Okay. So, A, that could be it, because at the end, it said something like it was a lesson on how important it is to communicate and to work alongside others. So, that's cooperating. But I better make sure on these others. So, he provides organizational skills for the narrator and Charlie to be successful. Let's see, I don't think so, because in the middle here, it looks like Charlie doesn't have a clue what's going on and he's got a problem and he needs help. So, he's obviously not giving them organizational skills and Charlie is obviously not being successful. So, that's not it. He serves as the adult sponsor if there are problems that the Student IVs can't resolve. Okay. Up here, I read that it said he's the school sponsor for the book fair. So, that part's true, but if there are problems the Student IVs can't resolve. Well, I also remember that when I read down here in paragraph five, they were supposed to have a meeting. But then Mr. Eagan has to go to a conference, and so he's not even there. And, then these kids have to figure out how to solve the problem on their own. So, he's, that's not the one. And, he attempts to help the narrator and Charlie to become friends by assigning them to work together. Well, he does assign them to work together, but I don't think that at the end Charlie and the narrator are friends. Like, he was thinking what were you thinking when you put us together? So, they aren't really friends. So, that's not it. So, my answer, Mr. Eagan helps the narrator understand the value of cooperating with others. Okay. Next. Oops, next. All right. All right.</p> <p>Another one. Explain why the author most likely wrote the passage? Provide evidence from the passage to support your response. Okay. So, authors write books for lots of reasons. So, one reason is to teach people about new things or to give them information. Another one is to persuade or to try to convince them to do something or buy something. Authors write stories for entertainment, for people to enter, be entertained. But also, sometimes, to teach a lesson. So, if I look at this story and I remember at the bottom there was a lesson, I think that that's why the author wrote the story. Because they aren't teaching anything new and they</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
<p>aren't persuading me to do anything. So, the author wrote the story to entertain the reader, and then also to teach him a lesson, or teach the reader a lesson. And, I can say that the evidence is right down here on this last part of the paragraph. I'm going to click finish and turn in, turn in.</p> <p>Does that make sense? Okay. So, now I'm going to give you a chance to practice. So, you'll have, oops, a passage. So, Ben Franklin _____ [0:05:32], so you'll the read the passage. And, then we'll talk through the questions together. Lots of people like to just read it to themselves, but some people are reading it out loud to, to themselves. But you can do whichever one works best for you. So, I'll give you the computer. There's the mouse, and just let me know when you're ready.</p>	
<p>Student IV: So, I can go ahead and start reading?</p>	
<p>Interviewer: Oh, yeah, oh, yeah, I'm sorry. Go ahead and get started, yep.</p>	
<p>Student IV: _____ [0:09:29] and finding more information about the advantages of the cardiovascular exercise. I think I found _____ [0:09:39].</p>	
<p>Interviewer: _____ [0:09:42] the questions?</p>	
<p>Student IV: Um-hmm.</p>	
<p>Interviewer: Oh, okay. I'm sorry. I didn't know that. All right. So, what is the question asking?</p>	
<p>Student IV: Which book would be most helpful in finding more information about the advantages of the cardiovascular exercise.</p>	
<p>Interviewer: Okay. So, how would you answer this one?</p>	
<p>Student IV: I would...</p>	
<p>Interviewer: Like what would you do?</p>	
<p>Student IV: ...see if the word popped up in the paragraph anywhere.</p>	
<p>Interviewer: Okay.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student IV: It pops up right over here, and it means heart and blood vessels. So, the main answer I assume, which would probably be what the heart does for you.	
Interviewer: Okay.	
Student IV: But we also, the healthy heart manual also has the word heart in it, but it does include blood vessels. So, I don't think it would be faster _____ [0:10:26], but it probably could. I just don't think it's short sports, because it doesn't have anything to do with the body or mind or heart.	
Interviewer: Okay.	
Student IV: It says to describe this kind of exercise _____ [0:10:41] people of all ages. The health heart manual could be it, but I don't really think it is.	
Interviewer: Tell me what you're thinking there. Why, why do you think it could be, but maybe not?	
Student IV: Because, it says the healthy heart manual _____ [0:10:59] thing that describes what it does for you. But it doesn't, I don't think it had the word exercise in it or help anybody with that.	
Interviewer: Okay.	
Student IV: What the heart does for you and faster beat seem to be my only answer, but the faster beat seems to be the one that I'd assume. Because, it talks about exercises and how to, and I'd assume the exercises means to keep your heart at a good pace.	
Interviewer: Okay.	
Student IV: So, I'm going to go with C.	
Interviewer: Perfect. Excellent. Good thinking.	
Student IV: Paraphrase the advice Ben Franklin gave to his son, paragraphs four and five. So, I'd go down over	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
here and it says provide supporting details from the passage.	
Interviewer: Okay.	
Student IV: So, over here, the place I'd see that may suggest advice is five, because it says he suggested stair climbing to William when time was short or the weather bad. So, I'd assume paragraph five would have the most about advice. And, I think this one would just be other stuff he would talk about to his son. So, I'm going to go over to paragraph five and reread it to figure out what advice he's giving in particular.	
Interviewer: Okay.	
Student IV: So, what I'm getting from the passage is that he's telling his son, William, that stair climbing is actually a good exercise for the heart. Because, it suggested up here and then it also brings up the _____ [0:12:43] cardiovascular part in it. So, I'd assume since it says measure, it'd be about the distance and stuff.	
Interviewer: Okay. Great. You don't have to type it. You can just talk me through it. Awesome. So, if you're finished, then you would say finish. And, then turn in and turn in. Okay. Now I have another one there. So, let's see what that one says. Okay. So, this is just practice. Now we're going to do the real deal. Okay. All right. So, you see you have the same passage here, but now you've got some different questions. Do you want to reread it, or do you want to just keep going?	
Student IV: I'll just keep going.	
Interviewer: Okay. _____ [0:13:22] here.	
Student IV: So, which statement best states the main idea of this selection? Franklin proved that being fit prolonged the life by devising a new system for counting age. Well, it does suggest that in this letter to his son. I don't think he recalled it to everybody, but he might've.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student IV: Franklin invented swim pallets and studied swimming motions as a mean of building strength. That was a part of it, but it wasn't the main idea of the passage.	
Interviewer: Okay.	
Student IV: Franklin took a scientific approach to exercise that included measuring heartbeats and body heat. That could be one, because he did measure and suggest and stuff. Franklin worked to stay fit, because he understood the connection between exercise and good health. Well, he did understand the connection, but I don't think he worked to stay fit.	
Interviewer: Okay.	
Student IV: So, I don't think it's A or B, because it doesn't really give a main idea of the passage. It gives ideas, just not the main part. So, what I'm suggesting it could be C or D, because they both give a main idea in the passage. It just depends on the wording of it. So, certain words would be able to give the main idea.	
Interviewer: So, you just read through them then, or to decide or...	
Student IV: I would have to look at the words and figure out...	
Interviewer: Okay.	
Student IV: ...which one would be able to. I think it was the understood connection, because he did do that.	
Interviewer: Okay. Awesome.	
Student IV: Which question is answered in paragraph eight? I'd have to go back to paragraph eight and reread it to...	
Interviewer: Okay.	
Student IV: ...figure it out. The question that was answered doesn't really state a question, but I could infer from the questions. So, A, when did Ben Franklin learn to	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
swim? It didn't exactly say that, but pretty sure it was because of children.	
Interviewer: Okay.	
Student IV: Because, it does say that in another paragraph.	
Interviewer: Okay.	
Student IV: B, why do people love swimming so much? It doesn't really talk about that, it just talks about how we can benefit.	
Interviewer: Okay.	
Student IV: So, I'm going to get rid of that answer.	
Interviewer: Okay.	
Student IV: How did swimming benefit both the rich and the poor? It does mention both the rich and the poor and it says that it should be a skill once learned and never forgotten. But it doesn't say exactly how it could benefit them.	
Interviewer: Okay.	
Student IV: So, I'm going to eliminate that answer.	
Interviewer: Keep going. You're doing great.	
Student IV: Why did Ben Franklin think about opening a swimming school? He did think about that, but I'm, but reading from it, it's, talks about him saying that everyone should benefit from learning it. So, it could be. I don't think it's Ben Franklin learned to swim, because it didn't really talk about that. Just talked about the benefits. So, I'm going to go with D, because it seems most likely.	
Interviewer: Okay.	
Student IV: Ben Franklin fit for life is considered a biography, because it uses someone's actual words? It could be that, since it does use some of his actual words,	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
like from the letter. It tells about a person’s life. An autobiography is about someone who is writing about themselves, and the person who wrote this is by Trish Early, so it can’t, so it can’t be that.	
Interviewer: Okay.	
Student IV: C, it is written in first person. It is not. It was written in third person...	
Interviewer: Okay.	
Student IV: ...I’m pretty sure. So, I’m going to eliminate that answer. D, it teaches a lesson. It does teach some stuff, but the main moral of the story isn’t a lesson. It’s about writing about someone’s life.	
Interviewer: Okay.	
Student IV: So, I’m going to eliminate that answer.	
Interviewer: Okay.	
<p>Student IV: So, it’s considered a biography. The most likely answer would be if someone asked that, it’s because it tells about a person’s life. And, the author is not the actual person they’re writing about.</p> <p>Summarize Ben Franklin’s beliefs about exercise. Provide supporting details from the passage. So, I would go and look back at the little titles over here. So, keeping fit, exercise and inventing, and swimming with success. So, these three would be the most important ones, and the usual, more information is usually at the end or in the beginning.</p>	
Interviewer: Okay.	
Student IV: So, what I’ve gained from this passage is that Ben Franklin wants to help people, because he lived a long life because of the exercise he was doing.	
Interviewer: Okay.	
Student IV: So, what I’m, so what I put in my words is that Ben Franklin was, lived to be 66, only because he did	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
take care of his good health and did some exercise that would help the heart.	
Interviewer: Okay.	
Student IV: So, do I write it?	
Interviewer: Nope, no, not enough. You click finish. Good job. Nice thinking. Next one. Right. And, then there's just one more. You're doing a great job. Great thinking. Okay. I'll let you think or read through.	
Student IV: I think I'm ready to answer...	
Interviewer: Okay.	
Student IV: ...the questions.	
Interviewer: Go for it.	
Student IV: How can the reader tell that _____ [0:21:44] girl is realistic fiction? A, it presents factual information on a specific subject. B, it features a main character dealing with a conflict. C, it describes events that happened in the past. D, it includes an animal that relates to humans.	
Interviewer: Okay.	
Student IV: I don't think it's D, because it talks about a crow and a human relationship. So, I don't think it is, because it didn't talk about how the animal was similar to the human.	
Interviewer: Okay.	
Student IV: So, I'm going to eliminate that answer. It describes events that happened in the past. It could describe that, but usually that events that happened in the past are usually, sometimes, in first person. So, I will keep that answer just because it does give some events that could've happened in the past.	
Interviewer: Okay.	
Student IV: But it's a little bit too detailed for it.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student IV: B, it features a main character dealing with conflict. Yes, it does deal with Caroline not wanting to let her crow leave her. So, that could be an answer, because fiction does have that.	
Interviewer: Okay.	
Student IV: A, it presents factual information on a specific subject. I don't think it can be that, because it does talk about the crow and the human, but it does not give us a specific subject. It just talks about letting go.	
Interviewer: Okay.	
Student IV: So, I'm going to eliminate that answer, and I'm left with...	
Interviewer: Good thinking.	
Student IV: ...B and C.	
Interviewer: Okay.	
Student IV: I think it's B, because it talks about realistic fiction and fiction usually has a main character dealing with a conflict, no matter what. It provides the story _____ [0:23:26], so I'm going to choose B.	
Interviewer: Okay.	
Student IV: Main purpose of paragraph seven is, I'm going to go back down to paragraph seven.	
Interviewer: Okay. Nice thinking.	
Student IV: A, to emphasize the difficulties in crow's life. It doesn't really talk about his difficulties. It just talks about another kid wanting Caroline to let it go.	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student IV: So, I'm going to eliminate that answer. B, to contrast crow's world and the human world. Yes, it talks about that, because the boy said that crow's world is in the outside and not with Caroline. So, I will keep that answer just for now	
Interviewer: Okay.	
Student IV: To explain how crow, Caroline and Stephan acquired crow. It doesn't talk about that. It just talks about how Stephan wants the crow to be let go into the wild, but that's it. So, I'm going to eliminate that answer.	
Interviewer: Okay.	
Student IV: D, to show that Stephan has difficult talking to Caroline. I could see where they get the difficulty from, because he seems frustrated that Carolina won't let go. But it doesn't talk about how angry he wants, how angry he is about talking to her. And, it does show a little bit of difficulty, but it doesn't seem like the main part.	
Interviewer: Okay.	
Student IV: So, it mainly talks about crow's world and the human world, so I'm going to go with B.	
Interviewer: _____ [0:24:51]. Good thinking.	
Student IV: How was Stephan important to the plot? A, he prepares crow for a different kind of life. He doesn't prepare it, because they acquired crow from the outside and they, I think, pretty sure they rescued him from inference that he's on _____ [0:25:08]. So, I'll keep that. I don't, no, I'll eliminate it.	
Interviewer: Okay.	
Student IV: B, he shows Carolina how to take care of crow. No, he doesn't show it, because he wants Carolina to give crow up to the nature where he belongs.	
Interviewer: Okay.	
Student IV: So, I'll eliminate that one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All right.	
Student IV: He helps Carolina understand what she must do. Yes, it does talk about that, so I will keep it there for now.	
Interviewer: Okay.	
Student IV: Because, that gets Carolina to let crow go.	
Interviewer: Okay.	
Student IV: D, he explains how crow is different from other birds. It does not talk about other birds. It just talks about crow in the passage.	
Interviewer: Okay.	
Student IV: And, that is the main focus. So, I'm going to go ahead and choose C, because it's the most likely.	
Interviewer: Nice thinking.	
Student IV: Identify what the crow symbolizes in the passage. From reading it, I would assume that the crow is just a bird that they rescued, or an old pet. But I don't think that's likely, because if you had a pet, you wouldn't want to let it go.	
Interviewer: Sure. That makes sense.	
Student IV: So, I don't think it would be the pet part, so I'd assume that the crow symbolizes her not wanting to let go of something she might find close with, or sympathize with. Because, if you find something to sympathize with, you want to help it and take care of it and lead it along. So, I think she just wants to symp..., she's sympathizing with the crow and wants to keep it there with her so that she can protect it and not let it go through whatever it's went through.	
Interviewer: Okay. That makes sense to me. That's some good thinking.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student IV: So, do I finish?	
Interviewer: Yeah. You can click finish. Now, I just have a couple of questions for you. Okay. So, _____ [0:26:55]. Okay. Did you enjoy thinking out loud?	
Student IV: Yeah.	
Interviewer: Yeah? Yes, or no. And, you can say no.	
Student IV: Yeah. I did.	
Interviewer: You did? Okay. Why did you think so?	
Student IV: Because, it helped me talk about how I was feeling and get thoughts out of my head so that they weren't all clumped together.	
Interviewer: Oh, okay. That's sometimes helpful, huh?	
Student IV: Um-hmm.	
Interviewer: Did you think it was easy to think out loud? Or, did it make it more difficult to answer the questions?	
Student IV: It was slightly more difficult, because you had to figure out which thought would be more important.	
Interviewer: Okay.	
Student IV: Since you have so many going through your head while you're reading the passage. It was slightly difficult, but it was kind of easy letting the main points get out, so that the other ones can fade away.	
Interviewer: Okay. So, others _____ [0:27:57]. Were the reading passages easy, hard or medium?	
Student IV: They were pretty easy to me.	
Interviewer: Okay.	
Student IV: Mostly, because they didn't use extreme words that would be out of someone's vocabulary. And, they did provide a lot of details to help visualize it.	

Transcribed Responses	(Reserved for Cognition Analysis; Leave Blank)
Interviewer: What kind of books do you like to read? Do you have a favorite author?	
Student IV: I like to read. I have a favorite author. It's Erin Hunter.	
Interviewer: Really? What does Erin Hunter write?	
Student IV: She writes like _____ [0:28:27] books, survivors and other stuff.	
Interviewer: _____ [0:28:28] Erin Winter?	
Student IV: Hunter.	
Interviewer: Hunter. I'm always looking for some good books. Okay. And, then tell me which test questions you found difficult or confusing.	
Student IV: I found the, like summarizing questions that you probably have to type out a little bit hard, because you have to figure out how you want to put it in your own words without making it look like you just copied...	
Interviewer: Right.	
Student IV: ...off the passage.	
Interviewer: Putting it into your own words. That's awesome. That's all I needed from you. Thank you so much. You did a great job. You're a great thinker.	
Student IV: Do I leave this here?	
Interviewer: I don't know. Do you take them back usually with you?	
Student IV: Yeah.	
Interviewer: You may as well take it. Thanks again. Have a good weekend. It's almost here.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Okay, all right. I guess my first question is, do you know what you are here for?</p>	
<p>Student V: Kind of, but not really.</p>	
<p>Student V: I was told the state tests.</p>	
<p>Interviewer: Okay, let me give you a little bit more information. What we are trying to do is figure out how student’s brains work as they take different test questions or think through them. Since we cannot see your brain and what it is doing, we do what is called a think aloud. It is kind of like reading out loud. Except, instead of reading it, you are actually just saying whatever is going through your head. This might be something like, this is really stupid. That is cool or whatever. It is something like that. We are going to ask you to do that with some of the test questions. I will give you a chance to practice. Everything that you do is confidential, so I will not be showing the video to anybody. I am not sharing anything with anybody. It is all double secret. Let me see, okay.</p> <p>Let me give you some examples here. If somebody said, -- --, take this paper, fold it twice, and think out loud while you do it, this is what I would do. I would say, all right. I am going to fold this paper two ways. I am going to fold the paper hamburger style this way. And let me see, I have to fold it one more way. I am going to fold it hamburger style, I guess, again this way. I make four little boxes with my folds. That is thinking out loud.</p> <p>I will give you another example here like with the test. Then I will have you practice. Okay, so continue. All right. I have already read this passage. It might look familiar to you from last year. If I was thinking out loud, I would say all right. In the book fair, how is Mr. Eagan important to the plot? He helps the narrator understand the value of cooperating with others. Maybe. He provides the organizational skills needed for the narrator and Charlie to be successful. I do not think that one is true because down here I remember it said that Mr. Eagan was going to help them. Then he did not show up. He had to go to some conference, so he was not there to give them any organizational skills. I do not like that one. He serves as the adult sponsor if there are problems that the students cannot resolve themselves. Well, yeah, he is the sponsor. It said that in paragraph one. But like we just said, he did not</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>even. He was not even there for one of the days, so that is not the answer. He attempts the narrator and Charlie to become friends by assigning them to work together. No, because down here, the narrator is like I could not help wondering what Mr. Eagan was thinking. So obviously he is not friends with him. So my answer is going to be A. I am going to push next.</p> <p>All right, here is another one for me. Okay. Explain why the author most likely wrote the passage. Provide evidence from the passage to support your response. Okay. So I know that authors write for lots of different reasons. One reason is to maybe get people to do something or buy something, so persuade. They might also write to inform. Sometimes they write to entertain or to teach a lesson. I know that this book is a fiction story. So I know that informational and persuasive are not the answer. This guy must have written the story to entertain. But I also remember down here, it said there was a lesson. I guess, there is also a lesson. So my answer would be I think that the author most likely wrote the passage to entertain the reader with a story about two boys as well as to teach a lesson about how it is important to communicate and work together with others. Then I would type it. Then I would say finish. Does that make sense? You do not have to type anything.</p> <p>Okay, so if you were going to practice, I will let you practice now. What you will do is read a passage. Then we will talk through the answers together so I can read what your brain is thinking. Then you will do some more. Some kids like to read out loud. Others like to read just quietly. It does not matter to me. Whichever one is easier for you is totally fine with me. I will let you read. I will give you the mouse and the computer. Yeah, just let me know when you are ready to answer questions. Awesome. Thank you.</p> <p>[Silence 00:05:01-00:09:35]</p>	
<p>Interviewer: Okay. So if you were thinking aloud, how would you go ahead and answer this first question?</p>	
<p>Student V: Do I have to read this aloud?</p>	
<p>Interviewer: Yeah sure.</p>	

Transcribed Responses	(Reserved for Cognition Analysis; Leave Blank)
Student V: Which book would be most helpful in finding more information about the advantages of cardiovascular exercise?	
Interviewer: Okay. Which one would you pick and why? How would you weed through?	
Student V: It would not be this one.	
Interviewer: Why not?	
Student V: It is because it is sports.	
Interviewer: Okay.	
Student V: It is sports.	
Interviewer: Is that not related to the passage?	
Student V: It is not related to the passage, plus it does not help the cardiovascular function.	
Interviewer: Okay.	
Student V: It would not be for the heart ____ [00:10:26].	
Interviewer: Okay, why do you think that?	
Student V: I just think it.	
Interviewer: Okay. Is there any? You think that is it?	
Student V: I do not think it is.	
Interviewer: You do not think it is, okay. Then you can.	
Student V: I do not think so ____ [00:10:50].	
Interviewer: Okay, why not?	
Student V: I do not know. They are all just listed.	
Interviewer: You are doing a great job. Just say everything out loud.	

Student 5–Part I–School A Grade 8 ELA

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Student V: Cardiovascular exercise would be – I think it is this one.	
Interviewer: Okay. Why do you think that one?	
Student V: It is because cardiovascular exercise would be healthy for the heart.	
Interviewer: Okay. All right, so you click that one. Yeah.	
Student V: Hit next?	
Interviewer: Yes. All right. So this one says what?	
Student V: Paraphrase the advice Ben Franklin gave to his son in paragraphs four and five. Provide supporting details from the passage.	
Interviewer: Okay. How would you solve that?	
Student V: Do I have to type it?	
Interviewer: No, you do not have to type it. Just tell me out loud.	
Student V: All right. It is that walking is more exercise than riding horseback or riding coach. Walking upstairs would be a lot more exercise.	
Interviewer: Okay. Okay. Is there anything else you would add?	
Student V: It would get your – it would help with the cardiovascular.	
Interviewer: Okay great. That is some great thinking. Then you would click finish and then turn in. Then turn in again. Then we would have two more to go with. Look at that one again.	
Student V: This one?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yes, mm-hm. Scroll down and hit continue. Okay, so you can you have the same passage here and then some different questions. Did you want to read the passage again? Or do you want to just go to the questions?	
Student V: I will go to the questions.	
Interviewer: Okay, let us talk about it.	
Student V: I still remember that from last year.	
Interviewer: Okay. What is this one asking us about?	
Student V: Which statement best states the main idea of the section or selection?	
Interviewer: Okay.	
Student V: Improve. I think they...it is not that one.	
Interviewer: Why not?	
Student V: Because he did not make a new system for counting it.	
Interviewer: Okay.	
Student V: That was like the main idea. It was just _____ [00:14:18].	
Interviewer: Okay, good thinking. That makes sense. Okay, tell me why you think that.	
Student V: It is because the whole thing. Wait. Yeah, this one.	
Interviewer: Okay.	
Student V: Because the whole thing he was going through a scientific thing like swim paddles for the exercise and stuff.	
Interviewer: Okay. Okay, then you would click next. Great. Good job. Keep going. What are you thinking?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student V: I think it is this one.	
Interviewer: Tell me why you picked that one.	
Student V: It is because he loved swimming, and he thought everyone should learn. He taught a coworker.	
Interviewer: Okay, so you thought that was the best one. Did any of the other ones seem interesting or make you think twice? Did you just know right away?	
Student V: I am pretty sure it was this one. I went through all those.	
Interviewer: All right. Okay good. Next. Okay, and tell me why you picked that one.	
Student V: Because it talks about the person’s life here.	
Interviewer: Okay. How does that answer the question? How? What is the question asking you about?	
Student V: It is considered a biography because.	
Interviewer: Okay, so biographies are books or passages that tell about people. That is what you are thinking.	
Student V: Yes.	
Interviewer: Okay, so next. Okay.	
Student V: Summarize Ben Franklin’s belief. I need my reading glasses today.	
Interviewer: Oh no. Do you want me to read it to you? Would that help you?	
Student V: I can read it. It is just hard.	
Interviewer: Okay, I am sorry.	
Student V: Provide supporting details from the passage. He believes that exercise will make disease – will make you not get a disease.	

Student 5–Part I–School A Grade 8 ELA

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay.	
Student V: It will help you live longer.	
Interviewer: Okay. Was there evidence in the passage that you could show me that helped you know that?	
Student V: He lived longer. Right here.	
Interviewer: Okay.	
Student V: At 66, Franklin had lived a long life. In the 1700s, the average American lived only 40 years.	
Interviewer: Okay.	
Student V: He lived longer than average people.	
Interviewer: Than average, awesome. Then click on finish and then that one. Turn in. Then I think there is just one more.	
Student V: Yeah.	
Interviewer: Yeah. Are you sure you can read through without your specks?	
Student V: I should be able to do it.	
Interviewer: Okay. Just let me know when you are done reading, and then we will go through them again together.	
Student V: Okay.	
Interviewer: Thanks. I would offer you mine, but I do not think mine will work. [Silence 00:18:21-00:18:28]	
Student V: I remember this one from last year too.	
Interviewer: That is funny. [Silence 00:18:34-00:19:33]	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewee: [air] I remember this one from last year too. [air]	
Interviewer: Go to the top.	
Interviewee: How can the reader tell that Carolina Crow Girl is realistic fiction? [air] I don't see anything about this being the past, this whole thing. It's not this one. I don't think it's this one because...I'll come back to that one. It features a main character dealing with conflict. Okay, this one.	
Interviewer: _____ [00:04:13]	
Interviewee: I remember that any story _____ [00:04:13] the realistic fiction _____ [00:04:28] that's not realistic. Every story _____ [00:04:31] that.	
Interviewer: Okay.	
Interviewee: _____ [00:04:34] It wouldn't be B because there's actual information why she let the crow go. The main purpose of paragraph seven is. [air] I don't see that they acquired Crow in this one, so I can take that off. Take that one off.	
Interviewer: _____ [00:06:10]	
Interviewee: Because he did not have any difficulty telling her that.	
Interviewer: Oh.	
Interviewee: I think this one because it said Crow belongs to an entire other world.	
Interviewer: Okay.	
Interviewee: He's the one who told her to let the Crow go. What the crow symbolizes in the passage. Provide evidence from the passage to support your answer. Paragraph seven: "There's no such thing as absolute total freedom." _____ [00:07:29] [air] _____ [00:07:52].	
Interviewer: _____ [00:08:08]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewee: Yeah because _____ [00:08:10]. [air] Easier [air] because it's easier for me to think out loud than _____ [00:08:38] head. [air] Average.	
Interviewer: Can you tell _____ [00:09:00].	
Interviewee: I didn't really have any difficulty. [air]	
Interviewer: Yeah back to school. I'm mean back to class. [air]	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: All right. So here’s how this works. We’re doing a Cog Lab today, which simply means we’re trying to test new kinds of test questions, and we want to see how kids like you will do with them when we put them on a test. So the process is called thinking aloud. Have you ever heard of thinking aloud before?</p>	
<p>Student I: Yeah, but I’ve never done it.</p>	
<p>Interviewer: Okay. Well, all this is saying right here is you’ve been selected. Yay. And we’re going to do some ELA work with you. So did you see questions like this on the test last year? Does this look familiar?</p>	
<p>Student I: Yeah.</p>	
<p>Interviewer: Okay. So this is what we’re going to use to think aloud. The page here...we’re going to, like I said, study some different types of questions and see how they work. And thinking out loud is just when you say everything that you’re thinking as you’re going through it. So I’m going to give you some examples so you can kind of get an idea of what I’m talking about. It’s pretty easy. And nobody will know what you say or do or think so you’ll be just fine. And I’m sorry. I gotta record you. I’m sorry.</p> <p>All right. So the first thing I’ll do, I’ll just give you some examples. So if I was going to fold this paper and think aloud while I was doing it like that, I would say well, I’m going to fold this paper...like I’ll fold it in half like that. So that’s a fold, make a crease. And then I guess I’ll fold it...I guess I’ll fold it this way and make the crease that way. And then I’ll open it like this. So that’s thinking aloud. You’re saying everything that you’re thinking.</p> <p>So here’s another example of thinking aloud. If I was going to read “The Book Fair,” it would be even passages...as I’m reading the story, I’m going to say what I’m thinking out loud. Okay. Our school holds an annual book fair each January where new and used books are available for students to purchase. Our librarian, Mr. Egan, is the school sponsor for it. And I might say something like oh, Mr. Egan, we have a teacher named Mr. Egan in our school. Okay. Then I’m sure that Mr. Egan consulted our teacher, Ms. Kates for suggestions as to who would be</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cogna Analysis; Leave Blank)</p>
<p>the student directors, and I was pleasantly surprised when he approached me to be one of the students in charge. Oh, yeah, that would be cool.</p> <p>Okay. So I was even more surprised when she told me that the student I would be working with was Charlie Lyons. Okay. So Charlie Lyons is probably not going to be a good guy here because he's surprised. So Charlie and I have known each other since kindergarten but have never been close. Ever since kindergarten...ever since we were designated partners for the science project last year, there is very little we choose to say to each other. So they must not be friends.</p> <p>Needless to say, the science project fell short of our expectations. I know that we both had our individual ideas and strategies about the direction the project would go. But we just found it difficult to work together. In light of that event, I was dumbfounded that Mr. Egan and Ms. Kates found us a suitable match. So I might say something here like huh, I wonder how their friendship is going to be important here.</p> <p>Okay. At the initial meeting with Mr. Egan, we divided the responsibilities between us. I would be in charge of setting up the room, and Charlie...okay. Wait. I'm in charge and the volunteers to work the sale for all three days. Charlie would be in charge of all the books. We were both quite satisfied with our jobs and even more satisfied that there would be little contact between us.</p> <p>I left the meeting and started thinking of what to do. We had two weeks to plan. I knew I could not procrastinate. Okay. So procrastinate means to put off doing something. Okay. Procrastinate, I procrastinate all the time. See, I...lose my spot. Oh, there it is. Okay.</p> <p>I enlisted John, Mark, Kaley, and Rachel to help me with the setup and told other classmates to work at the fair. I figured that between Mr. Egan, the friends who volunteered to help me, and me, we would be just fine. My mom and Kaley's mom volunteered to help out, too. They would just give us more adult supervision in case any unforeseeable problems occurred. Okay.</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>A second meeting among Mr. Egan, Charlie, and me was scheduled for exactly one week before the fair was scheduled to open. Charlie was absent that day, and I anticipated that Mr. Egan would postpone the meeting for another day. Okay. He said that he would meet with me anyway because he had a librarian’s conference to attend the next two days. Mr. Egan said that he would be in touch with Charlie when he returned from the conference. Okay. This sounds like it’s going to be a problem here.</p> <p>He asked Charlie about how my preparations were going and I provided him with a detailed report. He seemed satisfied and said he would see me at the setup. I tried on two separate occasions to initiate a conversation with Charlie about the progress he was making, but each time, his response was everything’s cool. Okay. This sounds like a bad situation here.</p> <p>Okay. On the date of the setup, my friends and I arrived only to find Charlie with his head in his hands surrounded by a zillion boxes. That’s a lot of boxes. And I asked him, Charlie, what’s wrong. He responded I think I’ve got a problem. There are a lot more books here than I anticipated. I thought I could do it all by myself. I’m up a creek without a paddle. Will you help me? My initial impulse was say no, this is your mess. Figure it out. But instead, I responded sure, Charlie, let me see if I can get some people to lend us a hand.</p> <p>All in all, the book fair was a success, but I would have preferred not to have the last minute panic situation that we did. After the book fair was over, I could not help...stop wondering what Mr. Egan was thinking when he put us together so I asked him. His reply was quite simple, you see, I knew this would be a great experience for both of you. It wasn’t so much about running the book fair as it was a lesson in how important it is to communicate and work alongside others when necessary. I think he accomplished his goal.</p> <p>Okay. So I read the passage. All right. Now I’m going to think aloud with this question. So in “The Book Fair,” how is Mr. Egan important to the plot? All right. Let me read my options here. He helps the narrator understand the value of cooperating with others. That seems like a good answer. He provides the organizational skills needed for</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>the character, the narrator, and Charlie to be successful. That could be the...well, maybe not. He serves as the adult sponsor if there are problems that the students cannot resolve themselves. Okay. That's probably not true because he was not there at first. He attempts to help the narrator and Charlie become friends by assigning them to work together. No, I don't think he wants them to be friends.</p> <p>So I think my answer is going to be A or B. So let me look down here. So the narrator helps cooperating with others or he provides organizational skills needed. Well, he didn't really provide the organizational skills because the character had them. So I think the answer is A. So I would click that and then go to the next one.</p>	
<p>Student I: Okay.</p>	
<p>Interviewer: And then here's another one. Okay. Here's explain why the author most likely wrote the passage. Now, I don't expect you to type it here, but you can just kind of tell me what you think. So here's what it would look like.</p> <p>Okay. So explain why the author most likely wrote the passage. Well, this is a fiction story, I think. It's telling me something. It's entertaining me. So I'm thinking that because it's entertaining...I guess there's also a lesson. So maybe the author is writing the story, the passage, to teach a lesson through entertainment. Does that make sense?</p>	
<p>Student I: Yeah.</p>	
<p>Interviewer: That's kind of like what your thinking aloud would be. All right. Let me go over here. Okay. So now you get to practice. And let's click through here. That's fine. Turn in. Okay. So now here's your agenda. You'll just do the same kind of thing I did. You'll think out loud. And when you're thinking out loud, that will help us understand how is your brain working to think through the questions so we know are they good questions, are they not the best questions, should we use them in the future, should we not.</p> <p>Okay. So here is yours. Here's your practice. Okay. So now you're going to practice.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student I: Okay.	
Interviewer: All right. So Ben Franklin.	
<p>Student I: Okay. The bald older man rested a finger on one hand on the opposite wrist. His lips moved silently counting as he looked at his watch, 60 heartbeats a minute. Okay. When he finished, he started to swing a dumbbell. After a few repetitions, his face flushed and his body warmed in spite of the chilly weather. At the end of 40 swings, the man took his pulse again, 100 beats in a minute. The simple exercise had increased both his heartrate and the body temperature. For Ben Franklin, those two things made it a great workout.</p> <p>Okay. Keeping fit. At 66, Franklin had lived a long life. In the '70s, an average American only lived 40 years, and no understanding of the connection between exercise and good health. Franklin believed exercise to be the greatest importance to prevent disease. It's true.</p> <p>Over his lifetime, he developed some new and interesting ideas about keeping fit. In a letter of his son, William, Franklin gave some fatherly advice about types of exercise. There's more exercise in one mile riding on a horseback than in five in a coach and more in one mile walking on foot than five on horseback. To which, I may add, there is more in walking one mile and downstairs than five on a level floor. I suggested stair climbing to William when time is short or the weather was bad. Much could be accomplished in a matter of minute.</p> <p>Franklin measured the belief, right, okay, of an exercise by increased pulse and body heat, not by its length of time or distance. Today's fitness experts use the words cardiovascular heart and blood vessels to describe this kind of exercise and recommend it to people of all ages.</p> <p>Exercising and routine. When he was younger, Ben like more strenuous exercise. As a boy, he lived on the seaside city of Boston where he learned early to swim well and to manage boats. I don't really know how to swim.</p> <p>In order to improve his swimming speed, he conducted an experiment. I made two oval pallets about ten inches long</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>and six forward and a hole for the thumb in order to retain it fast in the palm. They much resembled a painter’s pallet. In swimming I push the edge of these forward and struck the water with their flat surface as I drew them back. I remember I swam faster by means of these pallets. But these...I don’t know that word...my wrists.</p> <p>These wooden pallets were Ben Franklin’s first invention. They were similar to the swim paddles that competitive swimmers now use to build strength. However, his second idea of sandals for the swell of his feet caused problems for his swimming stroke. For this experiment, Ben learned how to proper kick...that a proper kicked used the inside of a foot and ankle. The ridge of wood could not bend and twist like modern flexible swim fins.</p> <p>Swimming with success. Ben loved swimming and thought everyone should apply. It was a skill that could benefit both the rich and poor and once learned was never forgotten. When he was in his 20s living in England, Ben had such success teaching a coworker to swim that he thought about opening a swimming school. Oh, okay.</p> <p>He studied and practiced all the motions and positions in a book called The Art of Swimming. He even created some strokes of his own. One day, the muscular, barrel chested young man American...young American amazed British friends by swimming three and one half miles in the Thames River and performing on the way many feats of activity, both upon and under water.</p> <p>More than 200 years later, this famous swim and water show was still attracting attention at the International Swimming Hall of Fame named Benjamin Franklin one of the United States first ornamental swimmers and also honored him for being a swimming coach and teacher. He is the only founding father to be inducted into a sports hall of fame.</p> <p>Ben Franklin, colonial America’s most famous scientist and inventor, understood that exercise would not keep him young forever so he created another unique way to turn back the clock from his 70th birthday on. He counted his age backwards. At the time of his death in 1790, Ben Franklin thought of himself as 56, not, in fact, 84.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Okay. Which of...which book would be most helpful in finding more information about the advantages of cardio exercise, What the Heart Does for You. I mean, cardio does mean heart. So maybe.</p>	
<p>Interviewer: Okay.</p>	
<p>Student I: Okay. The Healthy Heart Manual, this is also...yeah. _____ [00:15:08] about the advantages it...not short sports. I'm thinking...More Information in Body Languages. It's either Healthy Heart Manual or...I think it's Healthy Heart Manual.</p>	
<p>Interviewer: Okay. And go to the next one. You did great. And so now, the next one.</p>	
<p>Student I: Paraphrase the advice Ben Franklin gave to his son in paragraphs four and five. Provide supporting details. Okay. Four and five. Okay. Do I need to read this out loud?</p>	
<p>Interviewer: Yeah. You can just tell me everything that you're thinking, like all your thoughts, like this is stupid or...</p>	
<p>Student I: In the letter to his son William, Franklin gave some fatherly advice about exercise. Okay. So it says right here, Ben Franklin gave his...to his son. Okay. There is more exercise in one mile riding on...wait. There is more exercise in one mile riding on horseback than five in a coach and more in one mile walking on foot than five on horseback, to which I may add that there is more in walking one mile and downstairs than five on a level floor. He suggested stairclimbing to William when time was short or weather bad. Much could be accomplished in a matter of minutes. Franklin measured the benefit of an exercise by increased pulse and body heat, not by length of time. Today's fitness expert used the word cardiovascular, heart and blood vessels, to describe this kind of exercise, recommend it to all people of age.</p> <p>So he gave to his son some advice about...that one mile riding on horseback than five in a coach and about more in one mile walking on foot than five on horseback. Also told him to like...he suggested stairclimbing when time was</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
short or weather bad. And I think that’s mostly what Franklin said to him.	
Interviewer: Okay. Yeah. Good. So when you’re done, you just say okay, yep, finished.	
Student I: Finished.	
Interviewer: Finished. Turn in. So that’s exactly the kind of thing that we’re going to do. We’ll just read it out loud, and then everything that you’re thinking as you’re either reading the passage or as you’re thinking about the question, just anything that comes into your head, you just say it out loud. It’s kind of weird in a way, but it’s fun at the same time. So if you want to click to operational session.	
Student I: Do I need to make this...	
Interviewer: No, you’re going to practice. Okay. So it’s the same passage that you just read. So go ahead and just whatever you think.	
<p>Student I: Okay. Which statement best states the main idea of the selection? Ben Franklin proved that being fit prolonged life by devising a new system for counting age. Ben Franklin invented swim pallets and studied swimming motions as a main ability and strength. Franklin took a scientific approach to exercise that include measuring heartbeats and body heat. Franklin worked to stay fit because he understood the connection between exercise and good health.</p> <p>So this one sounds like a good one. This one was only like the first beginning part. And this was about...close to the end. So probably not these two. Well, this was at the end so it’s most likely this one. Franklin worked to stay fit because he understood the connection between exercise and good health because it’s mainly mostly what it talked about.</p>	
Interviewer: Okay. Is there any place in the passage that would help you prove that?	
Student I: Around...right here. At 66, Franklin had lived a long life. In the 70’s, an average American only	



Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>lived 40 years. There is now understanding between connection between exercise and good health. Franklin believed exercise to be one of...be of the greatest importance to prevent disease.</p>	
<p>Interviewer: Excellent. Okay. Great. You got it. Next one.</p>	
<p>Student I: Okay. Which question is answered in paragraph eight? Swimming with success, Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor and once learned was never forgotten. When he was in his 20s living in England, Ben had such success teaching a coworker to swim he thought about opening a swimming school.</p> <p>When did Ben Franklin learn to swim? It doesn't say in here.</p> <p>Why do people love swimming so much? That's not really the point.</p> <p>How did swimming benefit both the rich and poor? It says the skill that could both benefit rich and poor, once learned it was never forgotten. That's a maybe.</p> <p>Why did Ben Franklin think about opening a swimming school? This one's most likely the answer because it said that Ben had success teaching a coworker to swim and he thought about opening a swimming school.</p>	
<p>Interviewer: Awesome. Good job. You're doing great. You could do this for your job.</p>	
<p>Student I: "Ben Franklin: Fit for Life" is considered a biography because it uses someone's actual words, it tells about a person's life, it is written in first person, it teaches a lesson. It teaches a lesson, that's probably not it. It's written in first person, it's not really because it said when he. It tells about a person's life, most likely because biography is like someone else telling about someone else's life. And auto is them telling about their own life. It uses someone's actual words, don't think there was anything he said. I think it's most likely it tells about a person's life.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Awesome.	
Student I: Okay. Summarize Ben Franklin’s belief about exercising. Provide supporting details from the passage. Okay. So it says right here, Franklin believed exercise to be the greatest importance to prevent disease. So I think he believed that it prevented disease. And I think he...I think that’s it. But I also think he believed it to be good and...yeah.	
Interviewer: Okay. Awesome. So then you would finish that one. Sweet. All right. So now you do one more.	
Interviewer: You’re doing great.	
Student I: Thank you.	
Interviewer: Okay. So...	
<p>Student I: Okay. Carolina Crow Girl. Caroline was...gave a hopeless shrug and sighed. She was always thinking about what was best for Crow, who couldn’t, after all, tell her. Well, I think Stephan said in his serious, thoughtful way, it’s pretty hard to know anything about a bird, Caroline. I mean, you can’t even think like a bird. You can’t know what Crow wants. You will never. Humans can’t do that. Crow ruffled his wings. He looked from Caroline to Stephan, Stephan to Caroline as he knew they were talking to him.</p> <p>Stephan shook his head. He should be released, Caroline. His feathers...his tailfeathers are all grown in. He’s thinking about it, she said. You don’t know. Okay. He’s thinking about it, she said. You don’t know. You think because he’s not in a cage that he’s free. That’s...okay.</p> <p>And Stephan said in a quiet, firm voice, but he’s not. He’s never been free. There’s no such thing as an absolute total freedom, Caroline. We all have things we can’t do or won’t do or aren’t allowed to do. That’s what it means to grow up. He stopped then, embarrassed that he’d gone on so long. But Crow, Crow belonged to an entire world, and it’s time to let him go there.</p> <p>I know. I know you’re right. I’m sorry, Stephan, for what I said. Across the brick patio, the ground was strewn with</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>dry, spiny leaves and seed pods. In came at the last...at last to the edge of a cliff. Side by side, they looked out into the ocean below the sky that went on forever.</p> <p>The distance line...the distance, a line of pelicans played followed by leader stringing low over the horizon. There were tiny sailboats in the distance. Surfers sitting out the swell, their feet dangling free in the deep, blue water. The world was full of space and wind to move you through it.</p> <p>Crow was perched lightly on the back of Caroline’s hand. In the sunlight, his feathers shown blue, purple, and green, magna and gold. He was a beautiful bird. He’d been her bird, but only for a time. Truly, he belonged to no one but the wind. That’s true, I think birds should not be caged.</p> <p>She brought him to eye level and bent on her...level on her bent arm. It’s time to be a bird she said looking at him...looking him straight in the eye. Crow tilted his head. You know what I’m saying, don’t you? Don’t you? Wait, don’t you, Crow? Crow’s black eyes glittered.</p> <p>It’s time, she said, blinking back tears. Do it, Caroline, Stephan urged. His family will find him. I love you, Crow, she whispered. She took Crow’s hands. She could feel his heart beating or else there were hearts in her hand that beat along with his. Fly, Crow, she whispered into his ears and then held her arm straight out, biting her lip so hard that she tasted blood, tossing him into the air. Fly.</p> <p>Crow dropped level below...wait. Crow dropped below the level of a cliff almost too fast for the eye to see. Then came out his wings, two beautiful, mainly colored wings. He dipped in a low arc, pulling...arc over the pounding surf. Then with great strong beats of his wings, took the air.</p> <p>Stephan cheered. He clapped his hands wildly. Yeah, Crow, he cried. Caroline dropped her arms, her empty hands, to her side. She felt like laughing and crying, both, and could do neither one.</p> <p>Crow, wheeling in the air as if he’d been flying all his life and dreaming of flying and knew all the right moves. He seemed to be showing off. Then he veered left and sailed towards the cliff again. With a light bounce, he landed on</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>her shoulder. Caroline turned her face and felt for a space of three breaths his soft feathers against her cheek, and then he was gone. With a single bob of his tail, he leaped into the air and sailed away off towards the tree.</p> <p>Caroline and Stephan watched until he became a tiny black speck in air and disappeared.</p> <p>Okay. How can the reader tell that Carolina Crow is realistic fiction? It pre...presents factual information on this specific subject. I don't really think so. Maybe, maybe not. It features a main character dealing with conflict. It's one I can entertain but probably not this one. It describes events that happened in the past. I mean, no, not really. It includes an animal that relates to humans. I don't know but all these seem wrong for some reason.</p>	
<p>Interviewer: Keep going. You're doing great.</p>	
<p>Student I: But I think it's it presents factual information on a specific subject. Probably not. That doesn't sound right. It features a main character dealing with conflict. I don't...no, I don't think so. It describes events that happened in the past. It's for sure not this one because it didn't say this happened in the past. It includes an animal that relates to humans. I mean, some animals don't relate to humans a lot. Probably not this one. It features a main character dealing with conflict. It presents factual information on a specific subject. I think it's this one.</p>	
<p>Interviewer: Okay. Tell me why.</p>	
<p>Student I: I feel like this one is more for non-fiction where it tells facts about the crow. And this one seems more like the answer because these two don't seem like it.</p>	
<p>Interviewer: Okay. Okay. Great. Good job.</p>	
<p>Student I: Okay. What is the main purpose of paragraph seven? The main purpose of paragraph seven is there's no such thing as absolute, total freedom, Caroline. We all have things we can't do or won't do or aren't allowed to do. That's what it means to grow up. He stopped then, embarrassed that he'd gone on for so long.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>But Crow, Crow belongs to an entire world. It's time to let him go there.</p> <p>Okay. To emphasize the difficulties in Crow's life. Probably not that one. He's just...Stephan was just telling Caroline that Crow...like there's no freedom stuff. To contrast Crow's world with the human world. I mean, maybe, maybe not. To explain how Caroline and Stephan acquired the crow. It didn't say anything how they got the crow so probably not that one. To show that Stephan has difficulty talking to Caroline. Well, he's talking to her a lot and just says he was embarrassed that he's gone on so long. So to emphasize the difficulty...no, I think it's to contrast Crow's world with the human world.</p>	
<p>Interviewer: And give me some information about that. Like why did you go there? Why did you think that one?</p>	
<p>Student I: Well, we all have things we can't do or won't do. It says right here, there's no such thing as absolute freedom. Oh, wait. No, it says he's never been...he's not...he's never been free. That's what it means to grow up. It says right here, but Crow, Crow belongs to an entire world and it's time to let him go there.</p>	
<p>Interviewer: Okay.</p>	
<p>Student I: And these don't really seem like the answers. I don't know why but they didn't say anything about how they caught the crow. Stephan can absolutely talk to Caroline, right here. To emphasize difficulties in Crow's life, I mean, up here it did say but he's not...he's never been free. So I think it's B.</p>	
<p>Interviewer: Okay. Great.</p>	
<p>Student I: How is Stephan important to the plot? He prepares Crow for a different kind of life. No, he's just telling Caroline about it. He shows Caroline how to take care of the crow. I mean, maybe because he's telling Caroline to let go of it. He helps Caroline understand what she must do. Most likely this one. He explains how Crow is different from other birds. He never says anything about other birds so it's most likely C because he's telling her to let go of Crow because he needs to be free out there.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Great. Okay. Excellent.	
Student I: Okay. Identify what the crow symbolizes in the passage. I think it symbolizes something that you have that you have to let go because it's like you can't keep it forever and it needs to be free. Yeah.	
Interviewer: Okay. And did you have any evidence in the passage that would help you know how to know that answer?	
Student I: Well, what does it say? He should be released, Caroline, and...yeah. That's it.	
Interviewer: Okay. Great. Perfect. And then finish this. Awesome. Sweet. Was it weird thinking aloud?	
Student I: Yeah, kind of.	
Interviewer: Little bit different? Yeah.	
Student I: Yeah.	
Interviewer: What were any questions that were really hard for you, do you think?	
Student I: Yeah, that last one.	
Interviewer: The last one was hard. Yeah.	
Student I: The...	
Interviewer: What made it hard, do you think?	
Student I: I couldn't really find it but I kind of like felt that it meant that because of Stephan telling Caroline to let go.	
Interviewer: Yeah. Did you know what the word symbolizes meant and everything or did you have to think about that one?	
Student I: I know what symbolize means. It means like let's say what that ribbon right there means or something like that.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yeah. Okay. Awesome. What a great job. Thank you so much for coming and helping me.	
Student I: Okay.	
Interviewer: You can go to class. Oh, and my friend Kristi here will take you out. Thanks again. I like your shirt, by the way. And your nails are super cool. I was noticing them.	
Student I: Thank you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Here come sit here. Do you mind if I take a video so I can remember what you said?	
Student 1: Okay.	
Interviewer: Hi, how do I say your name honey?	
Student 1: ----- [Student spells her name.]	
Interviewer: I like that, [spells name] . And are you in fifth grade?	
Student 1: Yes.	
Interviewer: And who's your teacher?	
Student 1: Ms. ----- [Teacher's name].	
Interviewer: And who teaches you math? Does she teach or does someone else?	
Student 1: Ms. ----- [Teacher's name].	
Interviewer: Okay that's what almost everybody has said. So do you know a little bit about what we're going to try to do today?	
Student 1: Testing.	
Interviewer: Yeah. So I work for the company that writes the questions kind of like this and we're trying to figure what kids your age think about when they take these kinds of questions. So we're hoping that you can talk to us about that today. Would you be willing to do that?	
Student 1: Yeah.	
Interviewer: We're not trying to see if you got the right answer, so we're not going to give a bunch of grades to your teacher or to you parents. It's just for us to learn how you think.	
Student 1: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So we're going to ask you today if you can think out loud. Have you ever heard that before?	
Student 1: No.	
Interviewer: No. So thinking out loud, I like to think of it as just basically everything that's happening in your brain while you're trying to solve a problem. Usually, I bet, you're just doing it in your head.	
Student 1: Yeah.	
Interviewer: But then I won't know what you're thinking, so if you say it out loud that will help.	
Student 1: Okay.	
Interviewer: So I'm going to show you what I think thinking out loud looks like and then I'll give you a chance to practice.	
Student 1: Okay.	
Interviewer: So if I have this piece of paper and somebody to me I want you to fold it in half twice. Okay so I'm going to take this side. I'm going to really match it up and then fold it right across and then I think I'll switch directions. So I'll go this way, fold it across, and then I'm going to check the work. Let's see if I did it right. Okay so I have one fold and two folds, so I think I did it right. So that's kind of what thinking out loud happens. It's important to say what you're going to do before you do it and then like you understood what I was going to do. And I can also do it in a math problem, so I'll show you. This one says there were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both and then I see this picture. For now, I'm just kind of going to know it's there and I'm going to read the question. How many students participated in only the high jump? So then I'm going to ask myself, well, what do they want to know? I think they want to know how many kids did only the high jump, and when I look at the picture I see a question mark. So I think they want me to figure out what that is. So I remember that when I look at this picture long jump means 15 kids did it. Six are in this middle,	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
which I think means they did both things. Do you remember that?	
Student 1: Um-hum.	
Interviewer: And so I'm going to use the scrap paper and I'm going to add 15 plus 6 and then I get 21. So I know that in these two carts I have 21 students and I still need to figure this out, but I need to know how many did all of it so I'm going to go back to the problem. I see there were 40, so there's 40 kids in all. Then I'm going to subtract the 21 that I figured out were in these two parts and I get 19. So I think that means there's 19 and then I'm going to look at my answers, and oh yeah, 19's a choice so I'm going to click it and I'm going to hit finish. You'll hit continue because I only have one question, but you have a few more. So that's kind of what thinking out loud sounds like. Do you have any questions for me?	
Student 1: No, not really.	
Interviewer: Does it kind of make sense?	
Student 1: Yes.	
Interviewer: And then I was hoping you could practice a little and you can ask me any questions and just everything you're thinking about say out loud.	
Student 1: I can hold it on my lap, so I don't have to...	
Interviewer: Perfect. Oh, you don't have to do that part if you don't want and any strategy is good.	
Student 1: Okay.	
Interviewer: And then this one is just a teeny bit different than the one I practiced on. There's something on the side that's helpful and then the problem is over here. You're going to want to look at both, so go ahead and give it a try. Oh, I'm sorry, one more thing. There's paper and pencil if you want to do any writing.	
Student 1: Okay. Do you want me to read it out loud?	
Interviewer: Yes please. Thank you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: Dean completed his reading goal for two weeks what is the total number of pages Dean read? Beth, Dean, Jake and Maya set a reading goal. This table shows their goals; reading goals, student, goal. Beth read 15 pages per day. Dean read 125 pages per week. Jake read 110 pages per week. Maya read 40 pages for two days.</p>	
<p>Interviewer: Yes so how do you think you could solve this?</p>	
<p>Student 1: Times that with that.</p>	
<p>Interviewer: Give it try. You can do it in your head or on the paper, however you would like.</p>	
<p>Student 1: [air]</p>	
<p>Interviewer: And how did you learn to multiply those two numbers?</p>	
<p>Student 1: Because usually when it gives this and then it says two weeks you know to multiply it.</p>	
<p>Interviewer: Very nice. So you got 250, so you want to click D and then if you hit next there's another practice problem.</p>	
<p>Student 1: A father has three children. He has 36 books that he will divide evenly among his children. The number of books each children will receive, B, can find out using this equation. Three times 9 equals 56.</p>	
<p>Interviewer: Yeah. And you know what? This one, it's not a number, it's a letter.</p>	
<p>Student 1: It's a letter?</p>	
<p>Interviewer: Yeah. Can you tell what letter that's supposed to be?</p>	
<p>Student 1: B.</p>	
<p>Interviewer: Yeah, so 3 times B equals 36.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Okay so I press nine?	
Interviewer: How do you know that?	
Student 1: Because 3 times 9 equals 36 and 9 divided 36 equals 3.	
Interviewer: Very nice, so you want to click 9. Good job, and then if you hit finish, those were just the practice problems. You did a great job. Do you feel like you understand what I need you to do?	
Student 1: Um-hum.	
Interviewer: Okay so go ahead and click turn in and then there's another turn in. Then we'll do the blue section so if you click the blue and if you go down a little there should be a continue. Yeah and the one more time you have to hit it. Okay so, if you want to read it and then think out loud, that'd be great.	
Student 1: [Item 1] Beth completed her reading goal for 10 days. What is the total number of pages Beth read? Beth, Dean, Jake and Maya each set a goal. The table shows their goals. Beth read 15 pages per day. Dean read 125 pages per week. Jake read 110 pages per week. Maya read 40 pages for two days. And they want to know how much Beth read.	
Interviewer: That's right.	
Student 1: So 15 times 10, 150.	
Interviewer: How did you know to multiply those 15 times 10?	
Student 1: Because usually they give a chart and it says and then it has 10 or something like the number and it's asking you how much stuff was read.	
Interviewer: And how did you know to multiply instead of maybe like add or subtract?	
Student 1: Because all these things, I just always knew how to do that, so I don't really know.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: That's okay, but you got it right so you must of known something. Okay go ahead and choose B and then next.	
Student 1: [Item 2] Use this information on the following three questions. Jake is reading a book that is 389 pages. Based on Jake's reading goal, how many pages of the book will Jake have left to read at the end of three weeks? Dean, Beth, Jake and Maya set a reading goal. This shows their goals; reading goals. Beth has 15 per day. Dean has 25 per day. Jake has 110 per week. Maya has 40 pages for two days. I'm going to be subtracting.	
Interviewer: Okay. Go ahead and try it.	
Student 1: [air]	
Interviewer: So you did 389 minus 110?	
Student 1: Um-hum.	
Interviewer: How did you know that it was going to be subtraction?	
Student 1: Because it says how many will he have left to read.	
Interviewer: Okay so is one of those words a clue that you should subtract?	
Student 1: Um-hum.	
Interviewer: Okay and which answer is that?	
Student 1: 279.	
Interviewer: Nice. Okay, how about this one?	
Student 1: [Item 3] Maya completed her goal for two days. The first day she read 22 pages. The second day she read eight pages in the morning. The equation can be found in the number of pages Maya read in the evening on the second day. Forty two minus 22 equals blank plus 8. Which value can be placed for the blank to make a true	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
equation? Beth, Dean, Jake and Maya set a reading goal to show their goals. Beth read 15 pages per day. Dean read 125 per week. Jake read 110 per week. Maya read 40 pages for two days. Forty two minus 22 [air] 17.	
Interviewer: So you did 40 minus 22 and got 17?	
Student 1: Um-hum.	
Interviewer: Okay and then how did that help you?	
Student 1: Because you have to figure out what the question asks, so I have to add 8 to 17.	
Interviewer: So what did you get?	
Student 1: 17, 18, 19, 20, 21, 22, 23, 24. I don't think that would be right.	
Interviewer: Because it wasn't actually here?	
Student 1: Yeah.	
Interviewer: So what would happen on the day of the test if you got an answer and it wasn't a choice? What would you do?	
Student 1: I would go by the closest or try to do it again.	
Interviewer: Okay so you choose your strategy. However you think you would like to do.	
Student 1: [air] 19, 20, 21, 22, 23, 24, 25.	
Interviewer: Close.	
Student 1: 40 minus 22...9, 8, 7...3-2 equals 1 so.	
Interviewer: So you got the same 17 again when you subtracted?	
Student 1: Um-hum.	
Interviewer: So then what would you do?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Plus 8, so 18, 19, 20, 21, 22, 23, 24, 25.	
Interviewer: You got it again, so then what would you do?	
Student 1: I would pick the...	
Interviewer: Closest answer?	
Student 1: Yeah.	
Interviewer: Okay great. Okay, how about number four?	
Student 1: How do you say that word?	
Interviewer: I would say Duane.	
Student 1: [Item 4] Duane knows what number multiplied by 7 is 21. The equation, can Duane use to figure out his number? Duane knows that the number multiplied by 7 is 21. Which equation can Duane use to figure out this number? Twenty one divided by 7.	
Interviewer: How did you know that?	
Student 1: Because if it's backwards multiplication.	
Interviewer: Very nice. Go ahead and click that answer, great.	
Student 1: [Item 5] A photo album has 56 pages. Which estimate is the closest to the total number of pages in 43 photo albums? Maybe 56 times 43?	
Interviewer: Try it. Do you want to move the computer so you can do one up here or is it okay on your lap?	
Student 1: It's fine.	
Interviewer: Okay.	
Student 1: [air] 2408, so the closest estimate would be 2400.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: And how did you know that was the closest estimate?	
Student 1: Because only eight and it says which total number of estimate problems and there's no 10 so it's going to be closer to the thousand.	
Interviewer: Nice. All right, how about this one?	
Student 1: [Item 6] 56 divided by 8 equals 7. I usually sometimes just write out like 56.	
Interviewer: You can have tons more paper, so yeah just flip the page. I'm sorry. You said you sometimes write out what you write out?	
Student 1: Like 56 likes seven times to try to figure it out.	
Interviewer: Okay sure.	
Student 1: Because that's what I do if I can't figure something out. Wait, I already know it's eight.	
Interviewer: How do you already know that?	
Student 1: Because we did multiplication with all the teachers who teach us that.	
Interviewer: Well, how do you know that you can use multiplication even though that graph says division?	
Student 1: Backwards. Dividing is backwards.	
Interviewer: That's great. Okay so go ahead and choose your answer. Okay, how about this one?	
Student 1: [Item 7] The rectangle represents one whole unit. The sum of the fraction represented in the shaded parts of the rectangles below. We're doing fractions right now.	
Interviewer: Oh great, maybe something you've done this year can help you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Eight and three, $8\frac{3}{8}$.	
Interviewer: So how did you get that three?	
Student 1: Oh, the shaded part.	
Interviewer: And how did you get the eight?	
Student 1: Oh, it said plus 1, 2, 3, 4, 5, 6, 7, 8.	
Interviewer: Very nice. Is that a choice?	
Student 1: Yes.	
Interviewer: Okay great, how about this one?	
Student 1: [Item 8] The students in Ms. Plar's class measured the length of the pencils. They recorded their measurements on the plot, length of pencils (inches). How many pencils were less than one whole and $\frac{4}{8}$ long inches? So $\frac{4}{8}$, there's only one, so yeah one.	
Interviewer: Can you tell me where you got the one from?	
Student 1: Oh, it said less than. Pencils were less than, how many pencils. Oh, so how many pencils were less was one whole.	
Interviewer: One whole?	
Student 1: Yeah.	
Interviewer: Okay great, so was that a choice?	
Student 1: Yes.	
Interviewer: So, it's this one right here is less than the $4\frac{1}{8}$?	
Student 1: Yeah.	
Interviewer: Okay great.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: [Item 9] Which comparison is true? That's not true because it would be this because there's more spots to fill. This one's equal. This is equal I think.	
Interviewer: How do you know their equal?	
Student 1: Because this counts as one half and that counts as one half.	
Interviewer: How does this count as 1/2?	
Student 1: If you slide that over.	
Interviewer: Very nice, okay number 10.	
Student 1: [Item 10] The fraction model shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? The students in Mr. Valdez's classes measured the height of their bean plants. The table shows their data. B, there's three of those so 1/4 and 1/4 and 1/4 and Mariah's was 3/4, so 3/4. It would be C. Wait, sorry, that's not going to be it. I think it would be, so that would be 3/4 and 3/4, but there's not an answer there.	
Interviewer: Okay, so what answer are you looking for?	
Student 1: If you add these together it's going to be 3/4 and then that's 3/4 so it would be A.	
Interviewer: How do you know it's A?	
Student 1: Because if you add these two together it would be 2/4 and then plus 1/4.	
Interviewer: Very nice, great. All right, you have two more.	
Student 1: [Item 11] Okay. Mr. Valdez made this frequency table to show the same information as in the data table of the bean plants. What is the total number of plants that has greater than 1/4 inch? The student's in Mr. Valdez's class measured the heights of their bean plants. The table shows their data. [air] two.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: How do you know that?	
Student 1: Because $\frac{1}{4}$ is less than $\frac{3}{4}$ and there's two of those.	
Student 1: [Item 12] Which list shows the plants height in inches in order from least to greatest? The students in Mr. Valdez's class measured the height of the bean plants. This table shows their data. It says least to greatest so $\frac{1}{2}$ would go first, so it's going to be that one.	
Interviewer: How do you know that $\frac{1}{2}$ goes first?	
Student 1: Because it's the least.	
Interviewer: And how do you know it's the least?	
Student 1: Wait, it could flip around too.	
Interviewer: I don't know. How would you decide?	
Student 1: Well $\frac{3}{4}$, you're going to have one to fill and then that one to fill, so it could either be this is I think it would be $\frac{1}{2}$ though.	
Interviewer: So option B is the correct answer?	
Student 1: Yeah.	
Interviewer: So $\frac{1}{2}$ would be the smallest?	
Student 1: Yeah.	
Interviewer: Okay great and that was the last one. Don't hit finish quite yet. I have a couple more questions about all of it. Did you enjoy thinking out loud today?	
Student 1: Yeah.	
Interviewer: You did a great job. Did you find it easy to think out loud or did it actually make solving the problems a little harder?	
Student 1: It made it easier.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Easier. Why did it make it easier?	
Student 1: Because I can repeat what I said and if I was thinking in my mind I could be thinking wrong.	
Interviewer: Nice and see how this problem had the chart over here and then the question?	
Student 1: Um-hum.	
Interviewer: Did you find those ones harder, easier, or the same as the ones that were like just a question?	
Student 1: Easier.	
Interviewer: Easier. Why?	
Student 1: Because I could look over here and think because you can actually see what numbers there are to look at.	
Interviewer: And were there any questions that you found either confusing or really hard?	
Student 1: This one was a bit confusing.	
Interviewer: The last one?	
Student 1: Yeah.	
Interviewer: Okay great. Which number was that? You did an awesome job. Thank you so much for your help. So I can bring you back to your class.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Unidentified Female: Your interview will be _____ [00:00:02] and _____ [00:00:02] will be with Miss ----- . How are you? I like your glasses.	
Interviewer: Do you mind if I take a little video of what we talk about so that I can remember it later without _____ [00:00:18]?	
Student 2: Yeah, it's fine.	
Interviewer: Thank you, thanks. So, you want to go ahead and sit down? How's your school? You said it's going—oh, I bet you know this better than I do. I have to switch the _____ [00:00:32]. Oh, you can sit down. There we go. Alright, perfect. So, how's your year going so far?	
Student 2: Pretty good.	
Interviewer: Pretty good? Are you in fifth grade? And what's your teacher's name?	
Student 2: Homeroom?	
Interviewer: Yes.	
Student 2: Miss ----- [Teacher's name].	
Interviewer: And how about Math? Is that the same teacher or different?	
Student 2: Different. It's Miss ----- [Teacher's name].	
Interviewer: Okay. So, you switch classes. Do you like that?	
Student 2: Yeah.	
Interviewer: Is it kind of fun? Good. So, do you know what we're going to do today? Did anybody tell you?	
Student 2: Kind of.	
Interviewer: You want me to tell you a little more?	
Student 2: Yeah.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Alright. So, I work for the testing company that writes these kinds of questions that you probably took in the spring. Does this look kind of familiar, these kinds of questions where they show you something and ask you a question? There are usually four answers.</p>	
<p>Student 2: Yeah.</p>	
<p>Interviewer: Do you remember doing that? And what we're trying to figure out is how these kinds of questions work with students like you. So, what we're hoping that you can do is talk out loud while you're solving a problem so that I can understand how kids your age would solve a problem like this. Does that make sense to you? So, thinking out loud is basically just saying everything your brain is thinking as you're trying to do something. Do you think you'd be able to do that for me?</p>	
<p>Student 2: Mm-hmm.</p>	
<p>Interviewer: So, I'm going to show you what I think thinking out loud looks like and then I'll give you a chance to practice. So, let's say I have this piece of paper and somebody's told me to fold this in half twice. I'd say to myself, "Okay, I need me fold it in half twice. So, I guess I'll go this way to start with. I'll line up the edges and I'll make a nice crease all the way across. Then I'm going to switch directions. This time I'll fold it this way, match my edges, make another crease. And then I'm going to ask myself if I did this. So, I'm going to check and I did one fold and two folds. So, yes, I did."</p> <p>And then this is what thinking out loud would look and sound like if it was a math problem. So, first, I would just read it. It says, "There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both." And then I see this picture here. For right now, I'm just going to remember it's there. I bet I'm going to need it later. And then it says, "How many students participated in only the high jump?" So, I'm going to ask myself, "What do they want to know?" So, I think they want to know how many kids did only the high jump. If I look at the picture, I see a question mark. I think they want to know what number goes there. So, to figure that out, I'm going to use this scrap paper. So, I see</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>over here 15 kids did the long jump and 6 are in the middle. And I think I know that that means that they did this part and this part. So, I'm going to add those two numbers, $15 + 6$. If I didn't know it, I could use my scrap paper to do that and I get 21 kids did either in the middle or the long jump. And I know that everybody else must have done the high jump, but how many kids did all of it? I'm going to go back to my problem and I see that there were 40 kids there total. So, if I take the 40 and I subtract the 21 that I got from these two, I'll get 19 kids in this section, the high jump. And then I'm going to look at my answers and I see that that's a choice. So, I'll click it and then I'll hit "Finish" because I only have one problem _____ [00:03:40]. You'll hit "Continue."</p> <p>Did that sort of make sense? The talking out loud part? Are you ready to give it a try?</p>	
<p>Student 2: Yeah.</p>	
<p>Interviewer: Okay, great. And there's paper and a pencil for you if you want to use it, but you don't have to. And then you can use this mouse. You'll notice on this one that there's something on this side and the questions over here. You're going to want to take all of that into consideration. So, do you want to start by reading it?</p>	
<p>Student 2: Use this information to answer the following question. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Dean completed his reading goal for 2 weeks. What is the total number of pages Dean read? [Air]</p>	
<p>Interviewer: So, I noticed on your paper you wrote $125 + 125$. And then what did you get?</p>	
<p>Student 2: 150.</p>	
<p>Interviewer: And why did you add those numbers together? How did you know to do that?</p>	
<p>Student 2: It said two weeks right here and it went over here and said 125. So, I add that two times and I get that.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Alright, great. So, go ahead and click your answer. And then you can hit the “Next” button. Great.	
Student 2: A father has 3 children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, b , can be found using this equation. [Air] I can figure this out in my head.	
Interviewer: Sure. So, what are you trying to figure out in your head? What’s your head thinking about?	
Student 2: What times 3 would equal 36?	
Interviewer: Very nice. Okay.	
Student 2: I think it’s 12.	
Interviewer: You think it’s 12. Very nice. That was just for a little practice. You can hit “Turn it in” two times. Now, you did a great job explaining ____ [00:06:32]. Ready to try another part?	
Student 2: Mm-hmm.	
Interviewer: Okay, so we’ll do the same idea where you’ll read the question and then you’ll tell me what you’re thinking. Okay, start with this one please.	
Student 2: [Item 1] Use this information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth completed her reading goal for 10 days. What is the total number of pages Beth read? It’s 15×10 .	
Interviewer: You said it’s 15×10 .	
Student 2: Mm-hmm. [Air]	
Interviewer: Then what did you get when you multiplied? [Air] So, when you multiplied 15×10 , what was the answer you got below the line? Is it 100? ____ [00:07:35].	
Student 2: ____ [00:07:37].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So, then did you go back and look at the choices and what might match?	
Student 2: Mm-hmm.	
Interviewer: Okay, so what would you do on a test if that happened, if what you got didn't match a choice?	
Student 2: I'd try adding it a different way.	
Interviewer: Okay.	
Student 2: I just tried 15 10 times.	
Interviewer: Okay. However, you would think to solve it. [Air] So, you added 15 10 times and what did you get?	
Student 2: 150.	
Interviewer: And why did you choose to add it 10 times? What in the problem helped you figure that out?	
Student 2: I don't know. For me, it's just easier to do that.	
Interviewer: And was there a clue in the problem that told you to do it 10 times? How did you know to do that? What does it say right there?	
Student 2: 10 days.	
Interviewer: She did it for 10 days. Very nice. Okay, go on and hit "Next."	
Student 2: [Item 2] Jake is reading a book that has 389 pages. [Air]	
Interviewer: So, you're doing 389×20 ? [Air]	
Student 2: It's not right	
Interviewer: So, you did $389 - 220$. What in the problem helped you figure out to do that?	
Student 2: This.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: What did they say that gave you that clue?	
Student 2: That it has 389 pages and he's supposed to be reading 110 pages a week.	
Interviewer: A week. So how did you—	
Student 2: So, I added that together twice.	
Interviewer: Okay.	
Student 2: And I should _____ [00:10:12] from this. Then _____ [00:10:18] three weeks.	
Interviewer: Okay. That didn't get you an answer that was a choice. So, what would you do if that happened?	
Student 2: Take my best guess.	
Interviewer: Sure, which would that be?	
Student 2: _____ [00:10:31].	
Interviewer: Okay, go ahead and choose the next one. Want to go ahead and read this part out loud?	
Student 2: [Item 3] Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening on the second day. $40 - 22 = \text{something} + 8$. The first thing I'll do is $40 - 22$. [Air] It's 18. It's 10.	
Interviewer: How did you know that because you said it's 18 and then you said it's 10? How did you get from 18 to 10?	
Student 2: Because I know $8 + 10$ is 18. And $8 + 10$ is 18 and if I had to add 10 to that.	
Interviewer: Very nice. _____ [00:11:45]	
Student 2: No, I didn't have _____ [00:11:49].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: I could tell you or you could call it anything you want. Do you want me to tell you _____ [00:11:53]? I would call them _____ [00:11:56].	
Student 2: [Item 4] I'll just skip the name.	
Interviewer: Yeah, perfect or you could just say "he."	
Student 2: He knows that a number multiplied by 7 is 21. Which equation can he use to figure out this number? Well, first of all, I already know the answer.	
Interviewer: You do? What is it?	
Student 2: $7 \times 3 = 21$.	
Interviewer: Okay. How did you choose the correct answer?	
Student 2: It's that one.	
Interviewer: It's C? How do you know it's C?	
Student 2: Because division is just backwards multiplication. So, you can see how many times it takes to get 21.	
Interviewer: Very nice way to explain it. You're doing great.	
Student 2: [Item 5] A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? [Air] First of all, I _____ [00:13:02].	
Interviewer: Okay. How would you do that?	
Student 2: I round the 40. That would round to around 60. Because it says estimate right there. It doesn't have to be the exact answer.	
Interviewer: That's right. [Air]	
Student 2: I guess it's 2400.	
Interviewer: How did you guess that?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: It seems the closest.	
Interviewer: And were you doing—	
Student 2: I did the math in my head.	
Interviewer: And what kind of math did you do?	
Student 2: Multiplication.	
Interviewer: Okay, so did you multiply two numbers together? Which two numbers?	
Student 2: I multiplied 40 x 56, I mean 40 x 60.	
Interviewer: And did you do that in your head?	
Student 2: Yes.	
Interviewer: Did you use that chart to help you or how did you figure that out?	
Student 2: I just know that kind of stuff.	
Interviewer: You do, okay. Great. Go ahead and choose B then.	
Student 2: [Item 6] Which number would make this equation true? 56 divided by blank equals—that's easy.	
Interviewer: Why did you say it's easy? Why is that one easy?	
Student 2: Because I've been doing it since third grade.	
Interviewer: And how did you solve that box?	
Student 2: Because I know $7 \times 8 = 56$ and that's just backwards.	
Interviewer: Very nice.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: [Item 7] A rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? Three-fifths.	
Interviewer: How did you get that?	
Student 2: Because I knew the answer. 1,2,3. 1,2,3,4,5.	
Interviewer: So, when you were just counting for three-fifths, what did you count first	
Student 2: The ones that are shaded gray.	
Interviewer: And you got how many? How many gray?	
Student 2: Three.	
Interviewer: Three and then how did you get the second number?	
Student 2: I counted up the white ones.	
Interviewer: The white ones, okay.	
Student 2: But five isn't an answer.	
Interviewer: Okay. So, anything else that you could try? Or _____ [00:15:30]?	
Student 2: [Air]	
Interviewer: How did you choose three-fourths? Sorry, can we go back for one second? I want to ask you one more question. How did you choose three-fourths?	
Student 2: Because that would be one-third and that would be two-fourths. So, I just added the fractions and that's the closest I got to the answer that I got.	
Interviewer: Awesome, thank you.	
Student 2: [Item 8] The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $4\frac{4}{8}$ inches long? Five.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: How did you get five?	
Student 2: I just went to this and added all the ones behind it.	
Interviewer: Okay, so you went to $4\frac{4}{8}$ and then counted what behind it?	
Student 2: All the x's behind it.	
Interviewer: Okay. This one.	
Student 2: [Item 9] Which comparison is true? Give me a second to look at them. [Air] This one.	
Interviewer: How do you know D is true?	
Student 2: Because all these other ones, it's like one-half is larger than one-fourth. And those aren't equal. That's larger. Those aren't equal. That's larger. But this is the only one that's true.	
Interviewer: It's the last one. How do you know that it's true?	
Student 2: Actually, it's not true.	
Interviewer: So, now you're thinking maybe which one would be true?	
Student 2: This one.	
Interviewer: Why is C true?	
Student 2: Because that would add up to one-half.	
Interviewer: Okay. Try this one.	
Student 2: [Item 10] This is a fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? [Air]	
Interviewer: Why did you choose A?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Because I know when I'm adding fractions, the one on the bottom stays the same and you add the two on the top.	
Interviewer: And did you use this part over here to help you at all?	
Student 2: Mm-hmm. Because it said Mariah has three-fourths and going off Mariah's bean plant.	
Interviewer: And did you use this picture to help you at all?	
Student 2: No, not really.	
Interviewer: Not really. Okay, great. Thanks.	
Student 2: [Item 11] Miss Valdez made this frequency table to show the same information as in the data table. What is the total number of plants that have a height greater than one-fourth inch? [Air]	
Interviewer: How did you know it was four?	
Student 2: Because I know one-half and three-fourths is larger than one-fourth and it said there's two students _____ [00:19:20] inch _____ [00:19:19] not including that. So, this _____ [00:19:24] is up and the _____ [00:19:26] was there.	
Interviewer: Great.	
Student 2: [Item 12] Which list shows the plant heights, in inches, in order from least to greatest?	
Interviewer: How do you know that A is true?	
Student 2: Because that's less than all the other ones. And three-fourths is larger than one-half.	
Interviewer: Now did you just know that or did you use something to figure out which one was bigger than the other?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: I just knew it.	
Interviewer: You just knew. Okay. Great. [Andrea – stop here.]	
Interviewer: And then you can hit the next. So, that’s are the end of the math problems for you. I just have a couple of questions about like everything you did. So, did you enjoy thinking out loud or not really?	
Student 2: I like thinking in my head more.	
Interviewer: Okay.	
Student 2: I don’t really like talking out loud.	
Interviewer: You did a great job. But I understand how it’s a little hard. And did you think that talking out loud about it actually made it harder to answer the questions, the same, or easier than if you just did it in your head?	
Student 2: Harder.	
Interviewer: Harder. And were there any questions that you found really hard or confusing?	
Student 2: Can I go back and look at them?	
Interviewer: Sure, that’s a great question. Yes, let’s. Yes, here we go. I’ll give it to you one more time. One more time. [Air] Let’s look here again and then we can just scroll through and you can stop me if you get to one that was really hard. Or you want to scroll through?	
Student 2: This one was very difficult.	
Interviewer: Okay, the first one. Okay, great.	
Student 2: That one, no, the first one wasn’t that difficult.	
Interviewer: Okay, it was the second one.	
Student 2: It was the second one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay, great.	
Student 2: That one was easy. That one was easy. That one was kind of difficult.	
Interviewer: Okay. Got it. Okay, you can go ahead.	
Student 2: Easy, easy, easy, easy. It was kind of difficult. Like I wouldn't say too difficult. That was easy. And that was easy.	
Interviewer: So, don't hit the next quite yet. The last question is the problems that have something over here plus a question, was this harder or the same or easier than the ones that were just a plain question?	
Student 2: The same.	
Interviewer: The same. Okay, great. You did an awesome job. Thanks for your help. We'll bring you back to the office. Okay?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: ____ [0:00:05] sorry we took you from PE. If it's okay with you, I was going to record...	
Student 3: Okay.	
Interviewer: ... [0:00:11] just hit record.	
Student 3: Yeah.	
Interviewer: So that when I get home, I can remember everything you said.	
Student 3: All right.	
Interviewer: So, are you a 5th grader this year?	
Student 3: Um-hmm.	
Interviewer: Yeah. Are you having a good year?	
Student 3: Um-hmm.	
Interviewer: What's your teacher's name?	
Student 3: Ms. ----- [Teacher's name].	
Interviewer: And, how about your math teacher?	
Student 3: Ms. ----- [Teacher's name].	
Interviewer: And, do you know sort of what you're here to do today?	
Student 3: Mmm-mmm.	
Interviewer: No. Okay. So, I work for a company that writes these kinds of questions that you probably take in the spring. Do you remember something like this last year? And, we're trying to figure out what kids your age think about while they're answering these kinds of questions. So, we're going to hope that you can think out loud today you work with me. Do ____ [0:00:51] think out loud means?	
Student 3: Um-hmm.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Great. And, we're not going to give you a score, like your teachers, your parents, the principal, nobody will get a score. It's just about to see how you're thinking, but not about right or wrong. Okay. So, first, I thought I would show what I think thinking out loud looks like, and then I'll give you a turn.</p>	
<p>Student 3: Okay.</p>	
<p>Interviewer: So, let's say I have this piece of paper and somebody says to me, "Think out loud while you fold it twice." Okay. So, first I think I'll just take it and _____ [0:01:29] just make a nice long crease along this page. Got to fold it twice, I have to do it two times. So, I'm going to switch directions. Then I'm going to fold it, line up my edges and make a nice crease right across. Then I'm going to check my work to make sure I did it okay. So, _____ [0:01:46] and then I folded it twice. I think _____ [0:01:49].</p> <p>And, now I'm going to show you thinking out loud with a math problem. So, the first time I just read it. It says there were—oh, I'll read it and then you'll get plenty of turns. There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both. And, then I see this picture. For now, I'm just going to leave that but remember that it's there. And, then it says how many students participated in only the high jump? So, first I always ask myself what do they want to know? So, I look again and I think they want to know how many kids did the high jump, and when I look at the picture, I see a question mark beside. I think I'm right. So, in order to solve this, I would ask myself _____ [0:02:30]. I can see 15 kids did the long jump and 6 kids are in the middle, which I think means they did the long jump and the high jump. So, I'm going to add those together. $15 + 6$ and I know that that is 21. And, then how many did these two things, but I still have to know how many did this. So, in order to figure that out, I have to know how many did them all, and so I go back and read. I see, oh, there were 40, right. So, if I then take away...</p>	
<p>Student 3: It would be minus 21.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice. And, I know that that is 19. I'm going to look at my choices and I see that that's a choice. So, I'm going to hit finish, because I only have one, but you'll have more. Did that make sense to you, how I talked out loud?	
Student 3: Um-hmm.	
Interviewer: Do you have any questions for me?	
Student 3: Mmm-mmm.	
Interviewer: Okay. Want to give it a try?	
Student 3: Um-hmm.	
Interviewer: All right. And, this one, you'll notice there's something extra on the side. You'll want to look at that and this side, too. Okay. So, you're ____ [0:03:28]. Oh, sorry, ____ [0:03:30]. There's pencil and paper if you want to write ____ [0:03:30]. Okay. Go for it. Read it out loud to me.	
Student 3: Yes.	
Interviewer: Okay.	
Student 3: Use this information to answer the following questions. Beth, Dean, Jake and Maya each set a reading goal. Their table shows their goals. Beth's goal was 15 pages per day. Dean's goal was 125 pages per week. Jake's goal was 110 pages per week, and Maya's goal was 40 pages per days.	
Interviewer: Right.	
Student 3: Dean completed his reading goal for two weeks. What is the total number of pages Dean read? 250.	
Interviewer: So, I saw you did $125 + 125$. How did you know to do that?	
Student 3: Because, it said his goal was 125 pages per week, and it said two weeks.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice. Okay. So, go ahead and choose your answer, and then you can hit next. There's another, one more practice. Okay.	
Student 3: A father has three children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, B, can be found using this equation. How many books will each child receive? 12.	
Interviewer: How do you know that?	
Student 3: Because, I multiplied 12×3 .	
Interviewer: And, did you just know that in your head...	
Student 3: Um-hmm.	
Interviewer: ...that 3×12 , very nice. Okay. Go ahead and pick B. Then if you hit finish, may have to do it a couple of times. Pop up again and then you can hit turn in. One more turn in. And, if you want to select. Do you have any questions for me before we go to next one? Okay. So, hit this blue one and if you scroll down a little, you can hit continue.	
Student 3: Right.	
Interviewer: One more time, continue. All right. Go ahead and give this one a try.	
Student 3: Use the information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Beth completed her reading goal for 10 days. Which is the total number of pages Beth read?	
Interviewer: So, I think, did you write 15×10 and then did you get 110?	
Student 3: Um-hmm.	
Interviewer: Okay. And, did that help you find the right answer?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Mmm-mmm.	
Interviewer: How did you know to do 15×10 ?	
Student 3: Because, it says 15 and then 10, and then I times'd it.	
Interviewer: Okay. And, so what would you do on the day of the test if you got an answer that isn't a choice? What would you do?	
Student 3: Redo it.	
Interviewer: Okay. Do you want to give that a try?	
Student 3: Um-hmm	
Interviewer: What did you get this time?	
Student 3: 1,510.	
Interviewer: Okay. So, you multiplied and you got 1,510. Did that help you choose an answer?	
Student 3: _____ [0:08:10].	
Interviewer: So, what would you do? Remember that today is not about choosing the right answer, so it's okay if you don't find the right answer. But what would you do on the day of the test?	
Student 3: Probably, keep doing it until I get the right answer.	
Interviewer: Okay. I think for today you can go ahead and just choose the one that you think is best, because you already told me how you processed the problem. So, just, you can, or you can hit next. Okay. Great. Go ahead and choose _____ [0:08:45]. Okay. How about this one?	
Student 3: Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per week. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages for two days. Jake is	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
reading a book that has 389 pages. Based on Jake’s reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks?	
Interviewer: I think I saw you write 110×3 , and then you got 330, right?	
Student 3: Um-hmm.	
Interviewer: Why’d you erase it?	
Student 3: Oh, I thought _____ [0:09:55].	
Interviewer: Did you think it wasn’t a choice?	
Student 3: Yeah.	
Interviewer: Yeah. Okay. So, how did you know to do 110×3 ?	
Student 3: Times, 110×3 , and then...	
Interviewer: How did you, like what made you think you should do that? How did you know?	
Student 3: It says Jake was reading a book at 300 pages. Based on Jake’s reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks.	
Interviewer: Okay. So, do you think that’s your answer or were you not quite done?	
Student 3: I don’t think it was 330.	
Interviewer: Okay. So, what, what do you think it could be?	
Student 3: 279.	
Interviewer: Okay. So, now you did $389 - 110$ and you got 279. So, is that your answer?	
Student 3: Um-hmm.	
Interviewer: How did you know to subtract?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Because, it says how many will he have left.	
Interviewer: So, did that give you the clue?	
Student 3: Um-hmm.	
Interviewer: Okay. Great. Go ahead and choose your answer. All right. Next one.	
Student 3: Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per week. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. The equation can be used to find the number of pages Maya read this evening on the second day. Which value can be placed in the blank to make this equation true?	
Interviewer: That's right. So, what did you do first when you tried to solve it?	
Student 3: I got the 18 for the blank and then I added 8 to the, to the 18. And, got 26.	
Interviewer: How did you know to add 8?	
Student 3: Because, it says $40 - 22 = 18 + 8$.	
Interviewer: Very nice. Can you choose your answer?	
Student 3: Um-hmm.	
Interviewer: Great job. Okay. How about this one?	
Student 3: Duane knows that the number multiplied by 7 is 21. Which equation can Duane use to figure out this number?	
Interviewer: How did you know that?	
Student 3: Because, 7 divided by 3 equals 21	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: 7 divided by 3 is 21?	
Student 3: Um-hmm.	
Interviewer: Okay. Great.	
Student 3: Or, no.	
Interviewer: You want to go back for one second? Do you want to say it differently?	
Student 3: Yeah.	
Interviewer: Okay.	
Student 3: 21 divided by 7 equals 3.	
Interviewer: And, now where did you come up with 3 _____ [0:13:51]?	
Student 3: $7 \times 3 = 21$.	
Interviewer: Okay. Very nice. Sometimes I mix those up, too.	
Student 3: A photo album has 56 pages. Which, which estimate is closest to the number of pages in 43 photo albums?	
Interviewer: What are you thinking about this one?	
Student 3: _____ [0:14:28].	
Interviewer: Okay. What would you do on the test if you didn't quite get it?	
Student 3: Think or read it.	
Interviewer: Yeah. Do you want to read it again?	
Student 3: Um-hmm.	
Interviewer: You can either read it to me or read it in your head, whatever you like. _____ [0:16:01]. There you go. So, you did 56×43 ?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Um-hmm.	
Interviewer: And, what did you get?	
Student 3: 22, 568.	
Interviewer: Okay. So, how will that help you?	
Student 3: Not any.	
Interviewer: Okay. How did you know to multiply?	
Student 3: 56, it says a photo album has 56 pages. Which estimate is closest to the number of pages in 43 photo albums?	
Interviewer: And, what made you think multiply?	
Student 3: Because, if you multiply _____ [0:16:40] you would get that closest.	
Interviewer: That's right. Okay. So, your answer doesn't seem to _____ [0:16:53] would you do if that happened on the test day? Are you reading it again, trying to figure it out?	
Student 3: Um=hmm.	
Interviewer: _____ [0:17:24].	
Student 3: A photo album has 56 pages. Which estimate is closest to the number of pages in 43 photo albums?	
Interviewer: I think I just heard you say, did you say divided by?	
Student 3: Mmm.	
Interviewer: Are you trying to figure out if multiplication...	
Student 3: Um-hmm.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: ...is correct or _____ [0:17:52]?	
Student 3: Um-hmm.	
Interviewer: Okay. Are you kind of still confused with this problem?	
Student 3: Um-hmm.	
Interviewer: Do you want to just hit next, the next one? Okay. _____ [0:18:18].	
Student 3: Which number would make this equation true? 8.	
Interviewer: How _____ [0:18:26]?	
Student 3: Because, I know that $8 \times 7 = 56$.	
Interviewer: Now, how did you use times, even though this says divided by?	
Student 3: Because, my teacher said if you put whatever number you know right there and then put the times sign right there, and then times those, you'll get the same answer as that.	
Interviewer: Very nice. I'm glad you listened to your teacher. Go ahead and hit next.	
Student 3: This rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? $\frac{3}{4}$.	
Interviewer: How do you know it's $\frac{3}{4}$?	
Student 3: Because, $\frac{1}{4}$ and then I added $\frac{2}{4}$ together and I got $\frac{3}{4}$.	
Interviewer: Great. Now, how did you, what did you do when you added $\frac{1}{4}$ and $\frac{2}{4}$? You, you did it in your head.	
Student 3: Yeah.	
Interviewer: How did you, how did you do that?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Well, I, that and then I went, and then I added those two.	
Interviewer: So, you added the top.	
Student 3: And, I got 3 and you don't change the bottom number.	
Interviewer: That's right. Great. Okay. Go ahead and choose your answer. Okay.	
Student 3: The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $4\frac{4}{8}$ inches long? 3?	
Interviewer: How do you know? How, where did you get 3 from?	
Student 3: I was counting how much the big ones are and then.	
Interviewer: So, what were you counting? Can you show me on the screen, yeah, like with your finger or the eraser? Yeah, either way.	
Student 3: That big numbers, because _____ [0:21:13] the big, or the small numbers are bigger than big numbers	
Interviewer: Okay.	
Student 3: And, I found that 1, 2.	
Interviewer: Yeah. 2.	
Student 3: 3.	
Interviewer: 3. Okay. So, 3 numbers are above that $4\frac{4}{8}$?	
Student 3: Um-hmm.	
Interviewer: Okay. But then 3 wasn't a choice, so is there anything else you could think about?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Times the x's.	
Interviewer: Give that a try and see what happens.	
Student 3: 4.	
Interviewer: So, can you show me with your finger or the eraser which x's were you counting?	
Student 3: That one	
Interviewer: Okay.	
Student 3: That one, that one and that one.	
Interviewer: Okay. And, you got 4. Hmm. How did you know which x's to count?	
Student 3: Because, it says lower than 4 fourths of an 8.	
Interviewer: Great. Okay. So, how is, this was one of the ones you counted, right?	
Student 3: Um-hmm.	
Interviewer: How is $4 \frac{7}{8}$ lower? How do you know that	
Student 3: I think it was better than last, better _____ [0:22:20] times then. And, you can times the 4 and the 7. And, you times it and then get the number and you can see which one is bigger.	
Interviewer: Okay. Cool. And, then so which choice would you make?	
Student 3: Oh.	
Interviewer: If you're not sure, we can go to the next one. It's up to you.	
Student 3: I think it's 7.	
Interviewer: You think it's 7? Okay. What made you think 7?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Since that one didn't have any x's, I found that one. Then I found that one.	
Interviewer: Okay. So, show me with your pencil. Do you count, you counted this one?	
Student 3: Yeah.	
Interviewer: Okay.	
Student 3: And, then that one.	
Interviewer: Yeah, yeah.	
Student 3: That one.	
Interviewer: Okay. 3.	
Student 3: That one.	
Interviewer: 4.	
Student 3: That one.	
Interviewer: 5.	
Student 3: And, then that one	
Interviewer: Okay. Great. Okay. So, go ahead and choose 7. The next one. So, what did the problem ask you to do?	
Student 3: Which comparison is true?	
Interviewer: All right.	
Student 3: I think those two are equal _____ [0:24:30].	
Interviewer: Option B?	
Student 3: Um-hmm.	
Interviewer: Oh, yes. Why do you think those two are equal to each other?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Because, if I add them both up, I get three thirds.	
Interviewer: Great. Are you not sure? Are you still thinking about some other ones?	
Student 3: Um-hmm.	
Interviewer: Okay.	
Student 3: Oh, that one.	
Interviewer: Why is that one?	
Student 3: Because it's $\frac{1}{2}$ and that's $\frac{2}{4}$, so there's the half on that one and then the half on that one.	
Interviewer: Very nice. Great. This one.	
Student 3: Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. _____ [0:25:31] bean plant heights. Anna has a $\frac{1}{2}$. Eva has $\frac{3}{4}$. Kent has $\frac{1}{2}$. Maria has $\frac{3}{4}$ and Peter has $\frac{1}{4}$. This is a fraction model that shows the height of Maria's bean plant. Which expression is equal to the height of Maria's bean plant? This one.	
Interviewer: Which one?	
Student 3: A.	
Interviewer: A. How did you know that A was equal?	
Student 3: Because, I added 2 and 3, so that makes $\frac{3}{4}$. And, then I added these 3, which makes $\frac{3}{4}$.	
Interviewer: Very nice. Great. Okay. Next one.	
Student 3: Use information to answer the following three questions. The students in Mr. Valdez's class measured their heights of their bean plants. This table shows their data. Anna has $\frac{1}{2}$. Eva has $\frac{3}{4}$. Kent has $\frac{1}{2}$. Maria has $\frac{3}{4}$ and Peter has $\frac{1}{4}$. Mr. Valdez made this, this frequency table to show the same information as in this data, data table. Bean plant heights. Which, what is the	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
total number of plants that have a height greater than $\frac{1}{4}$ of an inch? 2?	
Interviewer: _____ [0:27:34].	
Student 3: 1.	
Interviewer: 1. How do you know that?	
Student 3: Because those two, they're bigger than that one. So, I count these two and I put 2 away, and then there's just 1 left.	
Interviewer: You put, I'm sorry, can you say that last part again? There was these two, you put them away. What does that mean?	
Student 3: I took these two away and I _____ [0:28:04] there was only which would be more.	
Interviewer: Okay. 1 option that's bigger than $\frac{1}{4}$. Great. Okay. Go ahead and choose 1. Are, are you still thinking?	
Student 3: No.	
Interviewer: You're sure? Because take your time.	
Student 3: Okay. Which list shows the plant, or use this information to answer the following three questions. The student in Mr. Valdez's class measured the heights of the bean plants. This table shows their data. Anna had $\frac{1}{2}$. Eva had $\frac{3}{4}$. Kent had $\frac{1}{2}$. Maria had $\frac{3}{4}$. Peter has $\frac{1}{4}$. Which list shows the plant heights in inches in order from least to greatest?	
Interviewer: How do you know that? That's correct.	
Student 3: Because $\frac{3}{4}$, it's behind 4 and $\frac{1}{2}$ is in the middle. So, I did that, because $\frac{1}{2}$ is bigger than these two.	
Interviewer: Okay. Great. Okay. And, then hang on one second. Don't hit finish. We have a couple of questions and we might want to look backwards. So, did you enjoy thinking out loud today?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Um-hmm.	
Interviewer: You did? You did a great job. Did you find it easy to think out loud while you were solving these, or did it actually make it maybe a little harder than doing it in your head?	
Student 3: A little harder.	
Interviewer: A little harder. Okay. At school, do you usually do it in your head?	
Student 3: Um-hmm.	
Interviewer: And, then these items, the questions that have a thing over here, usually a table and then the question. Did you find those harder, easier, or the same as the ones that were just a plain question?	
Student 3: Easier.	
Interviewer: Easier. Why did you find those ones easier?	
Student 3: Because it gave me two, two whole things to address, put my mind on one and then put my mind on the other one.	
Interviewer: Nice. And, then were there any of these questions that you found confusing or hard?	
Student 3: Um-hmm.	
Interviewer: Yeah. Do you want me to go back through and you'll show me the ones that you thought were hard?	
Student 3: Um-hmm.	
Interviewer: Okay. So, this was the first one. Do you remember if that was confusing or hard?	
Student 3: Mmm-mmm.	
Interviewer: No.	
Student 3: Or, yes.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Oh, it was confusing. Okay. Okay. How about this one?	
Student 3: I think that one was, too.	
Interviewer: A little bit. Okay. This one?	
Student 3: Mmm-mmm.	
Interviewer: No. Okay. How about this one?	
Student 3: Mmm-mmm.	
Interviewer: This one?	
Student 3: Um-hmm.	
Interviewer: Yes. Okay. _____ [0:30:37]. This one?	
Student 3: Mmm-mmm.	
Interviewer: No.	
Student 3: Mmm-mmm. Um-hmm.	
Interviewer: Yes.	
Student 3: Mmm-mmm.	
Interviewer: No. This one?	
Student 3: Mmm-mmm. Mmm-mmm. Mmm-mmm.	
Interviewer: Nice. You did a great job. Thanks so much for your help today. We'll bring you back to _____ [0:30:58] back to PE. _____ [0:31:01].	
Student 3: _____ [0:31:03].	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Go ahead and sit right here. Do you mind if I take a video so I can remember what we talked about? Is that okay? I love your name. I have a niece who's 10 and her name is Student 4. How old are you?	
Student 4: 10.	
Interviewer: The same. I think you maybe spell it different. How do you spell it?	
Student 4:----- [student spells name]	
Interviewer: She is a Y but other than that, so fun. And who's your teacher this year, honey?	
Student 4: ----- [Teacher's name].	
Interviewer: And how about your math teacher?	
Student 4: ----- [Teacher's name].	
Interviewer: Okay, that's who a lot of the other kids had first. Did we take you out of something fun? What were you doing when Sarah came to get you?	
Student 4: We were about to start our science notebook.	
Interviewer: Is that sort of good to miss or bad?	
Student 4: In between.	
Interviewer: Do you know what you're going to do with me today?	
Student 4: Looking over questions from the state test.	
Interviewer: That's right. So I work for the company that helps to write your state tests and what we're hoping to learn is how kids your age think about these kinds of questions. So would you be willing to talk to me about that today?	
Student 4: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: So we're not looking for you to get the right answer. We're just looking to see how you think about it. So your teacher, your parents, your principal, nobody will get like a score. It's just about what you're thinking. We're going to ask you today to think out loud. Do you know what that means?</p>	
<p>Student 4: Like we talk about what you think.</p>	
<p>Interviewer: Exactly. So when I think about it, it's like everything the brain is doing when you're trying to solve a problem. You have to say it out loud or otherwise I won't know. Does that make sense? Okay, so I'm going to show you what I think thinking out loud looks like and then I'll give you a turn. I have this piece of paper and somebody says to me fold it twice. I would say out loud, think out loud what I would do is okay they said fold it twice. So to start with, I'll line up my edges and I'll make a crease across all the way and then I'm going to fold the other way the second time, so I'll just switch directions and then fold it this way and make a crease and I'm going to see how I did it. I see I folded it once and then twice. I think I did it right.</p> <p>And then if I wanted to think out loud about a math problem I might do something like this. First I would just read it and say there were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both. Then I see this picture and now I'm just going to kind of look at it and then read the question. How many students participated in only the high jump? So I always ask myself what do they want to know. I think they want to know how many kids did the high jump only, so if I look over here I see a question mark. I think that's going to help me. So I notice that 15 kids did the long jump and six kids are in the middle. I think that means those kids did both. So I'm going to use this paper to help me. So I'm going to add the two numbers they showed us, 15 plus 6 and get 21. That means 21 kids are in these two sections. Everybody else must be over here. But how many are in all? I'm going to go back and see, yep, there were 40 in all. So then I'm going to take the 40 in all and subtract the 21 that I got and I know that is 19 and when I look at my answers I see that's a choice, so I'm going to select B and then I'm going to hit finish because I only have one problem, but you're going to have more. Now did that sort</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
of make sense the thinking out loud? Did you understand what I was trying to do?	
Student 4: Um-hum.	
Interviewer: And did you have any questions for me before we start? No? Okay. So these are just practice, so if you want to read it out loud and then tell me what you're thinking about.	
Student 4: A father has three children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, b , can be found using this equation. How many books will each child receive? So like three times something would equal 36.	
Interviewer: Very nice. That's right.	
Student 4: Three times nine.	
Interviewer: Equals 36? Okay great, so then you would choose A, and then you can hit next. There's another practice and this one's just a teeny bit different. This one has something on the left and then the problem is over here, but you're going to want to look at it all.	
Student 4: Beth, Dean, Jake and Maya each a reading goal. This table shows their goals. Dean completed his reading goal for two weeks. What is the total number of pages Dean read?	
Interviewer: And I forgot to tell you there's scrap paper over here if you want to right anything down.	
Student 4: [air]	
Interviewer: So what are you thinking about? What are you trying to figure out?	
Student 4: Like would you subtract something or add something.	
Interviewer: Okay. Is there something over here that you're looking at on that table? Which part? Okay, so you're looking at Dean and then are you trying to figure out what to do with that information? Okay. What do you think might be best?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: Maybe like add 25 more to it.	
Interviewer: Okay. Why don't you try that and see either in your head if you know the answer or do you want to use the paper?	
Student 4: I think it would be 200 because 25 plus 25 is 50.	
Interviewer: And then how did you get the 200 out of that? You said 25 plus 25 is 50 and then how did you know that there was also that 200?	
Student 4: Because you add 125 to that.	
Interviewer: That's great. Okay, so go ahead and choose D, and then if you hit finish, that was the end of the practice. You can turn that and you did great. Did that make sense to you what I'm asking you to do?	
Student 4: Um-hum.	
Interviewer: Do you think you can do a few more? Okay, so go ahead and choose the blue one. And if you scroll down a little bit more and hit continue. You have to do it two times, continue. All right, so if you can read and then tell me everything you're thinking. Is this name hard? I would say it as Duane, but you can say it however you want.	
Student 4: Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? Twenty-one divided by 7 would be 3 and 7 time 3 is 21.	
Interviewer: Now, how did you know that you could use divided, but then you said 7 times 3 is 21. Those aren't the same. Like one was divided and one was times. How is that okay?	
Student 4: I meant 21 divided by 7.	
Interviewer: No. You said it perfectly. You said 21 divided by 7 is 3, and then I think you said 3 times 7 is 21. So how are you allowed to use one divided by and one times? How does that help you? I'm not telling you your	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
answer is wrong. You're actually very smart, but how did you know that?	
Student 4: Because like if you see a division problem you can like look at that number and like 7 times what equals 21?	
Interviewer: Very nice, great explaining. Okay, go ahead and choose C. So when I ask you the questions, it doesn't mean you're wrong. I just want to know how your brain thinks.	
Student 4: A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? [air]	
Interviewer: So what are you thinking about?	
Student 4: Like maybe you do something with the 56 and 43, like maybe multiply them.	
Interviewer: Okay. What would happen if you did that?	
Student 4: Maybe you would get one of those answers.	
Interviewer: Do you want to give it a try?	
Student 4: Last year Ms. Albright taught us turtle.	
Interviewer: You know what? I saw somebody else do that. I've never seen that before. What do you call it?	
Student 4: Turtle.	
Interviewer: That's a cool name for it.	
Student 4: [air]	
Interviewer: Okay. I saw you multiplied 56 times 43 and what did you get?	
Student 4: 2335. I'm thinking like what number is the closest.	
Interviewer: What would you round that to?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: 2000.	
Interviewer: 2000, so choice A. Very nice, all right go ahead and chose next.	
Student 4: [air] I'm thinking like one of those numbers times 7 would equal 56.	
Interviewer: That's a great thing to think about. Do you know which one that might be?	
Student 4: A maybe.	
Interviewer: How would you check to see if that's right?	
Student 4: Work it out probably. I know that 7 times 6 is 41, so I can like add 7 to that. I'm pretty sure it is A.	
Interviewer: Okay and you said out loud that you were trying to figure out 7 times something is 56, so how did you know to do times?	
Student 4: Because if you have a question like that you know that like 56 times 7 is going to equal something under 56.	
Interviewer: Very nice. That was great reasoning. Okay, go ahead. Oh, sorry. You did pick you answer, so go ahead and pick you answer and then hit next. Do you want to read that one to me?	
Student 4: Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth completed her reading goal for 10 days. What is the total number of pages Beth read? [air] Maybe you would like multiply 110 by 10 maybe?	
Interviewer: How did you get the 110?	
Student 4: I mean 40.	
Interviewer: Where did you see the 40?	
Student 4: I mean 15. I'm sorry.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: That's okay.	
Student 4: That.	
Interviewer: From that, very nice. Okay, so what would happen if you did that?	
Student 4: Maybe we'd get one of the answers over there.	
Interviewer: Do you want to try it?	
Student 4: [air]	
Interviewer: I think you did 15 times 10 on your paper, right? And what did you get?	
Student 4: 150.	
Interviewer: Do you think that means that might be the answer?	
Student 4: Um-hum.	
Interviewer: And how did you know to multiply those numbers?	
Student 4: Because like most of the time it is multiplying and sometimes it can be adding, subtracting or dividing	
Interviewer: That's great. Okay, go ahead and pick your answer.	
Student 4: Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of three weeks? Maybe like 110 divided by 3 or times.	
Interviewer: How do you know if it should be divided by or it should be times?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: I think it would be times because like if we do like 110 times 3 maybe we can get one of those answers.	
Interviewer: Give it a try.	
Student 4: 330.	
Interviewer: So is it D.	
Student 4: Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Maya completed her goal for two days. The first day she read 22 pages. The second day she read eight pages in the morning. Which equation can be used to find the number of pages Maya read in the evening on the second day? I would subtract like $40-22$ and then whatever answer that is would be the answer to the box.	
Interviewer: Okay great. Go ahead and try that.	
Student 4: It would be 18.	
Interviewer: So you did 40 minus 22 and got 18?	
Student 4: Um-hum.	
Interviewer: Is that your answer? Nice. Okay, how about number seven?	
Student 4: The students in Mr. Valdez's class measured the heights of their beans. This table shows the data. This is a fraction that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plants? I think it would be B because if you added all of those it would be $\frac{4}{4}$, which is one whole. And if you added those it would be $\frac{4}{4}$, which is one whole.	
Interviewer: So if you added...did you use the picture to help you get $\frac{4}{4}$ and then you also knew that that one before you?	
Student 4: Um-hum.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay great.	
Student 4: The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as in the data table. Which is the total number of plants that have a height greater than $\frac{1}{4}$ inch? Well $\frac{1}{2}$ and $\frac{3}{4}$ are both bigger than it.	
Interviewer: So how does knowing that help you get the answer?	
Student 4: [air] I know that I think it would be like $\frac{1}{2}$ is the biggest because it has the biggest space.	
Interviewer: Okay. Yeah, if you scroll down you can see the answer choices to help you choose an answer.	
Student 4: [air]	
Interviewer: What are you thinking about?	
Student 4: Well.	
Interviewer: Well, at the beginning, you told me that $\frac{1}{2}$ and $\frac{3}{4}$ are bigger than $\frac{1}{4}$, right? And then how could you use that to help you or are you not sure and that's what you're stuck on?	
Student 4: [air]	
Interviewer: So what would you do on the day of the test if you weren't sure?	
Student 4: [air] I think it would be two because $\frac{1}{2}$ is the biggest and it has a two right there.	
Interviewer: Okay great, so you used this table to help you?	
Student 4: Um-hum.	
Interviewer: Go ahead and choose two.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 4: The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. Which list shows the plant heights in inches in order from least to greatest? I think it would be B because $\frac{1}{2}$ is the smallest and then $\frac{1}{4}$ is the second smallest, I mean biggest, and then $\frac{3}{4}$ is the smallest.</p>	
<p>Interviewer: Okay, very nice. Go ahead and choose B.</p>	
<p>Student 4: This rectangle represents one whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? You would like write down the fractions and then you would add them.</p>	
<p>Student 4: That would be $\frac{1}{4}$ and the other one would be $\frac{2}{4}$, $\frac{3}{4}$.</p>	
<p>Interviewer: You're doing your math, so $\frac{1}{4}$ plus $\frac{2}{4}$ equals $\frac{3}{4}$ is what you have on your paper. Good job.</p>	
<p>Student 4: The students in Mr. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $4\frac{4}{8}$ inches long? I think it would be five because there's there three and then you would add all of those up.</p>	
<p>Interviewer: And how did you know only to do these ones?</p>	
<p>Student 4: Because $\frac{4}{8}$ is right there and it said less than.</p>	
<p>Interviewer: Very, very sweet, so one more.</p>	
<p>Student 4: Which comparison is true? I think it would be D because $\frac{1}{3}$ is bigger.</p>	
<p>Interviewer: $\frac{1}{3}$ is bigger than $\frac{2}{3}$?</p>	
<p>Student 4: Um-hum</p>	
<p>Interviewer: And so how do you know that $\frac{1}{3}$ is bigger than $\frac{2}{3}$?</p>	
<p>Student 4: If you were to draw it out it would have bigger space.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice and then don't hit finish quite yet because we might want to look back. I just have a couple more questions to ask you. Did you enjoy thinking out loud today?	
Student 4: Um-hum.	
Interviewer: Yeah? You were really good. Did you find it easy to talk out loud or did it actually make it a little harder to find the correct answer?	
Student 4: I mean some of them were hard, but most of them were easy.	
Interviewer: Okay, and then the ones that had something on the left and then the problem over here, did you find those harder, easier or the same as just like the clean problems?	
Student 4: The same.	
Interviewer: And then were there any problems that you found very hard or confusing?	
Interviewer: And then were there any problems that you found very hard or confusing?	
Student 4: I mean some of them were, but most of them weren't.	
Interviewer: All right I want to look at them real quick. If I get to a hard one do you want to show me and I'll write down the number? How was this one?	
Student 4: That was easy.	
Interviewer: Okay.	
Student 4: Easy.	
Interviewer: Easy.	
Student 4: Easy. Those both kind of got a little hard.	

Student 4 School A Grade 5 Mathematics

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All right, so all the ones with this reading table seemed hard?	
Student 4: Yeah.	
Interviewer: So maybe four, five and six. Okay and then how about this one?	
Student 4: Those were kind of easy.	
Interviewer: Okay and this one was kind of easy?	
Student 4: Um-hum.	
Interviewer: The ordering one?	
Student 4: Um-hum.	
Interviewer: Okay this one easy or hard?	
Student 4: Easy.	
Interviewer: And this last one?	
Student 4: Easy.	
Interviewer: Nice. You did a great job. Thank you so much for your help today and you can head back.	
[End of Audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: We're going to record what we say if that's okay with you.	
Student 5: Okay.	
Interviewer: So that I can remember what we talked about. Would you mind signing or writing your name right here so that it's okay and that we can work together today? That's a long name, and who is your teacher?	
Student 5: Ms. ----- [Teacher's name].	
Interviewer: How about your math teacher? Does she teach math also?	
Student 5: No, she doesn't. It's Miss ----- [Teacher's name].	
Interviewer: Are you having a good school year so far?	
Student 5: Yeah.	
Interviewer: Did anybody tell you kind of what we're going to do here today?	
Student 5: No, but we're going to test and we're going to write. That's how I know.	
Interviewer: Yes, it kind of looks like a test. Do you remember taking this test in the spring?	
Student 5: Yeah.	
Interviewer: What we're trying to figure out is how kids your age –	
Student 5: Think?	
Interviewer: Exactly—think about these kinds of questions. You're not going to get a score and we won't give a score to your parents or the principal or your teacher. It's just for us to learn about how kids think. We're going to ask you today if you're willing to think out loud. Have you ever heard of that before?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Yeah, I've heard of it.	
<p>Interviewer: Basically, I like to think about it as everything your brain is thinking when you're trying to solve a problem. I'm going to show you how I think of it and then I'll ask you to do it. If I have this piece of paper and somebody says to me I want you to fold it twice. So, I'm going to take this side and I'm going to match it up with this side and then I'm going to make sure I'm in the middle and then draw a nice crease across. And then, I'm going to switch directions. This time I'll come at it this way and then fold it, and then I'm going to make sure I did what I was supposed to. Let's see. I fold it once, and twice. That's kind of what thinking out loud sounds like for anything, and then I'm going to show you with a math problem. When I see a math problem the first thing I do is read it. I would say, "There were 40 students in a track meet. All of the students participated in either the long jump, or the high jump, or both." Then, I see this picture. For now I'm just going to leave it alone and see what the question is. It says, "How many students participated in only the high jump?"</p> <p>I always ask myself; well, what do they want to know? I think they want to know how many kids did only the high jump. When I look at my picture I see a question mark, so I think I can figure out what that is. When I look at the picture of the long jump it says there were 15 kids. There were six in this middle, which I think means ... do you remember?</p>	
Student 5: Yes, they're going to do both.	
<p>Interviewer: That's right, so I think if I add these two together that will help. I'm going to use some scrap paper and add 15 plus six.</p>	
Student 5: That's 21.	
<p>Interviewer: That's right. That's 21, but I still don't know what this question will get, so I think they need to know in all how many there were. We're going to go back and it says there were 40. So then, if I take the 21 away from 40 I think I'll get how many are in that section. I used my scrap paper and I found 19, and then I'm going to use the mouse – 19 was a choice – and I'm going to hit</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
finish because I only have one problem, but you'll have more. Did that kind of make sense, what we're going to try to do today?	
Student 5: Yes.	
Interviewer: You have scrap paper and a pencil if there's anything you want to write down, but you don't have to. The important part is that you say everything you're thinking. Are you ready to try it?	
Student 5: Yes.	
Interviewer: Go ahead. You can read out loud.	
Student 5: "A father has three children. He has 36 books he will divide evenly among the children. The number of books each child will receive, they will be found using this quotation. How many books will each child receive?"	
Interviewer: Yeah.	
Student 5: So, this is three divided by 36, would be total, so then three times 12 would equal 36.	
Interviewer: Very nice. That was great explaining. One more practice; this one is just a teeny bit different. There's something on the side and then the problem is over here, so you're going to want to look at it while –	
Student 5: "Using this information answer the following question. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals." Beth, 15 pages per day, Dean, 125 pages per day, Jake, 110 pages per week, and Maya, 40 pages per two days. "Dean completed his reading goal for two weeks. What is the total number of pages Dean read?" So, I'm going to ... wait, I'm going to add, wait ... yeah, I'm going to add ... actually I'm going to times that by two."	
Interviewer: Very nice. I like that you told me what you were going to do before you did it.	
Student 5: And then, once I add two times 125 it will equal 250.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: How did you remember to multiply it by two?	
Student 5: Because it says two weeks.	
Interviewer: Very nice. Now, you will notice that I'll ask you some questions. It just means I want to know where you are.	
Student 5: Okay.	
Interviewer: You did a great job, so you can hit finish and then that was the practice. Do you feel like you're ready to do a little more?	
Student 5: Yes.	
Interviewer: If you hit turn then, and then choose the blue there. There are going to be more questions and if you go down there's continue. I'm going to make you do it again. Just read it one more time. Go ahead.	
Student 5: [Item 1] "Duane knows a number multiplied by seven is 21. Which equation can Duane use to figure out this number?" I'll try, I'll try ... it said 21 divided by seven and then ...	
Interviewer: It's on your paper and you did 21 divided by seven and what did you get?	
Student 5: Yes, 21. I mean it's three.	
Interviewer: It's three? Okay, how does that help you?	
Student 5: It helps me because Duane wants to know, he knows seven divided by 21 ... I mean something divided by seven is 21. So, if you divide it, it's like the opposite of multiplication.	
Interviewer: That's very nice explaining. Good job. How about this one?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: [Item 2] “A photo album has 56 pages. Which estimate is the closet to total the number of pages in 32 number of albums?”	
Student 5: Hmm, which is the closest to the number of the pages in ... it would be three.	
Interviewer: That’s right.	
Student 5: Oh.	
Interviewer: I think you read it again.	
Student 5: So, you’re going to times 56 by 43 and then once you get that answer you can ... I mean you divide, I mean you can estimate ... you can change 56 to 60 and then you can change ... but if the number next to it is higher than a five, then it goes up one, but if the number is lower than a four it stays the same.	
Interviewer: That’s great.	
Student 5: So, 40 times 60 –	
Interviewer: So, what did you get?	
Student 5: Two hundred, but the closest to 200 would be 2,000.	
Interviewer: So, you multiplied 60 times 40 and got 200?	
Student 5: Yeah.	
Interviewer: And then you want to estimate that to be –?	
Student 5: Two thousand.	
Interviewer: Okay. How did you know to multiply those numbers?	
Student 5: Because it’s ... a photo album has 56 pages and the number of pages in the photo ... into the total of the pages in the photo, the 46 ... wait.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You've got it.	
Student 5: The photo album has 56 pages. The total number of the pages is 53, so they only used 53 pages so far out of ... but they haven't used all of the 56, so you would have to times ... you could either estimate uh them two first or you could times them first and then estimate the number.	
Interviewer: Great. Do you want to choose your answer?	
Student 5: Mm-hmm.	
Interviewer: Great job. How about this one?	
Student 5: [Item 3] Choose a number that would make this quotation true. Wait.	
Student 5: Okay. I'm going to ... what I like to do if I can't—if I like know it I would ... it's like nine is bigger than what would make this 63, so I'd go to a number lower than that to find it, so it would be seven times eight, and wait –	
Student 5: Then, if ... then it would be 56 because well, if I ever get stumped on a question that's like close to ... if I knew the question, like say this was lower than that, like one less, then I would go to that number if I know the answer. Then, I would just minus the number there so it gives me the answer.	
Interviewer: That's a great strategy. How did you know that you could multiply on your paper even though this says divide?	
Student 5: Because it's like with ... if it's like if it was that over there but it was times, I could ... it's like how division is the op—yeah, division is the opposite of multiplication and multiplication is the opposite of sub, of division.	
Interviewer: That's right. Great. Let's try the next one.	
Student 5: Oh, wait. Okay. So, it's like when we –	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yes. You know what? This part is the same, but this part is different.	
Student 5: [Item 4] “Use this information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals.” Beth, 15 pages per day, Dean, 125 per week, Jake, 110 per week, Maya, 40 pages per two days. “Beth completed her reading goal for 10 days. What is the total number of pages Beth read?” So, I would take times 15 times 10 and ... wait. I think ... it would times it with zoom uh, and then one times one is one, but ... like ... oh, I think I know. Oh. It’s ... it would be ... wait.	
Interviewer: So, on your paper you wrote 15 times 10 and you got 150. What are you thinking about now?	
Student 5: I’m thinking—because I had another one but it wouldn’t be right. So, I’m pretty sure it would be 100 uh because this, all you would have to do is just add the zero to the 15 and then you can get the answer.	
Interviewer: Very nice. Okay, how about number five?	
Student 5: “Use this information to answer the following three questions. Beth, Dean, Jake, and Maya have ...”	
Interviewer: Very nice, yeah.	
Student 5: [Item 5] Jake is reading a book that has a total ... that has 389 pages. “Based on Jake’s reading goal, how many pages of this book will Jake have left to read by the end of the three weeks?” So, I would ... for Jake, so I would minus 30, 389 minus 110.	
Interviewer: Okay.	
Student 5: Yes, so it would be two, 279.	
Interviewer: How did you know to subtract 110?	
Student 5: Because it says how many pages will he have left in this book at the end of the three weeks.	
Interviewer: Great.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 5: [Item 6] “Maya completed her goal for two days.” The first she read 20, 22 pages, and the second day she read eight pages. Which quotation can be used to find the number of pages Maya read evening to the second question? Which is the value of—okay, so 40 minus 22 ... so, I’ll do 18 minus eight. Wait. Then, I’ll get 10.</p>	
<p>Interviewer: I’m just going to say out loud what you wrote so that I’ll remember. You wrote 40 minus 22 equals 18 and that 18 minus eight equals 10. How did you know at the end you wanted to do minus?</p>	
<p>Student 5: Wait, oh wait ...</p>	
<p>Interviewer: How did you know to do that?</p>	
<p>Student 5: Because it wants me to find out what number it will be, so then I would minus those two. Then it would give me the ... even though I minus-ed it, that number would probably ... if I added it, it would have too much for these.</p>	
<p>Interviewer: Very smart. That’s great. How about this one.</p>	
<p>Student 5: [Item 8] “Use this information to answer the following three questions. The students in Mr. Valdez’s class measured the height of their bean plants. This table shows their data.” Okay. “This fraction model shows the height of Maya’s bean plant. Which expression is equal to the height of Maya’s bean plant?” So, it would be ... so if it’s ... I can add those two plus that and there’s that.</p>	
<p>Interviewer: Yes, so when you added you were talking about this picture. What did you add up here when you added them?</p>	
<p>Student 5: I got two, two fours, and then all I had to do was just find which one would add to two-thirds.</p>	
<p>Interviewer: Two-thirds?</p>	
<p>Student 5: Well, uh three-fourths.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Three-fourths? Very nice. Okay.	
Student 5: Okay, so it's the C. Okay. "Mr. Valdez made a frequency table to show the same information as in the data table." What is the total of plants that have a height of greater than ... four?	
Interviewer: How did you get that?	
Student 5: Because it says which one has a greater, and these two are greater than that one.	
Interviewer: Okay, so one-half and three-fourths are greater, and then how did—this table helped you find the answer, so how did you get four?	
Student 5: Because the tally marks are for each student that had at least three-fourths or one-half.	
Interviewer: Very nice. Great.	
Student 5: [Item 9] "This list shows the, the ... shows the plant's height in inches in the order from least to greatest." Okay, so one-half would be ... wait. Oh, from least to greatest, okay. Oh, wait. No, it can't be that. Wait. Oh, I see. It would be this because that is only one part of the ... like it's only one-fourth part of something, and then that would be half and that one is the closest to one-half.	
Interviewer: Which one is the closest to one-half?	
Student 5: Three fifths. Three fourths.	
Interviewer: Very nice. How about number 10?	
Student 5: [Item 10] "The rectangle represents one whole unit. What is the sum of the fractions represented by the shaded parts of the rectangle below?" So, I think it's ... if it is four, four, one-fourth plus two-fourths would equal three-fourths.	
Interviewer: Very nice.	
Student 5: [Item 11] "The students in Mrs. Plar's class measured the length of their pencil. They recorded their	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
measurements on one line plot.” The length of a ... how many pencils were less than four and four-eighths?	
Student 5: Five.	
Interviewer: How did you know which section to count?	
Student 5: Because these are all smaller than four because even some ... like because even though they're ... wait, wait. Because if I had one-eighth of a pencil and the other person four-eighths, then they would have a lot more, they would have at least half of the pencil.	
Interviewer: Okay, great and then there's one more. You would hit next.	
Student 5: Okay.	
Interviewer: There you go.	
Student 5: [Item 12] “Which comparison is true?” So, no it's that. It's just that one would probably be it.	
Interviewer: Good job.	
Student 5: Yes.	
Interviewer: How do you know that C is true?	
Student 5: Because even though they're in different spots, if you move that one over there then it would make one half.	
[Andrea – stop here.]	
Interviewer: Very nice. Don't hit finish yet. I have a couple of questions to ask you about all of them _____ [00:22:06]. So, did you enjoy thinking out loud today?	
Student 5: Yeah.	
Interviewer: You did a great job.	
Student 5: Thank you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You're welcome. Did you find it easy to think out loud or did it make it hard for you?	
Student 5: It was easy.	
Interviewer: Were there—do you know how some problems had like the chart over here and then the question?	
Student 5: Yes.	
Interviewer: Did you find those harder, easier, or the same as the ones that are just like one big question?	
Student 5: Well, basically like the same.	
Interviewer: And then, were there any ones that you remember that were really hard or really confusing?	
Student 5: Hmm. For a minute it was the photo album.	
Interviewer: Okay, yes. I remember that one.	
Student 5: Because I didn't—I didn't know it meant that 43 was –	
Interviewer: Great. You did such a great job. Thanks for your help today.	
Student 5: Thank you.	
Interviewer: You're welcome. Thanks for doing this. You did a great job.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: And, Student 1, we noticed with your paperwork that your, like maybe your mom signed it, but we also would love for you to sign it ____ [0:00:16]. Okay. Thank you. And, if it's okay with you, I was going to take a video, so that ____ [0:00:33]. Is that okay? So, I'll go ahead and turn that on. And, Student 1, what grade are you in ____ [0:00:37]?</p>	
<p>Student 1: 6th.</p>	
<p>Interviewer: Great. Are you having a good year so far?</p>	
<p>Student 1: Um-hmm.</p>	
<p>Interviewer: Yeah. And, what's your teacher's name?</p>	
<p>Student 1: Mrs. ----- [Teacher's name].</p>	
<p>Interviewer: Oh, ____ [0:00:47]. All right. I'm just writing down what time we're starting. So, do you know a little about what we're going to do today? ____ [0:00:55]. So, I work for a company that helps to write the tests you take in the spring. Does something like this look familiar, like where you see a question and then there's usually four answers and you choose the best one? And, what we're trying to figure out is which questions are best for kids for next year's test or even the year after that. So, we want to do them with kids your age and see what works well and ____ [0:01:14] work well ____ [0:01:15]. And, we're going to ask you to think out loud. ____ [0:01:19]. No, so thinking out loud is basically saying whatever your brain is thinking while you're doing something. Because, if you're just thinking in your head, I won't know what you're doing. But if you say it out loud, then I'll be able to learn what kids your age are thinking about.</p> <p>So, I just wanted to show you what I think thinking out loud looks like. And, then I'll give you a chance to practice. Okay. So, I have this piece of paper and somebody says to me, " ____ [0:01:43] fold this twice." And, I would think, okay, I think I'm just going to fold it this way first and I'm going to make sure...</p>	
<p>Student 1: ____ [0:01:49].</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Yeah. Going to make sure to line up the picture and _____ [0:01:53] have a nice crease in the middle. Then, I think I might go the other way this time. So, _____ [0:01:58] same thing. _____ [0:02:00] to make a really nice crease. Now, I'm going to ask myself, did I do what they wanted? I'll look and I'll say, "Well, I folded it once and I folded it twice. I think that follows the directions."</p> <p>And, then I'll show you what thinking out loud looks like with a math problem. So, first I'm just going to read it. It says, "There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both. Then I see that there's this picture. For now, I'm just going to know that it's there and I might, I'll look at it better later. Then it says, "How many students participated in only the high jump?" So, then I'm going to go back and I'm going to say, "Well, what do they want to know?" Okay. So, now I look at my question. How many students participated in only the high jump? So, then I'm going to look at the picture and I see that high jump has a question mark. And, I think that I remember that this middle part means they did this side, the long jump and the other side, the high jump. So, I'm going to use some scrap paper and try to figure out the answer. So, I know that 15 did the long jump and 6 did both. So, I'm going to add those to find the total of these sections put together.</p>	
<p>Student 1: 21?</p>	
<p>Interviewer: Very nice. And, that's _____ [0:03:10] and then I'm going to say, "How many did all of it?" I'm going to go back to the problem, and it says, "There were 40 students at the whole track meet." So, then I know that my total is 40, so if I take away the 21 in these two parts...</p>	
<p>Student 1: 19.</p>	
<p>Interviewer: ...I think, very nice. Did you do that in your head? So, I wrote it down, but you could also do it in your head, but you have scrap paper over here if you want to do any calculations. You don't have to. And, also, I just wanted to tell you that this will be anonymous _____ [0:03:38] word means nobody will know your answers, not</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>the teacher, not the principal, not the parents. It's just for us to learn about how kids do best.</p> <p>So, I'm going to give you a chance to practice talking out loud while you solve a couple of problems. Do you feel ready to do that?</p>	
<p>Student 1: _____ [0:03:53].</p>	
<p>Interviewer: Oh, good, good. All right. So, why don't you go ahead and read it out loud and then tell me what you're thinking.</p>	
<p>Student 1: A father has 3 children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, b, can be found using this equation. $3 \times b = 36$. That should equal 12.</p>	
<p>Interviewer: How do you know that?</p>	
<p>Student 1: Well, because $2 \times 3 = 6$ and then 10×3 is 30 and add those together, you get 36.</p>	
<p>Interviewer: Okay. Great. Go ahead and hit the next button and there's one more practice. Oh, and this one's a little different. It has something on the side and then the question's over here. You're going to want to look at it _____ [0:04:39] in order to solve the problem.</p>	
<p>Student 1: Use this information to answer the following question. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth has 15 pages per day. Dean wants 125 pages per week. Jake wants 110 pages per week, and Maya wants 40 pages per two days. Dean completed his reading goal for 2 weeks. What is the total number of pages Dean read? 250.</p>	
<p>Interviewer: How did you know that?</p>	
<p>Student 1: Because if you add 25 and 25, that equals 50, and then 100 and 100 equals 200 plus 50, 250.</p>	
<p>Interviewer: And, how did you know to add those numbers?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Because, well, it said two weeks, so I, all I did was multiply it by two or add it.	
Interviewer: Great. Okay. Go ahead and hit finish. Now, those were the practice problems. Did those feel like you understood how to do them? You did a great job. Okay. So, go ahead and hit turn in. And, then now there's one more set of problems _____ [0:05:51] blue section, and then if you scroll down a little there should be a continue. Awesome. So, you want to read this one and then _____ [0:05:58]?	
Student 1: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? 21 divided by 7.	
Interviewer: How did you know that?	
Student 1: Because, if you want to know something multiplied by 7 equals 21, you'd have to divide to get your answer.	
Interviewer: Okay. Great. Thank you.	
Student 1: [Item 2] A photo album has 56 pages. Which estimate is closest to the number of 43 _____ [0:06:37], 43 photo albums? This is multiplying.	
Interviewer: What makes you think that?	
Student 1: Because it's in the thousands.	
Interviewer: So, the answers gave you a clue. Okay. So, how would you go about choosing the best answer?	
Student 1: This one kind of confused me.	
Interviewer: Do you want to read it again and see if it makes more sense?	
Student 1: A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? 56, so I'm estimating 56, 60, _____ [0:07:22], 2,400.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So, I saw that you multiplied on your scrap paper, it looks like 60 times 40. How did you get those numbers?	
Student 1: I estimated 40 and 56 to the nearest 10th.	
Interviewer: Very nice. Great.	
Student 1: [Item 3] Which number would you like to make this true? 56 divided by 8 equals 7.	
Interviewer: How did you know there was an 8 in there?	
Student 1: Because, if you count up 7 times to 56, you will get 8.	
Interviewer: Okay. I'm sorry, one more question. You just said times, but the problem says divide. How did you know to use times to help you?	
Student 1: Dividing is the opposite of multiplication.	
Interviewer: Very nice.	
Student 1: [Item 4] Use this information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Beth completed her reading goal for 10 days. What is the total number Beth read? $15 \times 10 = 150$.	
Interviewer: Now, why did you or how did you know how to do times, 15×10 ? What gave you that?	
Student 1: Well, because it asks me to go add Beth's goal for 10 days. So, that's what I did.	
Interviewer: Very nice. Okay. Choose your answer. Yeah. And, then you can hit next.	
Student 1: [Item 5] Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
pages per week. Maya, 40 pages per two days. Jake is reading a book that has 389 pages. Based on Jake’s reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks? In 3 weeks, this one’s kind of, oh, 59.	
Interviewer: How did you get that?	
Student 1: Well, because he has 110, so if you go three weeks, that equals 330. And, then you have 59 pages left to get the 389, which is how many pages it has in all.	
Interviewer: So, you, I think you multiplied first, 110×3 , right, and then you, did you count, then you got 330, and then how did you use the _____ [0:11:09]?	
Student 1: I added 59 to it.	
Interviewer: You counted up. Very nice.	
Student 1: [Item 6] Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Maya completed her reading goal, her goal for two days. The first day she read 23 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening in, on the second day. $40 - 22 = 18$.	
Interviewer: You said something in your head. What did you do in your head?	
Student 1: So, what I did was subtract 40 and 22.	
Interviewer: And, you got 18. Great. And, that’s how you knew that was...	
Student 1: Plus $8 = 26$.	
Interviewer: Okay. So, you got 18 on the left and then you added the 8 on the right to get your total?	
Student 1: I should probably put the 18 right there. That’s the answer [0:12:32].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: 18 is the answer.	
Student 1: Yeah.	
Interviewer: Okay. So, I'm sorry, you subtracted on the left, $40 - 22$, and you got 18.	
Student 1: Yeah.	
Interviewer: Okay.	
<p>Student 1: Plus 8 equals 26.</p> <p>[Item 7] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. Anna had one, $\frac{1}{2}$ and Eva had $\frac{3}{4}$. Kent had $\frac{1}{2}$. Mariah had $\frac{3}{4}$ and Peter $\frac{1}{4}$. This is a fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? A.</p>	
Interviewer: How did you know A was right?	
Student 1: Because, if you add $2 + 1 = 3$ and she had $\frac{3}{4}$.	
Interviewer: Nice. And, did you use this picture at all to help you?	
Student 1: Um-hmm.	
Interviewer: Yeah. How did that picture help you?	
Student 1: It showed me how many fourths she had.	
Interviewer: Okay.	
Student 1: How many questions are there on this?	
Interviewer: You're on number 8 and there are 12.	
Student 1: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>[Item 8] Use this information to answer the following three questions. The students in Mr. Valdez’s class measure the height of their bean plants. This table shows their data. Anna, $\frac{1}{2}$, Eva $\frac{3}{4}$, Kent $\frac{1}{2}$, Mariah $\frac{3}{4}$, Peter $\frac{1}{4}$. Mr. Valdez made this frequency table to show the same information as in the data table. $\frac{1}{4}$, number of students. One had $\frac{1}{4}$, two had $\frac{1}{2}$, and then two had $\frac{3}{4}$. What is the total number of plants that have a higher greater, height greater than $\frac{1}{4}$ inch? Four.</p>	
<p>Interviewer: How did you know it was four?</p>	
<p>Student 1: Because, it says number of students right here. There’s two child marks, so that’s two people, that’s two people and they’re more than $\frac{1}{4}$. So, if you add those together it equals four.</p>	
<p>Interviewer: Great.</p>	
<p>Student 1: [Item 9] Use this information to answer the following three questions. The students in Mr. Valdez’s class measured the heights of their bean plants. This table shows their data. Anna $\frac{1}{2}$, Eva $\frac{3}{4}$, Kent $\frac{1}{2}$, Mariah $\frac{3}{4}$, Peter $\frac{1}{4}$. Which list shows the plant heights in inches in order from least to greatest?</p>	
<p>Interviewer: _____ [0:15:28] choose that one?</p>	
<p>Student 1: Well, because $\frac{1}{4}$ is smaller than $\frac{1}{2}$, $\frac{1}{2}$ is smaller than _____ [0:15:40].</p>	
<p>Interviewer: And, how did you know that a fourth was smaller than a half?</p>	
<p>Student 1: Because, a fourth is split into four equal groups and a half is split into two large groups.</p>	
<p>Interviewer: Very nice.</p>	
<p>Student 1: [Item 10] This rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? That would equal $\frac{3}{4}$.</p>	
<p>Interviewer: How did you know it equaled $\frac{3}{4}$?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Because, you add the shaded parts together, which equals 3 and 4 in the square, so that's $\frac{3}{4}$.	
Interviewer: $\frac{3}{4}$, very nice.	
Student 1: [Item 11] Students in Mr. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $\frac{4}{8}$ inches long? Okay. _____ [0:17:05] Three.	
Interviewer: How did you get that answer?	
Student 1: _____ [0:17:16] Five.	
Interviewer: How did you get five?	
Student 1: If you add $3 + 2 = 5$.	
Interviewer: How did you know which section to add, which sections to add up?	
Student 1: Because, this is 4 and $\frac{4}{8}$, so everything behind it _____ [0:17:38].	
Interviewer: There, and you add _____ [0:17:40].	
Student 1: Um-hmm.	
Interviewer: Great job.	
Student 1: [Item 12] Which comparison is true? C.	
Interviewer: How do you know C is true?	
Student 1: Because, $\frac{2}{4}$ is half of a whole.	
[Andrea – stop here.]	
Interviewer: Very nice. You can hit finished now. And, then I just have a couple _____ [0:18:06] for you about like everything that we did. So, did you enjoy thinking out loud while we did that?	
Student 1: Um-hmm.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yeah. You did a great job. Did you find it easy to think out loud or did it make _____ [0:18:18] harder?	
Student 1: A little harder, because I'm used to thinking on my own.	
Interviewer: Your bells here are so long.	
Student 1: They do, they do them on the weekends, too.	
Interviewer: They do? That's funny. Can you hear them outside? Is that how you know?	
Student 1: No. My teacher told me.	
Interviewer: Oh, that would probably scare you if you're here on the weekend alone. Were the ones that had something on the side, usually like a chart, and then the problem over here, were those harder, easier or the same as the ones that just have like one big problem?	
Student 1: They're about the same, so easy.	
Interviewer: And, then were there any of the questions that you saw that you found really hard or a little confusing?	
Student 1: _____ [0:19:02] confusing.	
Interviewer: Yeah. And, you can, here, I can go back. Any specific ones I can scroll back through and you can tell me the ones that you found hard.	
Student 1: I know it's not one of these last ones.	
Interviewer: Okay.	
Student 1: Whenever I read _____ [0:19:17]. This one.	
Interviewer: The one with Maya's...	
Student 1: This one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: ...goal?	
Student 1: The subtracting part confused me, because I'm doing it in my head, not on paper.	
Interviewer: Okay. And, any others, or was that the one that stuck out in your head as the most confusing? That one. Okay. Great. Student 1, thanks for your help today. And, _____ [0:19:37]. Thanks for your help _____ [0:19:45]. You did great, yeah. Oh, yeah, I put those on the _____ [0:20:34] or yesterday's kiddos. _____ [0:20:36]. I didn't know that, sorry. Okay. Very good.	
[Inaudible background discussion]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So what grade are you in honey?	
Student 2: 5th.	
Interviewer: And what's your teacher's name?	
Student 2: Mrs. ----- [Teacher's name].	
Interviewer: Are you having a good year so far?	
Student 2: Yeah. It's been fun so far.	
"Interviewer: _____ [0:00:53]. And then can I take a video of this just so that later when I go back home I can remember what you said? So did they tell you much about what we're going to do today? "	
"Student 2: Yes. "	
"Interviewer: So what we're hoping you'll do with me is I work for a company that writes the math tests that you take in the spring. Does something like this look familiar like they show you a question and then there's usually four answers? And we're trying to figure out what kinds of questions work best with kids your age. And so we're going to try _____ [0:01:20] today and then we'll go back to our office and figure out what would be best for next year's tests. Does that sound like something you'd be willing to do? "	
"Student 2: Okay. "	
Interviewer: Great. Thanks. And, everything you do today will be anonymous, which means your parents or your teacher, they won't get a score for how you did. It's really just for us to learn about what's best for kids _____ [0:01:37]. So, we're going to ask you to think out loud today. Have you ever heard of that before? No. So, thinking out loud is basically everything your brain is thinking about you want to say. Because, if you don't say it, I don't know what you're thinking. So, on the real test, you probably just do it in your head. But today, I'd love for you to say it out loud, so that I can understand what you're thinking. Anything you're thinking is great to say, even if it's I don't really know what they mean, or I'm not	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>sure what this word is. Anything your brain's thinking, say it out loud. Sound good? Okay.</p> <p>So, I want to show you how I think out loud, so you can kind of learn how to do it. So, if I have this piece of paper and somebody says to me, "Fold it twice." Okay. So, I think I'm going to fold it this way, sort of along this _____ [0:02:22]. I'm going to make sure that I line up my edges, and then I make a nice crease _____ [0:02:26]. Then they said to fold it twice, so this time, I'm going to go the other way. So, now I fold it this way and then I line up my edges and make another nice crease. And, I'm going to ask myself did I do what they said? Said to fold it twice and I did. Yeah, so I think, I think I did that one correctly.</p> <p>Now, I'll show you with a math problem what it means to think out loud. So, first, I would just read the problem. So, it says, "There were 40 students at a track meet. All of the students participated in either the long jump or the high jump." _____ [0:03:02] The long jump, the high jump or both. And, then they show me this picture, and I'm going to probably need that picture later, but for now, I'm just going to kind of hang up and then read the question. It says, "How many students participated in only the high jump?" So, now I'm going to go back to my picture and I see long jump has 15. There's 6 in the middle, which I think means they did this long jump and the high jump. And, then the high jump has a question mark. So, then I'm going to try to figure out what they're asking. They want to know how many students did only the high jump, so how many would be in that question mark. So, I'm going to use some scrap paper to try to figure out. So, it says that 15 did the long jump and now I know that 6 did both. So, I'm going to add those, 15, I'm going to use my scrap paper, plus 6, and I'm going to get 21 kids did either this middle section, which means both, or the long jump. And, then how many did all of them? I go back, oh, I see 40, 40 did the whole track meet. So, then I'm going to subtract the 21 that I know I have in these two parts, and I'm going to get 19. Then I'm going to look at my answers and I see 19's a choice, so I'm going to select 19. And, then you'll hit next, because you'll have more problems. I only have one, so I'll hit finish.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
But did that kind of thinking out loud make sense to you? Do you think you know sort of what I'm looking for?	
Student 2: Yeah.	
Interviewer: You ready to give it a try? Okay. Here, I'll leave this over here for you if there's anything you want to do on the paper, but you don't have to. Do you want to read this one for me?	
Student 2: A father has 3 children. He has 36 books that he will divide evenly among the children. The of books each child will receive, B, can be found using this equation. $3 \times B = 36$. How many books will each child receive?	
Interviewer: So, do you have an idea of how you can figure that out?	
Student 2: I could try times _____ [0:05:08], multiplying these numbers by 3.	
Interviewer: Yeah. Do you want to give that a try, either in your head or on the paper, however you would like to do it?	
Student 2: _____ [0:05:23].	
Interviewer: I see, I saw you did a little trick on your hands. What did you do?	
Student 2: I, it's the nines trick. So, like you put 10 fingers and whatever numbers times 9 that you put that finger down and it will give you...	
Interviewer: And, so what did you get for your answer when you did that?	
Student 2: 27	
Interviewer: And, how did you know that wasn't the right answer?	
Student 2: Because, that _____ [0:05:41].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. Great. So, now what should you try?	
Student 2: Multiply 12 right here. $3 \times 2 = 6$. So, the answer's 12.	
Interviewer: That's right, because you found on your paper that 12×3 is ____ [0:06:05]. Now, this one you'll see there's a chart on the left side and some sentences. You'll want to look at that and then the problem is over on this side, so you want to kind of read it all.	
Student 2: Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Dean completed his reading goal for 2 weeks. What is the total number of pages Dean read? So, ____ [0:06:43] 125 plus ____ [0:06:48].	
Interviewer: So, I noticed that you added 125 plus 125. How did you know to do that?	
Student 2: Because, it says for two weeks and that says for a week. So, all I would have to do is do that times 2, or I could just add it to ____ [0:07:13].	
Interviewer: Very nice. Great. Okay. So, go ahead and choose the correct answer and then you can hit finish. ____ [0:07:20] actually do it twice. That was the practice session. Did you feel like you understand what I want you to do?	
Student 2: Yeah	
Interviewer: You did a great job. Okay. So, you're ready to try a few more? Okay. So, go ahead and hit this blue rectangle and then if you go down a little, you can hit continue. The same thing on that ____ [0:07:35]. So, I want you to read this and then tell me everything that you're thinking.	
Student 2: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? 21 divided by 7?	
Interviewer: How did you know that that was the right answer?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Because, 3 times 7 is 21. In, in division, well, to find out the answer, you, all you have to do is know what 7 is multiplied by and it will get that answer.	
Interviewer: Very nice. Great. Go ahead and choose C. That was great explaining. Next, yep. All right.	
Student 2: [Item 2] A photo album has 56 pages. Which estimate, which estimate is closer to the total number of pages in 43 photo albums? _____ [0:08:42]. It will be _____ [0:09:18].	
Interviewer: I want to make sure they're hearing you and not the student, there's another student over there.	
Student 2: 6 _____ [0:09:39] is 200 _____ [0:09:49], so zero into _____ [0:09:53], 2408.	
Interviewer: Okay. And, how can you use that to help you?	
Student 2: I can estimate it to the closest number.	
Interviewer: And, which would that be in this case?	
Student 2: 2,400.	
Interviewer: Wow. I'm just going to for one second show the video how you actually solved that, because that was a really neat strategy that you used to multiply those numbers. _____ [0:10:46] like a bunch of different steps and then put it all together. That was really neat. Okay. How about the next one?	
Student 2: [Item 3] 56 divided by blank equals 7. So, it's not _____ [0:11:02] because $7 \times 9 = 63$. It's 8 equals, $7 \times 8 = 56$.	
Interviewer: And, now I noticed that you said 7 times 8, but this says division. How did you know to use multiplication?	
Student 2: Because, to find out the answer to division, you just have to know what number multiplied by the answer equals 56.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice. Okay. Choose your answer. Great. And, then the next one.	
Student 2: [Item 4] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth completed her reading goal for 10 days. What is the total number of pages Beth read? _____ [0:11:49] So, it would be 3 extra days, so 150 pages.	
Interviewer: How did you figure that out?	
Student 2: Because, it says she read 15 pages per day, and then you can do 15×10 and that equals 150. Because, you just have to add the zero.	
Interviewer: So, I can see you didn't use your paper, so you knew _____ [0:12:15]. Okay. Great.	
Student 2: [Item 5] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks? Hundred _____ [0:12:39] pages per week, so 389×125 .	
Interviewer: _____ [0:12:51].	
Student 2: Never done this before, like this before, so I don't know how to draw a box. But they both have three numbers in it, so...	
Interviewer: They both have three numbers. Great.	
Student 2: ... _____ [0:13:43] thousand, so 8,000 equals 30,000 _____ [0:14:31] 900 equals 30,000 times _____ [0:14:36]. 6,000 equals 9, 10, 11. Four carries, _____ [0:15:06] thousand plus _____ [0:15:10] 16, _____ [0:15:14] hundred _____ [0:15:22] plus 6 _____ [0:15:36] 180 _____ [0:15:45] 6, 4, _____ [0:15:50] 3×4 , 5×3 is 15, so _____ [0:16:01] 30, 6 plus 5 is, _____ [0:16:15]. _____ [0:16:24] times 80, 4 plus zero _____ [0:16:30] hundred _____ [0:16:39] five, eight plus, $9 \times 5 = 45$. _____ [0:16:50] 40,625. That doesn't _____ [0:17:12].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Right. So, what do you, what would you do on the day of a test if you did all that hard work and then it wasn't a choice?	
Student 2: I'd do division instead.	
Interviewer: All right. Want to give it a try?	
Student 2: 389 divided by ____ [0:17:32]. Well, now I've done it with 30 pages on the left side.	
Interviewer: Okay. So, do you want to give it a try, or are you not sure how to do it when it has 3 numbers that you're dividing by?	
Student 2: I'm not sure how...	
Interviewer: Not sure. Okay. So, then do you want to just make your best guess on ____ [0:18:07]? Remember, you're not going to get a score, so it's not really ____ [0:18:12]. You did really good explaining about your thinking.	
Student 2: 279.	
Interviewer: Yeah. Go ahead and choose that. Okay. And, then we'll do the next problem.	
Student 2: [Item 6] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening on the second day. So, 40 ____ [0:18:55] 40 minus 22 ____ [0:18:59] plus 8.	
Interviewer: Do you want more paper? Do you want a new piece of paper? Or, you're okay [0:19:12]?	
Student 2: I'm good. ____ [0:19:16]. 40 minus 22 ____ [0:19:23] carry one over ____ [0:19:27] 3 then minus 2 is 8, 3 minus 2 is one. So, 18 plus 8 ____ [0:19:41], 26.	
Interviewer: How did you know to add the plus 8?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Because, it says like that's where the answer goes and then you, it said to add 8.	
Interviewer: Add 8. Great.	
Student 2: [Item 7] The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. This fraction is a model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? [0:20:31] this one?	
Interviewer: How do you know that?	
Student 2: Because, it's 2 over 4 plus a 1 over 4, which would make that 3 and this would stay the same.	
Interviewer: Very nice. Did you use this picture at all to help you, or no?	
Student 2: Well, I looked at how many it had colored in.	
Interviewer: And, how many did it have colored in?	
Student 2: 3 out of 4.	
Interviewer: Very nice.	
Student 2: [Item 8] The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as the, that, as in the data table. So, what is the total plants that have height greater than $\frac{1}{4}$ inch. Well, one student there, two students there, two here. So, four, five?	
Interviewer: How did you figure that out?	
Student 2: Because, these are all over $\frac{1}{4}$, because the $\frac{1}{2}$ is $\frac{2}{4}$.	
Interviewer: So, you added up all the numbers on this side.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: [Item 9] The students in Mr. Valdez’s class measured the height of their bean plants. This table shows their data. Which list shows the plant heights in each, in inches, in order from least to greatest? So, $\frac{1}{4}$, $\frac{3}{4}$, that one’s wrong, because it’s starting with the 2 over 4.	
Interviewer: Okay.	
Student 2: That one’s starting with 3 over 4, so this, this one?	
Interviewer: How did you know that the ones that started with 2 over 4 and 3 over 4 were wrong?	
Student 2: Because, the _____ [0:22:54] these are all more than 1 over 4.	
Interviewer: Great.	
Student 2: [Item 10] The rectangle is 1 whole unit. What, what’s the sum of the fractions represented by the shaded part of the rectangles below? 3 over 8.	
Interviewer: So, how did, did you use this picture to help you?	
Student 2: Yes. I saw that there’s 4 in each square and 4 plus 4 = 8. And, then these _____ [0:23:26] colored in and that one has one, so that’s 3 over 8.	
Interviewer: Okay. So, the, the, how did you get the 3?	
Student 2: _____ [0:23:36].	
Interviewer: _____ [0:23:36] the 3. Okay. And, then how did you get that 8?	
Student 2: There’s 4 plus 4 is 8.	
Interviewer: Very nice.	
Student 2: [Item 11] The students in Mrs. Plar’s class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than 4, $\frac{4}{8}$ inches long? Three?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: How did you get that?	
Student 2: Because, right here, it's less than 4, 1, 2, 3, 4, 5.	
Interviewer: So, how did you get 5? I think I saw what you were doing, but can you tell me what you were doing to get 5?	
Student 2: It says less than 4, 4 and 4/8, and 4 and 4, it says right here. And, I saw 3 wasn't the answer, I reread the question and _____ [0:24:34] so I counted all the ones under 4 and 4/8 that equal 5.	
Interviewer: Recounted all the X's that were below. Very nice. Okay. Go ahead onto the last one.	
Student 2: [Item 12] Which comparison is true? That one's wrong, because _____ [0:24:53] $\frac{1}{4}$ is not, is not more than half. But if this one was filled in, too, it would be, it would be the same.	
Interviewer: That's right.	
Student 2: This one's wrong, because that one has more colored in and it's the same number. This one?	
Interviewer: You think that one is true?	
Student 2: Yes, because this _____ [0:25:15] has colored it, too, and so if this was right here, it would just be a half like that one. And, this one has the same denominator, but different numerators, because this one's bigger and then this one's smaller, so it would be this one.	
[Andrea – stop here.]	
Interviewer: Great. Great explaining. Okay. So, now _____ [0:25:37] questions. I just have a couple of questions for you about everything that we did. Did you enjoy thinking out loud while we just practiced that?	
Student 2: Yeah.	
Interviewer: You did a great job. And, did you find it made it harder to answer the questions when I made you	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
talk out loud, or easier or about the same as when you just do it in your head?	
Student 2: Well, sometimes, I get confused in what I was going to say and I, I stopped _____ [0:26:00] and then I'd say it, that I'm getting confused.	
Interviewer: Yes.	
Student 2: Because, I never thought out loud before _____ [0:26:06] having to be quiet when we do tests.	
Interviewer: That's right. So, it was a new experience. You did a really great job. And, then the ones that had like a chart over here and then the question, were those harder, easier or the same as the ones that just had one question _____ [0:26:22]?	
Student 2: It was the same.	
Interviewer: Same.	
Student 2: This was harder.	
Interviewer: Yeah.	
Student 2: Because, I've never done it before. Most I've done was 3 numbers divided, multiplied by 1 number, or 2 numbers. And, I haven't done it times 3 numbers.	
Interviewer: So, that was going to be my last question. Which ones did you find really hard or confusing when you had to multiply 3 by 3?	
Student 2: Yeah.	
Interviewer: Okay. Any others that were hard or confusing?	
Student 2: Not really, except the one that I did this wrong.	
Interviewer: Yes. You just, yeah, you did a lot of hard work and the answer wasn't there. All right.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: At least I got this right.	
Interviewer: You did, that's right. You did a wonderful job. Thanks for your help today. And, I love your bow. My kids would love that. Come this way and we'll take you back ____ [0:27:03].	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Are you having a good year so far?	
Student 3: Yeah.	
Interviewer: Yeah. And, what's your teacher's name?	
Student 3: Ms. ----- [Teacher's name].	
Interviewer: Can you say it one more time?	
Student 3: Ms. ----- [Teacher's name].	
Interviewer: Great. And, I was going to take a video of this, so that when I get back to my office, I can remember what you said. Would that be okay with you? _____ [0:00:55] just record. Okay. And, _____ [0:00:58] we're going to sort of going to do today? _____ [0:01:01].	
Student 3: Yeah. I think that I'm just going to answer some questions and you're just going to record it for test questions.	
Interviewer: That's right. So, I work for the company that writes these kinds of questions that you probably took last spring. Do you remember these kinds of questions where we show you some stuff and then there's usually four answers, you pick the best one?	
Student 3: Yeah.	
Interviewer: So, what we're trying to figure out is how kids your age actually think about these kinds of problems. So, we're hoping that you can help us with that. And, everything you say will be anonymous, which means like we won't tell your teachers, your parents how you did. It's not about getting them right. It's about thinking, how you're thinking about the problems. Does that make sense?	
Student 3: Okay.	
Interviewer: We're going to ask you to think out loud today. Have you ever heard of that?	
Student 3: Yeah.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Do you kind of know what it means?	
Student 3: Yeah.	
<p>Interviewer: So, it's, I like to think of it like everything your brain is thinking you want to say out loud. Because, if you just think it, I don't know what you're thinking. So, it may be isn't what you do at school all the time, because there are lots of kids. But today, it's just you and me, so you can everything that you're thinking as you're solving them. Does that make sense so far? Okay.</p> <p>So, I thought I would show you what I think thinking out loud and then I'll give you a chance to practice. So, let's pretend somebody says to me, "Here's this piece of paper. I want you to fold it twice." Okay. So, I think I'll, maybe I'll fold it this way, like sort of long _____ [0:02:19]. I'll line up the edges and I'll make a crease straight across. Then they said to fold it twice, so now I'm going to fold it the other way. I'll do the same thing, line up my edges, I'll make a crease straight across. And, then I'm going to check my work. They said to fold it twice, so I folded it once and twice. So, I think that I followed the directions.</p> <p>_____ [0:02:40] thinking out loud, just kind of anything, and now I'll show what thinking out loud with a math problem _____ [0:02:43]. So, first I'm just going to read. It says, "There were 40 students at a track meet. All of the students participated in either the long jump or the high jump or both." And, they're showing me this picture. For now, I'm just going to remember it's there and then I'm going to read the question. How many students participated in only the high jump? So, I'm going to ask myself what do they want to know? They want to know how many students did only the high jump. I think that's why there's a question mark in this picture. So, if I remember correctly, this middle is kids who did both, and over here, this 15, they do only the long jumps. So, I'm going to use some scrap paper and try to solve this. So, I see that 15 did the long jump, 6 are in the middle, so they did both. I'm going to add those together, $15 + 6$, and when I do that, I get 21. That tells me how many are in these parts, but I need to figure out how many are in this. So, I think to do that I have to know how many were all together, and they told me that. So, now I'm going to go</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>back, oh, there were 40 students at the track meet. So, then I'm going to subtract 21, these two parts, from the total of 40. And, I get 19, which when I look is option B, so I'm going to click B. And, I think that means there were 19 students who did the high jump. And, then I'll hit, and that's because I only have one practice, but you're going to hit continue when it's your turn.</p> <p>Did that kind of thinking out loud make sense to you? You ready to give it a try yourself?</p>	
<p>Student 3: Yeah.</p>	
<p>Interviewer: Okay. So, I want you to first please read it and then tell me you're thinking. Oh, I forgot to say one more thing. And, there's scrap paper over here if you want to do any calculations.</p>	
<p>Student 3: A farmer has 3 children. He has 36 books. What will he divide evenly among the children? The number of books each child will receive, B, can be found using this equation. How many books will each child receive?</p>	
<p>Audio gap from [0:05:05] to [0:06:41]</p>	
<p>Student 3: $5 + 5 = 0$ _____ [0:06:52] $2 + 2 = 4$ plus 1, that would be 5 and the one _____ [0:07:00] that would be 2.</p>	
<p>Interviewer: Now, how did you know, you did on your paper $125 + 125$, how did you know to do that?</p>	
<p>Student 3: Because, in the chart [0:07:10] it says 125 pages per week and it said that his goal is for two weeks, so you would add that plus two.</p>	
<p>Interviewer: That's great thinking. Okay. Go ahead and choose your answer, and then those were the practice problems. You feel pretty good about what we're going to do today, like you understand it?</p>	
<p>Student 3: Yep.</p>	
<p>Interviewer: So, go ahead and hit turn in and you have to do it twice, you can do it twice. And, then if you hit the</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
blue section, this will be our last part that we'll do together. If you scroll down a little bit _____ [0:07:35].	
Student 3: Okay.	
Interviewer: And, then one more time. Okay. So, if you want to read it and then tell me what you're thinking.	
Student 3: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? Well, if 7 divided by, if 7, 21 divided by $7 = 3$. So, then it would, it could be _____ [0:08:10].	
Interviewer: So, how did you know to use divided by even though in the problem they didn't say divided by?	
Student 3: Because, it, it, it says multiplication and multiplication, multiplication is the opposite of division.	
Interviewer: Very nice. Thank you.	
Student 3: [Item 2] A photo album has 56 pages. Which estimate is closest to the number of pages of 43 photo albums? So, to figure that out, I will, I will do 56×43 , $3 \times 6 =$, 3×5 is 15, but then you add 3 more. That would be 17 and 3×5 is 15, plus 1, so that would be 16. And, then $4 \times 6 = 24$, and then you would add the, you would add 2 right here. And, then the $4 \times 5 = 20$ plus 2. It will be 22 _____ [0:09:53] 24 and then _____ [0:10:04] $4 + 7 = 11$, $2 + 6$ would equal 8 plus 1 and that would be 9. And, then $2 + 1$ would equal 3.	
Interviewer: Okay. _____ [0:10:45] help you. What are you thinking about?	
Student 3: _____ [0:11:15]. I'm just trying to figure out how it could help me...	
Interviewer: Okay.	
Student 3: ...work on the computers.	
Interviewer: So, you multiplied 56×43 , right. And, you got 391, and you're trying to figure out how that can help you choose the best answer. What would you do if it was	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
the day of the real test and you got to this point in your, sort of what you got, and it didn't match an answer choice?	
Student 3: I would skip ahead.	
Interviewer: Okay. Do you want to, do you want to do that and then come back to it at the end? Okay. So, you can just hit next. Oh, I didn't know that, tricky. And, then it reminds you to come back to that.	
Student 3: We have these on, on here _____ [0:12:17].	
Interviewer: Yeah. Wow. That's great. Okay. So, yeah, just _____ [0:12:20]. We'll do that at the end. Okay.	
Student 3: [Item 3] Which number would make this equation true? 56 divided by blank equals 7. A _____ [0:12:37] that we use in my class is 56 is 7×8 . So, that would mean that it would be 8.	
Interviewer: Now, you said 7×8 , but the problem says division. How did you know to say 7×8 ?	
Student 3: Because, it's the opposite, so then it would, if you just flipped it around, it would be the same.	
Interviewer: Very nice. Okay. How about this one?	
Student 3: [Item 4] This information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. The table shows their goal. Beth completed her reading goal for, for 10 days. What is the number of pages Beth read? So, if it's 15 pages per day and it's 10 days, you would multiply that, you would multiply 15×10 , and then 0×5 would be 0, and 0×1 is 0. And, then 1×5 would be 5, and then $1 \times$ _____ [0:14:08] would be _____ [0:14:09].	
Interviewer: So, when you multiplied, you got 15 and then I saw you erase that. Why did you erase that?	
Student 3: Because, at the, at the beginning, it's 15 pages per day, and it needs to be, it needs, their goal is for 10 days.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: That’s right. Is there some, a different strategy you could use?	
Student 3: Well, from multiplication, I know that 10, usually 10 times anything would just add a zero to it.	
Interviewer: Yeah. So, does that help?	
Student 3: Yes. So, that would mean it would be ____ [0:15:57].	
Interviewer: Right. Great. Okay. How about the next one?	
Student 3: [Item 5] Use this information to answer the following three questions. Beth, Dean, Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Jake is reading a book that has four hun, 389 pages. Based on Jake’s reading goal, how many pages of this book will Jake have left to read in three weeks? So, if his, if his goal is 110 pages per week, then you could, you could multiply that by 3. 3×0 is 0, 3×1 is 3, 3×1 is 3, so then that’d be 330. And, then 330, if it needs to be three weeks, and if that would want to, and if the 3 stands for weeks, and the 110 stands for pages, then 3×110 would be, that would be three weeks. And, and he needs to, his goal is for three weeks, so it’s 330.	
Interviewer: 330. Very nice. Great thinking. Okay. Next one.	
Student 3: [Item 6] Use this information to answer the follow three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening and on the second day. Which value can be placed in the square to make this equation true? So, 40 minus, $40 - 22$ would be, you would need to borrow from the 4 and make it a 3 ____ [0:18:59]. Then $10 - 2$ is 8, and $3 - 2$ is 1. So, then it would be 18, and $18 + 8 =$, if $8 + 8$ equals 16, you put the 6 down there and add the 1, so $1 + 1 = 2$, that’d be 26.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Now, how did you know to add that 8 after you got 18?	
Student 3: Because, on the problem, it says $40 - 22 =$ that. And, then that, you need to add 8 more to it.	
Interviewer: Great. _____ [0:19:46].	
Student 3: [Item 7] Use this information to answer the following three questions. The students in Mr. Valdez’s class measured the heights of their bean plants. This table shows their data. This fraction model that shows the height of Mariah’s bean plant. Which expression is equal to the height of Mariah’s bean plant? If it’s, it shows $\frac{3}{4}$, then if you go down to A, it’s $2 + 1$, and if you add fractions, the bottom number stays the same. But the top numbers change, so then that would be $\frac{3}{4}$.	
Interviewer: Great. Nice. Good explaining.	
Student 3: [Item 8] Use this information to answer the following three questions. The students in Mr. Valdez’s class measure more heights of the bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as the data table. What is the total number of plants that have a height greater than $\frac{1}{4}$ inch? Well, on this chart, $\frac{1}{4}$ is smaller than $\frac{3}{4}$ and $\frac{1}{2}$. So, then you would add the, those two together and that would equal 4. So, then the answer would be 4.	
Interviewer: Great.	
Student 3: [Item 9] Use this information to answer the following three questions. The students in Mr. Valdez’s class measured the height of bean plants. The table shows their data. Which list shows the plants heights in inches from order least to greatest? On A, $\frac{1}{4}$ is, is the smallest of all of them, and then $\frac{1}{2}$ is a little bit bigger, then $\frac{3}{4}$ is there, a little bit bigger than that. On B, then $\frac{1}{2}$, I know it’s not right, because $\frac{1}{4}$ is smaller than that. On this one, $\frac{3}{4}$ is, I know it’s the biggest one. And, same with D. So, the answer is A.	
Interviewer: Now, did you find it hard to explain out loud _____ [0:22:31]?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: No, not really.	
Interviewer: You did a really nice job. Great. Go ahead and try the next one.	
Student 3: [Item 10] This rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts in the rectangles below? Well, on this side, there's only $\frac{1}{4}$ that is shaded. And, then on this side, there's only $\frac{2}{4}$. So, if you add $\frac{1}{4}$ plus $\frac{2}{4}$, it would equal $\frac{3}{4}$.	
Interviewer: Now, how did you know that $\frac{1}{4}$ plus $\frac{2}{4}$ equal $\frac{3}{4}$?	
Student 3: Because, if you imagine all the white ones were gone and you drag the, the shaded one over there, that would be three out of four.	
Interviewer: Very nice.	
Student 3: [Item 11] The student in Mr. Plar's class measured the length of their pencils. They recorded the measurements on a line plot. How many pencils were less than $4\frac{4}{8}$ inches long? So, on here, if you want to figure that out, you go to $4\frac{4}{8}$, which, then you go to all the ones before it and then there's a one on that one and a three on that one, then a one on that one. Here's another right here. So, you would add $1 + 3 + 1$, and you could, you could ignore the 3 right now and do the $1 + 1$, and that would be 2. And, then $2 + 3 = 5$.	
Interviewer: Very nice. Last one.	
Student 3: [Item 12] Which comparison is true? On A, it's $\frac{1}{2}$ is less than $\frac{1}{4}$, so that's not true. On B, it's $\frac{1}{3}$ is equal to $\frac{2}{3}$, which isn't true. $\frac{2}{4}$ is equal to $\frac{1}{2}$, that is true. But, and on D, $\frac{2}{4}$ is less than $\frac{1}{3}$, or yeah, $\frac{2}{3}$ is less than $\frac{1}{3}$, and that's not true.	
Interviewer: How do you know that C is true?	
Student 3: Because, with, if you take the shaded ones and put this one to the side, then half of it will be shaded and half of it won't be, like on this side.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Great. And, then did you want to go back?	
Student 3: _____ [0:25:15].	
Interviewer: You want to read it again?	
Student 3: [Trying item 2 again] A photo album has 56 pages. Which estimate is closest to the total number of pages in, in 43 photo albums? This time, I'm going to, this one's really confusing for me.	
Interviewer: So, tell me what you're thinking about.	
Student 3: I'm just thinking that if I work this out on, if I worked out 56×43 , I don't see how it could get up to 2,000 and over.	
Interviewer: Okay. So, how did you know to do 56×43 ?	
Student 3: Because, the number is getting bigger.	
Interviewer: Very nice. So, you don't have to choose an answer, because today I just wanted to know what you were thinking about. So, _____ [0:26:42]. You did a great job. I just have a couple of questions for you _____ [0:26:46] all of it put together. So, did you enjoy thinking out loud, or not really?	
Student 3: I enjoyed it, but it made me a little nervous.	
Interviewer: You did a great job. I know, I understand why it makes you nervous, because you don't know me very well. But you did an awesome job.	
Student 3: Thank you.	
Interviewer: You're welcome. Did thinking out loud make it harder, easier, or the same when you were trying to answer it?	
Student 3: Well, it probably made it a little bit easier.	
Interviewer: Oh, good. And, then you know the problems that have like a chart over here and then the	

Student 3 School B Grade 5 Mathematics

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
question. Did you find those harder, easier, or the same as like a plain problem like this one?	
Student 3: I found those easier, because you have a number to start out from and you don't have to start out from scratch.	
Interviewer: Great. And, then were there any that were particularly either hard or confusing?	
Student 3: Well, other than question two.	
Interviewer: I was going to say, I bet this one is what you were going to do. Okay. So, multiplying. Any other ones _____ [0:27:57] other ones didn't feel confusing.	
Student 3: _____ [0:28:00] confusing.	
Interviewer: You did a great job. Thanks so much for your help today. _____ [0:28:05].	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Hi. If you don't mind I'm going to tape [?] your answers, so, that when I get home, I'll remember what you said. Is that okay? Alright. So, do you know what we're going to be doing today.	
Student 4: I do.	
Interviewer: We're not trying to find out if you know the right answers; we're trying to find out how you're thinking about them. So, there is going to be no record of your answer. I work for the company that runs these kinds of tests so that we get to learn how kids your age think about all this. So, it doesn't matter if you don't know. What grade are you in?	
Student 4: Fifth.	
Interviewer: And what's your teacher's name?	
Student 4: Ms. ----- [Teacher's name].	
Interviewer: Can you say that one more time?	
Student 4: Ms. ----- [Teacher's name], her name means "----."	
Interviewer: And can you spell your name for me?	
Student 4: ----- [student spells name].	
Interviewer: Okay. So, we can get started. So, like I said, we're here to figure out how you think about math questions. And do you remember taking a test like this in the spring to ask... usually there's four answers and you pick the right one. And we're going to ask you to think out loud. Do you think you can help out?	
Student 4: Yeah.	
Interviewer: Just think about... like everything your brain is thinking about when you're trying to solve something. But I'm not in your brain, so you have to say it out loud for me to understand what you're thinking. So, anything you're thinking is great, even like, "I don't know how to do this, but I wonder if I mean..." or "Oh is it this	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>question, I can't really remember..." anything you're thinking, just say it out loud.</p> <p>And so, I want to just show you what I think... so, let's pretend that somebody says to me, _____ [00:01:56].</p> <p>And then I'm going to show you what thinking out loud looks like, but this time a problem, and there will be scrap paper for you.</p> <p>So, first I'll just read it out loud. It says, "There were 40 student 4s at a tract meet. All of the student 4s participated in either the long jump or the high jump, or both. For now, I'm just going know it's there. And it says, "How many student 4s participated in only the high jump?" So, I'm going to make sure I know what they're asking, what do they really want to know is this: how many student 4s were in high jump? So, I know in the picture it says high jump with a question mark, so I think they want me to figure out what question mark is.</p> <p>So, I remember, I think... that this part in the middle means those student 4s did both of the two things. So, I know that if I add the long jump plus the middle, it's going to get me everybody except for the high jump people. So, I'm going to add on my paper, 15 plus 6.</p>	
<p>Student 4: 21.</p>	
<p>Interviewer: Very nice. And you knew that that was 21. I have these two parts, so I'm going to go back to my problem, because that's not the question mark. So, in the first sentence, it says there were 40 student 4s, so I think that means 40 in total. So, I'm going to do 40, and I'm going to subtract 21--</p>	
<p>Student 4: 19.</p>	
<p>Interviewer: Nice job. And you knew that was 19. So, I see that 19 is B. I'm just going to make sure that I understand the sentence. If I put 19 here, and I add 6 and 15, that was this next sentence, because I'm going back to the 40 that they asked for. So, I would use the mouse and choose B, _____ [00:04:00]</p>	
<p>Student 4: So, this is like a mistake [?]</p>	
<p>Interviewer: Exactly. But you're not going to get a score. So, it's just for us to learn about how you're thinking. So, do you feel like you're ready to practice thinking out loud</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>a little bit? Okay. So, we want you to start, please, by reading it. And then there's scrap paper if you want, and then just tell me what you're thinking. This one, you'll notice there's something on the left, and then the problem is up here, you're going to want to read it all so you understand what they're talking about. Do you want to read it out loud to me?</p>	
<p>Student 4: Use the information to answer the following questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day; Dean, 125 pages per week; Jake, 110 pages per week; Maya, 40 pages per two days. Dean completed his reading goal for two weeks. What is the total number of pages Dean read? 125...</p>	
<p>Interviewer: How did you know to add 125 plus 125?</p>	
<p>Student 4: Because it says Dean completed his reading goal for two weeks, and that's only one week.</p>	
<p>Interviewer: Very nice. So, you can go ahead and choose D with the mouse, and then you can hit "Next". How about this one?</p>	
<p>Student 4: A father has three children. He has 36 books that he will divide evenly among the children. The number of books each child will receive, b, can be found using this equation. It's 12.</p>	
<p>Interviewer: Good. How did you know that?</p>	
<p>Student 4: Because 3 times 12 is 36.</p>	
<p>Interviewer: So, is that something that you knew.</p>	
<p>Student 4: Yes.</p>	
<p>Interviewer: Very nice. Okay, so you can go ahead and choose B. And now, we've finished the practice ones, did those make sense to you what I want you to do?</p>	
<p>Student 4: Uh-huh.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You did a great job. So, we've finished just for that part, and then there's a section that has two more problems, and I'd love for you to do the same thing, just solve it and tell me what you're thinking as you solve it.	
Student 4: Okay. [Item 1] Use the information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day; Dean, 125 pages per week; Jake, 110 pages per week; Maya, 40 pages per two days. Beth completed her reading goal for 10 days. What is the total number of pages Beth read?	
Student 4: 15... that's 35.	
Interviewer: How did you get 35?	
Student 4: Oh, 30.	
Interviewer: Okay. How did you get 30?	
Student 4: Because 5 plus 5 is 10, so you add zero, and you put the one above the two 1s, and that's a 3.	
Interviewer: And why were you adding 15 plus 15?	
Student 4: Because Beth used ten days, so I'm doing two.	
Interviewer: Okay, great. Keep going. Sorry for interrupting.	
Student 4: So, that's 4.	
Interviewer: So, that would be 4 for 40?	
Student 4: Yes.	
Interviewer: Okay.	
Student 4: That's 40. And then this is ____ [00:08:19].	
Interviewer: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: And then, there's two more days left. 30.	
Interviewer: So, let me understand. So, you found, first, how many was two days, and then you used that to get 4, and then to get 8, and then you added another two. Very nice. So, which choice do you think is best?	
Student 4: A.	
Interviewer: Okay. How about the next one?	
Student 4: [Item 2] Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of three weeks? It's D.	
Interviewer: I'm just going to see what you did. You did 110 plus 110, and then you got 220. And then you added another 110, and then you got 330. Just because the... No, that's okay. You're doing great.	
Student 4: And... _____ [00:10:08] I think it's 330.	
Interviewer: Okay. How did you know to add 110 to 110, and then another 110.	
Student 4: Because I know how much pages per week.	
Interviewer: And then how many times did you add it?	
Student 4: Three.	
Interviewer: How did you know it's three?	
Student 4: Because if I added that plus that number or the same number, that'd make it 440.	
Interviewer: Okay, so you stopped at three because _____ [00:11:04]?	
Student 4: Yes.	
Interviewer: Okay. On to the next one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 4: [Item 3] Maya completed her goal for two days. The first day, she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening on the second day. $40 - 22 = 18$. $18 - 2 = 16$. $16 + 1 = 17$. Plus 8... 16 plus 1, that's 2.</p>	
<p>Interviewer: How did you know _____ [00:12:10]?</p>	
<p>Student 4: Because it says it right there, and that's what I did.</p>	
<p>Interviewer: Okay. Next.</p>	
<p>Student 4: [Item 4] Duane know that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? 21×7. 7 goes in 1, 7... wait. How I learned 7×1 is technically a song that my teacher made up, because 3, 6, 9, 12, 15, 18, 21. And that's how I know all.. 1 through 12.</p>	
<p>Interviewer: So, how did you know that "A" was the best answer?</p>	
<p>Student 4: Because 21×7.... no, wait... 21 divided by 7.</p>	
<p>Interviewer: So, how did you know that "C" was the best answer.</p>	
<p>Student 4: Because 21 divided 7, 7 can't go into... it's technically easy. I did this a long time... 7 can't go into 2, so you put a zero. How many times can 7 can go into 21? And then you count by saying 7, 14, 21... and the answer is 3.</p>	
<p>Interviewer: Now, up here it says "multiplied", and then your answer had "divided". How did you know that that was okay?</p>	
<p>Student 4: Because if you...a number multiplied by 7 is 21, so... 3 is multiplied by 7. That's 21. So, you see that if you multiply every number that you can till you get to 21.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>[Item 5] A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? 43 times 56, right?</p>	
<p>Interviewer: Uh-huh. So, you multiplied 43 times 57, and you have 473?</p>	
<p>Student 4: No, wait, I got this wrong. I'm supposed to add a 0, and then 0, and that's 3, and that's 2.</p>	
<p>Interviewer: And then 2300. How did you get that?</p>	
<p>Student 4: Well, you can't... like do this all at once, so you have to go 6 times 3 equals 18... wait... yeah. And then, put the 8 down, and that's too big because you can't put it right there, so you have to do plus one. On the next line, so 6 times 4 is 24, plus 1, that's 25. So, you put a 25, and then you have to bring down the 0 right here. And then 5 times 3 is 15, so add the 5, and then you've got to do plus 1. Then 5 times 4 is 20, plus 1, that's 21. And that's how I got it.</p>	
<p>Interviewer: Okay. And then which answer would you choose?</p>	
<p>Student 4: B.</p>	
<p>Interviewer: And why "B"?</p>	
<p>Student 4: Because "B" is... if you don't have the right answer, and you see the wrong one up there, that might be the closest to the answer. You add up until you get that answer.</p>	
<p>Interviewer: Okay. Great. Thank you. Next one.</p>	
<p>Student 4: [Item 6] 56... that's 8.</p>	
<p>Interviewer: How do you know that?</p>	
<p>Student 4: Because 7 times 7 is 49, plus 7, that's 56.</p>	
<p>Interviewer: And how did you know... you said 7 times 8, but this says "divided by"...</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: Yeah, 56 divided by 7--I mean divided by 8.	
[Item 7] [Some text seems to be missing here.]	
Interviewer: How did you get the 3?	
Student 4: When you put those together, I mean that's 3, because that's 2, that's 1. And then you add up all those.	
Interviewer: All the different parts.	
Student 4: Yeah.	
Interviewer: Okay.	
Student 4: [Item 8] The student 4s in Mrs. Plar's class measured the lengths of their pencils. They recorded their measurements on a line plot. How many pencils were less than 4 and four-eighths inches long?	
Interviewer: Which fraction are you focused on?	
Student 4: That's 4 and four-eighths. So, that's 3 inches. That's 1 inch, 2 inch, 3, 4 inch, and 5 inch, because they're all equal. Then... no it's five.	
Interviewer: How do you know it's 5?	
Student 4: Because less than inches, that's one, that's two, that's three, that's four, that's five. Because you don't add these... because this is lower than this one, so you count that one; that's lower than that one, so you count that one. That's the same, so you count that one, and that's one.	
Interviewer: So, you added up every fraction that had less than three Xs to get your answer?	
Student 4: Yeah.	
[Item 9 seems to be missing]	
Interviewer: Okay, great. [00:19:46] - [00:20:03] [Inaudible]	
Student 4: That's true.	
Interviewer: How do you know it's true?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: Because if you put that over there, that's, that is it.	
Interviewer: Very nice.	
Student 4: [Item 10] Use this information to answer the following three questions. The student 4s in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. This is a fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? Yeah, that one.	
Interviewer: Option D?	
Student 4: Yeah.	
Interviewer: How did you know D was the right answer?	
Student 4: Wait a minute. That one.	
Interviewer: A or B?	
Student 4: A.	
Interviewer: How did you know A was correct?	
Student 4: Because 2 plus 1 is 3, and you _____ [00:21:13]	
Interviewer: Okay. And did you use this table to help you?	
Student 4: Yes.	
Interviewer: And which part of it did you use?	
Student 4: Because one, two, three... those are three and then there's four.	
Interviewer: Okay. Next.	
Student 4: [Item 11] Use this information to answer the following three questions. The student 4s in Mr. Valdez's	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>class measured the heights of their bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as in the data table. Wait, why is that a 2? Oh, it's okay. What is the total number of plants that have a height greater than one-quarter inch? Um... three plants.</p>	
<p>Interviewer: What's your answer?</p>	
<p>Student 4: 2.</p>	
<p>Interviewer: So, how did you know that it's two?</p>	
<p>Student 4: Because one, two.</p>	
<p>Interviewer: So, there were two that had... which measurement?</p>	
<p>Student 4: Three-fourths.</p>	
<p>Interviewer: Two that had three-fourth. Great. Next.</p>	
<p>Student 4: [Item 12] Which list shows the plant heights, inches, in order from least to greatest? B.</p>	
<p>Interviewer: How do you know B is correct?</p>	
<p>Student 4: Because that's a 2, and that's a 1, that's 1 and that's a 4. That's the biggest number, that's one of the least, but that's the least because it has two, and the others have four.</p>	
<p>[Andrea – stop here.]</p>	
<p>Interviewer: Awesome. There are no additional questions. Let me just ask two questions?</p>	
<p>Student 4: Yeah.</p>	
<p>Interviewer: You did a great job. And did you enjoy thinking out loud today?</p>	
<p>Student 4: Yeah.</p>	
<p></p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You did a great job. And did you find that when I made you talk out loud, did it make it harder, easier, or the same to find out the correct answer?	
Student 4: Definitely easier.	
Interviewer: Easier? What made it easier?	
Student 4: Because if I talk out loud, I can actually remember it. But if I talk in my head, I just read very fast, and I don't really remember.	
Interviewer: Looking at that table over here, and then the question, did you find it was harder, the same, or easier than just a plain question?	
Student 4: The same.	
Interviewer: Okay. And then were there any questions that you remember being really hard or a little confusing?	
Student 4: Not really.	
Interviewer: Great. You did an awesome job, and thank you for your help today.	
Student 4: Are you back to _____ [00:23:56].	
Interviewer: Oh, yes, sure. You did a great job. Thank you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: If you don't mind I was going to record it so I can remember what you said. Is that okay with you?	
Student 5: Okay.	
Interviewer: My name is ----- and I work for a company that writes these kinds of math questions. Do you remember something like this? You probably took it in the spring where there are questions and four answers?	
Student 5: Yes.	
Interviewer: Does that look familiar? What we're trying to figure out is how kids your age do with questions like these, like what they think about when they're answering them, so we're hoping that you could tell us what you're thinking about. Your score won't go to your parents or your teachers. It's just for us to learn about how kids think. Does that sound like something you'd be willing to do? Okay. We're going to ask you today to think out loud. Have you ever heard of something like that?	
Student 5: Yeah.	
<p>Interviewer: Basically it's just like everything you're thinking you're going to say so that I can understand it because if it's just in your head I won't know. I'm going to show you what I think thinking out loud looks like and sounds like and then you'll get a turn. Let's pretend somebody gave me this piece of paper and told me my job was to fold it twice in half. So, what I'm going to do is I'll fold it this way first, I'll line up the edges, and I'm going to make a crease straight across. Then, they said to fold it twice so then I'm going to go back the other way and I'll take my paper, fold it, make sure it's straight, and then go straight across. And then, I'll probably check my work so I know I did one fold and then another fold. I think I followed the rules. I did it twice.</p> <p>Now, I can show you thinking out loud with a math problem. The first thing I would do is just read this. It says, "There were 40 student 5s at a track meet. All of the student 5s participated in either the long jump or the high jump or both." Then, I see this picture and I'm going to leave that for just a second. I'm going to read the question. It says, "How many student 5s participated in only the</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>high jump?” I’m going to ask myself what do they want to know. I think it’s how many student 5s did only the high jump, and then I see that question mark, so I think they want me to figure out what that means. I know that this is showing me that in the long jump there were 15 kids. There are six in the middle, so I think that means those six did the high jump and the long jump, and then I’m going to try to figure out the answer, so I’m going to need some scrap paper.</p> <p>I know there were 15 that did long and six that did both, so I’m going to add those together, 15 plus 6, and get 21. Then, to figure this out I think I need to know how many did all of it, so I’m going to go back. It says there were 40 student 5s at the track meet, so then I know I can subtract 21 from 40 to get 19, which is answer B. So, I’m going to click B, and then I’m going to ask myself if that makes sense. Does it make sense that I clicked 19 there? I think it does. Great. So, that was sort of me talking out loud, thinking out loud. Would you be willing to give it a try as well?</p>	
<p>Student 5: Yeah.</p>	
<p>Interviewer: Okay. Over here there’s scrap paper if you want to—like I used it to do a couple of things. If you want to use it, great. If not, you don’t have to. If you want to start by reading it and then tell me what you think.</p>	
<p>Student 5: “A father has three children. He has 36 books that he will divide evenly among the children. The number of books each child will receive can be found using the quote.” So, I think it would be so you would three times something, or you can just divide three times 36.</p>	
<p>Interviewer: Yes. So, which answer would that be?</p>	
<p>Student 5: Twenty-two; wait, twelve.</p>	
<p>Interviewer: Twelve? How do you know that twelve is correct?</p>	
<p>Student 5: Because I had 12 returns.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice! Then, you can hit next and this one is just a teeny bit different. There's something on the left, this table, and you're going to want to look at that in order to help you answer the question.	
Student 5: "Use this information to answer the following questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goal." Beth reads 15 pages per day and then Dean reads 125 pages per week and Jane reads 110 pages per week and Maya reads 40 pages per two days. Dean completed his reading goal for two weeks. What is the total number of pages Dean read? Um, 240 I think.	
Interviewer: How did you figure that out?	
Student 5: Because I added 125 plus 125.	
Interviewer: Why did you add it together, 125 plus 125?	
Student 5: Because it says Dean completed his reading goal for two weeks and it said he read 125 pages per week.	
Interviewer: Awesome. So, go ahead you can click D. Wait, did you say 240 out loud?	
Student 5: Yeah.	
Interviewer: Yes, you hit turn in, so those were the practice ones. You did a great job thinking out loud. Are you ready to try a few more?	
Student 5: Mm-hmm.	
Interviewer: You're doing a great job. Okay, so if you can just continue reading it and then telling me what you think?	
Student 5: [Item 1] "Duane knows that a number multiplied by seven is 21. Which equation can Diane use to figure out this number? Um, 21 divided by 7.	
Interviewer: How do you know that it's divided by it?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Because if you divide it by 21 you get three.	
Interviewer: I notice that up here it says multiply but then your answer had divide it. Why is that?	
Student 5: Because it said multiply by three, so you'd get 21 but in this one it's asking how much would you get if you get it?	
Interviewer: Great. Awesome. Pick you choice, and then you can hit next.	
Student 5: [Item 2] "A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums?"	
Interviewer: Mm-hmm.	
Interviewer: So, you multiplied 56 times 43. How did you get the right answer? Hmm. What did you most write for your answer?	
Student 5: That it's two million. It's 20,000.	
Interviewer: Mm-hmm, so what would you do on the day of the test if you got an answer that doesn't match what the choices were?	
Student 5: I would try a different –	
Interviewer: Yeah, do you want to give that a try?	
Interviewer: So, it looks like you tried to divide 56 by 43?	
Student 5: Mm-hmm.	
Interviewer: And then did that help on the choice of response?	
Interviewer: So, which operation makes the most sense to you; adding, subtracting, multiplying, or dividing given what they showed you?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Probably multiplying.	
Interviewer: Multiplying? Okay, so what made you think of multiplying?	
Student 5: Because you'd get at least 2,000.	
Interviewer: Great. Okay, so then do you have an idea of which one would be the best choice?	
Student 5: Uh, this one.	
Interviewer: Great. Go ahead and choose that one. Awesome, and then you can hit next. Can you read this one out loud?	
Student 5: [Item 3] Yes. "Which number would make the equation true; 56 divided by what equals seven?" I think it's A.	
Interviewer: Why do you think it's A?	
Student 5: Because I did seven times eight would equal 56.	
Interviewer: How do you know you can do seven times eight even though it says divided by?	
Student 5: Because you can check your work. You can see if it equals the same.	
Interviewer: Awesome. Choose the best answer.	
Student 5: [Item 4] "Use the information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals." Beth had 15 pages per day, Dean had 125 pages per day, and Jake had 110 pages per week. Dean had 125 pages per week and Maya had 40 pages for two days. "Beth completed her reading goal for 10 days. What is the number of pages Beth read?"	
Interviewer: So, you were counting five times 40. Where did you get those numbers from?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Right here—it's 40 and it says Beth completed her reading goal for 10 days, but it says ... oh, I read it wrong.	
Interviewer: That's okay. So, what would you like to do instead?	
Student 5: 15 pages times 13 –	
Interviewer: Mm-hmm.	
Student 5: I think 150.	
Interviewer: I saw you wrote on your paper 10 times 15 equals 150, but I think your brain something to get that answer. How did you get that answer?	
Student 5: I was doing 15 times five, but I did it twice.	
Interviewer: Very nice strategy. Great, so go ahead and choose your answer.	
Student 5: Do I have to read that?	
Interviewer: It's up to you. Does it look familiar?	
Student 5: Yes.	
Interviewer: So, if it's the same –	
Student 5: [Item 5] “Jake is reading a book that has 389 pages. Based on Jake’s reading goal, how many pages of the book will Jake have left to read at the end of three weeks?”	
Interviewer: Mm-hmm.	
Student 5: I think it would be 59 pages.	
Interviewer: On your paper you divided 389 by 110, and then how did you know 59 was the answer?	
Student 5: Because I subtracted 389 minus 330 and I got that answer.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: How did you know from the problem to do 389 divided by 110?	
Student 5: Because Jake reads 110 pages per week and it says 389 pages and it says how many left pages would he have left at the end of the three weeks.	
Interviewer: Very nice. Great, so go ahead and pick your answer and you can hit next.	
Student 5: [Item 6] “Maya completed her goal for two days. The first day she read 22 pages. The second day she read eight pages in the morning. Which equation can be used to find the number of pages Maya read on the second day?”	
Student 5: It would be 26.	
Interviewer: Now, you wrote down 18 plus eight equals 26. How did you get to this number, 18?	
Student 5: Because 20 minus 40 equals 20 and then there’s two left, so I subtracted 20 minus two and it got me to 18.	
Interviewer: How did you know to add eight to that?	
Student 5: Because it would equal 18 plus eight.	
Interviewer: Great. Go ahead and pick your answer please. How about this one?	
Student 5: [Item 7] “Use this information to answer the following three questions. The student 5s in Mr. Valdez’s class measured the heights of their bean plants. This table shows their data.” Anna one-half, Eva three-fourths, Kent one-half, Mariah three-fourths, and Peter one-fourth. “This fraction is a model that shows the height of Mariah’s bean plant. Which expression is equal to the height of Mariah’s bean plant?” I think it’s A.	
Interviewer: Why do you think it’s A?	
Student 5: Because two plus one is three, but you can’t change the bottom two numbers.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Did you use this picture to help you solve that?	
Student 5: No.	
Interviewer: You didn't use it? Okay, great. Thanks. You can just click it. There you go.	
Student 5: [Item 8] "Mr. Valdez made this frequency table to show the same information as the data on the table." Bean plant heights; plant heights were one-fourth, one-half, and three-fourths. "What is the total number of plants that have a height greater than one-fourth?" Four.	
Interviewer: How did you know that?	
Student 5: Because I looked over here and I saw two and I saw them each here which made four.	
Interviewer: Why did you not include that one?	
Student 5: Because it said which one is greater than one-fourth?	
[Item 9]	
"Which list shows the plant highest in inches and order from least to greatest?" I think it's A.	
Interviewer: Why?	
Student 5: Because it's the order from which the greatest and one-fourth is least, what is least and one-half of one-half is least out of three-fourths.	
Interviewer: Okay.	
Student 5: [Item 10] "This rectangle represents one whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below?" I think it would be three-fourths.	
Interviewer: How did you get that three-fourths?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Because the dark spots would be, and then it says plus and then the dark spots, there's three of them so I added those together and then there's four over here and four over here.	
Interviewer: Nice.	
Student 5: [Item 11] "The student 5s in Ms. Plar's class measured the length of the pencils. They recorded their measurements on a line plot. How many pencils were less than four and four-eighths inches long?"	
Student 5: I think it's five.	
Interviewer: How did you get five?	
Student 5: Because it says which one is less than four and four-eighths and I simply counted that one, which is four and that one, which is five.	
Interviewer: Nice.	
Student 5: "Which comparison is true?" I think it's this one.	
Interviewer: Why do you think that one?	
Student 5: Because this one is in two-fourths and it's actually in half. You can make it smaller.	
[Andrea – stop here.]	
Interviewer: Very nice. Okay, so that was the last question for math. I have a couple of questions I wanted to ask you just about all the pages. So, did you enjoy thinking out loud?	
Student 5: Yes.	
Interviewer: You did a great job. Did you find it easier to think out loud, or did it actually make it harder to answer the questions?	
Student 5: It was easier.	
Interviewer: Easier? What made it easier?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Because you're actually getting it out of your system so you can actually see it.	
Interviewer: That's great. And then, you know how some of the problems had a table over here and then a question? Did you find those ones harder, easier, or the same as the ones that were just one big question?	
Student 5: The same.	
Interviewer: The same? So, there was no difference. And then, were there any questions that you found really hard or confusing?	
Student 5: I think one.	
Interviewer: Okay. We can go back through and you can stop me if you see it.	
Student 5: This one.	
Interviewer: This one? Okay, great and then what made this hard for you?	
Student 5: Because I didn't which—I tried multiplication and it didn't work and when I tried dividing it didn't work either.	
Interviewer: Thank you so much. You did a wonderful job. Thanks for helping today. You're all done so I'll bring you back.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: We are recording just our voices so that I can remember. Is that okay?	
Student 1: Okay.	
Interviewer: Are you in eighth grade this year, Student 1?	
Student 1: Mm-hmm.	
Interviewer: Do you have your math teacher's name?	
Student 1: Homeroom?	
Interviewer: I'm sorry. Do you know your math teacher's name?	
Student 1: Oh. I believe it's Ms. [Teacher's name].	
Interviewer: Are you having a good year so far?	
Student 1: Pretty good. And you?	
Interviewer: Yes, thank you. So, do you still want to know what we're here for, or do you want me to tell you a little more about it?	
Student 1: From what I know I'm here to test and see if I can—if you guys could get some answers.	
Interviewer: Exactly. I work for the company that writes these kinds of questions. What we're trying to figure out is how kids your age think about these kinds of problems. We actually don't need to know if you got the right answer or not. We just want to know what you're thinking as you're trying to solve them. You're not going to get a score. Your Interviewer won't get a score. Your parents won't get a score. It's just for us to learn more about how eighth graders are thinking about these problems. We're going to ask you to think out loud. Have you ever heard of that before?	
Student 1: Yep.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: I like to think of it as just kind of everything that’s happening in your brain as you’re trying to solve the problem. I thought I’d show you how I think out loud and then I’ll give you a try. Does that sound okay?</p>	
<p>Student 1: All right.</p>	
<p>Interviewer: If I have this piece of paper and somebody says to me, “Please fold this paper twice,” then first I would think, all right well I guess I’ll go this way and I’ll line up my edges and then I’ll fold straight across to crease it, and then I think I’m going to switch directions for this. So then, I’m going to fold this way, again line up my edges and then make a nice crease, and then I’m going to ask myself if I followed the directions. Let’s see; one, two creases, so I think I did what they asked. That’s sort of thinking out loud. Did you notice that I tried to tell you what I was going to do before I did it so that you’d understand?</p>	
<p>Student 1: Mm-hmm.</p>	
<p>Interviewer: Then, this is thinking out loud with a math problem. The first thing I do is read it. Matthew wrote each letter of his name on a separate piece of paper and then put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a T? So, the first thing I always ask myself is what do they want to know?</p> <p>I go back to the question. They want to know what’s the probability that Matthew will choose a T with each letter that’s the same, so the first thing I’m going to do is count the letters in Matthew, so M-A-T-T-H-E-W. I’ve got seven and then I see that there are two T’s, so the chances that he’ll get a T are two out of the seven total. So, you would click B, and then I only have one so you can hit finish. This was just my practice and then we can turn and ____ [00:02:56]. Did that sort of make sense, my thinking out loud? Do you want to give it a try?</p>	
<p>Student 1: Sure.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: So, you'll hit the practice session and if you go down a little it says continue, and then I gave you a pencil and a calculator. If there's anything you want to try to figure out go for it. This one is a little different from my practice. There's something over here that you'll want to consideration and then the problem is on that side. Start by reading it.</p>	
<p>Student 1: The students in Mrs. Garcia's class were each given a number at random. This table shows the number. Which number is equivalent to Bailey's number? So, Bailey is one over three. All I can remember is well, I keep on forgetting how to change a fraction to a decimal to that other stuff. I can remember that one over three would kind of be equivalent to 0.1 over three, wouldn't it?</p>	
<p>Interviewer: How do you know that?</p>	
<p>Student 1: It's mostly because of memory, but ... yeah.</p>	
<p>Interviewer: If you hit next there will be another one.</p>	
<p>Student 1: Eighteen students in classroom will each – hold on, sorry.</p>	
<p>Interviewer: Yeah, the other day the kids didn't like my mechanical pencil so there's a regular one there, too.</p>	
<p>Student 1: So, there's eighteen students in each classroom. Each cube is one sided, or one through six, so one through six. One time ... how many times is a number greater than three expected to be rolled? So, one through six sides but they'll be able to roll it once, so you'd have to have that by times one. Eighteen students in the classroom, so is it just like they each have a turn through at it?</p>	
<p>Interviewer: Yes.</p>	
<p>Student 1: So, that would be eighteen times six, wouldn't it or eighteen times one? Or, it would be divided from what I can remember. From that, it would be three.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So, you'd have eighteen divided by six? Why did you choose divided by?	
Student 1: Because from what it looked like from the integer right here and if I try to multiply it there are no answers from there.	
Interviewer: Great. Now, do you notice that I asked you some questions? It doesn't mean your answer was wrong. I just want to know more about what you're thinking, so you're doing a great job. Now, if you want to hit finish those were the practice problems. You're doing a great job thinking out loud. Do you have any questions for me before we jump into a few more?	
Student 1: Not really.	
Interviewer: Okay. You're doing a great job, so go ahead and get that operational and then go down and hit continue. So, if you want to read this one and then tell me what you think.	
Student 1: [Item 1] Use this information to answer all three questions. Points A, B—triangle BCD is similar to triangle ACE. The length of segment BD is three units and the length of segment AE is six units. If the length of segment ACE is 7.2 inches what is the length in units of segment BC? Wait. So, let's write down these numbers so we can get a little basis so we don't have to look back and get a little bit of whiplash. All right, the triangle BCD is similar to ACD. All right.	
Student 1: So, three times six; wouldn't it be that? That don't seem right though.	
Student 1: So, wouldn't it be like 7.2 minus eighteen or divide it or something?	
Interviewer: Why don't you try it and see what happens.	
Interviewer: So, you did two over two minus eighteen and got 5.4?	
Student 1: That ain't an answer, so ... 7.2 times one point ... not one point, so times eighteen, sixteen? Six or	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
seven? I know this answer is not really complete, but I've just got to finish this.	
Interviewer: Take your time. So, did you do 7.2 times eighteen and you got thirteen –	
Student 1: Thirteen point ninety-six.	
Interviewer: And now, why did you multiply by eighteen? How did you figure that part out?	
Student 1: It was just during a guess that went in my head, but –	
Interviewer: So, I don't see eighteen on the screen so I think you did something to get that number.	
Student 1: Six times three.	
Interviewer: Okay, the numbers are six times three. Okay.	
Student 1: So, next should we subtract, so should we add?	
Interviewer: Try that.	
Student 1: That's not an answer either, so –	
Interviewer: Nine? That's not a choice either. Hmm.	
Student 1: Well, we should divide it but that's kind of difficult and kind of confusing. So, two to the ... twenty-four, that's something. All right. So, I got something wrong with this. BD is three units in length and segment AE is six units in length and segment AC is 7.2 units both going into these. 7.2, that would be ... well, since this one is shorter it would basically be like divided by something. So, let's see 7.2 divided by ... let's try three first. Two point four; that ain't an answer, but it's close. Then, let's try 7.2 divided by six. One point two, and also not an answer, so that is completely out of the question. Uh, a graph so six?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: All right, basically so right there was a .123, so I decided that since this is just talking about from A to C this would basically be to try and see if we could divide from or something like that from here to here. That's three and I'm thinking 7.2, 7.2 would either be like ... I'm making sure ... oh, 7.2 is subtracted by three is 4.2.</p>	
<p>Interviewer: You subtracted three and got 4.2?</p>	
<p>Student 1: Yeah.</p>	
<p>Interviewer: Great. We'll go on to the next one.</p>	
<p>Student 1: I'm sorry. That too way too long.</p>	
<p>Interviewer: There's no rush.</p>	
<p>Student 1: All right. Trapezoid ABDE is translated 11 units to the left and then reflected over to x-axis to form image ABDE. What are the coordinates of the vertices of trapezoid ABDE? Oh, this one seems much more easier than the last one, so –</p>	
<p>Interviewer: Great. What are you thinking?</p>	
<p>Student 1: So, this; this is just three to two. This is asking to multiply by the—it's translated 11 units to the left. Oh, okay. This means to the left. I usually think of like getting a little graph for this, but since there's no real other graph I could make ... hold on. What's this?</p>	
<p>Interviewer: Oh, it's just the way to use them, another way to use the mouse, but you can use that mouse over there or this one. Yeah, I find that thing kind of hard.</p>	
<p>Student 1: All right. Well, that's just over there. I get a little –</p>	
<p>Interviewer: Do you want to try to draw something yourself?</p>	
<p>Student 1: Mm-hmm.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: So, let's just get the ones that are needed out of the way. Since these are going by ... I must go by three ... since from what these are, the only true ones that matter right now are the lines that are on three and nine, six and seven and nine and six. So, most of them are odds except even, so from this we can get that so if it's saying 11 units to the left; one, two, three, four, five, six, seven, eight, nine, ten, that would be negative eight. And then E would be one, two, three, four, five, six, seven, eight, nine, ten, eleven, negative three. From what I can see there's no negative eight so that's out of the question from what I can see. So, the first part ... oh, yeah I've got that part.</p>	
<p>Student 1: I got four. Did I skip over one?</p>	
<p>Interviewer: Yeah. Try again [Silence, murmuring - 00:14:36 to 00:14:40]</p>	
<p>Student 1: So, it's just negative nine?</p>	
<p>Interviewer: Negative nine, yeah so you're counting –</p>	
<p>Student 1: So, all of these are negative nine; one, two, three, four, five, six, seven, eight, nine, ten, eleven, so negative three?</p>	
<p>Interviewer: Mm-hmm.</p>	
<p>Student 1: So, it would be negative nine and negative three, a lot of these, and since I see most of these don't have a negative nine it will only ... so, this one I'm assuming are going to be the answer.</p>	
<p>Interviewer: Either C or D?</p>	
<p>Student 1: Either C or D.</p>	
<p>Interviewer: Because they both have the negative nine that you were looking for?</p>	
<p>Student 1: Yeah, and since E has negative three and C doesn't have negative three, G would be the answer.</p>	
<p>Interviewer: Very nice.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Which segment lies on a line that represents a proportional relationship between X and Y? A proportion relationship? I'm trying to figure out what that also meant.	
Student 1: What does that mean, that first –?	
Interviewer: Yeah, you know what? I bet you're going to see that more this year. So, I think I don't want to tell you.	
Student 1: Rats. It's been a really long time since we've done –	
Interviewer: A lot of these and this one was hard.	
Student 1: Which segment took ... all right ... so, X and Y ...	
Student 1: It would be AC wouldn't it?	
Interviewer: Why would it be AC?	
Student 1: Because most of these are not X and Y naturally because these were both kind of beyond the X line. This one only goes up a scale with it.	
Interviewer: Great. That's good reasoning. How about this one?	
Student 1: Triangle ABC is similar to triangle DEF as shown below. What is the length of DF? This would be 15 centimeters as well, so –	
Student 1: So, since I multiplied these two this would be 13 times 15 most likely, so there; that's that. So, those are probably supposed to be added then. Oh, wait it's just trying to get to this one, ain't it?	
Interviewer: To this one right here?	
Student 1: Yeah, it's just trying to show that.	
Interviewer: Yeah, DF.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: So, let's look at the answers first; nine, ten, twelve, and thirteen. Since this is odd it had to be divided by odd if you're talking about division. Fifteen divided by nine; that would be ... so fifteen divided by nine. You can't divide that—one point six, six, six, and six. Fifteen divided by ten is 1.5. I think I might have to let the ten slip past even though it's not an odd. Oh wait. Nine can be divided by three and fifteen can be divided by three, so that most likely would be reasonable since these couldn't, these can't be divided by three natural –</p>	
<p>Interviewer: So, you're in agreement that all of them can be divided by three?</p>	
<p>Student 1: Yeah.</p>	
<p>Interviewer: Great.</p>	
<p>Student 1: Yanni drew the rectangle KLMN on this graph. Yanni will reflect that rectangle over the x-axis. Which ordered pair describes the location of point K after it is reflected over the x-axis? All right.</p>	
<p>Student 1: My head is trying to get this wrapped over it.</p>	
<p>Interviewer: Take your time.</p>	
<p>Student 1: So, the last one ... so the last time we had an ordered pair those would be x-axis and y-axis. From what I remember it was probably going to have to be like ... so, since this very negative, the one we're trying to get would most likely be either ... it would probably be negative one or something. If we're talking about this one being on the x-axis that would be negative three, but this is also regular three if we're talking about the y-axis.</p>	
<p>Interviewer: Mm-hmm.</p>	
<p>Student 1: And if we're trying to get like a negative number down here, just try and keep on that y-axis. This won't go perfectly with this. It will go perfectly with this, so it would be either negative one or three, but I'm thinking yeah it's supposed to be y-axis and x-axis, so</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
thinking about this, this is probably what it was, K and M.	
Interviewer: Okay. Which choice would that put us with?	
Student 1: Since this would be negative three on the x-axis and this is ... no, I can't go with it. And there's no negative one, so it's just ... can I go with my instinct there?	
Interviewer: Okay. Which one is that? Do you think it's negative three, positive one?	
Student 1: Yes.	
Interviewer: Mm-hmm.	
Student 1: Density expresses the proportional relationship between mass and volume of a substance. Density is defined as unit of mass, grams, per unit of volume, cubic meters. Based on the graph, which equation represents the relationship between mass and the volume, v of copper? The density of copper?	
Student 1: It's not really wanting a specific number, is it right now? So, if I'm wanting to get ... so, since this one is up to 100 I'll just try to see if that will bring something.	
Interviewer: Found it?	
Student 1: I'm used to having these ____ [00:22:14].	
Interviewer: I think they want you to order them.	
Student 1: Yeah, I've just got to stick to the math and get the relationship between the mass and the volume, v of copper. So, mass is ... oh.	
Student 1: I'm not used to these type of things. Should I just go with my instinct this time?	
Interviewer: Sure. Why not?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: My instincts kind of tell me to go with nine feet.	
Interviewer: Is there something about either the graph or the question that made you choose that?	
Student 1: Like I said, I'm going with my instinct, but it's kind of just confusing most of this. If I get like a math question I have to have like numbers with it so I could get a better idea of what it is.	
Interviewer: So, this one is confusing because it has fewer numbers and more letters?	
Student 1: Yes.	
Interviewer: Okay. That makes sense.	
Student 1: And the graph doesn't really show what type it's talking about, so –	
Interviewer: Mm-hmm. Do this one.	
Student 1: Tickets to a play cost \$29.00. On the first day of the play, 52 tickets were sold. The manager used twenty to fifty to estimate they had tickets of \$1,000.00. So, this one is wanting 29, 52, 50 ... the manager's estimate is reasonable because the value is close to the actual volume of ticket sales. It was \$29.00 on the first day and 52 tickets were sold, so let's multiply 29 times 52.	
Student 1: So, 104; 104 dollars were sold.	
Interviewer: Mm-hmm.	
Student 1: Which statement best describes the situation? The manager's estimate is not reasonable because the value estimates the actual value of the ticket sales by \$500.00. Is that saying that it wants it to be divided by \$500.00?	
Interviewer: Hmm. I don't know. Let's see.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: So, \$500.00 divided by one of the ... equals ... so, no that doesn't equal that. And if we used 20 times 50 that's most likely \$2,000.00 ain't it? Oh, yes. \$1,000.00.</p>	
<p>Interviewer: One thousand, mm-hmm.</p>	
<p>Student 1: The manager's estimate is reasonable because the value is the exact value of the ticket sales. So, they estimate ticket sales of \$1,000.00 but that's not right because whenever we multiply 29 to 52 that only got 104, so they're like what, \$996.00 off by the rule. _____ [00:25:39], so the manager's estimate is not reasonable because the value overestimates the actual value of ticket sales by about \$500.00. So, these two would not be it because they said that it's an estimate of \$1,000.00 and these ones are agreeing with the \$1,000.00, but we did the calculation and got that the manager's estimate is not reasonable because the value underestimates that, the value ... actually value. Okay. About the manager estimate; I'm going to check if I got that correct. It would nine times 29. \$1,508.00.</p>	
<p>Interviewer: Hmm. That was good that you double-checked that.</p>	
<p>Student 1: Yeah, so the manager's estimate either the odd by accident because they probably weren't thinking clearly enough, so –</p>	
<p>Interviewer: \$1,508.00 when you re-multiply? Okay.</p>	
<p>Student 1: So, the manager's estimate underestimates the actual value of the sales by \$500.00, but these are still kind of reasonable because this only sits at about \$1,000.00. This one is \$500.00 more dollars away, so the manager's underestimates, so that would be the answer, wouldn't it since it says its estimate is reasonable but this is just answering both of these.</p>	
<p>Interviewer: Okay, so you think it's not reasonable?</p>	
<p>Student 1: Yes.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: How did you know that the answer; that is underestimates the actual value? How did you figure that part out?	
Student 1: Because this has \$500.00 more dollars to it, and it's just saying; oh, we got like \$1,000.00. That wouldn't necessarily be the answer.	
Interviewer: Great.	
Student 1: I can tell this one might have been tricky for people that kind of over-read it.	
Interviewer: Mm-hmm. How about this one?	
Student 1: What is the value of negative three of ... so that would be three times three times three times three times three, so it's three times four threes. So, that would be 81, negative 81 since it's also a negative.	
Interviewer: So, you knew it was the negative 81 because this number has the negative in front of it?	
Student 1: Yes.	
Student 1: These ones, those were easier. Which value is the greatest distance from zero on a number line? This one kind of confuses me most of the time because like from what I can remember or what my mind thinks I remember is that the ones that are further away from like zero; in general they have a decimal, those are the least, but the greatest are the ones that are closer to the decimal.	
Interviewer: Oh, okay.	
Student 1: So, if this is correct then ... I, like I said I forgot what the ... how to turn a fraction into a regular like decimal or something like that. I kind of forgot how to do that unless ... 100 divided by four equals 25. Three over four equals ... so times 25, times 25 equals 100 total, so four times 25, that would be 75.	
Interviewer: Mm-hmm.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Now, what I forgot is if I need to simplify this, so 100 divided by 75, that would equal ... somehow you don't simplify these by each other, but instead maybe by five? So, 75 divided by five is 15.	
Interviewer: Mm-hmm.	
Student 1: But then, that would just keep on going on for the more ... since you said I've got enough time, uh I shouldn't worry.	
Interviewer: No, that's right.	
Student 1: So, that would be ... let's test out 75 divided by 15, so yeah that's five. 100 divided by 15 ... good thing I checked back on that.	
Interviewer: Good.	
Student 1: Because 15 and that would equal 20. If we divided these both by five that would be ... this is why I don't really like these because I remember we'd have to go to like 100 for this, but then I keep on going down with it because I think I've got to simplify it even more. So, this would equal three and that would equal four except those are odd, but this ain't the answer.	
Interviewer: So, I think that you're having a hard time comparing the fractions to the decimal numbers, right?	
Student 1: Yes. My instincts tell me to like go with either this or this.	
Interviewer: Okay, so how would you choose between the decimal numbers, the A and the B?	
Student 1: The negative decimal is kind of confusing because ... if it's like I said it's supposed to be the farthest away from zero is the least, but just talking about greatest, but it's basically like going from negative zero to zero and just ... that don't really much sense. So, I'm going to go with the positive because positive is always good.	
Interviewer: Mm-hmm, great. Go on to the next one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: Use this information to answer the following three questions. Students in Mrs. Garcia’s class were each given a number at random. The table shows the number. John divided his number by negative nine. Which is the best estimate of his answer?</p>	
<p>Interviewer: Yeah, there’s ton of papers.</p>	
<p>Student 1: So, if we divide ... so, is it talking about each by it or we get Shawn’s and divide it by negative nine?</p>	
<p>Interviewer: What do you think?</p>	
<p>Student 1: Yeah, so negative 940 divided by negative nine. Let me get the calculator up here. This does go up to the nineties but it’s negative, right?</p>	
<p>Interviewer: I’m not sure. It’s a fancy eighth grade calculator. I think it will.</p>	
<p>Student 1: Divided by negative nine ... hmm, is it okay if I bring my phone for the calculator real quick?</p>	
<p>Interviewer: Sure.</p>	
<p>Student 1: Because that one has a bit more sense with it. I’m not used to the ones where they start going ... all right, so just talking about negative 940 divided by negative nine ... hmm. That would be, that wouldn’t be possible.</p>	
<p>Interviewer: What did you get when you divided it? 104.444444?</p>	
<p>Student 1: Yep.</p>	
<p>Interviewer: Well, would that help you choose the best answer?</p>	
<p>Student 1: Maybe if we were doing an estimate because then that would just be regular there, but since these cancel each other out because negative 90 ... okay, so let’s try regular, and doing just regular.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Mm-hmm.	
Student 1: So, if we do negative ... so, it just don't work that way, so let's say we're trying to estimate –	
Interviewer: Do you want to read the question one more time?	
Student 1: Yes. Let's see ... Shawn divides his number by negative nine and Shawn's is negative 940.	
Interviewer: But how about the question? Can you read that one more time?	
Student 1: Which is the best estimate of –?	
Interviewer: Yeah.	
Student 1: And I remember since if two negatives cancel each other it becomes a positive, so –	
Interviewer: That's right.	
Student 1: This would just be 100.	
Interviewer: Let's go to the next one.	
Student 1: I'm not wasting anyone's time right now?	
Interviewer: No, because you're doing a great job. I just didn't want to hear that noise inside your voice.	
Student 1: Oh. This is saying; what is the value of Rachel's number to the third power? Okay, is it just basically trying to divide it by three?	
Interviewer: Let's see.	
Student 1: I've always gotten that confused, so negative seven divided by three ... and I'm not going to be it, whatever it is, so negative seven times three, that would not be an answer.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: No? Okay.	
Student 1: So, it would be seven times three, or 21. But since that's a negative I'm thinking ... and since it's the three it doesn't necessarily say the three is a negative, so it would just be negative 21.	
Interviewer: Great. All right, there's one more.	
Student 1: And then I can go on my way?	
Interviewer: Mm-hmm. I'll have a couple of questions for you then, but they're super-quick.	
Student 1: All right. I'm cool with the questions if you just ask them to me, as long as they're not math problems.	
Interviewer: You're doing a great job.	
Student 1: [Item 12] Which of the following students has the number that is the greatest distance from zero on the number line? The greatest distance from zero ... I'd most likely say negative 940, but Shawn isn't on there.	
Interviewer: That's right.	
Student 1: So, the greatest distance from zero? I would go with my gut and say either Leon or Kim.	
Interviewer: And is there something that's drawing you to those answers?	
Student 1: Because every time I usually check a— do a fraction if I either use a regular numerator like this or something like that it's either the ones with the fraction that are the farthest away. I don't even understand how, or it's just —	
Interviewer: It's tricky.	
Student 1: Yeah.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So, go ahead and go with your gut. What's your feeling on this?	
Student 1: And since the bottom denominator is bigger I'm thinking that as well, so I'm going to have to go with Leon.	
Interviewer: Leon? Great. You did a wonderful job. Just a couple of questions for you.	
[Andrea- stop here.]	
Student 1: Could I turn in?	
Interviewer: Sure. So, did you enjoy thinking out loud?	
Student 1: It helped out a bit.	
Interviewer: Did you find easier to think out loud as you were answering the problems or did it actually make it harder to find the right answer?	
Student 1: For some of the questions I mean if I thought in my head it would still kind of get me a little bit confused, but I usually read it to myself because I can get a better thought on it than speaking out loud.	
Interviewer: Okay. You know the problems that had a table over here and then the problem? Did you find those harder, easier, or the same as just like one big question?	
Student 1: A bit harder because some of them didn't really necessarily have numbers and said to give an approximate number for it.	
Interviewer: And then, were there any questions that you remember being confusing or very hard? The ones that were the estimates; were those the ones you found hardest?	
Student 1: Yeah.	
Interviewer: Okay, the estimate and then without a lot of numbers?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Mm-hmm.	
Interviewer: Great. You did an awesome job. You're all set. We'll bring you back today _____ [00:37:33] and we'll try to figure out the best place for it.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: I can remember what we talked about is that okay with you? Okay great thank you go ahead and sit down. So [Student 2] can you tell me how you spell your name?	
Student 2: [Student spelled name.]	
Interviewer: Okay I got that right. And who's your math teacher this year?	
Student 2: My math teacher is I think, or, what was her name?	
Interviewer: It's okay if you can't remember.	
Student 2: Started with an R.	
Interviewer: R. Okay, is it ----- [[Teacher's name]]?	
Student 2: Yes.	
Interviewer: Okay, perfect. Somebody else has him. Okay great are you having a good year so far?	
Student 2: Absolutely.	
Interviewer: Awesome. I don't know much you know about this. I'll just tell you a little bit. I work for a company that writes the test that you probably take in the spring. Do you remember questions kind of like this? Usually taken on the computer and what we're here to try to figure out how kids your age think about math problems. Because we don't usually get to know what's going on in your head as you're answering the questions. Hoping that today you can think out loud if you're able. So it's basically like everything your brain's thinking about as you're going to solve the problem. Anything you're thinking is great to say even like oh I don't know what they mean by this word or I don't really know what they're asking. Or, first I should multiply or whatever you're thinking about if you want to say it out loud that would be really helpful to me. Is that something you think you could do today?	
Student 2: Absolutely.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Great. So first I thought I'd show you how I think out loud, and then I'll give you a chance. So, if I have this piece of paper and somebody says to me fold it in half two times. I'll line up my edges, make a straight all the way. Now I'm going to flip my paper to go the other way. Line up my edges again and make a nice crease. Then I'm going to ask myself did I do what they wanted? So let's check. I folded it once, I folded it twice. Sort of thinking out loud. Now I'll show you it with a match question.</p> <p>So, first I just read it. It says Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a t. So I always ask myself, what I think what I know. Okay what's the probability that he will choose a t. So I think to figure that out I have to know how many choices there are, so I'm going to spell him name and count. M-a-t-t-h-e-w, so I've got seven in all. Then I'm going to look and I see that there are two t's so I know that he has two out of seven total choices. Does that make sense?</p>	
<p>Student 2: Absolutely.</p>	
<p>Interviewer: So I would click b and I'm going to hit finish because I only have one, you're going to have a few more. Do you think the thinking out loud kind of makes sense? Do you want to give it a try?</p>	
<p>Student 2: Absolutely.</p>	
<p>Interviewer: Nice, so there's paper and pencil and a calculator if that is helpful for you at any point. And then if you want to read it out loud and then tell me what you're thinking that would be great.</p>	
<p>Student 2: Okay. Eighteen students in a classroom will each roll a fair number cube with side labeled one through six. One time. How many times will the number greater than three expect to be rolled? When I think about it, I need to read the question over again.</p>	
<p>Interviewer: That's great, that's a good strategy.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 2: Eighteen students in a classroom will each roll a fair number cube with sides labeled one through six. How many times? One time? How many times will the number greater than three expect to be rolled? Well the probability of rolling a six-sided dice is one out of six. I played many games that required me to roll a dice so I should know this.</p>	
<p>Interviewer: So how did you know it was three?</p>	
<p>Student 2: As I've personally known I play a lot of, I play Dungeons and Dragons.</p>	
<p>Interviewer: And that's a dice game? So you knew that there were three chances to get that?</p>	
<p>Student 2: A probability, yeah.</p>	
<p>Interviewer: Yeah, great okay. Go ahead and take one more practice one. This one's just a teeny bit different. This one has something over here and then the problem is here. You're going to want to look at it all to find the right answer.</p>	
<p>Student 2: I know this.</p>	
<p>Interviewer: Perfect.</p>	
<p>Student 2: Use the information that the following question gives. The students in Missus Gracia, as I think it's called, class which were each given a number at random. This table shows their number. One out of three, negative eight, negative three through four, five, seven over three, seven, -940, which number is equivalent to Bailey's number? As I learned from fractions that one third can never be physically a whole number, and if she were to put it as a hundred, it would equal 33 over a hundred. So, since there's physically no way to divide three until the number stops.</p>	
<p>Interviewer: Nice job, okay that was great explaining. If you want to go ahead and hit finish that was the practice part. Do you feel like you understand what I need you to do? You're doing a great job with explaining. If you hit the blue one and then if you go down a little bit, there you go. If you go down a little bit there should be a continue</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
and they make you do it twice. Okay, would you want to read it and then tell me.	
Student 2: [Item 1] Triangle ABC is similar to triangle DEF, as shown below. What the length between D and F? Okay, if A through B equals 15, and A through C equals three, then obviously you've got to multiply by three to get 15 so it would be centimeters.	
Interviewer: Ah so you obviously have to multiply by three how did you know that?	
Student 2: Well it's because if five would equal 15, you'd have to multiply by three to get 15. And if these two are the exact same shapes, then you'd have to go through A to C to get three and then multiply by three would equal nine.	
Interviewer: Very nice.	
[Item 2 is missing.]	
Student 2: If you want me to be more descriptive I can.	
Interviewer: You're doing a great job, just the way you did it was awesome.	
Student 2: [Item 3] Density expresses the proportional relationship between mass and volume of a substance. Density is defined as the unit of mass, grams per unit of volume, cubic centimeters. Based on the graph which equation represents the relationship between mass and volume, v of copper. This is a hard one. Okay I'm looking, I can say the points they end up through here equals 20 and then obviously go down the middle of this cube. Relationship between mass and volume via copper. I'm thinking to myself I have absolutely no idea what to do.	
Interviewer: Okay so this one has been hard for lots of kids. Is there something maybe on the graph that could give you an idea?	
Student 2: It says, between the mass and the volume. So mass and volume, they both equal and then go down to the middle but they slowly edge off. So. [air]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: It's alright you just started I'm sure you'll learn more this year. [air]	
Student 2: Let me take a gander at this real quick. M equals nine v, m equals zero point one v, m equals nine plus v, m equals zero point one plus v. Okay.	
Interviewer: Does that help at all.	
Student 2: Probably not. I'm thinking of division here. I feel like I know this question but there's one thing that's keeping me from.	
Interviewer: What is it? What part of the question is the hard part?	
Student 2: What is the math equation that I'm required to do to decipher this question. That's what I'm thinking to myself. Volume, cubic feet. So, for volume and cubic, okay. Density is defined as a unit of mass per unit of volume, cubic centimeters. So, these are tough questions it's been a long time.	
Interviewer: It's okay.	
Student 2: Based on the graph, which equation represents the relation between mass and volume? Okay. [air] This would equal two, this is one and they would equal ten. I'm thinking of fractions here. So, as these fractions have been equal to this, so I'd have to divide it into a decimal now.	
Interviewer: Sure.	
Student 2: One out of three.	
Interviewer: How did you get one out of three?	
Student 2: The other question.	
Interviewer: I was going to say because I think you said one to ten.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: It's one to ten that would equal as a decimal, well three over one. So these two answers are eliminated.	
Interviewer: Okay great. [air]	
Student 2: I don't think there's addition here unless. Multiplication is also a hard course to go to. Honestly, I'm thinking which one is the safer bet.	
Interviewer: Yeah. Which one do you think?	
Student 2: Honestly I'm thinking the multiplication one.	
Interviewer: Okay great well choose that.	
Student 2: [Item 4] Use the information to answer the following three questions. Points A, B, C, D, and E lie on the same sides of a triangle as shown. Triangle BCD is similar to triangle ACE. The length of segment BD is three units and the length of segment AE is six. The length of segment AC is seven point two units, what is the length of units BC? Okay. [air]	
Student 2: Honestly, I would have to take a look at the triangle, for me this is probably literally the key to linking me to this question. Oh you can hide questions okay.	
Interviewer: Yeah so if you see an answer that's wrong you can hit the little eyeball and it goes away.	
Student 2: What is the length of units BC? So it said that BCD okay so they're both singular. The length of segment BD from here to here is three. AE from here to here is six, and that's multiplied by two okay. So, length of segment AC, is below BC, no wait. These equilateral triangles. If the length of the segment is AC, seven point two, what is the length in units of segment BC? Oh okay wait AC. So this will be seven point two. Oh I think I have to divide okay.	
Interviewer: Why do you think you have to divide how did you know that?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 2: Because, hard time to explain. BD, I'm thinking to myself these are not equilateral triangles because they're kind of leaning to the side. And the length of segment AE is six. The length of segment AC is from here to here. But that wouldn't lead anywhere okay. ACE, and the length of segment AE okay. Honestly these are not equilateral triangles but I feel like this side and this side are equilateral but this side obviously is. The length of segment AC okay. I feel like we have to divide here.</p>	
<p>Interviewer: Okay, what are you going to divide by?</p>	
<p>Student 2: Two, because if these were divided by two, then like units BD, they're three. And units AE is six. And then well obviously those honestly think six divided by two equals three. So, eliminate this and this. It's the difference between multiplication and this. Units of BC. Wait a minute, oh wait. Okay I got it if the length of segment AC is seven point oh yes it is because it's the smallest side okay. So I'm absolutely right.</p>	
<p>Interviewer: Very nice reasoning. [air]</p>	
<p>Student 2: Trapezoid AB, ABE.</p>	
<p>Interviewer: You're fine take your time.</p>	
<p>Student 2: [Item 5] Trapezoid ABDE is translated 11 units to the left and then reflected over oh God it's one of these. One of the axis to form image ABDE, what is the coordinates of the vertices of trapezoid ABDE? Okay, so this translates to the left. Okay so it's this trapezoid specifically. Translates to the left 11 times, equals two and then, okay.</p>	
<p>Interviewer: These are not your favorite.</p>	
<p>Student 2: Yeah, these ones are the higher ones, that ones that make me feel like oh no.</p>	
<p>Interviewer: Just think about what you would do as your first step.</p>	
<p>Student 2: Honestly, subtracting by that so it would be point nine.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay that's great thinking.	
Student 2: So, okay these little. [air]	
Interviewer: I think you're doing great so far. So what would you do after that?	
Student 2: Honestly this whole entire thing, can I draw?	
Interviewer: Sure you can.	
Student 2: This would go one two three four five okay. So it's go from two. So, go from nine to two.	
Interviewer: I think there's an eraser if you want to erase one of those. [air]	
Student 2: Okay, oh wait I'm a point up okay.	
Interviewer: Yeah, good job. [air]	
Student 2: And then this will go through that, that four. [air]	
Student 2: And then this will go slide up here. And obviously I'm too lazy to draw.	
Interviewer: That's okay.	
Student 2: And then I have to reflect it now. Okay, but since this is one spot away from, well, zero point, actually two spots. Wait a minute. Wouldn't it be at the exact same place. Or maybe. [air]	
Student 2: I think they would be right here because, I'm getting mixed up.	
Interviewer: Take your time.	
Student 2: Okay.	
Interviewer: You're doing a great job.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: If I reflected angles two down to the line, since the numbers are here there's blank the grid so I think they'd be at the exact same place. Which x axis the reflective so I'm guessing they're going to go down here. [air]	
Student 2: But I've learned that I've been bamboozled like 99 times throughout this specific question here.	
Interviewer: You have a great vocabulary. That's a fancy word.	
Student 2: Either go down here, reflected down here. It has to be between those.	
Interviewer: Between which two I'm sorry I didn't see.	
Student 2: These two. I was thinking to myself, because this x axis would reflect to x axis. X axis is right here, be flipped down here. Then, I'm stuck. Thank God there is one of these. Three, it'll go three down, negative three, which I think it's right here if I'm not blind.	
Interviewer: Yes.	
Student 2: Three, oh that's just the numbers covering it up.	
Student 2: And then this I think if I'm, I think it's right here and I think this one is right here. And now what I'd have to do is put the course together, I'm thinking it will be B.	
Interviewer: I'm sorry, did you say B or D?	
Student 2: D.	
Interviewer: D okay. Yeah because you drew the shape, and now you're looking at which coordinate.	
Student 2: It could be positive. [air]	
Interviewer: That was great thinking. So you don't think you're very good at that and then you figured it out.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Oh wait okay.	
Interviewer: Oh yes but if you wanted to you obviously you can or C if it even matters.	
Student 2: It doesn't matter. Which segment lies on that line that represents a proportional relationship between x and y? [air]	
Student 2: [Item 6] Which segment lies on a line that represents the proportional relationship okay. So, you see they're talking about the zero point? Or, honestly it's telling about the letters but. [air]	
Student 2: Stuck on this one.	
Interviewer: Is there something in the question that was particularly, that you're stuck on a little bit?	
Student 2: I was thinking proportions.	
Interviewer: Yes yes, information.	
Student 2: Which segment lies on a line that represents a proportional relationship between x and y? [air]	
Student 2: A lot of this, so that means I have absolutely no idea but. [air]	
Interviewer: Last time you told me you weren't sure, you looked at the choices. Maybe that would be helpful on this one?	
Student 2: I'm thinking probably yes. D is I think as I've observed this triangle they're all obviously from point C to point E. And they're always connected to the triangle points C and A to C. Wait a minute. [air]	
Student 2: I used to know segment lies on a line that represents a proportional relationship between x and y. What am I not getting here?	
Interviewer: Yes I was just going to say I think you figured out that that's the important part from the question, the proportional relationship right?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Between the x and y axis as I'm observing. But there's something I don't get.	
Interviewer: Do you know what that means to be a proportional relationship or do you not remember that?	
Student 2: I do not remember.	
Interviewer: Later this year so I think you should just make your best guess and then know that you're going to study that again in the eighth grade.	
Student 2: Yes absolutely.	
Interviewer: And then you'll get to that and you'll be so excited.	
Student 2: Because I was going to say I missed that one question.	
Interviewer: But remember you're not going to get a score so it's okay if you don't click the right answer.	
Student 2: Oh really. Okay well I don't have to be stressed.	
Interviewer: Oh yes I'm sorry. Nobody's going to get a score for this.	
Student 2: Okay. Lies on a line that represents a proportional relationship I'm going to try my best guess. AC.	
Interviewer: Great. Okay how about this one.	
Student 2: [Item 7] Shawn divides his number by negative nine. Who's Shawn. To the best estimate of his answer. This is Shawn.	
Interviewer: Are you looking for the highlighter I think it's maybe in that other clicker. Oh there it is.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: I'm going to highlight Shawn's numbers. They'll probably be the most important. And, I want to work it on paper and pencil.	
Interviewer: There's paper and pencil right there. Help yourself, and there's a calculator or there's a calculator on the computer. Or you can do it on pencil and paper whatever is best for you.	
Student 2: Yeah it pops up. I've done a lot of these they just pop up randomly. Nine, obviously it's negative nine. All I need to know is, the goal is negative so they're going to be positive. So, okay. I think that's about enough.	
Interviewer: Try it again.	
Student 2: Oh it's 940 by one. Ten, but it'd be a positive ten. Oh it's 104. But it goes on forever. So if I were to estimate, what's the best estimate. If it was an estimate, the only thing I need to see is paper and pencil so yeah so. Only answer that's close to it at least since their both negative that'd equal positives.	
Interviewer: Very nice.	
Student 2: [Item 8] What is the value of Rachel's number to the third power? Okay so basically either I think it's exponents. Or something related to that. This information isn't important anymore so I need to erase it. Rachel. Seven to the third power, honestly. There's obviously multiplication but that's not it, because I'm thinking it's an exponent. It's between positive and negative. I'm thinking to myself okay it's negative.	
Interviewer: How did you know that?	
Student 2: Because if you divide seven by seven, it would equal positive. If you divide seven by negative 49 I think, then it would equal negative.	
Interviewer: Very nice. You're doing great.	
Student 2: [Item 9] Which of the following students have the number that is the greatest distance between zero on the number line? Oh it's one of these. Oh they don't have Shawn in the answer okay. The greatest distance	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
from zero on the number line. So one of these, then Leon, then Nina, then Patrick. Oh they all had the lines in the side I used to remember what these were.	
Interviewer: Yeah do you remember what that means?	
Student 2: All I remember is that if they're a negative they'll turn in to a positive I think. I think positive will stay the same. As I make my inference here, these two are out of the question, because they're fractions. I mean these are, so that wouldn't work. Negative eight. [air]	
Student 2: It didn't say between positive and negative so I think it would be Kim.	
Interviewer: How did you decide it was Kim?	
Student 2: The five is a positive, it didn't say specifically like which one is more like positively on the other side. You know what I mean.	
Interviewer: On the positive numbers?	
Student 2: And then, I didn't put any filter on that so. [Item 10] Tickets that cost twenty-nine dollars on the first day of the play, 52 tickets were sold. The manager used 20 and 50 to estimate the tickets sales of 1,000. Which statement describes this situation? The manager's estimate is reasonable because value is close to the actual value of the ticket sales. The manager's estimate, I read too fast. The manager's estimate is reasonable because that value of the exact value of the ticket sales. The manager's estimate is not reasonable because the value underestimates the actual value of the tickets by about 500. [air]	
Student 2: There was 29 tickets sold, sorry 52. So as you can see, it's not reasonable because it is an underestimate. The actual value.	
Interviewer: Very nice.	
Student 2: Well 1,508.	
Interviewer: That's great now two more.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: [Item 11] What is the value of negative three to the fourth power? [air]	
Student 2: These are obviously wrong. It's an exponent. You have to multiply three times three times three times three you know. It would equal a positive so, a negative times a negative equals a positive, a negative times a positive okay. Because a negative times a negative equals a positive.	
Interviewer: Okay hang on. You said it would be positive or negative your answer?	
Student 2: Negative.	
Interviewer: Negative, your answering negative okay.	
Student 2: [Item 12] Which value is the great distance from zero on the number line? [air]	
Student 2: So, eliminate this. The greatest okay. Does that count as a filter on positive or negative? I don't know. I'm x-ing these two off. And I have to turn eight into a fraction so my first step would be turn eight out of ten and then then see if I can obviously simplify that. And then I simplify it, I think I simplify it by two obviously to get five or three. Oh four sorry.	
Interviewer: Okay four out of five.	
Student 2: Then, so four over five and three over four, and then I have to combine like terms. So twenty of them, four divided by five, wait that's 25. Okay I multiplied by four, okay. That would equal 12 so as you can see, this is a negative though. So, eight. Zero point negative zero point because like I say it didn't have any specifics on positive or negative.	
[Andrea – stop here.]	
Interviewer: You did a great job. I just have a couple of questions for you about like all of it put together. So did you enjoy thinking out loud through it.	
Student 2: Yeah it was rather interesting.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: That’s great. And did you find it easy to think that route or did it make some of your problems harder?	
Student 2: With the raspy voice I have currently it was kind of hard to read faster, because in my mind I can just breeze through the whole entire sentence but yeah.	
Interviewer: Hard to read fast out loud. And then the items for how to make a table over here and then the question, did you find this harder, easier, or the same as one like this that’s just one big question?	
Student 2: Tables on the side.	
Interviewer: Like these, either the graphs and then the question or a table and then the question.	
Student 2: If there was, for example, if it were too big, then I’d suggest you have two sides. Because it would be able to fit the question on one side.	
Interviewer: Okay. But you didn’t really find one harder or easier?	
Student 2: Yeah I didn’t really find one harder or easier. The rest of the questions just easier.	
Interviewer: Alright okay and were there any particular questions that you found confusing or really hard?	
Student 2: I think it’s somewhere, it’s the AC, I think it’s after this one. This one.	
Interviewer: Oh, number six. Okay great.	
Student 2: That one was confusing, I couldn’t figure it out.	
Interviewer: That’s the one you’re going to listen for this year. When your teacher says it. Okay you did a great job thank you so much for your help.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: ____ [00:52:11 to 01:00:11]. Please come in, have a seat on the blue chair. If it is okay with you, I was going to record this so that when I get home, I can remember what you said. Is that okay with you?	
Student 3: Yeah that is fine.	
Interviewer: Okay ____ [01:00:22 to 01:00:38] So, again, my name is Interviewer and I work for the company that writes these kinds of math questions that you probably take in the spring.	
Student 3: Yeah.	
Interviewer: Would you be willing to talk to me about a few math problems today?	
Student 3: Yeah.	
Interviewer: So, what we are trying to learn is how kids your age think about math problems. You are not going to get a score or your parents or your teachers is not, we are not really looking to see if you get the right answer, we are just looking to see what you think about as you are solving a problem.	
Student 3: Okay.	
Interviewer: Anything you say will be anonymous so like we will not put your name on it or anything.	
Student 3: Right.	
Interviewer: We are going to ask you to think out loud. Do you know what that means?	
Student 3: Yes, just say what I am thinking.	
Interviewer: Exactly and anything you are thinking is great even like oh I do not know what that word means or I am not really sure I know what they are asking me. So, anything you are thinking...	
Student 3: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: ...is great. I thought I would show you how I think out loud and then I am going to review it to you. If I have this piece of paper and somebody says to me fold it in half twice.	
Student 3: Okay.	
Interviewer: Okay so I am going to take and just fold it this way, I am going to line up my edges and I am going to make a nice crease across _____ [01:01:34 to 01:01:36] fold it the other way but the same idea. Line up my edges, and make a nice crease. Then I am going to check to see if I did what they asked. So, it looks like I folded it once, and I folded it twice. So that is kind of thinking out loud. Did you notice that it tried to say what I was going to do before I did it?	
Student 3: Yes.	
Interviewer: So that you would understand. And then this is the math problem I am going to think out loud. So first I just read it, it says Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Mathew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a “t”? So, I always ask myself what do they want to know. So, I look at the question and it says – what is the probability that he will choose a “t”? okay so I have to figure out his name, how many letters so I am going to count them M-a-t-t-h-e-w. So I got seven but they only want to know about the “t’s” so I see that there are two “t’s” so I know that is two out of seven and if I look at the choices I see that B is a fraction way to write 2 out of 7 so I will use the mouse and click B and then I am going to hit finish because I only have one problem. But you would hit, there would be a next one. So, does thinking out loud kind of make sense to you?	
Student 3: Yeah.	
Interviewer: There is a calculator and pen and pencil, paper and pencil if you want to write anything down.	
Student 3: Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: But if you want to read it to me that would be great and then tell me what you are thinking.	
Student 3: Eighteen students in a classroom, each roll a fair number cube with sides labeled 1 through 6 one time. How many times is the greater number than 3 expected to be rolled?	
Interviewer: Uh-huh.	
Student 3: So, 18 students in the classroom and I am more of a visual learner.	
Interviewer: Yeah that is great.	
Student 3: So, 18 students in a classroom and each will roll a fair number of cubes labeled besides 1 through 6, one time. How many times is a greater number expected to be? How many times is a number greater...so 1 through 6 which means three numbers are greater out of 18 so I do 18 divided by 3 is what I think so I would say 6.	
Interviewer: How did you know to do 18 divided by 3?	
Student 3: Because 3, because you have to, there are 18 students in a classroom and there are 3 which means 18 students each roll once.	
Interviewer: Yeah.	
Student 3: Which means 3 over or 18 over 3 then the top goes go in the box.	
Interviewer: Very nice so you might have noticed I asked you a question at the end it does not mean your answer is wrong I just want to know more.	
Student 3: Alright.	
Interviewer: Okay. You are doing great so go ahead and hit next.	
Student 3: Use this information to ____ [01:04:17 to 01:04:19]. The students in Miss Garcia's class were each given a number at random. This table shows the numbers.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Uh-huh.	
Student 3: Bailey $\frac{1}{3}$; Kim (-8); Leon ($-\frac{3}{4}$); Nina 5; Patrick $\frac{7}{3}$; Rachel (-7) and then Shawn (-940). Which number is equivalent to Bailey's number? So, $\frac{1}{3}$ and since it is multiple choice I can see.	
Interviewer: Yeah.	
Student 3: So, the top of the box since they are all decimals, I need to get a decimal.	
Interviewer: Uh-huh.	
Student 3: So, that will not work so you have to find zero then put the decimal that is there. _____ [01:05:02] then 3 goes into 10 three times _____ [01:05:07 to 01:05:23].	
Interviewer: Now I think I heard you say _____ [01:05:25] never heard before. You said I think put the 1 in the box is that a trick that helps you.	
Student 3: Well when you have fractions and you are trying to get a decimal and you want to put the top in the box.	
Interviewer: Wow I never heard that before that is cool., great okay so you would choose the best answer. Those were the practice ones; you can hit finish and then they make you turn it in twice. Okay press the turn in button. Now did that make sense?	
Student 3: Uh-huh.	
Interviewer: You did a great job thinking out loud so now _____ [01:05:48] there will be the same idea, just, if you go down, there is continue and then _____ [01:05:53]. Okay go ahead.	
Student 3: [Item 1] Triangle ABC is similar to triangle DEF as shown below. What is the length of DF?	
Interviewer: Uh-huh.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 3: So, I see, this and then that and then 5 and 15 which means you would have to do 15 divided by 5 which is 3 which means then...but to get...so, which means you would have to check your work which would be 5 times 3 equals 15. Which means I would have to do 3 times 5 which equals, no, you would do, you do 3 times 3.</p>	
<p>Interviewer: Yeah.</p>	
<p>Student 3: Which equals 9.</p>	
<p>Interviewer: That was a great explaining your thinking. You can hit next.</p>	
<p>Student 3: [Item 2] Yanni drew the rectangle KLMN on this graph. Yanni will reflect the rectangle of the y or of the x-axis. Which ordered pair describes the location of point k after it is reflected over the x-axis? So, reflect is like a mirror and it is like flipped.</p>	
<p>Interviewer: Yes.</p>	
<p>Student 3: So, if you are going to put it over the x, N will be _____ [01:07:09] (-3), (-1) so I think it would be (-1) because it is...no it would be (-3) and then (-1) here. So, N would be right there.</p>	
<p>Interviewer: Uh-huh.</p>	
<p>Student 3: Then k would be flipping it (-3) which means it would be (-3), (-3).</p>	
<p>Interviewer: Nice job.</p>	
<p>Student 3: [Item 3] Density expresses the proportional relationship between mass and volume of substance. Density is identified as the unit of mass (grams) per unit of the volume, the volume (cubic centimeters). Based on the graph, which equation represents the relationship between math and the volume v of copper. So, for ever...for every one we did it by 10 so then 2 times 10 _____ [01:08:12] times 10 which then makes it 40 so would be _____ [01:08:18] M equals 9 plus v 2 plus 9 does not equal that. Two times 9 _____ [01:08:32] so then 2 times 0.1 _____ [01:08:37 to 01:08:42] then I do _____ [01:08:43 to</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
01:08:46] plus zero which would make it 20 so that means that would be my answer.	
Interviewer: Very nice. I just want to say out loud what you did. So, you did 2 times .1 which did you get that from right here?	
Student 3: Yeah will because my answer was not right or was not an option on there so then I started trying all my different answers.	
Interviewer: Try and where did you get the numbers that you decided to try?	
Student 3: I got 2 because it was the first number I saw and then I was going to 20 because they line up.	
Interviewer: Very nice. Great, okay go ahead and hit next.	
Student 3: [Item 4] Use this information to answer the following three questions. Points A, B, and C and E lie on the side of the triangle as shown. Triangle B, C and D is triangle they are similar with triangle A, C, E. The length of the segment BD is 3 units and the length of the segment AE is 6 units. If the length of segment AC is 7 points, 7.2 what is the length in units of segment BC?	
Interviewer: Uh-huh.	
Student 3: So, BC right there is 3 and then AC is 6 and to get 3 to 6 because there is this one number you want to times 2.	
Interviewer: Yes.	
Student 3: Which equals 6 so that means I would have to do 7.2 divided by 7 because AC, oh wait, that is two different numbers okay. So, BD is 3 units and then AE and so if I was doing AC .7 and then I was going to BC I would just ____ [01:10:23 to 01:10:29] one, two, three, four and then because they are not exact, I am going to 4.2.	
Interviewer: Okay so you used your pencil to sort of estimate the space.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Yeah and I counted four because my theory or whatever it was ____ [01:10:44].	
Interviewer: Okay, great.	
Student 3: [Item 5] Trapezoid ABDE is translated 11 units to the left and the reflected of the x-axis to form image ABDE. What are the coordinates of verticals of trapezoids ABDE'? So, if it is translated 11 units to the left, ABDE, we are going to do one, two, three, four, five, six, seven, eight, nine, ten, eleven (-7) and 6 which make B equals ____ [01:11:28] and 6.	
Interviewer: Do you know what when you said before you wrote you said (-7) and 6 but then you wrote (-11). Do you know which one?	
Student 3: Yeah because I was thinking ____ [01:11:40].	
Interviewer: Yes, you said out loud (-7).	
Student 3: And then A one, two, three, four, five, six, seven, eight, nine, ten, eleven; (-9) and 3, (-9) and 3. And D would be one, two, three, four, five, six, seven, eight, nine, ten, eleven; 6 and (-4), (-4) and 6. And then you would be I know it would be 3 because they are on the same line.	
Interviewer: That is right.	
Student 3: ____ [01:12:27].	
Interviewer: Okay.	
Student 3: One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve ____ [01:12:35 to 01:12:38].	
Interviewer: That is okay, that is okay.	
Student 3: One, two, three, four five, six, seven, eight, nine, ten, eleven (-2). ____ [01:12:49 to 01:12:54] (-9) and then 3, 7, (-9) and 3, (-7) and 6, you get a ____ [01:13:03].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice. Okay how about this one.	
Student 3: [Item 6] What segment lies on the line represents a proportional relationship between x and y?	
Interviewer: Uh-huh.	
Student 3: Let me see, C and E ____ [01:13:21 to 01:13:26] 9 and 8.	
Interviewer: Uh-huh.	
Student 3: ____ [01:13:27 to 01:13:31] and then B and D would be 6 and 7 and 6 which would be ____ [01:13:37].	
Interviewer: So, when you said B and D will be 7 and 6 can you tell me where those numbers came from?	
Student 3: Well, I do not where I got 7 from.	
Interviewer: Oh, okay.	
Student 3: But I got 6 in there.	
Interviewer: Six, six okay. So, you went from this number across to where B and D were?	
Student 3: Yeah.	
Interviewer: Okay.	
Student 3: Then A and E is 3 and then E is 8.	
Interviewer: Uh-huh.	
Student 3: So, A and C is 3 and 2; 9 and 6; 3 and 2; 9 and 6 I see. So, you just times 3 on both sides. Like I am just going to make it into a fraction.	
Interviewer: Okay.	
Student 3: ____ [01:14:21] And then to get 6 or 2 to 6 and then 3 and 9 you have to times by 3.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Uh-huh.	
Student 3: That would make a proportional relationship.	
Interviewer: Very nice. You are the first student who has been able to explain that, very impressive.	
Student 3: I think that was 6 and 2 _____ [01:14:43].	
Interviewer: Great job.	
Student 3: [Item 7] Shawn divides his number by (-9). Which is the best estimate of the answer? The students in Miss Garcia’s class were each given a number _____ [01:14:55]. Shawn divides his number by (-9) so (-940) divided by (-9) so then (-9) _____ [01:15:06] once, zero and then it is 4 _____ [01:15:11 to 01:15:18] which would go into it 9 times 4 which is 36 which will equal 4 again.	
Interviewer: Uh-huh.	
Student 3: _____ [01:15:32].	
Interviewer: So, when you divide it what did you get for an answer?	
Student 3: I got 104.	
Interviewer: Uh-huh and did that help you?	
Student 3: Kind of it helped me know that I was wrong _____ [01:15:44 to 01:15:46] so now I am just going to times these...	
Interviewer: Okay.	
Student 3: ...together, times my answers by (-9). But because I know that we learn this thing in sixth grade which is called the Dorito Triangle and it is negative, negative _____ [01:16:01]. So, I know that two negatives equal a positive.	
Interviewer: Nice.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: And because these two are negatives which means they have to be a positive so I know that is going to be either 10 or 4.	
Interviewer: That was great reasoning.	
Student 3: _____ [01:16:11 to 01:16:21] So zero _____ [01:16:24 to 01:16:28] so the best estimate would be 100 because that would _____ [01:16:30].	
Interviewer: So how did you decide between 10 and 100?	
Student 3: Well because 10 and (-9) equals (-90) and then I just know that 100 times 9, well that would 900.	
Interviewer: Okay.	
Student 3: And then you just add the negatives in there and that would be the best estimate.	
Interviewer: Nice. How about this one?	
Student 3: [Item 8] What is the value of Rachel's number to the 3rd power? _____ [01:16:53 to 01:16:58] (-7)?	
Interviewer: Uh-huh. There is tons of paper if you need more space.	
Student 3: That is okay. So (-7) to the 3rd power which would be 7, which is _____ [01:17:11] which would be (-7) times (-7) times (-7).	
Interviewer: Uh-huh.	
Student 3: So, these two go 49 times (-7) equals...	
Interviewer: You have a calculator.	
Student 3: ... _____ [01:17:27] 49 times _____ [01:17:33 to 01:17:38] 343.	
Interviewer: Uh-huh.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: And (-343).	
Interviewer: How did you know.	
Student 3: Bring the negative sign. Which of the following statements has the number that is the greatest distance from zero on a number line?	
Interviewer: Uh-huh.	
Student 3: _____ [01:17:54 to 01:18:03] I think it would be, oh sh...out of these I was about to say shit.	
Interviewer: Yeah that is what everyone wanted to say.	
Student 3: Kim is (-8), Leon is (-3/4), Nina is 5, and Patrick is 7/3. So, I am going to make the fractions into a decimal because it would be easier to compare.	
Interviewer: Sure.	
Student 3: _____ [01:18:29 to 01:18:39] 175 then 7 divided by 3 equals _____ [01:18:43 to 01:18:59]. And then you have 5 and (-8) which would make it (-8) because this one is a decimal so it is closest and this one is five.	
Interviewer: Uh-huh. Nice.	
Student 3: Negative 8.	
Interviewer: Now, how did you know that it was okay that (-8) even though that is a negative number.	
Student 3: Because on a zero-number line it can go both ways. So, you have zero and then you have (-1) and then you have _____ [01:19:24].	
Interviewer: Uh-huh.	
Student 3: And (-8) would be down here.	
Interviewer: Yes.	
Student 3: All the _____ [01:19:29] would be on the same side just _____ [01:19:31].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Great.	
Student 3: [Item 10] Tickets to play cost \$29. On the first day of the play 52 tickets were sold. The manager used $(20)(50)$ to estimate the sales of tickets. They had ticket sales of \$1,000.	
Interviewer: Yeah.	
Student 3: So, they cost \$29 and they sold 52 _____ [01:19:54 to 01:19:58] the manager's estimate is reasonable because that value is so close to the actual value of ticket sales. The manager's estimate is reasonable because that is the value of ticket sales. So, I am just going to multiply these two. Eighteen over one 35, 36, zero _____ [01:20:17 to 01:20:30]. The manager's estimate is not reasonable because that value underestimates the actual value of ticket sales by 500 which would be right.	
Interviewer: Because when you multiplied what did you get?	
Student 3: I got \$1,508 and it says it is \$1,000 and he underestimates the value by \$500 and _____ [01:20:49].	
Interviewer: Very nice.	
Student 3: [Item 11] What is the value of (-3) an exponent of 4? (-3) times (-3) times (-3) times (-3) _____ [01:21:07 to 01:21:16] which gets 81.	
Interviewer: Uh-huh.	
Student 3: Positive 81.	
Interviewer: How did you know it was positive?	
Student 3: Because these two negatives make a positive and then these two negatives make a positive and then positive/positive is a positive.	
Interviewer: Very nice. Alright there is one more.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: [Item 12] Which value is the greatest distance from zero on a number line? So again, I am just going to put the $\frac{3}{4}$ and make it into a decimal.	
Interviewer: Uh-huh.	
Student 3: Which _____ [01:21:43 to 01:21:47] and then $\frac{1}{2}$ would equal .5.	
Interviewer: Uh-huh.	
Student 3: _____ [01:21:49] and then (-.8) and so on a number line _____ [01:21:57 to 01:22:01] it is going to equal zero.	
Interviewer: Uh-huh.	
Student 3: _____ [01:22:03 to 01:22:10] between those it is a (-8) would be _____ [01:22:11].	
Interviewer: Uh-huh.	
Student 3: So, .75 is the right one it should $\frac{3}{4}$.	
Interviewer: How did you choose between the .75 and the .8?	
Student 3: Because the .75 is closest to one.	
Interviewer: Nice, great.	
Student 3: Because it only takes .25 more.	
[Andrea – stop here.]	
Interviewer: Great. Now I just have a couple questions for you about all of what we just did.	
Student 3: Okay.	
Interviewer: Did you enjoy thinking out loud?	
Student 3: I think it helped me a little bit more.	
Interviewer: That is great, you did a really nice job. Did you find it easy to think out loud or did it make solving some of them harder?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: The reading, the word problems made it harder but then the other ones did not really.	
Interviewer: Okay ____ [01:22:56] that makes sense. And then the items that had the thing on the left it was either a graph or a table and then the questions. Did you find those harder, easier or the same as the ones that were just the question?	
Student 3: I kind of found them harder because I feel like it distracted more. Because I would have two different things and it would just be easier to have the graph right here and the question here.	
Interviewer: Okay that is good advice. Then were there any that you remember being really hard or confusing?	
Student 3: The one about what was it.	
Interviewer: I bet I know what you are going to say. Is it the proportional relationship? We can go back and look at them.	
Student 3: Yeah.	
Interviewer: Let's take a look ____ [01:23:32 to 01:23:50] I will scroll through and you can tell me when to stop ____ [01:23:51 to 01:23:55].	
Student 3: It was not that one. No, no, no, not that one, that one.	
Interviewer: Yes, okay that is what I thought I remembered. Great. Any others that you remember or that was the one? ____ [01:24:10 to 01:24:14].	
Student 3: This one probably because I did not see the best estimate.	
Interviewer: Okay.	
Student 3: And I kept thinking it was ____ [01:24:18].	

Student 3 School A Grade 8 Mathematics

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewer: _____ [01:24:19 to 01:24:30].	
Student 3: That was relatively easy.	
Interviewer: Great you did an awesome job thanks so much for helping me.	
Student 3: Thank you.	
Interviewer: Do you know what class you should go back to?	
Student 3: This one.	
Interviewer: Okay, great. Thank you so much.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Thank you, you as well. ____ [00:17:07 to 00:22:26]. What is your name?	
Student 4: [Student name].	
Interviewer: [Student name] nice to meet you. Do you mind if I take a video so I can remember what you said?	
Student 4: Yeah.	
Interviewer: That is okay? Okay I will just turn it on and you can sit right here there is plenty of room for your stuff. Are in eighth grade this year?	
Student 4: Yeah.	
Interviewer: Are you having a good year so far?	
Student 4: Um, yeah.	
Interviewer: Pretty good, okay. Do you know your math teachers name?	
Student 4: Miss [Teacher's name].	
Interviewer: Okay great, that is who the last kid had as well. So just so...do you know what we are going to try to do today?	
Student 4; Not at all.	
Interviewer: Oh okay.	
Student 4: I think it is answering test questions.	
Interviewer: Great so I work for the company that writes these kinds of questions that you probably take in the spring. Do you remember taking that last year? And we are trying to figure out how kids your age thinks about math problems. It does not matter whether you get them right or wrong, we just want to know what you are thinking about. You are not going to get a score like your parents will not get one, your teacher will not get one, it is just for us to learn what kids think about when they are trying to find the right answer. Would you be willing to help us today?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: Yeah.	
Interviewer: Okay. We are going to ask you to think out loud, have you ever heard of that.	
Student 4: Yeah.	
Interviewer: Because if you just think it in your head, I want to know what you are thinking. So, I am going to sort of show you what I think thinking out loud looks like and then I will ask you to practice in a minute. Anything you are thinking is great to say, even if it is – I do not know what this problem means or maybe there is a word and you are like oh we did that last year and I do not really remember. Anything you are thinking is great to say.	
Student 4: Okay.	
<p>Interviewer: Let’s pretend for a minute that somebody said to me – fold this piece of paper in half twice. So, I think to myself, alright, I get it started this way and I will line up my edges and I am going to get a nice crease across. Then they said to do it twice, so I am going to switch the way my paper is facing and then go across and do the same thing, line it up and make a nice crease. Then I am going to see if I did what I was supposed to. So, there is one-fold and two-fold. So, I think I did. That is thinking out loud, did you notice that I said what I was going to do before I did it so that you would hopefully understand instead of after. It is a little easier to say it first.</p> <p>Then thinking out loud with a math problem, it will probably look like this – first I will just read it. It says – Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a “t”? so I always ask myself first - what do they want to know and then I usually go back to the question. I think they want to know what is the probability that he will choose the letter “t”. So, in order to figure that out, I have to figure out how many letters are in his whole name I am just going to count them. M-a-t-t-h-e-w so I got seven total choices but they only want to know about the “t”. So, I see that there are two “t’s” so in order</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
to solve it I know it will be two out of the seven total, then I look at my choices and I see that that is a choice. Two out of seven can be written as this fraction so I would use that and well, _____ [00:25:17 to 00:25:23] that was just working.	
Interviewer: Okay here for now I will just use this mouse but we will get you a better one. Okay so I will hit finish because I only have one problem but would you be willing to try a practice and see if you sort of understand how to think out loud?	
Student 4: Okay.	
Interviewer: _____ [00:26:09 to 00:26:13] Sorry we are making this really hard for you.	
Student 4: Thank you.	
Interviewer: Alright let's see here _____ [00:26:19 to 00:26:25] oh it made a good noise that is a good sign usually. Okay it looks like it is working. So, if you on this one it is a little different than the one, I did out loud. You see that there is something over here and then the question. You are going to want to look at it all to find the right answer.	
Student 4: I could start reading.	
Interviewer: That would be great.	
Student 4: So, use this information...	
Interviewer: And there is a calculator and a pen and pencil if you want to solve it.	
Student 4: Okay, thank you. Use this information to answer the following questions. The students in Miss. Garcia's class were each given a number at random. This table shows their numbers.	
Interviewer: Uh-huh.	
Student 4: Which number is equivalent to Bailey's number? So, I have to divide _____ [00:27:06 to 00:27:12] I have to divide $1/3$ by 3?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Uh-huh to try to turn it into...	
Student 4: I guess...	
Interviewer: Okay great.	
Student 4: _____ [00:27:20 to 00:27:27] shoot, don't mind that is not _____ [00:27:30 to 00:27:36] it is 3 repeat.	
Interviewer: So, what choice does that look like?	
Student 4: Okay _____ [00:27:40 to 00:27:5].	
Interviewer: You can hit next and there is one more practice.	
Student 4: Eighteen students in a classroom will each roll a fair number cube. What is that?	
Interviewer: Oh, it is a fancy word for dice.	
Student 4: Oh, okay.	
Interviewer: Okay.	
Student 4: With sides labeled 1 through 6 one time. How many times, how many times is a number greater than 3 expected to be rolled? So, if there are 6 numbers, there are 3 numbers that are greater than 3. So, it would be 3?	
Interviewer: Okay so go ahead and choose. You are doing a great job at explaining what you are thinking so I think you have it, are you willing to try a few more? Click turn in that was the practice part and then if you click the blue operational and just scroll down and click continue. Then if you want to read it and then talk about it.	
Student 4: Oh no, no, no.	
Interviewer: Read the problem and then tell me what you are thinking.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: Okay. Use the following information to answer the three-three questions.	
Interviewer: Uh-huh.	
Student 4: [Item 1] Points A, B, C, D and E lie on the three sides of the triangle as shown ____ [00:28:42 to 00:28:46].	
Interviewer: Good checking that.	
Student 4: The BCD is similar to triangle ACE. The length of the segment BD is 3 units the length of segment AE is 6 units. If the length of segment AC is 7.2 units, what is the length, in units of segment BC?	
Interviewer: Uh-huh.	
Student 4: So, AC would be this one.	
Interviewer: Uh-huh.	
Student 4: And that is 7.2 ____ [00:29:13 to 00:29:26] is 3 units; AE is 6 units ____ [00:29:29 to 00:29:32] in all honesty I do not know.	
Interviewer: That is a great thing to see. So, I found that the other test you did not know what the answer should be, what would you do?	
Student 4: Count squares.	
Interviewer: Okay great, give it a try.	
Student 4: So, there is one, two, three, four squares?	
Interviewer: Okay. And with that how does it get you the best answer?	
Student 4: B?	
Interviewer: Like you were...	
Student 4: Is this a square?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Can you show me which squares you were counting?	
Student 4: These ones.	
Interviewer: From?	
Student 4: B to C.	
Interviewer: B to C okay great. And it is closest to B.	
Student 4: You choose.	
Interviewer: Okay I will choose. ____ [00:30:03 to 00:30:10] there you go.	
Student 4: [Item 2] Trapezoid ABDE is translated to 11 units from the left and then reflected over to the x-axis to form image ABDE. Which, what are the coor-how do you say it?	
Interviewer: Coordinates.	
Student 4: Coordinates of the following ver-verticals of trapezoid ABDE? so ____ [00:30:32 ____ [00:30:35] it is over here it is reflected down here.	
Interviewer: Uh-huh.	
Student 4: By 11 units, so we take this one to 11 units so ____ [00:30:47 to ____ [00:30:52] one, two, three, four, five, six, seven, eight, nine, ten, eleven so ____ [00:31:00 to 00:31:12] sh...I lost my place.	
Interviewer: Oh, geez okay. You know this little trick about you can use the computer pen and then when you get to where you want to be you can draw a little dot.	
Student 4: Oh, that is, that is smart. ____ [00:31:22 to 00:31:33].	
Interviewer: Oh, geez it got in your way I am sorry.	
Student 4: ____ [00:31:35 to 00:31:40] Four.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Uh-huh.	
Student 4: Six so then eight, nine, ten, eleven _____ [00:31:43 to 00:31:50] right here. How do you draw?	
Interviewer: Oh, much better, okay there you go.	
Student 4: Okay.	
Interviewer: And then I think you can move that little thing over there next time so it is not in the way of the grid as much.	
Student 4: Oh, okay. So _____ [00:32:03 to 00:32:10] two, yeah.	
Interviewer: Uh-huh.	
Student 4: Okay.	
Interviewer: So, you got A is that two and then what was your second number?	
Student 4: Nega-negative um (-8).	
Interviewer: Negative 8 okay.	
Student 4: _____ [00:32:20 to 00:32:26] one, two, three, four, five, six, seven, eight, nine, ten, eleven.	
Interviewer: Uh-huh.	
Student 4: So, _____ [00:32:34 to 00:32:43]	
Interviewer: Is this (-4). Okay.	
Student 4: One, two, three, four, shit. One, two, three, four, five, six, seven, eight, nine, ten, eleven. _____ [00:32:59 to 00:33:12] One, two, three, _____ [00:33:15], six, seven, eight, nine, ten, eleven. _____ [00:33:19 to 00:33:30] Okay so, _____ [00:33:31 to 00:33:35] I did something wrong. _____ [00:33:37]	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewer: So, what would you do on the day of the test? You did a lot of work and then it did not match an answer, what would you do on the test day?	
Student 4: _____ [00:33:45] Try to figure out what I did wrong.	
Interviewer: Okay.	
Student 4: _____ [00:33:47 to 00:33:49] So, oh I read the numbers backwards.	
Interviewer: Oh, okay, so maybe you flipped them.	
Student 4: Yeah. _____ [00:33:55] so I got but I got a (-8).	
Interviewer: Do you want to recount them?	
Student 4: Yeah. One, two, three, four, five, six, seven, eight, nine, ten, eleven.	
Interviewer: Oh.	
Student 4: [chuckles] Maybe I just do not know how to count. So, (-9) and I put 2 because that one is on 2.	
Interviewer: Yeah so both of the numbers seem to _____ [00:34:29] choices. Do you want to try to re-read it and see if there was anything that would help if you read it again?	
Student 4: Trapezoid ABDE is translated 11 units to the left, oh that is not the left. See _____ [00:34:45].	
Interviewer: Okay there is no time...	
Student 4: So...	
Interviewer: There is no time limit.	
Student 4: _____ [00:34:48] The left is this way.	
Interviewer: Uh-huh.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 4: So, one, two, three, four, five, six, seven, eight, nine, ten, eleven. So then 9 and 3 _____ [00:35:02 to 00:35:09] and then one, two, three, four, five, six, seven, eight, nine, ten, eleven. Six and (-7) _____ [00:35:22 to 00:35:28] one, two, three, four, five, six, seven, eight, nine, ten, eleven _____ [00:35:38 to 00:35:51]. One, two, three, four, five...one, two, three, four, five, six, seven, eight, nine, ten, eleven. Six and _____ [00:36:07 to 00:36:16]. One, two, _____ [00:36:15] [bell ringing], three, four, five, six, seven, eight, nine, ten, eleven _____ [00:36:24 to 00:36:42]. So (-3) and 3; (-7) and 6; (-4) and 6; and (-3) and 3. So it is C,</p>	
<p>Interviewer: Very nice, great job. Okay how about this one.</p>	
<p>Student 4: [Item 3] Use the information to answer the wait. Which line, which segment runs on equal line huh. Which segment lies on the line represents a proportional relationship between x and y?</p>	
<p>Interviewer: Uh-huh.</p>	
<p>Student 4: So that x _____ [00:37:13 to 00:37:31] I do not know what it is asking.</p>	
<p>Interviewer: Okay that is a great thing to say. So, go back to the question and is there a particular part that you are sort of _____ [00:37:38] on.</p>	
<p>Student 4: Proportional relationship.</p>	
<p>Interviewer: Okay and every kid that I have seen has said the same thing so on the day of the test that happens you got to a question that you are not really sure of, what would you do?</p>	
<p>Student 4: _____ [00:37:49] I do not know [chuckles].</p>	
<p>Interviewer: Would you just like make your best guess?</p>	
<p>Student 4: Yeah.</p>	
<p>Interviewer: Or look at the choices and...</p>	
<p>Student 4: Yeah.</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewer: So why don't you go ahead and...	
Student 4: _____ [00:37:58] right here.	
Interviewer: Okay.	
Student 4: A and C is this one. So, I think it is B and D. I think it is this one.	
Interviewer: Okay is there a reason that you are thinking that it is that?	
Student 4: Because _____ [00:38:14 to 00:38:16] no maybe it is A and C because it goes this way, like what is that way called, _____ [00:38:24 to 00:38:26] vertical.	
Interviewer: Uh-huh. Okay, great.	
Student 4: I do not know.	
Interviewer: That is okay. Let's see. Okay how about this one?	
Student 4: [Item 4] Triangle ABC is similar to triangle DEF, as shown. What is the length of DEF? So, so that is _____ [00:38:44 to 00:38:47] then this one will be times 3 and that one will be times 3 so it would be, that side would be 9.	
Interviewer: Very nice.	
Student 4: And then, wait _____ [00:38:58 to 00:39:01] that is what I was _____ [00:39:04] oh okay I do not know why I confused myself.	
Interviewer: You did a great job explaining that one. There you go.	
Student 4: [Item 5] Okay, how do you say that name?	
Interviewer: I think Yanni.	
Student 4: Yanni will reflect the triangle over the x-axis. Which ordered pair describes the location of the point	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
k after x-axis is reflected? So, _____ [00:39:24 to 00:39:35] it reflected at this one, I think.	
Interviewer: Okay.	
Student 4: So, then k is one, two, three, away _____ [00:39:42 to 00:39:45] two, three down.	
Interviewer: Uh-huh.	
Student 4: But, hold on, one, two, three, so, it would be a (-3) _____ [00:39:53].	
Interviewer: Let's see _____ [00:39:56].	
Student 4: Right here.	
Interviewer: Very nice. Great. The next one.	
Student 4: [Item 6] _____ [00:40:00 to 00:40:05] Density express proportional relationship between the mass and volume of the substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters). Based on the graph which equation represents the relationship between mass and the volume of copper?	
Interviewer: Uh-huh.	
Student 4: So, _____ [00:40:28 to 00:40:37] the relationship between _____ [00:40:39 to 00:40:47] this mass and this if volume.	
Interviewer: That is right.	
Student 4: _____ [00:40:49 to 00:40:55] well are you sure, okay so that is my mom, I was scared my mom was going to text me because I was going to marked tardy for the class.	
Interviewer: No, you, go _____ [00:41:00] and we will send you back with a pass.	
Student 4: Yeah, I will be marked tardy until I get there _____ [00:41:04 to 00:41:08].	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Oh, oh, oh I am sorry.	
Student 4: That is okay.	
Interviewer: But you will not, they will know that you were doing something else.	
Student 4: Yeah.	
Interviewer: Okay.	
Student 4: Yeah, they will figure it out afterwards.	
Interviewer: Okay, good, good.	
Student 4: _____ [00:41:15 to 00:41:28] I do not know how to do this one.	
Interviewer: Okay. What about, what in the question is the confusing part or is there a particular word or a few words that are hard or?	
Student 4: I do not know how I am supposed to find the relationship between the mass and the volume.	
Interviewer: Okay. Is there anything in the graph that you think can maybe help you?	
Student 4: _____ [00:41:43] This is mass and this is volume.	
Interviewer: Uh-huh.	
Student 4: I do not know how to find the relationship.	
Interviewer: Okay so do you want to do the same thing choose the best answer that you can?	
Student 4: _____ [00:41:53 to 00:41:56] I guess, I do not even know which one will be the best answer.	
Interviewer: Okay. Well you could just think if you _____ [00:42:01 to 00:42:04]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: We will just answer this.	
Interviewer: Okay, great, remember there is no score.	
Student 4: [Item 7] Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used, that number, to estimate, they had ticket sales of \$1,000. So the manager's estimate is reasonable because the value _____ [00:42:30 to 00:42:31]. The manager _____ [00:42:32] 50x, where is this one. I do not know what the (20)(50) means.	
Interviewer: Oh yeah, okay, here in the thing? Do you know that that is a way to show multiplying when the numbers are next to each other in parenthesis? So, it is just, you know how you can write (20)(50).	
Student 4: Oh okay	
Interviewer: Sometimes people use the dot that is just another way of showing it.	
Student 4: Okay, so the managers estimate is reasonable because the value is closest. So, if you multiply that it would be \$1,000 because that is the estimate they had. Ticket sales \$1,000. The manager's estimates are reasonable because the value is the exact _____ [00:43:10 to 00:43:14] ticket sales...I think it would be this one because (20)(50) is \$1,000.	
Interviewer: Uh-huh, very nice. Okay next one.	
Student 4: [Item 8] What value of, what is value, okay so it would be (-34) so (-3) times (-3) times (-3) so that would 9.	
Interviewer: Yep.	
Student 4: One, two, three _____ [00:43:44 to 00:43:46].	
Interviewer: How did you know how many times you had to write that?	
Student 4: Because it is the to 4th Power.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Very nice.	
Student 4: So, you write it four times...	
Interviewer: Uh-huh.	
Student 4: And this one would be 9 times 9 is 81.	
Interviewer: Uh-huh.	
Student 4: So, it would be positive 81.	
Interviewer: How did you know it was positive 81?	
Student 4: Because the negatives cancel each other out.	
Interviewer: Uh-huh, very nice. Great how about this one?	
Student 4: [Item 9] Which is the value of the greatest distance from the zero on the line? _____ [00:44:15 to 00:44:22] Okay so the number line would be _____ [00:44:24 to 00:44:28] it would be _____ [00:44:29]. I think I would be (-1/2).	
Interviewer: Okay.	
Student 4: No (-3/4) because 3/4 is bigger.	
Interviewer: Okay because 3/4 is bigger than 1/2. And then I heard you compare these two, how about compares to the options A and B?	
Student 4: Negative one _____ [00:44:48] would be further than 0.6, but _____ [00:44:54 to 00:45:01].	
Interviewer: Eight over ten.	
Student 4: Eight over ten; then 6 over 10 and _____ [00:45:05 to 00:45:39] 8 times 4 is _____ [00:45:40].	
Interviewer: You have a calculator.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: _____ [00:45:41 to 00:45:47] 32.	
Interviewer: Uh-huh.	
Student 4: So then 6 times 4 is _____ [00:45:52].	
Interviewer: So, you have a common denominator to compare the fractions.	
Student 4: Yeah. Oh so (-.8) would be bigger.	
Interviewer: Because what fraction did you end up getting?	
Student 4: Thirty-two over forty _____ [00:46:04 to 00:46:07].	
Interviewer: Very nice. Great _____ [00:46:10 to 00:46:13] Three more.	
Student 4: [Item 10] Use this information to answer the following three questions. The students in Miss Garcia's class were given _____ [00:46:20 to 00:46:24]. Shawn divides his number by 9, what is his best estimate? So, Shawn's number is (-9) _____ [00:46:29 to 00:46:32] so if you divide that by 9, can I use the calculator?	
Interviewer: Sure.	
Student 4: _____ [00:46:34 to 00:46:43] So his...	
Interviewer: What did you get your calculator? One hundred and four.	
Student 4: 104.4 so it would be, his best estimate would be (-100).	
Interviewer: How did you know it was (-100)?	
Student 4: Because he divided, oh no it is +100 because he divided by, he divided (-9) by _____ [00:47:02 to 00:47:07].	
[Item 11]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>What is the value of Rachel's number to the 3rd Power? So, Rachel's number _____ [00:47:13] so it would be (-73) so _____ [00:47:19 to 00:47:24]. So (-7)(-7) is 49?</p>	
<p>Interviewer: Uh-huh. Okay.</p>	
<p>Student 4: Then times 7 so _____ [00:47:32] 49 times 7 is 343 so it would be (-343).</p>	
<p>Interviewer: Now how did you know that one was negative?</p>	
<p>Student 4: Because these two negatives cancel each other out and then this negative does not have anything to cancel it out so it stays.</p>	
<p>Interviewer: Okay, great job. Okay last one.</p>	
<p>Student 4: [Item 12] Which of the following students has the number that is greatest _____ [00:48:00 to 00:48:15].</p>	
<p>Interviewer: _____ [00:48:17] paper if you need more space.</p>	
<p>Student 4: Nine forty over _____ [00:48:20 to 00:48:25] is 940.</p>	
<p>Interviewer: Okay so which choice would that be?</p>	
<p>Student 4: That one _____ [00:48:29 to 00:48:33].</p>	
<p>Interviewer: They try to trick you.</p>	
<p>Student 4: _____ [00:48:32 to 00:49:00] So coming along they would be 12's. _____ [00:49:03 to 00:49:49] I did something wrong. Oh, that is not times 4 this would be times 12 so 7 times 12 is 84. _____ [00:50:02 to 00:50:28] So 60 it would be _____ [00:50:28 to 00:50:33] (-8) I think.</p>	
<p>Interviewer: So, you found a common...you turned them all into fractions and then it came down there okay and then you said it would be the one that is 8, which one is that?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: (-8).	
Interviewer: It is okay that she is negative or how did you know it is okay that she has a negative in front of hers?	
Student 4: Because it was simply farther on that side. [Andrea – stop here.]	
Interviewer: Very nice. Okay so that was the last math problem. Then I just some questions for you about what we did. Did you enjoy thinking out loud today? Not really.	
Student 4: It was hard to explain.	
Interviewer: I thought you did a great job. Did you find it easy to think out loud? Or did it actually make solving the problems a little harder?	
Student 4: It made them harder.	
Interviewer: _____ [00:51:18 to 00:51:21]. Then the questions that had like the thing on the side either a table or, here it is, the table and then the question, did you find those harder or easier or the same as the ones that were just one big question?	
Student 4: Sometimes they were harder.	
Interviewer: Okay. Is there something that makes them a little harder?	
Student 4: Because you do not have read the table in the question.	
Interviewer: Okay so a lot to read. And then were there any questions you remember thinking they were really confusing? I remember you stopped me on two. Oh, this one, right, but which equation.	
Student 4: The relationship.	
Interviewer: Yeah and the proportional let's find that one _____ [00:52:03 to 00:52:09]. You did an awesome job, thank you for your help today.	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Student 4: Thank you.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Do you want to go ahead and sit on the blue chair? Do you mind if I take a video so I can remember what we talked about?	
Student 5: Yeah sure.	
Interviewer: Okay, thank you. My name is _____. I am sorry. I will get you a clean. I work for the company that write these kinds of questions that you take in the spring. Do you remember taking that last year?	
Student 5: Yeah.	
Interviewer: Yeah. What we are trying to figure out is how kids your age think about math problems. Would you be willing to talk to me today about what you are thinking when you solve a couple problems?	
Student 5: Mm-hm.	
Interviewer: You are not going to get a score. We are not going to keep track of how many you got right. Your teacher will not get the answers. It is just for us to learn how you are thinking. We are going to ask you to think out loud. Do you think you know what that means?	
Student 5: Yeah.	
Interviewer: Yeah. I like to think of it as basically everything in your brain that you are thinking about when you are solving a problem. You have to say it out loud for me to understand. If I were given this piece of paper and asked to fold it twice, I would say to myself okay. First, I think it will turn it this way, and I will make sure to line up my edges. Then fold right across with straight lines. Then I am going to flip the way it is turned and do it again. I will cross my lines. Then I am going to make sure. I am going to check my work. I did fold it once and twice. I think I did what they asked. That is sort of thinking out loud. Did you notice that I said what I was going to do before I did it?	
Student 5: Yes.	
Interviewer: That helps the person listening kind of know what they are getting ready for. Then this would be	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>thinking out loud with a math problem. It says, I do not – you can forget that. Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a T? I always ask myself, what do they want to know? I think they want to know, what is the probability that he will choose a T. I am going to go back to the letter of his name. So, his name is Matthew. First, I just want to know how many letters he has, so I am going to count. M-A-T-T-H-E-W. So he has seven, but they only care about the Ts. In his name, I see two Ts. That is two out of the seven. Then I am going to look at my choices. Yes, you want to choose B. You see you can use the mouse and then you can hit. I only have one problem because that was just a practice for the think out loud.</p> <p>Then do you want to try thinking out loud? If you hit this part, you can practice. And if you go down, there is a continue. Do you have any questions for me before we start? Do you think you get it? Then this problem is a little different than mine. There is something on this side that you are going to want to look at before you solve the problem.</p>	
<p>Student 5: All right. Use this information to answer the following. Students in Ms. Cristy’s class were given a number at random. This table shows their number. One-third the absolute value of negative eight, the absolute value of negative three-fourths, the absolute value of five, the absolute value of seven-thirds, the absolute or just negative seven, and negative nine-forty. Which number is equivalent to Bailey’s number? So one-third, you do the division there. It will be .33.</p>	
<p>Interviewer: You just know that? You have like done that before maybe.</p>	
<p>Student 5: Yeah.</p>	
<p>Interviewer: If you ever want to, there is pencil and paper if you want to figure something out. Okay, great job.</p>	
<p>Student 5: Eighteen students are in a classroom where each roll a fair number Q with size labeled one through six</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
one time. How many times is the number greater than three expected to be rolled? Since there are only six numbers and three small, it is just three.	
Interviewer: Very nice. Now is that – those were just the practice ones. Sometimes I will ask you a question as you are thinking. It does not mean your answer is wrong. It just means I want to know a little more. Okay. Great, if you want to hit the blue? There you go. Okay, go ahead and start with this one.	
Student 5: Use this information to answer the following three questions. Points A, B, C, D, and E lie on the sides of the triangle as shown. Triangle BCD is similar to triangle ACE. The length of the segment BD is three units, and the length of segment AE is six units. The length of segment AC is 7.3 units. What is the length in units of segment BC? So AC is 7.2 and A to C is that. We are asking for the length of segment BC. So these are the same length, so then it would just be 7.2 divided by two which would give you 3.6.	
Interviewer: How did you know that they were the same length?	
Student 5: It is because it is just up one, over two, up one, over two.	
Interviewer: Very nice. Okay, how about this one?	
Student 5: Trapezoid ABDE is translated 11 units to the left and then reflected over the X-axis to form image ABDE. What are the coordinates for the vertical trapezoid ABDE? Right, so if it is translated 11 units for now, we will translate with the dots.	
Interviewer: Okay. So do you have an idea of what it could mean? Are there like a couple options you are thinking about? Translated.	
Student 5: Like this or like that?	
Interviewer: Yeah. Would that give you like a hint on what you could do?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Yeah. You could flip it there. Translated 11 units to the left, so this way 11 units. So it is maybe going by six. Oh, I messed up. Two, three, four, five, six, seven, eight, nine, ten, 11. I am assuming that is where B will be. It will be negative eight and six. So that is wrong.	
Interviewer: I was going to say other kids have had an easier time counting with the eraser rather than the mouse.	
Student 5: I got you. One, two, three, four, five, six, seven, eight, nine, ten, 11. There we go. Let us say seven and six.	
Interviewer: Okay.	
Student 5: It would be the negative seven six. This is the only option that you could possibly get.	
Interviewer: Okay, so you just worked with one coordinate and there was only one that worked. Okay, that is great.	
Student 5: Use this information. Which segment lies on a line that represents a proportional relationship between X and Y? Segment CE, segment BD, segment AC, segment AE. Segment AE, right.	
Interviewer: How do you know that?	
Student 5: It is because proportional is like I am trying to think. I mean, my mind just instantly goes there. I cannot really explain myself sometimes.	
Interviewer: You were trying to find proportional, and then that one just stuck out to you as okay	
Student 5: Yes.	
Interviewer: Okay.	
Student 5: _____ [00:08:02]. Triangle ABC is similar to triangle DEN as shown below. ABC. All right, what is the length of DF? That would be nine because if you divide that by three, it is similar. So I would assume you would multiple three by three to get that.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Oh nice. Next?	
Student 5: Oh yeah, I am not even pronouncing that right.	
Interviewer: Yeah, you know what? It does not matter. However you want to say it is totally fine.	
Student 5: Okay. Draw the rectangle on KLMN on this graph. It will reflect the rectangle over the X-axis. Which word there describes the location of point K after it is reflected over the X-axis. It has to be down like that. It is just over the X-axis. Which word is point K? It would be...seven, three, four. I am assuming it would negative. It would be negative 35. Okay, that is not it.	
Interviewer: It is not a negative.	
Student 5: Oh, I never really was adept in this.	
Interviewer: Yeah.	
Student 5: I just did not do seventh grade math. So image means like mirrored. Then it would be that, I am assuming.	
Interviewer: How did you know? You said it would be mirrored. Then how did you know that A was the best choice?	
Student 5: It is because looking at these other answers, I would not imagine that they would be here where point M is.	
Interviewer: So you...	
Student 5: Oh wait. Maybe it would be. I am thinking about the definition of reflect. Gosh, I really need to learn how to do these.	
Interviewer: I was not saying your answer was wrong. I was just trying to figure out how you knew it was right.	
Student 5: I am saying the answer is wrong.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Now you are thinking it is B.	
Student 5: Yeah, I think.	
Interviewer: Can you show me where this is on the graph?	
Student 5: It is right where the pointer is.	
Interviewer: Oh okay.	
Student 5: It is going to swing that over.	
Interviewer: Okay.	
Student 5: Density expresses the proportional relationship between mass and quantity substance. Density is defined as a unit of mass per unit volume cubic centimeters. Based on the graph, which equation represents the relationship between mass and the volume? Mass...so I would assume it would be looking for the M in $Y=MX+B$. It is looking at the unit M. I am putting an educated guess on this one, because I am not too sure.	
Interviewer: You said something that was interested. You said you are looking for the M in $Y=MX+B$. What is the M? Do you know?	
Student 5: Oh, I forgot. Let me see. The B is slope. The MX is the X-axis.	
Interviewer: How did you? How did you select A? Was there something about it that made you choose it?	
Student 5: It just seemed logical to me. I do not. I mean, it is the most educated guess.	
Interviewer: All right, great. That is good insight.	
Student 5: Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used 20 times 50 to estimate. They had ticket sales of \$1000. Which statement best describes the situation? The manager's estimate is reasonable. No, it is not because that	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
would not round down to 20. It underestimates because he rounded down instead of rounding up.	
Interviewer: Very nice.	
Student 5: What was the value of negative three to the _____ [00:12:59]? That is really just three. So it is nine times seven. Six. Six. Eight. That should be positive 81.	
Interviewer: How do you know it is positive	
Student 5: You take negative three times negative three, and you get positive nine.	
Interviewer: Okay.	
Student 5: Times negative three is negative 27. Times negative three is positive 81.	
Interviewer: Okay, very nice.	
Student 5: Which value is the greatest distance from zero on a number line? 0.8, 0.6, three-fourths which is .75, and one-half which is .50.	
Interviewer: How did you know? Sorry, you went super-fast on that. How did you know that that was the answer?	
Student 5: Okay, so I converted this into decimals because that is just easier for me to look at on a number line.	
Interviewer: Yeah.	
Student 5: I drew a picture of the number line in my head.	
Interviewer: Okay.	
Student 5: I had like negative 0.8, then I had negative 0.6, then I had .75, and then I had .50.	
Interviewer: Was that okay? I noticed that some had the negative sign. Did you think?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Absolute value. I did not factor in the negative because it said greatest distance.	
Interviewer: Nice. Right.	
Student 5: Use this information to answer the following three questions. Students in Ms. Cristy's class were given a number at random. This table shows their numbers. Shawn divides his number by negative nine. Which is the best estimate for his answer? Let me see. So it would be around 100.	
Interviewer: How do you know that? What did you do? Did you get something in your head?	
Student 5: I just see nine. Then I took out the 40 because it said estimate, so my 100.	
Interviewer: How did you know if it was negative 100 or positive 100?	
Student 5: Okay. I have to think. You had – it would be negative. I was going to say because it is even, so it would probably be.	
Interviewer: Yeah.	
Student 5: Oh God, now I have to work this out. I confused myself. If you divided negative...times 100. Yeah, I do not know. I think. I think it would be positive because it is multiplying by a positive number. It is not multiplying by. It is multiplying by an even number of times.	
Interviewer: Okay great.	
Student 5: What is the value for each number to the third power? So, negative seven times negative seven. It is 21 times negative seven. That is seven and that is 14. It is negative 147. Oh wait, what? To the third power, so I have to do it again. It is negative. Give me a second.	
Interviewer: That is okay. Take your time. So...	
Student 5: The third is times that. Oh, that is not 14. It is 21.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: First you did negative seven times negative seven, and you got 49. Okay, then what do you do?	
Student 5: Multiple it again by negative seven, which gets me seven times nine is 63. Seven times four is 28. Plus six is 34. It is negative 343.	
Interviewer: Very nice.	
Student 5: Which of the following students has the number that is greatest distance from zero on the number line? So _____ [00:17:44] negative eight. Hang on. It is five. Nina has five. Patrick has not eight.	
Interviewer: It was nice to see you used process of elimination. Hang on. Do not hit finish quite yet. I just have a couple questions, and you might want to look back to these. First, we forgot to ask you. What is your math teacher's name this year?	
Student 5: Ms. Morad.	
Student 5: Ms. Morad.	
Student 5: Morad.	
Interviewer: Did you enjoy thinking out loud today?	
Student 5: Yeah, I mean, I guess. I have never done it.	
Interviewer: Oh great. I am glad you got to try it.	
Student 5: Yes.	
Interviewer: Did you find it easy to think out loud? Or did it make it harder to answer the questions?	
Student 5: I guess harder because I am normally a person that does not explain my answer, I guess. I always just get it. I used to get in trouble for not showing my work.	
Interviewer: You just did it in your brain. Is that it?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Mm-hm.	
Interviewer: Then the problems like this one that had a table or a picture over here and then the question, did you find those harder, easier, or the same as just like one question?	
Student 5: Are they easier or the same? I see it as the same.	
Interviewer: Okay.	
Student 5: Because I do not like to think. I do not want to overcomplicate stuff.	
Interviewer: Yes.	
Student 5: I do not want to oversimplify stuff.	
Interviewer: That is smart. Then were there any questions that you remember being either confusing or really hard?	
Student 5: Not really hard. I just do not remember the definition of it.	
Interviewer: Oh yeah. What was that? Do you remember what that was?	
Student 5: It was this one.	
Interviewer: Okay.	
Student 5: It was not this one. It was this one. It was this one.	
Interviewer: Of the reflection?	
Student 5: Reflection.	
Interviewer: Okay, that is perfect. Great. You did an awesome job. Thank you for your help today. The bell rang, so I think you are going to want to go to your next class.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: Yeah.	
Interviewer: Okay. You can just make sure you take your _____ [00:19:44]. Thank you so much for your help. It was great.	
Unidentified Female: Are you ready for your last one	
Interviewer: All right, I think so. Let me check. Yes, by the time they get here I will be all set. Yes.	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: We're just going to record this so that I don't have to take notes all the time we're talking. Is that okay with you?	
Student 1: Mm-hmm.	
Interviewer: November . . . Right, it's working. So, Student 1, how do you spell Student 1?	
Student 1: ----- [student spells name].	
Interviewer: And are you in 8th grade?	
Student 1: Yes.	
Interviewer: And do you know your math teacher's name?	
Student 1: Miss ----- [Teacher's name].	
Unknown: The camera's starting [background conversation].	
Interviewer: So, I said this earlier, but my name is ----- [Interviewer], and I'm one of the people that writes the math tests that you probably took in the spring last year. Looks something this. Do you remember taking those tests?	
Student 1: Yeah, twice.	
Interviewer: So, it's a great thing, and thank you so much for doing this. So, we're here today to try out some new test questions and see how kids your age interact with those kinds of questions. So, does this look familiar, like you remember taking these kinds of questions last year?	
Student 1: Mm-hmm.	
Interviewer: Great. So, today, we're trying to figure out some new questions work with kids your age. And as part of this study, we're going to ask you to think out loud. Because if you just do it in your head, we don't know what you're thinking.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Mm-hmm.	
Interviewer: So, we're going to ask you to talk about it. Have you ever heard of thinking out loud before? Can you talk about it maybe?	
Student 1: Kind of.	
Interviewer: A little bit. Okay. So, basically, thinking out loud is when you say what your brain is thinking as you're going do it. Like deciding what the answer to a question like this might be. So, you want to say everything you're thinking, even if you think it's kind of weird. Like, oh, this question's terrible, it's really hard, it's really easy. This question's boring. Anything you're thinking, we want to know about. And don't worry. Everything you say is anonymous, meaning we won't report what you said, we'll just say, a student said. And the results won't go to your principal or your parents or your teacher. So, it's just for us to figure out what questions are best to use for kids. Does that make sense so far?	
Student 1: Mm-hmm.	
<p>Interviewer: Great. So, first, I'm going to kind of show you how I would think out loud. So, for a minute, let's pretend that my job was to fold this paper twice. So, I'm going to say what I'm going to do a little bit before and as I'm doing it.</p> <p>So, first, I'm going to take the paper, I'm going to fold in half this way. I'm going to make sure I line up the edges, then make a nice crease. So, I fold it in half. And I'm going to fold in half again. And then witch to the other way. I'm going to do all the same process. So, I'll fold it, I'll line up my edges. And I'll make a nice crease.</p> <p>So, hopefully, that showed you what thinking out loud is like. And the important part is I said before I was going to do something. I said it after the fact, you maybe wouldn't have known as much what I was going to do.</p> <p>And now, I'd like to model a little bit with a actual problem. So, this is a problem. The first thing I'm going to do is read it. So, it says, 'Matthew wrote each letter of his name on a separate piece of paper and put them in a bag.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a 't'?</p> <p>So, the first thing I'm trying to figure out is, what is the question? Okay, so, I'm going to read it again. 'What is the probability that Matthew will choose a 't'?' Now, I know that they want me to figure out based on his name. So, I'm going to count the number of letters in 'Matthew.' So, M- - . . .</p>	
<p>Student 1: Seven.</p>	
<p>Interviewer: . . . T-T-H-E-W. Very nice. So, seven. And in 'Matthew' there are two Ts. So, I know that he has 2 out of 7 chances, and that fraction is $\frac{2}{7}$, which in this case, is B. So, I would use the mouse or this, whichever you prefer, to actually select B. And then it lights up blue, so you know that that's your answer.</p> <p>So, that's kind of what thinking out loud for a math problem would look like. Does that make sense to you?</p>	
<p>Student 1: Mm-hmm.</p>	
<p>Interviewer: Do you want to take your backpack [background noise]? Okay. So, now I'd love for you practice. So, this is the one that I just practiced on. Press 'Turn In'. Turn in. There's a couple for you to practice. And, at any time, if you want to use, there's scrap paper and a calculator, if you want to use that at any time. So now, it's your turn to give thinking out loud a try. Oh, and some of these questions, there's something on the left. I'd love for you to read that part, and this part as well.</p>	
<p>Student 1: Okay.</p> <p>'Use this information to answer the following question.</p> <p>The student in Mrs. Garcia's class were each given a number at random. The table shows their numbers.'</p> <p>Bailey, $\frac{1}{3}$. Kim, absolute -8. Leon, absolute $-\frac{3}{4}$. Nina, absolute 5.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Patrick, absolute $7/3$. Richard [sic], -7 Shawn, -940</p> <p>'Which number is equivalent to Bailey's number?'</p> <p>So, $-1/3$. . . I don't know how to work this calculator.</p>	
<p>Interviewer: Oh, here, let me help you. Okay, so it's on. There you go. And then do you need help? What were you trying to put into the calculator?</p>	
<p>Student 1: There's a way that I can like make it to decimal [cross talking].</p>	
<p>Interviewer: Oh, I don't think this calculator's fancy enough to do that. Did you have a different strategy for how to do that maybe?</p>	
<p>Student 1: Not really. I mean, I can't hardly remember. It feels like maybe 5th grade, I learned how to do it.</p>	
<p>Interviewer: So, in your head, what were you thinking, what were you trying to do? Did you use anything from maybe over here to help you?</p>	
<p>Student 1: I was trying to make the $1/3$ into a decimal through my head. I think maybe, probably, 0.33, continuous.</p>	
<p>Interviewer: Great. And so which option is that?</p>	
<p>Student 1: B.</p>	
<p>Interviewer: Okay. So, you just want to tell me what you're thinking. Awesome. And then, you can hit Next, and there will be another one.</p>	
<p>Student 1: Did I get it [cross talking]?</p>	
<p>Interviewer: Try it again. There we go. Okay, great. So, here's another one, if you want to give it a try.</p>	
<p>Student 1: "Eighteen students in a classroom will each roll a fair number cube with sides labeled 1 through 6 one</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
time. How many times is a number going to be greater than 3 expected to be rolled?	
Interviewer: Yes.	
Student 1: 'How many times the number 3 greater, or, number greater than 3 expected to be rolled?' It's 1 through 6, probably 3 more.	
Interviewer: Okay. Great. Oh, that's okay. And then, perfect. We can hit 'Turn In.' And then, when possible, you just want to tell me why that was the best answer, or why that was your answer. So, do you feel like you're ready to move on a few more?	
Student 1: Mm-hmm.	
Interviewer: Okay, great. Let's do it. Okay, so. Right, so go ahead and answer 1 just as you did when you were taking the test last spring.	
Student 1: [Item 1] 'Points A, B, C, D, and E lie on the sides of a triangle.' 'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of segment AE is 6 units. If the length of segment AC is 7.2, what is the length, in units, of segment BC?' AE is 3 units. Okay, so it's BD is 3 units long and AE is 6. But AC is 7.3, no AC. That would be [pause] 3.6 units.	
Interviewer: So, can you tell me how you found that length, 3.6?	
Student 1: I took 7.2 divided by 2, because B is _____ [00:17:24] C.	
Interviewer: Okay, thank you. Thanks for sharing. So, yeah, if you can hit Next.	
Student 1: [Item 2] 'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>image A'B'D'E'. What are the coordinates of the vertices of trapezoid A'B'D'E'?</p> <p>So, if it's asking to reflect it, would it be this way or down?</p>	
<p>Interviewer: Yeah. So, if you go back to the problem, do you think you figure out if, which way they like to go?</p>	
<p>Student 1: Like with x-axis, so it could go down. So, C would be -9. Or would it. This one would be (-9, 6), so those not actually ____ [00:18:19]. It would be six negatives. B is (-6, 4). B doesn't have (-6, 4).</p>	
<p>Interviewer: Okay. So, what would you do if you were taking the test on that day? And what you think is the answer isn't appearing as a choice?</p>	
<p>Student 1: I would have just guessed.</p>	
<p>Interviewer: Okay. So, do you want to do that here, then?</p>	
<p>Student 1: I'm just trying to see if I can find that's [cross talking]</p>	
<p>Interviewer: Sure. Yeah, take your take your time. There's no rush.</p>	
<p>Student 1: Yeah, the answer for A has a 3, but it's on a 2. So, . . .</p>	
<p>Interviewer: Which?</p>	
<p>Student 1: Guess again on that one.</p>	
<p>Interviewer: Okay.</p>	
<p>Student 1: E would have been 8, but they're saying (3, 3)s. All of them, yeah. I want to say it was flipped, and then flipped upside down. So, it would have been 9. So, it would probably have been this was flipped, and then flipped down.</p>	
<p>Interviewer: Okay. All right. So, on this one, can you do this one and say out loud what you're thinking?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: [Item 3] 'Which segment lies on a line that represents a proportional relationship between x and y?'</p> <p>I'm just trying to remember what we did for this. Because . . .</p>	
<p>Interviewer: So which part are you trying to remember?</p>	
<p>Student 1: How to actually do the problem. Like the proportional relationships. Let's see. Which line represent _____ [00:20:23] between x and y. I don't really know.</p>	
<p>Interviewer: Okay. So, what would you do again, if this was a real test and you knew your teacher couldn't help you, what would you do?</p>	
<p>Student 1: I would try to do it on my own until like a certain point, and then I would probably just guess.</p>	
<p>Interviewer: Okay, so why don't you go ahead give that a try. [pause] Okay, how about this next one?</p>	
<p>Student 1: [Item 4] 'Triangle ABC is similar to DEF, as shown.'</p> <p>The length of DF.</p> <p>Wants the length of DF.</p> <p>It's centimeters, but _____ [00:21:15]. Taking a guess, that'd probably be 10 more centimeters right there, would be _____ [00:21:24], then it's bigger. So, this one would have been 13 centimeters.</p>	
<p>Interviewer: Okay. So, how did you, can you just say out loud a little bit more about how you determined DF was 13?</p>	
<p>Student 1: By looking at the numbers we were given, this one was 5, and this one's 15. How big they were, too. This one, it's like the same triangle but that's bigger, too. So, since this one's 15, I thought this one might be 13, because we've got 3 over there.</p>	
<p>Interviewer: Okay, great. Thanks.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: [Item 5] 'Yanni drew a rectangle KLMN on this graph.</p> <p>'Yanni will reflect this over the x-axis. Which ordered pair describes the location of point K after it is reflected over?'</p> <p>So, we've got (3, -3). If we flipped it over, we would have gotten maybe -3 and -3. So, [clicks A] because it's reflected over.</p>	
<p>Interviewer: So, what is that, 'reflected'?</p>	
<p>Student 1: That means that I took it and flipped it over onto the bar [PH].</p>	
<p>Interviewer: Very nice. Thank you. Okay, the next one.</p>	
<p>Student 1: [Item 6] 'Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit mass (grams) per unit of volume (cubic meters [sic]).'</p> <p>'Based on this graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'</p> <p>So 2 would have been about 20. If it was about that. Let's see. 'Volume of a substance.' Okay, so just going up by 10, it'd be multiplied. Because we got, there's no words, we got 1 right there, 2, 3, 4, it's going up by 10.</p> <p>'Based on this graph, which equation . . .' [pause] I don't know.</p>	
<p>Interviewer: Okay. So, what would you do again if it was ...?</p>	
<p>Student 1: Unless it's, I would have guessed on it, when I got to a certain point.</p>	
<p>Interviewer: Okay. So, is there something that would make you choose one of the options over the others?</p>	
<p>Student 1: Probably, would be based on _____ [00:24:05].</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. So, why don't you go ahead and do that. Okay, how about this one?	
<p>Student 1: [Item 7] "Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used 2 [sic] (50)s to estimate they had ticket sales of \$1,000.</p> <p>'Which statement describes this situation?'</p> <p>Manager estimated the reasonable because the volume is close to the action value of the tickets.</p> <p>Manager estimate is reasonable because that value is the exact value of the ticket sales.</p> <p>The manager's estimate it's not reasonable because the value under statements the actual value of the tickets by \$500.</p> <p>The manager's estimate is not reasonable because of that value estimates the actual value of tickets sales by about 500.</p> <p>How, manager used to estimate about. _____ [00:25:24] it's reasonable because the value is close enough to actual value of tickets sold.</p>	
Interviewer: So, option A?	
Student 1: Yes.	
Interviewer: Okay. What did you think about this problem? Did you think it's hard, it's not easy, or sort of in the middle?	
Student 1: It was sort of hard, but not.	
Interviewer: Okay. And then, how about talking out loud about it? Is that hard to do for this problem, easy, or about the same?	
Student 1: Meh. Kind of, kind of not.	
Interviewer: And so, what made you choose option A?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Because I'm not really good with word problems, so I would have went for what I would have thought was it.	
Interviewer: Great. Thanks. Okay. Go ahead and select A, and then you can hit Next.	
Student 1: [Item 8] 'What is the value of $(-3)^4$? Take 4th power is. So, if you take, . . .	
Interviewer: Yeah, take this.	
Student 1: There's -9 and again. I'm used to the big . . .	
Interviewer: Yes, I was just going to say--. Do they let you use those on _____ [00:26:22]?	
Student 1: For 8th grade, our [cross talking].	
Interviewer: Yeah, do you have one?	
Student 1: Yes.	
Interviewer: Oh, sorry about that. Yes, you can use that.	
Student 1: It's all right. This one's _____ [00:26:44], so. You take -3, multiply it by -3, so it's this. -27. But I put 3, so.	
Interviewer: So, how many times did you put it in this time?	
Student 1: Four.	
Interviewer: Okay. And what did you get?	
Student 1: 81.	
Interviewer: Now, how did you know to put it in four times?	
Student 1: Because it's to the 4th power, equals the, like 3 equals whatever 3 to 3 [cross talking] point 3.	
Interviewer: Great. Okay. Can you hit Next?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 1: [Item 9] ‘Which value is the greatest distance from zero on a number line?’ What, let’s see, that’s 75, that’s 60, that’s 80, this one would have rolled backwards because it’s forwards, forward, backwards. Saying going on this one, because it’s greater than the other ones. Unless, I don’t know, you’re this. The decimals might be a little bit more than this, but.</p>	
<p>Interviewer: Okay, now how about this one?</p>	
<p>Student 1: [Item 10] 'Use this information on the following three questions.</p> <p>Mrs. Garcia's class was given a random number. As shown on . . . On the table it show their number.</p> <p>Bailey, $\frac{1}{3}$ Kim, absolute -8 Leon, absolute $-\frac{3}{4}$ Nina, absolute 5 Patrick, absolute $\frac{7}{3}$ Richard [sic], -7 Shawn, -940.</p> <p>Which is the best estimate of his answer?</p> <p>Shawn divides his number by -9.</p>	
<p>Interviewer: So, what are you going to put it?</p>	
<p>Student 1: -940 divided by -9. Got that. Which would have the best estimate, would have been -100. Because that’s the closest number.</p>	
<p>Interviewer: Can you say out loud what you got in your calculator?</p>	
<p>Student 1: -931.</p>	
<p>Interviewer: Okay, and then the closest to that is?</p>	
<p>Student 1: Is -100.</p>	
<p>Interviewer: Okay. So how did you know that that was the best answer?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Because it was closest to the number that he divided.	
Interviewer: Okay. Thanks.	
Student 1: [Item 11] 'What is the value of Richard's number to the 3rd power?' Richard, or Rachel's. I've been saying that wrong.	
Interviewer: That's okay.	
Student 1: So, it'd be -7, multiplied by -7, multiplied by -7. Which would be -7, three times by itself, you get -343. Which is option A.	
Interviewer: And did you find that question easy, hard, medium?	
Student 1: Pretty easy.	
Interviewer: Pretty easy, okay.	
<p>Student 1: [Item 12] 'Which of the following students has the number that is greatest distance from zero on a number line?'</p> <p>1/3, absolute -8, absolute -3/4, absolute 5, absolute 7/3, -7, and 940.</p> <p>It really determines, because Shawn right now, if he was an option, he would have been the furthest one. But we got Patrick, which is absolute 7/3, Kim, Nina, that's absolute 5, Leon, absolute -3/4. Kim that has absolute -8. Kim would be the farthest if it was backwards, but it's absolute -8, so that would translate it to 8, because any absolute number that is negative would _____ [00:30:43] into a positive. Unless it has a negative sign outside, then it would have been a negative. So, Kim is option A. And then Finish.</p>	
[Andrea – stop here.]	
Interviewer: Yes. Okay, and then you can hit Turn In. I think you have to do it twice.	
<p>So, thank you so much for doing that. I just have a couple questions about all of them put together. So, did you enjoy _____ [00:31:08] out loud while you're doing that?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 1: Kind of.	
Interviewer: Honest answer.	
Student 1: Kind of.	
Interviewer: Kind of. Okay, what part was okay and good about it?	
Student 1: Oh, what did it say? That this is all math. But yeah.	
Interviewer: Maybe the one, you said earlier, that word problems were sort of not your thing, so the ones that were more like just numbers, was that the part that you preferred?	
Student 1: Yeah.	
Interviewer: Okay, and then, what was the hard part for you?	
Student 1: The word portion.	
Interviewer: Okay.	
Student 1: The word problems.	
Interviewer: Okay. And then, did you find it easy to think out loud? Or did it make it more difficult for you to choose the correct answer?	
Student 1: It's kind of easy.	
Interviewer: Okay. And then, remember that some of the problems had like something over here . . .	
Student 1: Diagrams.	
Interviewer: . . . and then the problem. Did you find those different from just the ones that just had one big problem in the middle? Did you find them more challenging, or easier, or the same?	
Student 1: They're the same.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Same, okay. And then, was there a particular question or couple questions that you found either difficult or confusing?	
Student 1: Mm, no.	
Interviewer: No? Okay.	
Student 1: Well, yes, the absolute value. The absolute something is when the value ones.	
Interviewer: The absolute value.	
Student 1: Or the proportional value ones.	
Interviewer: Proportional, okay. Great. Okay. Those are the end of the questions that I have. So, thank you so much. And then, can I get you guys to the office, or what is the best . . .?	
Student 1: _____ [00:32:37]	
Interviewer: Okay, let's go to the _____ [00:32:40]. Thank you so much. [Door closes] Yeah. 908. Or no, 808. [Laughs]	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: _____ [00:00:00] tell me your name. Student 2? And if it's okay with you, I'm going to record this, just so that I don't have to take notes on everything?	
Student 2: Okay, fine	
Interviewer: Okay. All right, and can you spell your name for me?	
Student 2: ----- [student spells name].	
Interviewer: And are you in 8th grade?	
Student 2: Yeah.	
Interviewer: Do you know your math teacher's name?	
Student 2: Miss ----- [Teacher's name]. I have the schedule _____ [00:00:20].	
Interviewer: Oh, no. That's okay. Nope, just the first name is perfect. Thank you. Or, her last name is _____ [00:00:24]. Okay.	
So, as I said, my name is ----- [Interviewer], and I'm one of the people that writes the tests that you take in the spring, like the standardized fill-in-the-bubble tests. Do you remember taking those in the end of the year?	
Student 2: Yeah.	
Interviewer: Okay. So, we're studying new types of test questions, and we want to see how to better work with students in middle school. And, have you ever heard about thinking out loud, what that means?	
Student 2: Yeah.	
Interviewer: Yeah. So, basically, it's like saying what your brain is thinking as you're doing something. And you can, anything you're thinking is great. Even if you're like, 'I don't like this question.' Or 'I can't remember how to do this,' or 'I wish they would have told me more about something.' So, anything you're thinking is great to share.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Everything you share is anonymous, which means we won't tell your parents, your teacher, your principal. It's just to figure out if these are good questions for students. Does that make sense to you so far?</p>	
<p>Student 2: Yeah.</p>	
<p>Interviewer: Okay. So, first, I just want to show you like how I would think out loud. So, if I have this piece of paper, and I was told to fold it in half twice, what I would do is think about, well, okay, I'm going to fold it half once. To start with, I'm going to fold it this way. Line up the edges, make a nice crease, all the way across. Then, I'm going to fold it again. So, I'm going to just switch the orientation, line up the edges, crease it again. Then, I'm going to make sure, oh, yeah, I folded it twice. So, I did what they wanted.</p> <p>And now I can show you thinking out loud with an actual math problem, what I would do. So, first I would just read it. So, it says, 'Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a 't'?</p> <p>So, the first thing I'm going to think about is, well, what do they want now? So, it's this last part, 'What is the probability that he will choose the letter 'T'?' So, first I'm going to just count the letters in 'Matthew.' So, M-A-T-T-H-E-W. So, I got seven. And then, how many Ts. Well, in 'Matthew' there are two Ts. So, it's 2 out of the total 7, which in this case, is B. So, you would use the mouse, select B. And then when you do it, eventually, you'll hit Next, but there's just this, so you can hit Finish on this one and you can, yeah, you can hit the green 'Turn In' and you'd hit it twice.</p> <p>So, do you have any questions? Does that make sense, sort of what I was doing?</p>	
<p>Student 2: Yeah</p>	
<p>Interviewer: Okay. And then go ahead and click the Practice Session. All right. Sorry, and if you scroll down a</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>little bit, there's a Continue. Yep, good job. And then you can hit Continue again.</p> <p>And so, what I'd love for you to do is read the question, and then tell me everything you're thinking about.</p>	
<p>Student 2: Okay.</p>	
<p>Interviewer: Why don't you read it out loud _____ [00:03:23]?</p>	
<p>Student 2: 'Eighteen students in a classroom will each roll a fair number cube with sides labeled 1 through 6. How many times is a number greater than 3 expected to be rolled?'</p> <p>3, obviously.</p>	
<p>Interviewer: What was, how did you know it was 3?</p>	
<p>Student 2: Because. There are only three numbers that are greater than 3 on a cube. So, there's only 6 sides on a cube.</p>	
<p>Interviewer: Great. And then I forgot to tell you that there's scrap paper and a calculator if at any point you'd like to use that.</p>	
<p>Student 2: Okay.</p> <p>'Use this information to answer the following questions.</p> <p>'Garcia's classroom . . .'</p>	
<p>Interviewer: It's okay, you read it out loud.</p>	
<p>Student 2: 'Which number is equivalent to Bailey's number?'</p> <p>So Bailey has $\frac{1}{3}$. So, I would turn $\frac{1}{3}$ into [distortion].</p>	
<p>Interviewer: So, how are you, how would you do that then? How would you turn $\frac{1}{3}$ into a decimal?</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Student 2: I would, hmm. What I taught, which I can't really, exactly remember, but I would times it by 100.	
Interviewer: Okay.	
Student 2: So that would be 3 times 100, that would be 300. So, it would be 100 out of 300. So, I think it would be, Patrick, because that's the only one that has a whole number. Oh, no, it would be Nina, because	
Interviewer: So, these problems, we call this a stimulus on the left. It's just like helpful information. But then the choices are on the right. So, is there a choice . . . ?	
Student 2: Oh, what number is [cross talking]?	
Interviewer: Yes.	
Student 2: It would be, I wouldn't times it by 100. I would divide it. So, it would be, I'm used to scientific calculator.	
Interviewer: You know what? The last student said the same thing.	
Student 2: 3 divided by 100, so, 3. So, it would be this is the closest one.	
Interviewer: Okay, so you would choose the closest to .03, which is what your calculator got?	
Student 2: Yeah.	
<p>Interviewer: Okay, great. And can you go ahead and hit, you've finished. So those were the two practice problems. Okay, go ahead and hit Turn In. Okay great.</p> <p>So, you're going to go ahead and do a few more and say everything out loud that you're thinking. Do you feel ready to do that?</p>	
Student 2: Yeah.	
Interviewer: Okay, so go ahead and hit Operational, and you just go down and hit Continue. Great, and then Continue again. Nice.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 2: Mm-kay.</p> <p>[Item 1] 'Triangle ABC is similar to triangle DEF, as shown below.' 'What is the length of D to F?'</p> <p>Okay, so, since this is 15, going to same length, this would be 15. Or, no. Since they're not the same length. 10 because this one looks like it's a few less, so it would be 10.</p>	
<p>Interviewer: It looks like a few less than the 15?</p>	
<p>Student 2: Yeah.</p>	
<p>Interviewer: Okay, great. So, go ahead and hit 10. And now, did you find that question sort of hard, easy, medium?</p>	
<p>Student 2: Mm, it was kind of medium, since it didn't have a scale to show the other sides.</p>	
<p>Interviewer: Okay, great. How about this one?</p>	
<p>Student 2: [Item 2] 'Yanni drew the rectangle KLMN on this graph.'</p> <p>'Yanni will reflect the rectangle over an x-axis. Which ordered pair describes the location of point K after it is reflected on the x-axis?'</p> <p>So, x-axis, it's like this, so it's switch over to (2, 3). Wait, (3, 3). It's 1 over this, would switch over and it would go . . . (3, 3) So it'd be (-3, 3).</p>	
<p>Interviewer: Okay. So, how did you determine that it was (-3, -3)? What did you do?</p>	
<p>Student 2: Well, since it's an x-axis, I would switch it over this way.</p>	
<p>Interviewer: Wow.</p>	
<p>Student 2: And x-axis is down here, like this, so I would switch down. And (-3, 3).</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You're doing great. Thank you. And next.	
<p>Student 2: Okay.</p> <p>[Item 3] 'Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit mass (grams) per unit of volume (cubic centimeters).'</p> <p>'Based on the graph, which equivalent represents the relationship between mass, m, and the volume, v, of copper?'</p> <p>Okay, so, the 1 would be right here. And the first number it connects with is 10. So, it would be, 1, no, it would be 1m, it's a little bit underneath. So, it would be actually a 9. $1v$, or $m=9v$.</p> <p>I'm not good at thinking out loud.</p>	
Interviewer: You're doing a great job. Okay, how about this one?	
<p>Student 2: [Item 4] 'Use the information to answer the following three questions.'</p> <p>'Point A, B, C, D, and E lie on the side of the triangle, as shown.'</p> <p>'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of the segment AE is 6 units.'</p> <p>'If the length of the segment AC is 7.2 units, what is the length, in units, of segment BC?'</p> <p>Well, since BD is 3 and AE is 6, it's 3 more than this. So, I'm going to think since AC is 7 units, a find half of the, wait now, yeah, I would find half this, which would be half of 7.2. So, I'd do 7.2 divided by 2, I'd get 3.6.</p>	
Interviewer: Okay. I'm sorry, back, if you just think about that question for just a second, was it hard to think out loud _____ [00:10:43]?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Kind of. Because it's like, a lot of information is given to you. But they should, like, make it where there are too many words, you can see the numbers clearly.	
Interviewer: Okay, thank you. Okay, how about this one?	
<p>Student 2: [Item 5] 'Use the information to answer the following three questions.'</p> <p>It's the same as it was last time.</p> <p>'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertical trapezoid A'B'D'E'?</p> <p>'kay, so. This one is kind of hard to understand, because there's a lot of unneeded information in the words. They should just have the main stuff.</p>	
Interviewer: Okay. So, can you pull out the main stuff to make it?	
Student 2: Yeah, they don't tell me if this has already been reflected. So, I don't know if I should reflect it or not. I'm just going to say it's already been reflected.	
Interviewer: Okay.	
Student 2: ABDE. A is at (3, 2), or, yeah, (3, 2). Oh, so it is reflected from what I can get from the answers, it's been reflected. So, I'd bring it down . . .	
Interviewer: So, I'm sorry, what about the answers made you know it was reflected?	
Student 2: Because A is 2, (3, 2), and there isn't a (3, 2) on this. So, I realized it's been reflected. So, A go down 3, bring it from, it would be, huh, . . . x-axis. It would go down 3, so it would be . . . I don't get this. Wait, unit, 11 units to the left. So . . . go this way, 1, 2, 3, . . . 6, 7, 8, 9, 10, 11. So it would be -9 and go down 3. And be, since it would go over 11, [clears throat] sorry, my voice is cracking.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: That's okay.	
Student 2: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. That'd be (-7, 4). No -7s. So, it's one of these two, since these don't have -7.	
Interviewer: Okay. So, you're narrowing your choices.	
Student 2: Yeah. D would go 11 units, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. It's -4 and go down. So, it would be this one because it's the only one with a (-4, -6). Because it go to the x-plane. It'd be D.	
Interviewer: Great. Okay. Did you find that question to be hard, easy, or medium?	
Student 2: Hard.	
Interviewer: Hard, okay. Great. Thanks. And the next one.	
Student 2: [Item 6] It's the same information as shown. [The coordinate grid/shared stimulus.] 'Which segment lies on a line that represents a proportional relationship between x and y?' Hmm. Okay, so I'm trying to match up ones that would be the same, so . . .	
Interviewer: What's the first _____ [00:15:03]?	
Student 2: It would be, the first one is A, which is 3 and 2. But that wouldn't be right, because they're not the same numbers. B is 6 and 4, that wouldn't be right. I think it would be A and E because they go in the same line segment. So, I think it would be A and E.	
Interviewer: Okay. And was there a vocabulary word, or a concept in the problem that you were thinking about, as you were trying to solve it?	
Student 2: The proportional relationship.	
Interviewer: Okay, great. Thank you. _____ [00:15:43]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 2: [Item 7] 'Use the information to answer the following three questions.'</p> <p>'The students in Miss Garcia's class were given a number at random. The table shows their numbers.'</p> <p>And it's the same as the question before.</p> <p>'Shawn divides his number by -9.'</p> <p>'Which is the best estimate to his answer?'</p> <p>So, I'm going to find Shawn. His is -940. Well, since he's dividing a negative by a negative, I would make it a positive. So, I would find it, 940 divided by 9, which is 104. I think I did wrong. So, I'm going to try 9 divided by 940. So, I got it right the first time. Which was a 104. So, using estimates, I would go to 100, because 4 would round down.</p>	
<p>Interviewer: Great. And now how did you know that that was the best estimate? Oh, sorry, you can hit the Back if you want to look at the choices again to explain it. So, how did you know that the was the best choice?</p>	
<p>Student 2: Because if you divide a negative by a negative, it becomes a positive. And then it said 'estimate' which made me think rounding. So.</p>	
<p>Interviewer: Very nice. Thank you.</p>	
<p>Student 2: [Item 8] 'What is the value of Rachel's number to the 3rd power?'</p> <p>Rachel has -7. So that'd be -7 times -7, which would be a positive, times -7 again. So, 7 times 7 times 7 would be a - 343. Because 3rd power means the number times itself 3 times.</p>	
<p>Interviewer: Great. And how did you think, was it hard to pick out one _____ [00:17:46] your answer on that question?</p>	
<p>Student 2: Not really, no.</p>	
<p>Interviewer: Okay, great. Okay, how about this one?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 2: [Item 9] Okay, so it's the same table. 'Which of the following students has the number that is the greatest distance from zero on a number line?'</p> <p>I believe it would 8, because it has this, which means the number on a number line, which would be a positive 8.</p>	
<p>Interviewer: What means the number on a number line?</p>	
<p>Student 2: The lines right here.</p>	
<p>Interviewer: The lines, okay. Thank you.</p>	
<p>Student 2: So, it would automatically become a positive. And none of them, the highest one they have that is a positive is Nina. So, I believe it's Kim.</p>	
<p>Interviewer: Great. Okay, great.</p>	
<p>Student 2: [Item 10] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used $(20)(50)$ to estimate they had a sale of \$1,000.'</p> <p>'Which statement best describes this situation?'</p> <p>Well, it wouldn't be 20, you'd round it to 30. So, he's already off by that. And 52 would round to 50. So, I would do 30 times 50 to find the correct answer. 30 times 50 [4 bell tones]. I guess he is being reasonable, because it's close to the number of ticket sales.</p>	
<p>Interviewer: Okay. So, which would that be?</p>	
<p>Student 2: It'd be A.</p>	
<p>Interviewer: And so, what did you get in the calculator?</p>	
<p>Student 2: \$1,500.</p>	
<p>Interviewer: And so, how did you, you said that was reasonable or not reasonable?</p>	
<p>Student 2: Because the one that says it's not reasonable is 500. Oh, wait, it'd be not reasonable, because he underestimates the value of 500. I didn't read the question, the answer fully.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. Take your time. Okay, great, go ahead and select Next, then.	
Student 2: [Item 11] 'What is the value of $(-3)^4$ ' Well, -3 times -3. It'd be a positive, because it's timing itself by an even number. So, it'd be 3 times 3 to the second power, times 3, which is third, times 3 which is fourth. And it'd be positive 81.	
Interviewer: So now, did you find that question to be easy, hard, . . . ?	
Student 2: Easy.	
Interviewer: Okay, great. Thanks.	
Student 2: [Item 12] 'What is the greatest distance from zero on a number line?' Okay, so I change $\frac{3}{4}$ to a decimal, so it would be 4 divided by 100, no that would be, that would actually 75, because, so that would be 75. That would be 0.50. This one would be highest, because 80 is over 75. So, A would be the highest number.	
[Andrea – stop here.]	
Interviewer: Great. So that's the end, so you can hit Turn In, and then you have to do it twice. And then, I just had a few questions to ask you about, like, everything we just did. So, did you enjoy thinking out loud, as you did this?	
Student 2: Yes. Interviewer: Okay, and did you find it thinking out loud made it harder or easier, or the same as when you do the [cross talking]?	
Student 2: It made a little easier. Because I can actually organize the information better. Instead of it all running together in my head.	
Interviewer: That's great. Okay. And then, some of the items you noticed had something over here, like those tables, and then the question. And some just had a plain question. Did you find a difference between those two?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 2: Yes, because the tables actually showed more information than the actual question. So.	
Interviewer: So, did that make it harder, easier?	
Student 2: Easier.	
Interviewer: Okay, great. And then were there any particular questions that stuck out to you as either confusing or very hard?	
Student 2: The one that with the Miss Garcia's class one.	
Interviewer: Mm-hmm. And that was particularly hard for you?	
Student 2: It was confusing.	
Interviewer: Okay, confusing. Great. Wonderful. Well, thank you so much for doing this. And the bell just rang. So now do you know where you should go?	
Student 2: Yeah.	
Interviewer: Okay, we'll bring back to the office, but _____ [00:22:23].	
Student 2: Right. _____ [00:22:28] [inaudible to end of recording]	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: And [Student name] _____ [00:00:02].	
Student 3: Yes.	
Interviewer: And do you know your math teacher's name?	
Student 3: Miss ----- [Teacher's name].	
<p>Interviewer: [Teacher's name], okay. Great. Let's see. I'm just going to hit record. I'm not actually going to record our faces. I'm just going to, record what we say, so that I don't have to takes not on everything. [recording damage] backpack.</p> <p>So, I don't know if you know about, if they told you what you're doing, but I work with a company that writes the math tests you've taken in the spring. Does something like this look familiar to you? And so, we're here to try to figure out what kind of test questions will be good for kids your age in future. So, we're just here to get your responses.</p> <p>Everything you say is anonymous. So, your teachers or your parents, or the principal won't get a report on what you did. It's just to help us make the tests better for kids in the future.</p> <p>And we're going to ask you to think out loud while you're working with me. Have you ever heard of that before, think out loud?</p>	
Student 3: Yeah. Kind of.	
Interviewer: Kind of know what it means?	
Student 3: Yeah.	
<p>Interviewer: So, I like to think of it as sort of, everything your brain is thinking about, you just say it, so that I can understand. Because if it's just in your brain, I don't know. So, if you could just say it out loud, that would make our work together go better. Anything you're thinking is great. Even if, gosh, I don't remember how to do that. Or, we did that last year, but I don't really remember what it means. Anything you're thinking is great to say.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>And so, I just wanted to show you how I would think out loud. So, let's pretend that somebody gives me a piece of paper. And now I will fold it twice. So, I guess I would say, Okay, I'm going to start on this end, _____ [00:01:31] really nice thing, and make a crease across, _____ [00:01:33]. And I'm going to do the same thing, only I'm going to switch the way I'm going. Line up the ends, make a nice crease, and I'm going to make sure I did what I asked. So, I folded it once, oh, yeah, I folded it twice.</p> <p>And then I'll show you sort of thinking out loud with an actual math problem. So, this one says, 'Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a 't'?'</p> <p>So, first I want to ask, what do they want? Okay, so I'm going to back. Oh, okay, 'What is the probability that Matthew will choose a 't'?' So, in order to figure that I have to know how many letters there are, so I'm going to count them. M-A-T-T-H-E-W. So, seven total. And then Ts, I see 2 Ts. So, 2 out of the 7 total. And then I see option B as the fraction $\frac{2}{7}$, so that matches what I was hoping for. And then, I'll Finish, you'll Next. I'm just going to do one, and then you're going to do more.</p> <p>So, did thinking out loud, do you kind of think you understand what I mean?</p>	
<p>Student 3: Yeah.</p>	
<p>Interviewer: And then there's a pencil and a calculator if at any point you want to use that. And, I have two practice ones for you, so you can ask me any questions, if any of it doesn't make sense. And then, I'd love to hear what you're thinking. So, if you want to go ahead and start by reading it, and then tell me what you're thinking.</p>	
<p>Student 3: Will I read everything?</p>	
<p>Interviewer: Yes, please.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 3: 'Eighteen students in a classroom will each roll a fair number cube with one side labeled 1 through 6 one time. How many times is a number greater than 3 expected to be rolled?'</p> <p>Okay, so, that's six, I would subtract it by 3.</p>	
<p>Interviewer: And what would you get?</p>	
<p>Student 3: 3.</p>	
<p>Interviewer: Nice. And you want to go ahead and, that's right. And then you can hit Next. Try one more time, there you go.</p> <p>Oh, and then this problem, you'll see some of them have something on the side, and then the problem. You'll want to read this part as well as the question.</p>	
<p>Student 3: Okay.</p> <p>'Use this information to answer the following question.'</p> <p>'The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.'</p> <p>Bailey, $\frac{1}{3}$. Kim, absolute value of -8. Leon, absolute value of $-\frac{3}{4}$. Nina, absolute value of 5. Patrick, absolute value of $\frac{7}{3}$. Rachel, -7 Shawn, -940</p> <p>'Which number is equivalent to Bailey's number?'</p> <p>So, I would look at Bailey's, $\frac{1}{3}$, and I just automatically know that 0.33 equals $\frac{1}{3}$.</p>	
<p>Interviewer: So, you said you automatically know. Is there a way that if you didn't automatically know, that you would, like what if you were talking to a little kid? How would you explain to them, that [background conversation]?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: I would divide the numerator by the denominator. And . . .	
<p>Interviewer: Nice. Great. Okay, so you can go ahead and click B. And then hit the Finish. So, those are the practice ones. You did a great job. Did they make sense? Do you think you understand what we're looking for?</p> <p>Great. So, now we're going to the real ones. And same thing, just keep talking about whatever your thinking. Start with this one.</p>	
Student 3: [Item 1] 'Triangle ABC is similar to triangle DEF, as shown below.'	
Interviewer: And then keep going.	
<p>Student 3: Okay. 'What is the length of D and F?'</p> <p>I look at D and F. Compare it to the ABC. So, if 5 is 15, I know that 5 times 3 is 15, so 3 times 3 would be 9.</p>	
Interviewer: Great. That was great explaining.	
Student 3: So, I would 9? To equal that DF.	
Interviewer: Nice.	
<p>Student 3: Thanks.</p> <p>[Item 2] 'Yanni drew this rectangle KLMN on this graph.'</p> <p>'Yanni will reflect the rectangle over the x-axis. Which ordered pair describes the location of point K after it is reflected over the x-axis?'</p> <p>[pause] So, I would have to reflect. So, it would be like a mirror. So, it would be on the lower portion. And if -1 is the bottom, and 3 is the top, I know that's 4, 5 spaces. So, move it down 5 spaces.</p>	
Interviewer: Okay.	
Student 3: So, it would be -5 and -1.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: See if that's a choice.	
Student 3: That's not.	
Interviewer: So, does that maybe make you rethink what you want to do?	
Student 3: It's a good hint.	
Interviewer: The answer's not there. What else?	
Student 3: Would I reflect it from this way over? From left to right?	
Interviewer: I would maybe go back to the question and see what they told you to do.	
Student 3: 'Yanni will reflect the rectangle over the x-axis.' So, it'd be this way. So, it would be down. So, I would, somebody's got me confused. [Laughs] [pause]	
Interviewer: So, earlier I told you, you were flip it like a mirror. So, what would happen if you did that?	
Student 3: Oh, K and L would be the bottom, and N and M would be top.	
Interviewer: Yes.	
Student 3: [pause] The location of point K. So, K would be -1 and N would be 3?	
Interviewer: All right. See if that's a choice. That's okay, you've done great thinking out loud, if you just want to pick one. Or you cannot pick one, and hit Next. Whatever you think is best. Okay.	
Student 3: [Item 3] 'Density expression the proportional relationships between mass and volume of a substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters).'	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>'Based on the graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'</p> <p>So the arrow is pointing straight up, and it goes [background noise] back 11. So, [pause]. So, it would 1 and every 10th, because 1 and 10 match up with arrow. Which would be m equals that times v.</p>	
<p>Interviewer: Now, you said out loud, every 10. So how did you turn every 10 into this, $m=0.1v$.</p>	
<p>Student 3: Because 110 are multiples or whatever.</p>	
<p>Interviewer: Okay, great, thanks. And go ahead on to the next one.</p>	
<p>Student 3: [Item 4] 'Use the information to follow three questions.'</p> <p>'Points A, B, C, D, and E lie on the sides of a triangle, as shown.'</p> <p>'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of segment EA is 6 units.'</p> <p>'If the length of segment AC is 7.2 units, what is the length, in units, of segment BC?'</p> <p>We did this last year. [Laughs]</p>	
<p>Interviewer: Good.</p>	
<p>Student 3: I think I forgot I did this. [Laughs]</p>	
<p>Interviewer: Okay.</p>	
<p>Student 3: _____ [00:11:44] And that's 6.</p>	
<p>Interviewer: _____ [00:11:48] so the section is 3 and that section is 6. How can you use that to help you?</p>	
<p>Student 3: What can it do? _____ [00:12:02] here is 6. [pause]</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: You're not sure how to do that? Okay. Is there a particular word or words in the question that you remember from last year, but you're having a hard time remembering like how to do it because of the words? Is there something that was . . .?	
Student 3: Not really. I just forgot. You know the expression would be for it.	
Interviewer: Okay, great. All right. Go ahead and hit Next.	
<p>Student 3: [Item 5] 'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertical trapezoid A'B'D'E'?</p> <p>It is 11 units to the left. So, 1, 2, 4, 5, 6, 7, 8, 9, 10, and 11. So it would be -8 and 6. So A would be right over here. So that means, and then it is reflected over the x-axis, so it would be flipped down to be at. It would be here, I believe. Wait, no, it would be on the x-axis. So, it would be -8. A would be at -10. So, it might be -9. [laughs]</p> <p>Can you . . .</p>	
Interviewer: Can you use that _____ [00:14:35]?	
Student 3: Use this, or this?	
Interviewer: I guess either one, however you can re-assess now based on what you were looking for wasn't a choice.	
Student 3: Okay, so, did I count wrong? So, 11 units to the left. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. So, I did count wrong. So, [cross talking]	
Interviewer: That's okay. Just right-click and then that should go away. There you go.	
Student 3: So, there. Then A is . . .	
Interviewer: So, do you want to write anything down, so that you don't miss . . .	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 3: Strike. [Laughs] So, while we're . . . E's at -7, and A would be a -9. So, E is 3 units to the right of B, so it would be -4. And E, wait, no D is ____ [00:15:54] And then E to B, 6 units from A. So, it would be on unit ____ [00:16:12], so it's a -3. And then, so I have all the coordinates. But now, I flip it. So, they didn't get -3? And then B would be that, -6. ____ [00:16:51] -3, E is 6. And then, come down, so it's yeah, that would be [laughs]. That's how it goes, so. Let's look. ____ [00:17:29] Probably be a (-3, 6). So, B or A would be it. (-9, 3). So, nothing they [background noise].</p>	
<p>Interviewer: Great. Now, ____ [00:17:58] there's no rush.</p>	
<p>Student 3: [Item 6] 'Which segment lies on the line that represents a proportional relationship between x and y?' Proportional. Portion is size, I think. So, if we took xy, BD, I think that was there. But it doesn't have a letter. [pause] If it was proportional relationship. [pause] I have no idea.</p>	
<p>Interviewer: So, you said out loud, 'proportional relationship.' Do you remember what that means from last year?</p>	
<p>Student 3: I might. The size of something, which is same shape, but different size.</p>	
<p>Interviewer: Okay, but then you're not sure how to use that to pick the correct answer.</p>	
<p>Student 3: Yes.</p>	
<p>Interviewer: All right. Do it. Take your best guess.</p>	
<p>Student 3: A and E is the closest to what I was [cross talking].</p>	
<p>Interviewer: Okay. Great. And then go ahead and hit Next.</p>	
<p>Student 3: [Item 7] 'Use this information to answer the following three questions.'</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>'The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.'</p> <p>Bailey, $\frac{1}{3}$ Kim, absolute value of -8. Leon, absolute value of $-\frac{3}{4}$. Nina, absolute value of 5. Patrick, absolute value of $\frac{7}{3}$. Rachel, -7 Shawn, -940.</p> <p>'Shawn divides his number by -9.'</p> <p>'Which is the best estimate of his answer?'</p> <p>So, his, divided by -9. We'll round negative -940 to -900, because it's lower than 5. And then I would divide which -900 divided by -9, would be . . .</p>	
<p>Student 3: So are negatives. 900 divided by 9. I get 100, which would translate to 100, because a negative divided by a negative is positive.</p>	
<p>Interviewer: Okay, great. Mm-hmm.</p>	
<p>Student 3: Is that right?</p>	
<p>Interviewer: Negative divided by negatives a positive. Is that what you want to say?</p>	
<p>Student 3: I know it's not addition. So, it would be -100.</p>	
<p>Interviewer: Because a negative divided by a negative ends up on the negative answer.</p>	
<p>Student 3: Yes.</p>	
<p>Interviewer: Okay, great.</p>	
<p>Student 3: [Item 8] 'What is the value of Rachel's number to the 3rd power?'</p> <p>So, Rachel's number is -7. To the third power. I know negative -7 to the third power would be -7 times -7 times -7. And -7 times -7 is 24. -7 multiplied by 24 is 168. And then, that is not right. [laughs]</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So could you check your work maybe?	
Student 3: So, -7 times -7 times -7. So, -7 times -7 times -7, 343. And it's negative, so it would be -343.	
Interviewer: How did you know it was a negative answer?	
Student 3: Because -7.	
Interviewer: Because you started with a negative?	
Student 3: Yeah.	
Interviewer: Okay, great. So, go ahead and choose the A button. There you go. Okay.	
Go ahead and _____ [00:23:07] this one.	
<p>Student 3: [Item 9] 'Which of the following students has the number that is the greatest distance from zero on a number line?'</p> <p>'Distance to zero'. So, distance is clearly _____ [00:23:20] negative and positive. And that Bailey's $\frac{1}{3} = 0.33$. So that's really close. And -8 would be positive 8, which is farther than Bailey. And then Leon's $\frac{3}{4}$ equals 0.75 and it's negative, so it's still farther than Bailey's. And Nina's 5 is further than Bailey's number. Patrick's $\frac{3}{7}$ [sic], I don't really have an exact answer to that, but I know it would be over 2, because 3 and 7, divide from the 2. Rachel's -7 is higher than Bailey's and Shawn's is farther than Bailey's.</p> <p>So, it's the greatest distance. So, Shawn's 940 is farther than the rest of these. So, Shawn would be the answer. Only Shawn's not there. [Laughs]</p> <p>'Which student has the number that is the greatest distance from zero on a number line?'</p> <p>So, Kim, -8, which would be positive 8. And then Leon, which was 0.75, and then Nina is 5. And that would be 2 $\frac{1}{3}$. So, out of the choices, Nina has the most.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Okay. And how did you decide that Nina was the one that was the most?	
Student 3: I, Kim, wait, no. Kim has the most, because hers equals 8 and 8 is larger than 5.	
Interviewer: Okay, great. All right. Try this one.	
<p>Student 3: [Item 10] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used $(20)(50)$ to estimate they had ticket sales of \$1,000.'</p> <p>So, tickets to the play cost \$29. On the first day of the play, 52 tickets were bought.</p> <p>It looks like he rounded, but that wouldn't round out right. _____ [00:26:22]</p> <p>'The manager's estimate is reasonable because that value is close to the actual value of the ticket sales.'</p> <p>'The manager's estimate is reasonable because that value is the exact value of the ticket sales.'</p> <p>'The manager's estimate is not reasonable because that value underestimates the actual value of the ticket sales by about \$500.'</p> <p>'The manager's estimate is not reasonable because that value overestimates the actual value of the tickets sales by about \$500.'</p> <p>So, if I do 29 times 52, it equals \$1,508, which is over \$500, which C and D say. And it overestimates the value, because he rounds down, instead of rounding up, which he should have done.</p> <p>So, the answer would be D.</p>	
Interviewer: So let's talk.	
<p>Student 3: [Item 11] 'What is the value of $(-3)^4$?'</p> <p>So, know that 3 to the power of 4, is 3 times etcetera. So, 3 times 3 times 3 times 3 is 81. And it's negative, so it would be -81.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So the negative attached to the -3 makes the answer negative?	
Student 3: I believe so.	
Interviewer: Okay. There's one more.	
Student 3: [Item 12] 'Which value is the greatest distance from zero on a number line?' So, negative ½, negative 0.8 is largest. Just because it's the larger number.	
Interviewer: How did you compare the numbers, decide which one was the largest?	
Student 3: -.8 is larger than .6. And I know that ¾ equals 0.75, which is still smaller than -.8. And then ½ is smaller than -.8.	
Interviewer: Great.	
Student 3: So, that was my final decision.	
[Andrea – stop here.]	
Interviewer: [Laughs] So, now I just have. Those are the last questions for you, I just have some questions about all of them. Did you enjoy thinking out loud with me today?	
Student 3: Yeah.	
Interviewer: Yes, okay. And did you find it easy to think out loud, or did it actually make solving the problems harder for you?	
Student 3: It's not necessarily harder. It's just more elaborate, I'd guess you'd say. Because I'm used to thinking in my head.	
Interviewer: [pause] Sorry. I can't write as fast as you can talk. Were the items that had like the chart over here and then the problem, harder, easier, or the same as the questions that just had a question. Did you notice a difference?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 3: Probably harder. Because I had to translate multiple different things back and forth. To the problem and the. I'm just giving you _____ [00:29:57], right?	
Interviewer: That's okay. You're doing great. And then, were there any particular questions that you found confusing or difficult? I can scroll, we can scroll back through if you like. Like if you use the Back button you can stop with the ones that found as hard or confusing.	
Student 3: I don't know that I'm worried about hard. This one was kind of confusing, because some were larger, but the answers didn't belong with it.	
Interviewer: Yes. Okay.	
Student 3: That one wasn't too hard. That one wasn't too hard. This one was kind of confusing, because I haven't learned that really. I mean I've kind of learned it, but not really.	
Interviewer: It's coming up later in 8th grade.	
Student 3: That one wasn't terribly too hard. It was just a lot of back and forth. That one I had no idea.	
Interviewer: Okay. So that was proportional done. Yeah. Thanks.	
Student 3: No, that one wasn't too hard. That one wasn't too hard. That one wasn't too hard. And that's all.	
Interviewer: Right. Those are the end of my questions. Thank you so much for your help today.	
Student 3: _____ [00:31:07]	
Unknown: Do you want to take a peek?	
Interviewer: No, that's okay.	
[End of audio]	

Transcribed Responses	(Reserved for Cognition Analysis; Leave Blank)
<p>Woman: [pause to 00:00:39] [inaudible background conversation] And she had no video, too. _____ [00:00:54]</p>	
<p>Woman: Student 4 is here.</p>	
<p>Interviewer: Okay, great. Come on over this way. So, if it's okay, I'm going to take quick _____ [00:01:03] and then I want to _____ [00:01:05] so I can _____ [00:01:05] what you're saying. Okay. All right.</p> <p>So, again, my name is ----- [Interviewer]. And I work for the company that helps to write the math tests that you probably take in the spring. Do you remember questions kind of like this? Okay. And so, we're here to try to figure out is see how kids your age answer questions like this. And yours won't go to anybody like your teachers, or parents. So, it's just for us to figure out if these are good questions for kids, or maybe if we should try a different _____ [00:01:31]. Does that make sense?</p>	
<p>Student 4: Okay.</p>	
<p>Interviewer: Okay, so, in order to do this, we're trying to have you think out loud. Have you ever heard of thinking out loud? No, okay, so it's.</p>	
<p>Student 4: So, I guess it's like something you say out when you're thinking.</p>	
<p>Interviewer: Exactly. So, it's basically, like what your brain is thinking as you're doing something. So, when you're taking the real test, you probably do this all in your brain. But then I won't know what you're thinking. So, today, we're having you say it out loud, so that we can understand what you're thinking about as you do this.</p> <p>So, we could start with me showing you a little about thinking out loud. So, if I have this piece of paper, and somebody says, fold it in half two times, maybe would I would do is fold it in half first in this direction. Make sure I lined it up, make a crease all the way across the paper. And then I'm going to fold it again. So, I think I'm going to the opposite way, this time. Make sure again that I've lined it up really well, then I make a fold, crease. And maybe I check my work to make sure that I really did [background</p>	

<p>Transcribed Responses</p>	<p>(Reserved for Cognia Analysis; Leave Blank)</p>
<p>noise]. So, I can see the line, so that I know I did _____ [00:02:34].</p> <p>And did you notice that as I was doing it, I told you what I was doing as I was doing it, instead of after. Because after the fact, it's real hard to remember what you did. So, it's good if you can say it as you're doing it.</p> <p>And then, I thought I'd show you with a math problem. So, this one says, 'Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a 't'?'</p> <p>So, the first thing I'm trying to figure out is, what do they want to know? So, I think they want to know what's the probability that he will choose the letter T. So, first I'm going to count the number of letters in his name. So, I have M-A-T-T-H-E-W. So, I've got seven total letters. And I'm going to look again. And I see, one, two Ts. So, I know he has a probability, or the chances are 2 out of 7 total. And I know that that can be shown as a fraction, which in this case would be 2 over 7. So, I'm going to use my mouse and hit B. And there's only one problem here, so I'll just hit Finish. When you do it, eventually there'll be a Next button. Wups. Okay.</p> <p>So, did that sort of make sense, what I was doing as I thought out loud?</p>	
<p>Student 4: Mm-hmm.</p>	
<p>Interviewer: Okay, so now I was hoping you could practice on a math problem. First read it out loud, and then tell me everything that you're thinking</p>	
<p>Student 4: 'Eighteen students in a classroom will each roll a fair number cube with sides labeled 1 through 6 times. How many times is a number greater than 3 expected to be rolled?'</p> <p>Well, it's like 1 through 6, so 3 is in the middle. 3 is like 6, so, it would be 3.</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
<p>Interviewer: 3 chances. And I forgot to tell you, there's a calculator, and a pencil and paper if you ever want to, you don't have to, but if it ever helps you, you get to.</p> <p>And so, oh, great. And in this problem, you'll notice there's something over here. It's part of the whole problem, so you'd want to look at both sides</p>	
<p>Student 4: 'Use this information to answer the following question.'</p> <p>'The students in Mrs. Garcia's class were each given a number at random. The table shows their numbers.'</p> <p>So, I'll need the calculator to do like $\frac{1}{3}$.</p>	
<p>Interviewer: Sure. Oh, sorry, as _____ [00:05:10]</p>	
<p>Student 4: No, I'm used to using a _____ [00:05:13] calculator.</p>	
<p>Interviewer: That's what all your peers have said, the same thing. So, do your best, I guess, with the one you have. Or, you could figure it out. Oh, and I'm sorry. I don't know. Have you read the actual question yet? Or is it in your head?</p>	
<p>Student 4: No. 'Which number is equivalent?' Do you think that calculator would have _____ [00:05:35]?</p>	
<p>Interviewer: Oh, try it. See what happens.</p>	
<p>Student 4: Oh, that might work</p>	
<p>Interviewer: Oh, there we go. Okay, it's just slow.</p>	
<p>Student 4: [Cross talking] kind of like the same thing.</p>	
<p>Interviewer: Exactly. Yes. [Laughs]</p>	
<p>Student 4: Remember like doing partial fractions.</p>	
<p>Interviewer: Okay. So, you're trying to figure out Bailey, she or he is a fraction. And then you're trying to figure a decimal that's close, is that right?</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Student 4: Pretty sure it's like 1 divided by 3. It would be like . . .	
Interviewer: Divide it by 3, and then you got that 0.33333 [cross talking].	
Student 4: [Cross talking] because it means extra.	
Interviewer: That's right. And which option is that closest to?	
Student 4: The 0.33.	
Interviewer: Yes, so go ahead and pick that. Very nice. Okay. And you get it Turn In. And then those were the practice ones. Now, did those make sense to you?	
Student 4: Yeah.	
Interviewer: Do you think you understand what we're trying to do?	
Student 4: Yeah.	
Interviewer: Alright. So now we have another set. They're just like you just practiced. You did a great job. I just want you to do this next set and talk to me about it as you're doing it.	
Student 4: [Item 1] So, what is the length of D and F? Well, to do, I take those, and I like pull it downwards, and kind of like estimate with those.	
Interviewer: Okay, mm-hmm. So that's on the, is that hard on the screen? Because it's not like [cross talking].	
Student 4: No, it's like fine.	
Interviewer: Okay, great. So how would you do that?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: So, I would like measure it down, except for it's like, that's also close. I figure that one would be a like a 12, and that one would be probably like 10, maybe. Because I think it's too short to be 9.	
Interviewer: Too short to be 9. Okay. Great. And then did you find that question hard, medium, easy?	
Student 4: Easy.	
<p>Interviewer: Easy? Okay, great. Try this one.</p> <p>Student 4: [Item 2] 'Yanni drew the triangle KLMN on the graph.</p> <p>'He will reflect the triangle over the x-axle. Which of the ordered pair describes the location of the point K after it is reflex on axle?</p> <p>So, the x one is this one. And you'll like flip it. So, right now it's on 3. Now, I'd think that you'd flip it, so it would probably go on the other 3. And you'd have to think, so it'd be like going downwards, so it would be the same thing, except (3, 3).</p>	
Interviewer: Very nice. Great. Okay, how about this one?	
Student 4: [Item 3] 'Density equeshes . . .	
Interviewer: Expresses	
Student 4: . . . expresses the propertation . . .	
Interviewer: Proportional.	
<p>Student 4: . . . proportional relationship between the mass and the volume of a substance. Density is defined as the unit mass (grams) per unit of volume.</p> <p>'Based on the graph of the quality expression . . . I can't. [Cross talking].</p>	
Interviewer: _____ [00:08:49] start over.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 4: 'Based on the graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'</p> <p>So, 'based on the graph' _____ [00:09:07] between the mass and the volume. So, that's the volume, that's the mass. I get trickies on these one.</p>	
<p>Interviewer: So, what are you trying to figure out?</p>	
<p>Student 4: The relationship between the mass and the volume.</p>	
<p>Interviewer: Yeah. And you said it was tricky. What about it makes it tricky?</p>	
<p>Student 4: I don't remember like, my head goes everywhere, so I don't even remember how to do some of these. And that's like the hard part about it. Makes it tricky.</p>	
<p>Interviewer: Okay. Well, you said that this is the volume, and that this is the mass.</p>	
<p>Student 4: Yeah.</p>	
<p>Interviewer: How can that help you</p>	
<p>Student 4: It like tells you the number of it. So, these are naming the mass, and volume. Doesn't give you a number, you have to look at _____ [00:10:13].</p>	
<p>Interviewer: Well, it gives you some numbers in that.</p>	
<p>Student 4: Yeah, down here</p>	
<p>Interviewer: Right. So, will any of these numbers help you go back to the graph, maybe? Or no.</p>	
<p>Student 4: Yeah. Because like, the 9 could go here</p>	
<p>Interviewer: Mm-hmm.</p>	
<p>Student 4: With note like, well, volume and mass I'm looking at volume. I want to say like $9 + v$, because like,</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
you go 9 up and then ____ [00:10:42]. Whatever you 9-up and then like plus the v.	
Interviewer: Okay.	
Student 4: So, I'm going to say like $9 + v$.	
Interviewer: Okay, and what did you think about that problem? Did you find that one pretty hard, . . .	
Student 4: Yeah.	
Interviewer: . . . medium or easy? That one felt hard to you.	
Student 4: Yeah.	
Interviewer: Great, thanks.	
<p>Student 4: [Item 4] 'Use the information to answer the following three questions.'</p> <p>'Point A, B, C, D, and E lie on the side of a triangle, as shown.'</p> <p>'Triangle BCD is similar to the triangle ACE. The length of segment BD is 3 units and the length of segment AE is 6 units.'</p> <p>So, I'm looking at these ones, because it's at points around these ones. See how they're similar. If I get it, and just by do with the BCD and the ACE. So, see how they're similar? And I get it. But that ACE would be bigger than the, because of the width and stuff.</p> <p>'If the length of segment AC is 7.2, what is the length of the segment BC?'</p> <p>So, A and C is like, longer than B and C. So, I know it can't be like 14.4 because that's too long. And it has to be one of these two.</p>	
Interviewer: So, either A or B. That's right.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: And it gives you like 1, 2, 3, 4, 5, 6, 7 for the _____ [00:12:32]. So, for B and C, it would give like 1, 2, 3. So it'd have to be like 3.6 maybe.	
Interviewer: Very nice. So, you were counting the spaces.	
Student 4: Yeah.	
Interviewer: Okay, great.	
Student 4: Spaces.	
Interviewer: What's the next one?	
<p>Student 4: I didn't know what that part said. I remember it. So, I'm going to read.</p> <p>[Item 5] 'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axle to form A'B'D'E'. What are the coordinates of the vertical trapezoids A'B'D'E'?</p> <p>So, it says reflects over the x-axis. That means we're going to flip it over again. So, I figure it A and E are probably go like -3 and so. But there's no -3 so you don't. Well, it does say 'flipped.' So, probably don't have to -3 except for it doesn't flip, it says reflect. So, maybe it would be like -3, like it gives you like 9.</p>	
Interviewer: So, they all have that in common, right?	
Student 4: Yeah.	
Interviewer: So, could you go back up here and look, read it to either out loud or to yourself again and see if there's another clue in there.	
Student 4: 'Trapezoid ABDE is translated 11 units' . . . So, to the left. Wait, so it goes this way.	
Interviewer: Mm-hmm.	
Student 4: So, 1, 2, 3, 4, 5, 6,7, 8, 9, 10, 11. So it go right here.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Yes.	
Student 4: And then reflects, so it'd go downwards. So, it go 1, 2, 3, 4, . . . 1, 2. So like -7, no, it's -9 for a fact. And reflect, I want to say like going over by I also want to say no.	
Interviewer: So, it's that word 'reflect' that you think is so hard.	
Student 4: Yeah.	
Interviewer: Okay, so you think it means flipping over.	
Student 4: Yeah, so I want to go like (-9, -3) for the A. And that gives me two more options left	
Interviewer: Great.	
Student 4: And then, B. B would go like 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. And then it would go flip downwards. So, it's like 7. So, it'd be -7. Then _____ [00:15:59] flip down, I feel like it'd be -6, so that means that with these two, again. No, it would be this one. Because that one's not a negative. So, it would have to be D.	
Interviewer: So, you used, by process of elimination . . .	
Student 4: Yeah.	
Interviewer: . . . to figure that out? Okay. And did you find that question hard, easy, medium?	
Student 4: Like, medium. [Item 6] 'Which segment lies on the line that represents a proportional relationship between x and y?' So, segment likes on a line. _____ [00:16:37] x and y. I want to say C because that's automatic. It's like, goes both ways. With that one [cross talking]	
Interviewer: Option C or point C? [Cross talking]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 4: I don't know, but I also want to say A and E, because they go down, too. That means all these could get down, but they can also just _____ [00:17:06]. I want to say A and E, because they go down this way, and they both can lead to the x and y.</p>	
<p>Interviewer: Okay. Was there a vocabulary word or words up here that helped you figure out your answer?</p>	
<p>Student 4: 'Which segment lies on the line that represents a portion relationship between x and y?' The x and y and then like E will like go on down to x and A will go down to both y.</p>	
<p>Interviewer: Okay, thank you. How about the next one?</p>	
<p>Student 4: [Item 7] 'Which of the information the following three questions.'</p> <p>'Mrs. Garcia's class were each given a number at random. This table shows their number.'</p> <p>'Shawn divides his number by 9.'</p> <p>First, we'll have to find out Shawn's number. Which is that, and divides, which his number is -940. He divides it by, I don't know if that's how you can, he was to divide it by -9.</p>	
<p>Interviewer: What did you get in your calculator?</p>	
<p>Student 4: Like 104.444 go on.</p> <p>So, it's like 100 to estimate it. There's the round it the nearest, so it would be like 100.</p>	
<p>Interviewer: Okay. And how did you know if the answer was -100 or positive 100?</p>	
<p>Student 4: Because it doesn't have a negative on the calculator.</p>	
<p>Interviewer: Okay. All right. Thank you. How about the next one?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 4: [Item 8] 'What is the value of Rachel's number to the 3rd power?'</p> <p>So, Rachel's number is -7. -7, and that's like to the 3rd power is -7 times -7, that gives you 49. So, it would have to be a negative, because on paper, like to the power is like times it by each other. And then it's like negative, so it would have to be a negative, because a negative times a negative is a positive, times another negative is a negative. So, it would be negative.</p> <p>And 7 times 7, it would be 343.</p>	
<p>Interviewer: Very nice. So which option is that?</p>	
<p>Student 4: It'd be a negative, because [cross talking].</p>	
<p>Interviewer: Great job. Okay. Now did you find that question hard?</p>	
<p>Student 4: Easy.</p>	
<p>Interviewer: Easy, okay. How about this answer?</p>	
<p>Student 4: [Item 9] 'Which of the following students has a number that is the greatest distance from zero on the number line?'</p> <p>[Audio distortion] has the greatest distance? I want to say that means like, closer to the number line.</p>	
<p>Interviewer: Okay</p>	
<p>Student 4: And that means we have to find like [distortion], well, at least these ones [cross talking].</p>	
<p>Interviewer: Mm-hmm. Sorry.</p>	
<p>Student 4: I want to draw a box, and then I like write their names on it. The one's out here, so you know which one that they are, and ____ [00:21:04]. So, I'll write Kim, Leon, I want to say, Nina, and Patrick.</p> <p>And then I'll, I'm going to write like, make a 3-down, so I can write the correct answer on there, see what [distortion]. And Kim's is -8. Leon is 3 above 4. Nina is 5.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
And then Patrick is 7 over 3. Which is Nina knows definitely a 5.	
Interviewer: How do you know?	
Student 4: Because the lines in between it, it means nothing change, and it just goes to like a regular number. And then Kim's is just going to be 8, because there cannot be a negative. For all these, I use these [cross talking] [distortion].	
Interviewer: It's okay. You're a regular _____ [00:22:19]. Oops, sorry. [cross talking].	
Student 4: It's fine. And then you have to figure out the fraction of this, which it would be like 3 divided by 4. So, that's like a 0.75. _____ [00:22:47] And so that would be a 0.75, _____ [00:22:56]. And then 7 divided by 3, because that's how you find an improper fraction. That is like	
Interviewer: Here, we have to write our [background noise]. [Laughs].	
Student 4: So, it'd be 2.58. And that would make Leon the closest, because he's like 0.75. So that would make the closest to like the greatest. Or not like the greatest, would be the most.	
Interviewer: So, would that change your answer?	
Student 4: Yeah.	
Interviewer: Okay. So now	
Student 4: So, if all these students have the number that is the greatest distance from zero on the number line. [Background noise] is a, Bailey is the highest. Well, the lowest. And then the highest would be Kim. So, between Leon and Kim over the most to.	
Interviewer: Okay, which one do you think it is?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 4: I want to say it's Leon, but I want to say it's K-, I don't know.	
Interviewer: Well, could you go back to the question and see if that gives you a clue?	
<p>Student 4: 'Which of the following students has the number that is the greatest distance from zero on a number line?'</p> <p>Because greatest means highest. I want to say Kim because greatest means highest, and she . . .</p>	
<p>Interviewer: I'm just going to take this for one second. Because you made such a nice chart. I just want to make sure that we capture that. _____ [00:24:51]</p> <p>All right. How about this one</p>	
<p>Student 4: [Item 10] 'Tickets that cost \$29. On the first day of the play, 52 tickets were sold. The manager used $(20)(50)$ to estimate they had ticket sales for \$1,000.'</p> <p>'Which statement best describes this situation?'</p> <p>'The manager's estimate is reasonable because that value is close to the actual value of the ticket sales.'</p> <p>'The manager's estimate is reasonable . . .</p> <p>Well, it's not like estimation, because it tells you that it's 1,000 because it was 20 times 50. That gives you the answer.</p>	
Interviewer: Hmm.	
<p>Student 4: 'The manager's estimate is not reasonable because that value underestimates 1,000.'</p> <p>'The manager's estimate is not reasonable because that value underestimates</p> <p>I want to say it's A, because it was closest. Except for the 29 is not closest to that [distortion]. It would be a 30. I want to say it's A because it was close. And it was about</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>1,000. It would be about 1,000. It would be about 1,642. With 3 cents. What got it 3 cents?</p> <p>Because _____ [00:26:36], they're about 500. So, I want to say it's A.</p>	
<p>Interviewer: And what made you select A?</p>	
<p>Student 4: The manager's estimation is reasonable because the value is not, is close to the actual value of the tickets sold. And they're saying that 1,000 tickets were sold, which it's not being, well, C and D because it was not about 500. As I looked up on the calculator, it is 1,642 and 33 cents. And so, it was about the reasonable value.</p>	
<p>Interviewer: Okay. Thank you. How about the next one?</p>	
<p>Student 4: [Item 11] 'What is the value of $(-3)^4$?' I'm doing this on this [cross talking].</p>	
<p>Interviewer: Sure. [Laughs] That's good.</p>	
<p>Student 4: Which, it would be a positive, this time, because 3 times 3 is a positive, times a negative is a negative, times another negative is a positive. So, it would be like a positive 3, and it's like 3 times 3 times 3 times 3. Would be 81. So, it's a positive 81.</p>	
<p>Interviewer: Which is an answer, great. And did you find it hard to talk out loud as you were answering that question?</p>	
<p>Student 4: Not really.</p>	
<p>Interviewer: You did a really nice job on that. Great.</p>	
<p>Student 4: I just like stutter. It would get [cross talking] want to say.</p>	
<p>Interviewer: You're doing a great job.</p>	
<p>Student 4: [Item 12] 'Which value is the greatest distance from zero on a number line?'</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Looks like A, B, C, and D, which A and B, well, they're all like in the lines. Which mean they can't be a negative, at all. So, it would be 0.8, and then 0.6. And then, for like, the calculator, it would be 3 divided by 4, would be 0.75. And that would automatically $\frac{1}{2}$, because 1 over 2 is $\frac{1}{2}$, so that would be 0.5. And so, the greatest from zero on the number line, which would be the highest, [cross talking] . . .</p>	
<p>Interviewer: [Laughs] Nice.</p>	
<p>Student 4: Would be A, because 0.8 would also be 0.80, and 0.6 would also be 0.60, and then, 0.5 would also be 0.50. And so, it would be 80, because 80 is the largest number.</p>	
<p>[Andrea – stop here.]</p>	
<p>Interviewer: Nice. Great. Okay. Thanks for your, you can hit Turn In.</p> <p>Thanks for your great thinking. We're almost done. I just wanted to ask you a couple questions, kind of about the whole thing. Can you just spell name for me, so I have it.</p>	
<p>Student 4: J-A-C-A-L-Y-N.</p>	
<p>Interviewer: Oh, good. Okay, I got it.</p>	
<p>Did you enjoy thinking out loud while _____ [00:29:49]?</p>	
<p>Student 4: Yeah.</p>	
<p>Interviewer: You did? Oh, you did a really nice job. Did you _____ [00:29:51]?</p>	
<p>Student 4: Most of the time, no. We'll just use our calculators.</p>	
<p>Interviewer: Okay. And do you find it easy out loud, or did it make it more difficult to answer the questions?</p>	
<p>Student 4: It kind of made it more difficult, because I can't like speak out loud that much.</p>	
<p>Interviewer: And then, did you, I know some of the questions had like a thing over here, like a table, and then</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
a question. And some just were the question by itself. Did you think there was a difference, like did one seem harder or easier than the other?	
Student 4: No, it felt the same.	
Interviewer: It didn't matter. Okay great. And then was there a particular question or questions that you found really confusing or difficult?	
Student 4: Not really.	
Interviewer: You did a wonderful job. Thank you so much for your help. _____ [00:30:35]	
[End of audio]	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: All right. Student 5, do you spell it with a Y?	
Student 5: Yeah.	
Interviewer: And are you in 8th grade?	
Student 5: Yeah.	
Interviewer: And who's your math teacher?	
Student 5: Miss [Teacher's name].	
Interviewer: Okay. That's same as the last three times. Don't let my clock confuse you. I'm on east coast time, so it's not correct. [pause] Okay. So, thank you so much for doing this. I'm just going to record just what we say, so I don't have to take notes on everything, if that's okay. And then, later I can go home and listen to it, so if _____ [00:00:49] gotten down everything, it helps me [background noise]. Oh, here.	
Student 5: I'm kind of too shy.	
Interviewer: I'll move it over a little closer to you, then. That's actually a great idea. And there's calculator and scrap paper for anything. You don't have to use it, but if you want to write anything down, feel free. I don't know how much they explained to you, but I work for the company that helps to write the math test that you take in the spring. Does something like this look familiar?	
Student 5: Oh, yeah.	
Interviewer: Okay. So, what we're trying to figure out is what kind of questions are best to put on the test for kids. So, we're going to try them out on you guys, see how you think, and then it'll help us make the tests better in the future. So, something that we're going to ask you to do today is think out loud. Have you heard of that before?	
Student 5: [Giggles] No.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Interviewer: Okay, so basically, thinking out loud is just saying everything your brain is thinking while you're doing something. Because if you don't say it out loud, I don't know what you're thinking. Well, you might know, but you have to say it out loud for me to understand.</p> <p>And so, I wanted to show you sort of what that looks like. So, if I were asked to fold this piece of paper in half twice, I'm going to think about it. So, I think [background noise] in half. I'm going to line up the edges, make it really straight, and then I'm going to crease it all the way across. And, I think I'm going to fold it the other way, so it doesn't get too ____ [00:02:04]. . . like this, and I'm going to do the same thing. Line it up and make a crease.</p> <p>So, that's sort of thinking out loud. Did you notice how I said what I was going to do before I did it, and then I went ahead and did it?</p>	
<p>Student 5: Yeah.</p>	
<p>Interviewer: And then I'll show you sort of what that looks like with a math problem. See, this says, 'Matthew wrote each letter of his name on a separate piece of paper and put them in a bag. All of the pieces of paper are the same size. Matthew will choose a piece of paper from the bag without looking. What is the probability that Matthew will choose a 't'?</p> <p>So, first I'm going to ask myself, 'What do they want to know?' So, I think they want to know what's the probability of the chances that he'll pick a T. So, before I can figure that out, I have to find out how many letters are in his name. So, I'm just going to count. M-A-T-T-H-E-W. So, there are seven total letters. And then they want to know about T. Well, I see two Ts. So, I know that the probability is 2 over the 7 total. So, in that case, I would click B. And then, there's only question for me to practice, so if you just hit the, you'll have a button that says "Next".</p> <p>So, did that sort of make sense, how I talked out loud about it?</p>	
<p>Student 5: Yeah. So, it's like solving the problem, but like ____ [00:03:14].</p>	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
Interviewer: Exactly. Now do you have any questions for me? Do you want to give it a try?	
Student 5: Yeah.	
Interviewer: Okay. So, we'll let you practice on a couple. If you have any questions, feel free to ask me. So, if you want to start by reading it, and then tell me what you're thinking.	
<p>Student 5: Okay.</p> <p>'Eighteen students in a classroom will each roll a fair number cube with sides labeled 1 through 6 one time. How many times is a number greater than 3 expected to be rolled?'</p> <p>Okay, so _____ [00:03:41] I'm seeing the chances of the numbers. So, _____ [00:03:46] the sides are 1 through 6. So, that's what I'm thinking about right now. And then it's asking how many times is a number greater than 3 expected to be rolled. So, _____ [00:03:57], since there's 1 through 6, I'm going to take out 3, and then I'm going to count the rest of the numbers that are left, and that's how much numbers, like _____ [00:04:08] should be the answer.</p>	
Interviewer: Okay, so which choice would that get to?	
Student 5: It would be 3.	
Interviewer: 3? Okay, A.	
Student 5: Pick A.	
<p>Interviewer: Yup. And then you can hit the Next _____ [00:04:18].</p> <p>This question, unless there's something on the side, and then the question, you'd want to look, take all of this into account in order to solve the problem.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 5: Yeah. Okay.</p> <p>'Use this information to answer the following question.</p> <p>The student in Miss Garcia's class were each given a number at random. This table shows their numbers.'</p> <p>Do I have to read the chart?</p>	
<p>Interviewer: It's up to you. You don't have to read it out loud. But you're probably going to need it to solve the problem.</p>	
<p>Student 5: 'Which number is equivalent to Bailey's number?'</p> <p>So, at this moment I'm looking up Bailey's, so it's one-third. And then all of them are like -8, $-\frac{3}{4}$, 5, 7 over 3, -7, -940. So, what I'd be looking is to reduce them into a form where I can figure out the answer.</p>	
<p>Interviewer: Great. So how would you do that?</p>	
<p>Student 5: I'll do Bailey's first.</p>	
<p>Interviewer: Okay.</p>	
<p>Student 5: And I'll do like a decimal [cross talking] to see if I can find it that way, I guess. And . . .</p>	
<p>Interviewer: And so, did you do something on your calculator? How did you turn Bailey into this number?</p>	
<p>Student 5: I divided 1 over 3.</p>	
<p>Interviewer: Mm-hmm. Okay.</p>	
<p>Student 5: [pause] _____ [00:05:46] do the fractions, because I guess on the negatives, I don't have to do that much of anything.</p>	
<p>Interviewer: Okay.</p>	
<p>Student 5: So, [pause]. It's okay if I _____ [00:06:03].</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Oh, yeah, that's totally okay. So, you knew that $\frac{3}{4}$ and 0.75 are the same?	
Student 5: Yeah. [cross talking] ____ [00:06:17]. And the same thing, for 7 over 3, I would divide 7 over 3, so the number I got 2.3. So, now, I'd be looking at it and see what my answers are, ____ [00:06:33]. [pause]	
Interviewer: Okay, so how can that to help you answer this question?	
Interviewer: Okay, that's fine. That might help you later, so how can you answer this specific question?	
Student 5: Right now, I'm going to look at the answers they're giving me, the choices. And I'll see which one's equivalent to one-third. So, right now, I will choose B, because when I divided 1 over 3, it got me to 0.3 going on and on, without stopping, so. [Cross talking]	
Interviewer: Okay, great. You did a great job explaining your thinking, so I think you're ready to try some more. Do you feel ready to try some more?	
Student 5: Yeah, sure.	
Interviewer: Okay, so then, that was the practice. ____ [00:07:24] and then you'll, just like you did, just keep talking about how you're solving things.	
Student 5: Okay. Okay, so [Item 1] "Triangle ABC is similar to triangle DEF, as shown below. What is the length of DF?" So, right now, I'll be looking at the letters, and so right now I'm looking at DF, I'm looking at the measurements ____ [00:07:53] on it. Bring it to the small number, and be like, if it could help me see something, if I try.	
Interviewer: Yeah.	
Student 5: Sorry, that's a moment, I'll be looking at AB and D and E. I'll see what's the difference and how can that help me. So, to get D and F. [pause] At A and B on the first triangle, the small one, it says 5 cm. I'll compare that one with A and C. So, there are 2 cm that are taken away.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>That's less than. I see ____ [00:08:34], in here, so right now, it's a ____ [00:08:37] for D and F. So, I'll see the choices it's giving me. So, not to figure it out. [pause]</p> <p>So, now, what I'm going to be thinking is like imagining to see if it feels right or not. So, I don't know how to say, but ____ [00:09:08] like that's right or not. I don't know. So, [pause] I'll choose D because I . . .</p>	
<p>Interviewer: Why'd you choose D?</p>	
<p>Student 5: I chose D, because the first triangle's a small one. It's 3 cm on A to C. And A to B is 5 cm. So, what I'm thinking right now is that D and E, that's 15 cm, so I subtracted 2 cm from it, I ____ [00:09:56] 13. So that's [cross talking]</p>	
<p>Interviewer: Great. Thanks, okay, how about the next one?</p>	
<p>Student 5: [Item 2] 'Yanni drew the rectangle KLMN on this graph. Yanni will reflect the triangle over the x-axis. Which ordered pair describes the location of point K after it reflected over the x-axis?'</p> <p>So, right now I'll be looking at the graph, and looking at the letters. And I'll be like which one is the x-axis, and the y-axis . . .</p>	
<p>Interviewer: Okay.</p>	
<p>Student 5: . . . [cross talking] ____ [00:10:32]. Focusing on that, and ____ [00:10:35] the area. And I'll be looking at what it says. And ____ awkward. [pause] So I'll be looking at point K, and I'll see where it reflects over the x-axis. So, I'll be like, it's like, ____ [00:11:03], out here, so I'm counting [pause]</p>	
<p>Interviewer: Sure.</p>	
<p>Student 5: So, now it'll be -3, __ by . . . [pause]</p>	
<p>Interviewer: So, I think I saw you count up 3 spaces to get to K. Is that what you did?</p>	
<p>Student 5: Mm-hmm.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: And then how did you determine the bottom one?	
Student 5: So, I reflected it [sound distorted].	
Interviewer: And where did you end up when you did that?	
Student 5: (-3, -5).	
Interviewer: Okay.	
Student 5: So now I'm looking over at the choices they've given me, and something's wrong. So, now I have to be checking [cross talking].	
Interviewer: What I can check it again, sure.	
Student 5: Yeah. [pause] I don't think that I _____ [00:11:55] my help, is like, looking at the choices, and figuring out the chart and see what I did wrong.	
Interviewer: Sure. [pause]	
Student 5: Not, not, okay. [pause] Now, I guess that's me learning my x-axis.	
Interviewer: That's okay. [pause 00:12:46 to 00:13:39] So, what are you doing right now? Are you comparing something, or what are you doing?	
Student 5: Right now, I'm not, I'm looking at the choices, and seeing which one right now, I'm doing a guess.	
Interviewer: Okay, great.	
Student 5: Seeing which one would make sense, and which ones wouldn't.	
Interviewer: Okay, so how about choice A. Does that make sense, or does that one not make sense?	

Transcribed Responses	(Reserved for Cogna Analysis; Leave Blank)
<p>Student 5: My _____ [00:14:05] would make sense, because it says, it reflected over the x-axis, and that looks reflected over the x-axis, so it would _____ [00:14:11].</p>	
<p>Interviewer: Okay, how about B?</p>	
<p>Student 5: B. It's not, like it didn't, I don't feel like it reflected, it's still kind of on the y-axis. On $\frac{1}{3}$, it's right here, it's still on the y-axis, so right now, it's not a great choice for me right now. And then -3. I mean, yeah, it's over the y-axis, but -3, -2, would make a third choice because that's where the straight line would change things today then.</p>	
<p>Interviewer: Great. Okay, go ahead and choose that one. [pause]</p>	
<p>Student 5: You want me to read it?</p>	
<p>Interviewer: Yes, please.</p>	
<p>Student 5: Okay.</p> <p>[Item 3] 'Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters).'</p> <p>'Based on the graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'</p> <p>So, it's up in the v chart the graph, whatever they've given me. Now they will _____ [00:15:31]. Then I'll be looking at the choices they have given me, so that will give me a hint what I'm doing with the chart. So, I'm going to be looking for the question they're asking me for.</p> <p>So right now, I'm looking at the beginning of the chart, right there where it starts. I'm looking at mass. Get started at zero. So did volume. So, I'm going to be looking for the second point. So, it's 10 and the volume's 1. [pause] At this point I'll be looking at the numbers on the chart to see if they like how . . . [pause]</p> <p>So, at this point, I'll be thinking, it will be the first choice.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: What made you think that?	
Student 5: I think that's the first choice, because I'm starting to look at the chart. It's not actually, I'm at the point where 10's at. So, it's not the, it's not that, I'm thinking. And 9's an estimate where I'm taking, because it's kind of close to it.	
Interviewer: Great. And then how did you it was 9v instead of 9 + v, because they both have the 9?	
Student 5: Because [pause]. I think the reason why I didn't choose it was like I guess because, oh, yeah, I see, because straight line it's to m, right? And right now, we're looking up to where the volume's at. So, right now I'm like 90, and if I chose C, 9+v it shouldn't make sense at that point. Would it? Because then, it would have been hiding another 9, because that's where volume's at.	
Interviewer: Okay. How about the next one?	
<p>Student 5: [Item 4] 'Use this information to answer the following three questions.'</p> <p>'Points A, B, C, D, and E lie on the sides of a triangle, as shown.'</p> <p>'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of segment AE is 6 units.'</p> <p>'If the length of segment AC is 7.2 units, what is the length, in units, of segment BC?'</p> <p>So, right now, I would kind of not pay attention to that one. I'll pay attention to the question. At this point I'll be looking at A and C since it's 7.2 units. And I'll be looking B and C. So, what I'm noticing right now is that A and C is the whole segment and that's 7.2 units. And BC is half of that. So, what I will be doing is divide 7.2.</p>	
Interviewer: Great.	
Student 5: And I'm going to do 3.6 units since that's one of my choices. It was my _____ [00:20:22] would	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
think. It would be. And if it didn't show _____ [00:20:25] and I would have done something bad. So, they do win it.	
Interviewer: Sure, okay. So, you did in the calculator 7.2, and what did you do?	
Student 5: And I divided by 2.	
Interviewer: To see what's half of it, great. Okay, how about the next one?	
Student 5: Okay. 'Use this information to answer the following three questions.'	
Are there three questions? Oh, wait. Never mind.	
Interviewer: Oh, so this part is the same as the previous one. The left is the same, but the question is going to be, yeah.	
Student 5: I was like, wait a minute. There were three questions. Okay.	
[Item 5] 'Points A, B, C, D, and E lie on the sides of a triangle, as shown.'	
'Trapezoid ABDE is translated . . . yeah, displays the line?'	
Interviewer: Mm-hmm.	
Student 5: . . . 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertex of trapezoid A'B'D'E'?	
So, I'll be looking at the triangles right now. So, in my mind, I'm going through step-by-step. So, like, it's giving me. So, I'll be looking at trapezoid ABDE. So, I'll be looking at those. So, it's telling me to move 11 units to the left. So, then I'll start from point A and start A and then I'll go to 11 to the left. So, I'm coming to that point. So, I'm _____ [00:22:26], while my mind will be going through is like, when the steps and I'm seeing, and it said reflected over the x-axis to find image A'B'D'E'. So now my mind will be going like, so it's like, so that what I'll be looking at. And now it's asking for the coordinates. [pause] So,	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>then I'll remember to look over here, where I can write it down, with _____ [00:23:06]. That's _____ [00:23:08]. [pause]</p> <p>And I'll go over here and count.</p>	
<p>Interviewer: Mm-hmm.</p>	
<p>Student 5: So, at this point, it's just like there's [cross talking]</p>	
<p>Interviewer: So, you're the counting the distance from A to B.</p>	
<p>Student 5: Yeah.</p>	
<p>Interviewer: Okay.</p>	
<p>Student 5: So, like, I'm counting the lines now. It will be like my guidance counting them. So, then I'll go back over here, and I count. So, got them to right here. So, and I'll remember when I see it or how the _____ [00:23:58] looked like. Or I would draw it, but I didn't know if something from, I draw it my own and I'll see it an image of like how it would look like. So right I'll write down like a close estimate. Like of where it would be. [pause]</p> <p>Then I'll get the transform the next one. So, it would be like 9 E to B. So, that just moves the same spaces, am [cross talking] I right? So, they are coming to three units, - 4.</p> <p>Now, I'll be looking at the rest, D and E. So, like gave me an estimate. -1 and 3. So, now that I've found where it would be at once it was reflected over the x-axis, now I'll be looking at B and the choices they've given me to see which one would be the right one, too. The measurements that I got, and I guess, because I'm always looking at the numbers, we'll look at them, with the bring where I left them, I guess. So that one _____ [00:26:12]. [pause]</p> <p>So, point A would be here. So now that I'm look at it, it would be like this one, since it's given to me right now, I will be thinking on this one.</p>	
<p>Interviewer: Okay.</p>	

Transcribed Responses	(Reserved for Cognition Analysis; Leave Blank)
Student 5: Because it's giving the right measurement right there.	
Interviewer: For point A. Yeah. Okay.	
Student 5: Then I'll be looking at point B. And I guess, that's not my role. I should have talked it out and looked at it. [pause] And that this bring one. And I did something wrong.	
Interviewer: That's okay.	
Student 5: Yes, it's like, the first one I did, kind of got like, they got it right. But I guess again. Because I don't know.	
Interviewer: Okay. So how did you get from this, I think this is where started, this point A to somewhere over here? How did you do that?	
Student 5: I saw the restrictions where it says 11 units to the left.	
Interviewer: Okay, so first you went 11 to the left. And then, what was the second thing you did?	
Student 5: The second thing I did was like, kind of like, move all of the them to that side. And then I had an image of how it would look if I moved it over here, and instead it reflected over the x-axis. So, then I moved, like flipped them.	
Interviewer: Great.	
Student 5: So, I'm coming to this point. Now I'm kind of the thinking it over, because it's giving me a different measurement than [cross talking].	
Interviewer: So, what did you get this time?	
Student 5: I'm, I got (-7, 3). But I guess it's the wrong way, and it's giving B the (-7, 6). So, right now, I'm looking at what you've said when 6 would be.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: So, does it match up with the choice that you've made?	
Student 5: And that does up with this ones. So, I'm kind of thinking that's wrong. Because it's in 11 units to the left, and then reflected over the x-axis. But it wasn't reflected yet. It's still the same from where it was 11 units to the left.	
Interviewer: So, then, what does that mean, if it's going to be reflected over the x-axis?	
Student 5: I'd be like looking it over again, and asking questions, maybe. Like what did you do wrong? Looking at all the measurements right now. So, I'd be looking, wondering why I'm not, would this look right?	
Interviewer: Okay, sure. So, go ahead and try that.	
Student 5: So, I'm looking at where point A would have been if I would have chose the first one. So that led me to that one. So, at that point, I would think it would be wrong. Because it said it went to the left. So that would be eliminated [cross talking].	
Interviewer: Okay. Nice. Yeah. Okay.	
Student 5: Be focusing on that. Then I'll do the same thing over here. And I would think that one would be wrong as well, because that one's, like, it's on top. The coordinates are top, the y-axis was at. And it said, to the left, And it's still on the right side. So, I would think that would be wrong as well.	
So, now I'm left with two choices, and I'll be looking at them over and see which one, like, would be the best estimate that I could take. So, I'll be looking at the coordinates. [pause] And I'll be putting on and checking on them.	
Interviewer: Okay.	
Student 5: Sorry.	
Interviewer: That's okay. So, you're checking one by one, each coordinate. Okay.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 5: Yes, I'm checking one by one to see if the coordinates match up the shape or are they in the right order. See which things they got wrong, and then I'll be checking ones to see. Compare them to and I'll see, make a guess on which one's right, where my mind which one's right. [pause]</p> <p>So, now that I've been like halfway there, I'm starting to think it must not be, because it's still on top of the y-axis. So, now, since it said to reflect over the x-axis, it would be D.</p>	
<p>Interviewer: Option D, okay great. Okay, very nice. Go ahead and try the next one.</p>	
<p>Student 5: [Item 6] 'Use this information to answer the following three questions.'</p> <p>'Points A, B, C, D, and E lie on the sides of the triangle, as shown.'</p> <p>'Which segment lies on a line that represents a proportional relationship between x and y?'</p> <p>So, I'm looking at the choices they have given me. So, it's CE, BD, AC, AE. So, the front in my mind right now is saying, you got to remember this. But it's asking for, and the answer choices it's giving me, and I'll be looking at these segments. So, I'll be looking at where CE is at, and I'll be going through one by one to see which one would be right. [pause]</p> <p>At this point, I'm visualizing .</p>	
<p>Interviewer: Sure, okay. And you're visualizing them trying to find what? Which one is . . . ?</p>	
<p>Student 5: Like which one would be right. And right now, I'm like, my brains going through saying, 'this doesn't look right.' 'This does look right' 'This, like, I've seen this' it's around like I've seen basic questions. And right now, I'm looking at BAC. Because like in _____ [00:34:06] you usually see them starting from at this point to this point. And it wouldn't be wrong if it started at this point and I think that's where my mind goes to. I'd be like, I'll</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
eliminate those that doesn't look right. And I'm choosing AC.	
Interviewer: Great. And was there a vocabulary word or anything in the question that helped you choose that?	
Student 5: I guess it would be the segment, which one lies on the line. And that is it. That it represents proportional relationship between y and x.	
Interviewer: And do you know what proportional relationship means?	
Student 5: It's like [pause] I have to think.	
Interviewer: You're not sure?	
Student 5: I mean, I know it. But I can't explain it.	
Interviewer: Okay. That's fine. Okay, go ahead and do the next one. Thanks.	
<p>Student 5: [Item 7] 'Use this information to answer the following three questions.'</p> <p>'The students in Miss Garcia's class were each given a number at random. The table shows their numbers.'</p> <p>'Shawn divides his number by -9.'</p> <p>'Which is the best estimate of his answer?'</p> <p>So that now I've said the best estimate. So, that word, that's what got me on my mind. And now I'm saying, oh, yeah, it's an estimate. And I'll be rounding.</p>	
Interviewer: Yes.	
<p>Student 5: And which one is right. And I guess, because I've written it down, that will be kind of helpful for me. So, I'm looking Shawn's, and he said he divided his number by -9. So, I'll take Shawn's number and divide it by -9. So that got me to 139, which kind of looks wrong.</p>	
Interviewer: Try it again.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 5: I guess I did something with the calculators. Well, I got _____ [00:36:27]. 900 divided by 9 and since I know that they're both negatives, I can _____ [00:36:37] the negative sign.</p>	
<p>Interviewer: Okay, so they're both negatives. And so, what does that mean for the answer when both numbers are negative?</p>	
<p>Student 5: It will be negative as well.</p>	
<p>Interviewer: Okay, so then would the 104.44444 on the calculator help you?</p>	
<p>Student 5: Since this, which is the best estimate. So right now, 100 is close. So, I'll do 100, and that will be 100. But then when I am thinking so deep, I'm now eliminated by, I eliminated choices B and C. So now I'm looking at A and D. And I'm thinking, if it's -940 divided by -9, they're both negatives. The answer won't be negative. It will a positive, so then I'll chose D as my answer.</p>	
<p>Interviewer: Awesome. Next one.</p>	
<p>Student 5: [Item 8] 'Use this information to answer the following three questions.'</p> <p>'The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.'</p> <p>'What is the value of Rachel's number to the 3rd power?'</p> <p>So, to the 3rd power, now I'm thinking. There's going to be a number to the third power. So, now I'm looking at Rachel's number, which is -7. So, now that I've seen that, I'll do it to the 3rd power. So, right now, I'm multiplying 7 times 7 times 7. Three times. I won't do that again, because I did it wrong. Okay, so that's what it got me to. And since 3 is an odd number, it will be a negative 343.</p>	
<p>Interviewer: Nice.</p>	
<p>Student 5: And if it was an even number, it would be a positive. Nice choice of thing.</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Awesome. Okay. Next one.	
<p>Student 5: [Item 9] 'Use this information to answer the following three questions.'</p> <p>'The students in Miss Garcia's class were each given a number at random. This table shows their numbers.'</p> <p>'Which of the following students has the number that is the greatest distance from zero on a number line?'</p> <p>So, I've written it down, and now we look here. Be thinking giving me a number line right there. Thinking where 0 is at, and which one would be the farthest. It can not be which one's like, who are the positive side and the negative side. So, I'll be looking at the numbers. Right now, what I would be thinking would be putting the numbers on the number line, to see which has the greatest distance. [pause]</p> <p>And I have to point, if I don't know, at this point, say, I will be looking at the answer choices in front of me, and I'll be looking at Ken's, and Leon and Nina and Patrick's numbers. I'll be looking at their numbers. [pause]</p>	
Interviewer: Okay, what are you looking at?	
<p>Student 5: [pause] So, I'll be looking at these four numbers. That's what I'll be looking at. And I'll be putting a 0 and I'll see which one has a farther, most distance. At this point, I'll be thinking it would be, well, my mind's going through the process of seeing where the numbers are, it's supposed to go in. And it would be Kim's. It says - 8, but it's asking for the absolute value, since it has the parallel lines, like, around it. So, at that moment, I'll put them, it's the absolute value of it, so they'll be 8. Which is so _____. [00:41:01].</p>	
Interviewer: And so, how did you know she was the furthest from the zero?	
<p>Student 5: She was the furthest, because she has the bigger number. And, like approved choice. The other ones that would beat Kim.</p>	
Interviewer: Okay, yeah. Let's try the next one.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 5: [Item 10] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used $(20)(50)$ to estimate they had ticket sales of \$1,000.'</p> <p>'Which statement best describes this situation?'</p> <p>Let me read the answers.</p>	
<p>Interviewer: Read them here:</p>	
<p>Student 5: So, A. 'The manager's estimate is reasonable because the value is close to the actual value of the ticket sales.'</p> <p>B. 'The manager's estimate is reasonable because the value is the exact value of the ticket sales.'</p> <p>C. 'The manager's estimate is not reasonable because that value underestimates the actual value of the ticket sales by about \$500.'</p> <p>D. 'The manager's estimate is not reasonable because the value overestimates the actual value of the tickets sales by about \$500.'</p> <p>So, at this point, I'll be looking at what ____ [00:42:16], and which best describes of those words to my mind will be like, which one best describes. You're taking an estimate at this point, my mind is thinking. So, now, [pause].</p> <p>I was multiply the cost of the ticket and how much were sold.</p>	
<p>Interviewer: So, you needed 52 times 29.</p>	
<p>Student 5: So, I got \$1,508. So that helps me answer the question. So, now I'll be looking what the manager, the estimate, if it's sensible for 1,000. And I'll be looking at the choices they've given me, like which one of them makes sense. And which one wouldn't. [pause]</p> <p>Where I am right now, if it's reasonable.</p>	
<p>Interviewer: Yeah, how are you deciding between reasonable or not reasonable?</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
<p>Student 5: Looking at what it's saying and seeing if it is or not. And if it's not, then I'll eliminate that one. So now that I see the answer choices as it's talking more about the manager's estimate. So, I'll be looking at the manager's estimate and seeing if it's reasonable.</p>	
<p>Interviewer: So, what was the manager's estimate?</p>	
<p>Student 5: The manager's estimate was 1,000. And we're looking at these answer choices and seeing it's reasonable or not. And I'm getting one by one to see if it would make sense or not.</p>	
<p>Interviewer: Okay, sure.</p>	
<p>Student 5: [pause] At this point, I've already calculated, put it in the calculator 29 and 52, multiply those. Looking at my choices right now are C and D, because it's saying it's not reasonable, and it's not reasonable because the estimate was about 1,508. And his estimate wasn't that close. I mean, it kind of was, but it was off like 500. So, I'm looking at what it's saying.</p>	
<p>Interviewer: So, what's the difference between C and D?</p>	
<p>Student 5: I'm looking at C and it's saying 'underestimate' and D it's 'overestimate.' So right now, my mind is saying it would be D, because it's saying it's overestimate. That would be if it would have been more. So now, I'll be thinking about C, because it's underestimate. But right now, I'm confused at the moment. So, I'm trying to understand when going over and under.</p> <p>Yeah, it would be C. Because overestimates means going over.</p>	
<p>Interviewer: Mm-hmm. Great. Okay, go ahead and choose C. And there's two more.</p>	
<p>Student 5: Okay,</p> <p>[Item 11] 'What is the value of $(-3)^4$?'</p> <p>So, right now, I'm looking at the number -3 and it's 4th power. Right now, my mind's saying that the answer is</p>	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
going to be positive since 4 doesn't have negative. If it was an odd number, it would be a negative. So, right now I'm like, multiply those two. So, I get twelve.	
Interviewer: What did you multiply in the calculator?	
Student 5: 3	
Interviewer: 3 times 4? Okay, and you got 12. Okay, how does that help you?	
Student 5: It helps select, now that I know it's 12, that's the value. And in this case, I didn't think it was right, I would do 3 times 3 times 3 times 3. Four times. Right now, it's giving me 81.	
Interviewer: So that time you did 3 times 3 times 3 times 3? Okay, and got 81. Then what do you think that helps you decide?	
Student 5: It makes me like [cross talking]. See if it or not, but saying which one would be the right answer. Because right now, I'm looking at the answer choices, both of those numbers, I got them. And in my mind, I'm saying one of them is not right.	
Interviewer: Right.	
Student 5: So, in my mind right now, it would be saying, I would eliminate A and B, since they're both negatives. So, now I'm looking C and D. So, I'll get that one off my mind and not focus on those numbers. So, right now, I think it would be 81. Because saying -3 four times. And if I did 3 times 4, it's 12, but it's not like, you're just multiplying those two.	
Interviewer: That's right. Mm-hmm. Very nice. Okay, then we have one more.	
Student 5: [Item 12] Okay. 'Which value is the greatest distance from zero on a number line?' At this point, I have two fractions. So, I would reduce them into a form where I can get a decimal. So, on $\frac{3}{4}$, I know it's 0.75. And I will go, the last one is, since I haven't _____ [00:50:27] on the way back.	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Interviewer: Nice.	
Student 5: And I went with focusing on negatives, because it's kind of asking for the actual value. And so absolute value for 0.8 is positive, and so it is for answer D. So, these are my answer choices. And it's asking for the greatest, and my greatest number is the top one. So, it's A. [Andrea – stop here.]	
Interviewer: Very nice. Great. Okay. Now I just a couple, that was the last math question for you. I just have a couple questions about what we just did. So, do you enjoy thinking out loud for that? Or is it hard for you?	
Student 5: Neither one. I mean, at some points, it was like yeah, it was fine for me, like to think out loud. Give me a moment to actually think what I was doing.	
Interviewer: Okay great. And then did you find it easy to think out loud while you were solving math questions, or did it make it a little harder than if you were just doing it silently?	
Student 5: I think it kind of helped me in some of them.	
Interviewer: Oh, great.	
Student 5: But at some point, like if it didn't because I was focusing more on the numbers, asking if one makes sense.	
Interviewer: Okay. And then remember some of them have a chart over here and then the question. Did you find those harder, the same, or easier than just regular questions like this?	
Student 5: I think I found them harder. Because then you're have to [background noise]. _____ [00:52:08] but each of them means and seeing one by one.	
Interviewer: Yes, okay, great. And then, were there any particular questions that you found really hard or confusing?	

Transcribed Responses	(Reserved for Cognia Analysis; Leave Blank)
Student 5: The ones where the segments _____ [00:52:21].	
Interviewer: Yes. Okay. Awesome. Thank you so much. That was so amazing. You did a wonderful job.	
Woman: I think that was just her bells. So, police _____ [00:52:30] alert is different.	
Woman: Oh, good. Oh, yay. [Background noise] Oh, good afternoon. _____ [00:52:37] She did a great job. [inaudible background conversation] Lunch time.	
Woman: I know, sorry.	
Interviewer: She was very thoughtful in her responses, so.	
Unknown: _____ [00:53:00] [inaudible conversation]	
Woman: That's it. This is the one. [distortion]	
Unknown: And give her full name. [inaudible conversation]	
Interviewer: So, do they all eat lunch at the same time? Oh, wow, okay.	
Woman: The 8th graders.	
Interviewer: Okay.	
Woman: There's [cross talking]	
Interviewer: Okay.	
[End of audio]	

APPENDIX D
CODING FRAMEWORKS

ELA—Items in gray are cluster items. Items in white are discrete MC items.

Termite Tower	Item 1		Item 2		Item 3		Item 4 (CR)	
EI Reno - Grade 5	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Student 1	8C	1C	8C	15C	1H	15H	6F	
Student 2	7C	1C	7C				6F	
Student 3	8C		1C		8H	1H	6F	15F
Student 4	8C		8C		15H		15F	16F
Student 5	1C	6C	1C	8C	11H	7H	6F	8F
Student 6	8C				6H		6F	8F
Moore City - Grade 5								
Student 1	9C	1C	8C		2H			
Student 2	8C		1C	8C	8H		14F	8F
Student 3	8C	15C	8C	6C	8H	11H	15F	
Student 4	15C	8C	8C	7C	8H	15H	15F	
Student 5	1C	15C	7C		7H	6H	15F	6F
Student 6	8C		8C		8H		6F	
Student 7								
An Earful	Item 1		Item 2		Item 3		Item 4 (CR)	
EI Reno - Grade 5	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Student 1	8J	1J	1G		8B	13B	8E	
Student 2	8E	1E	8G	16G	8B	16B	8E	
Student 3	8E	15E	8G		8B		15E	
Student 4	8E				8B	2B	6E	8E
Student 5	1E	8E	8G		1B		8E	
Student 6	8E		8G		1B	8B		
Moore City - Grade 5								
Student 1	8E		8G		8B		1E	
Student 2	1E	8E	2G	7G	8B	7B	1E	8E

continued

EI Reno - Grade 5	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Student 3	8E		8G		2B		1E	8E
Student 4								
Student 5	7E	6E	8G		8B			
Student 6	8E	1E	7G	8G	1B	2B	1E	7E
Student 7	1E				8B	2B	8E	

Fit for Life - Grade 8	Item 1		Item 2		Item 3		Item 4 (CR)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Etta Dale Interviewee	8F		8F	1F	2B	6B	8E	6E
Moore City Grade 8								
Student 1	8F	11F	8F		8B	7B	8E	6E
Student 2	1F	6F	1F	7F	11E	1E	6E	
Student 3	8F	15F	8F		1B	2B	15E	8E
Student 4	8F		8F		2B		6E	8E

Carolina Crow Girl - Grade 8	Item 1		Item 2		Item 3		Item 4 (CR)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Etta Dale Interviewee	1B	8B	8F		8E		1E	8E
Moore City Grade 8								
Student 1	7B	8B	8F	15F	1E		1E	8E
Student 2	1B	8B	7F	8F	11E	1E	6E	
Student 3	2B	8B	8F	7F	6E	8E	6E	15E
Student 4	1B	8B	8F					

ELA Coding Key*

HOTS	HOTS
analyzing	1
applying	2
assessing	3
creating (developing)	4
designing	5
drawing conclusions/inferencing	6
evaluating/inferencing	7
explaining	8
generalizing	9
inferencing - integrate with other HOTS leaving here for definition purposes	10
interpreting	11
justifying	12
making connections	13
predicting	14
reasoning/inferencing	15
supporting positions using prior knowledge	16
utilizing multiple resources/texts	17

HOCs	HOCs
author's purpose	A
genre	B
key detail	C
literary devices	D
literary elements	E
main idea	F
point of view	G
research question	H
resources	I
best summary	J

*Strikethroughs represent HOTS/HOCs variables that were considered for analysis of the cog lab protocols and rejected for use in that analysis.

Mathematics—Items in gray are cluster items. Items in white are discrete MC items.

	Item 1 (7 x 21)		Item 2 (photo album)		Item 3 (56 divided by 8)		Item 4 (Beth's goal)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
School District B								
Student 1	1A	no evidence	7B	1C	1A	K	10	no evidence
Student 2	1A	no evidence	2B	no evidence	2A	2K	10C	no evidence
Student 3	1A	no evidence	no evidence	no evidence	1A	K	10C	no evidence
Student 4	1	no evidence	no evidence	no evidence	1K	no evidence	10	no evidence
Student 5	1A	no evidence	1	2	1A	no evidence	10	no evidence
School District A								
Student 1	1A	no evidence	2B	7	1A	K	10C	no evidence
Student 2	1A	K	7B	no evidence	1K	A	10	1
Student 3	1A	no evidence	no evidence	no evidence	1K	A	10	no evidence
Student 4	1A	no evidence	1	no evidence	1	no evidence	10	no evidence
Student 5	1A	no evidence	7B	1	7A	1K	10	no evidence
Item 1 (Triangles ABC and DEF)			Item 2 (Yanni's rectangle)		Item 3 (density)		Item 4 (length of BC)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
School District B								
Student 1	no evidence	no evidence	1G	no evidence	no evidence	no evidence	1H	F
Student 2	1H	no evidence	no evidence	no evidence	12Q	10	1H	F
Student 3	1H	F	1	no evidence	10Q	no evidence	no evidence	no evidence
Student 4	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	7	no evidence
Student 5	no evidence	no evidence	no evidence	no evidence	10	12Q	1H	F
School District A								
Student 1	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence
Student 2	1H	F	no evidence	no evidence	10	no evidence	1F	1H
Student 3	1H	F	1G	no evidence	10	no evidence	1H	no evidence
Student 4	1H	no evidence	1G	no evidence	no evidence	no evidence	no evidence	no evidence
Student 5	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence

	Item 5 (Jake's goal)		Item 6 (Maya's goal)		Item 7 (Mariah's bean plant)		Item 8 (frequency table)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
School District B								
Student 1	10	no evidence	6	no evidence	2E	D	10L	no evidence
Student 2	no evidence	no evidence	no evidence	no evidence	2D	E	10L	no evidence
Student 3	no evidence	no evidence	no evidence	no evidence	2E	D	10L	no evidence
Student 4	10	no evidence	no evidence	no evidence	2D	no evidence	no evidence	no evidence
Student 5	10	no evidence	6	no evidence	2D	no evidence	10L	no evidence
School District A								
Student 1	no evidence	no evidence	6	no evidence	2E	D	no evidence	no evidence
Student 2	1	no evidence	6M	no evidence	2D	no evidence	10L	no evidence
Student 3	10	no evidence	6	no evidence	no evidence	no evidence	no evidence	no evidence
Student 4	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	2	no evidence
Student 5	no evidence	no evidence	6M	no evidence	E	2D	10L	no evidence

	Item 5 (Trapezoid ABCD)		Item 6 (proportional relationship)		Item 7 (Shawn's number divided by -9)		Item 8 (Rachel's number to the 3rd power)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
School District B								
Student 1	no evidence	no evidence	no evidence	no evidence	2B	no evidence	2P	no evidence
Student 2	G	no evidence	no evidence	no evidence	2N	B	2P	no evidence
Student 3	no evidence	no evidence	no evidence	no evidence	7B	N	2P	no evidence
Student 4	1G	no evidence	no evidence	no evidence	2B	no evidence	2P	no evidence
Student 5	1G	no evidence	1	no evidence	2N	B	2P	no evidence
School District A								
Student 1	1G	7	no evidence	no evidence	N	B	no evidence	no evidence
Student 2	1G	no evidence	no evidence	no evidence	N	2B	no evidence	no evidence
Student 3	1G	no evidence	1H	no evidence	2N	B	2P	no evidence
Student 4	1G	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence
Student 5	no evidence	no evidence	no evidence	no evidence	2B	N	2P	no evidence

	Item 9 (ordering heights)		Item 10 (sum of fractions)		Item 11 (pencil line plot)		Item 12 (comparing fractions)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
School District B								
Student 1	2	no evidence	2E	no evidence	10L	no evidence	2E	1
Student 2	2	no evidence	2	no evidence	10L	no evidence	2E	1E
Student 3	2D	no evidence	2E	1	10L	no evidence	2E	no evidence
Student 4	no evidence	no evidence	2E	no evidence	no evidence	no evidence	no evidence	no evidence
Student 5	2E	no evidence	2E	no evidence	no evidence	no evidence	no evidence	no evidence
School District A								
Student 1	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence	1E	2
Student 2	2	no evidence	no evidence	no evidence	10L	no evidence	2E	no evidence
Student 3	no evidence	no evidence	2E	no evidence	no evidence	no evidence	2E	no evidence
Student 4	no evidence	no evidence	2E	no evidence	10L	no evidence	no evidence	no evidence
Student 5	2	no evidence	2E	no evidence	10L	no evidence	2E	no evidence

	Item 9 (distance from zero)		Item 10 (play tickets)		Item 11 (-3 to the 4th power)		Item 12 (distance from zero on a number line)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
School District B								
Student 1	2J	no evidence	no evidence	no evidence	2P	no evidence	no evidence	no evidence
Student 2	5J	no evidence	7	2B	2P	no evidence	5I	J
Student 3	5I	J	7	2	5I	no evidence	no evidence	no evidence
Student 4	2J	I	no evidence	no evidence	2P	no evidence	2J	no evidence
Student 5	I	2J	2B	no evidence	2P	7	2J	5I
School District A								
Student 1	no evidence	no evidence	7B	2	2P	no evidence	no evidence	no evidence
Student 2	5I	J	2P	no evidence	no evidence	no evidence	no evidence	no evidence
Student 3	6J	no evidence	2B	no evidence	2P	no evidence	2	no evidence
Student 4	no evidence	no evidence	no evidence	no evidence	2P	no evidence	5I	2
Student 5	5I	2	no evidence	no evidence	no evidence	no evidence	no evidence	no evidence

Mathematics Coding Key*

HOTS	HOTS
analyzing/applying	1
assessing	2
creating (developing)	3
designing	4
drawing conclusions	5
evaluating	6
explaining/reasoning	7
generalizing	8
inferencing	9
interpreting	10
justifying	11
making connections	12
predicting	13
supporting positions using prior knowledge	14
utilizing multiple resources/texts	15

*Strikethroughs represent HOTS/HOCs variables that were considered for analysis of the cog lab protocols and rejected for use in that analysis.

HOCs	HOCs
relationship between multiplication and division	A
reasonable estimate	B
place value	C
decomposition of fractions	D
models used to represent fractions	E
similarity	F
transformations (reflections, translations, rotations)	G
proportionality	H
distance from zero on a number line	I
absolute value	J
fluency with multiplication and division facts	K
data as presented in line plots and frequency tables	L
equivalent expression	M
division with negative number(s)	N
exponent	P
relationship between variables as presented in a graph, table, or equation	Q

APPENDIX E
CODED VERBAL PROTOCOLS

School District A—Grade 5 ELA (Student 1)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 1 - Inside a Termite Tower] Student I: Which sentence from the passage best supports the idea that termites _____ [00:11:56]. Well, maybe C, the airflow carries away heat.	No evidence	No evidence	No evidence
Interviewer: Okay. And why do you think that one?	No evidence	No evidence	No evidence
Student I: Because everyone needs cool air so they don't die.	generalizing key details	generalizing key details	generalizing key details
Interviewer: Okay, that's a good choice. Are any of these others a possibility, do you think?	No evidence	No evidence	No evidence
Student I: No.	No evidence	No evidence	No evidence
Interviewer: Why not?	No evidence	No evidence	No evidence
Student I: Because I don't know how A could be, because the large amounts of dirt are many different sizes,	analyzing key details	analyzing key details	generalizing key details
Student I: I don't know how that would help them survive.	drawing conclusion key details	drawing conclusion key details	drawing conclusion key details
Interviewer: Yeah, that makes sense.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: Or B, inside their mounds are large hollow tubes or termites almost always stay in their tubes and tunnels.	No evidence	No evidence	No evidence
Interviewer: And tell me why you don't think they would.	No evidence	No evidence	No evidence
Student I: I don't think they would because those are just facts and not like details about how they survive.	analyzing key details	analyzing key details	analyzing key details
Interviewer: Okay. Good thinking. So, click your answers. That was some good thinking; I like that, makes sense to me. Alright, what's this one?	No evidence	No evidence	No evidence
[Item 2 - Inside a Termite Tower] Student I: Which detail supports the idea that termites help one another? Termite workers feed kids until they can find food on their own.	No evidence	No evidence	No evidence
Interviewer: And why do you think that one?	No evidence	No evidence	No evidence
Student I: Because it's helping them find their food.	explaining - using a rationale key details	explaining/ rationale key details	explaining/ rationale key details
Interviewer: And what about the other options? Why didn't you think those would work?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: Because it doesn't really say--"A" doesn't really say how the termites help the king and the queen termites, because it just says termite kings and queens stay inside the chambers.	explaining - reference stim. key details	explaining/ reference key details	explaining/ reference key details
Student I: And then the termite tower has large tubes that help release heat, that doesn't say how they helped one another.	explaining/ reference key details	explaining/ reference key details	explaining/ reference key details
Student I: "Termite cities have passageways and tunnels to link different rooms," it doesn't say anything about how they help each other, it just says that they link to different rooms.	explaining/ reference key details	explaining/ reference key details	explaining/ reference key details
Interviewer: Awesome. Why don't you go ahead and click the answer that you think? And there you go. Good job.	No evidence	No evidence	No evidence
[Item 3 - Inside a Termite Tower] Student I: Which research question would best help the reader find information about the cycle of termites?	No evidence	No evidence	No evidence
Interviewer: What do you think?	No evidence	No evidence	No evidence
Student I: Maybe how termites turn into adults?	No evidence	No evidence	No evidence
Interviewer: And why do you think that one?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: Maybe because no one really knows	Applying (prior knowledge/opinion) research question	Applying (prior knowledge/opinion) research question	Applying (prior knowledge/opinion) research question
Student I: ... or how the termites speak to one another.	No evidence	No evidence	No evidence
Interviewer: Okay. Well, tell me what you think, why do you think that one? What made you pick that one? Or think about that one, I mean?	No evidence	No evidence	No evidence
Student I: Maybe because it sounds interesting that they talk.	Applying (vocabulary to make sense) research question	Applying (vocabulary to make sense) research question	Applying (vocabulary to make sense) research question
Interviewer: Yeah, yeah. Okay. What do you think the right answer is? Which one would you want to pick?	No evidence	No evidence	No evidence
Student I: Probably "C".	No evidence	No evidence	No evidence
Interviewer: Go ahead. And you think that one because you thought it sounded interesting to you.	No evidence	No evidence	No evidence
Student I: Uh-huh.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - Inside a Termite Tower] Student I: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from the passage to explain your answer.</p>	No evidence	No evidence	No evidence
<p>Student I: Well, in the passage, it said they have about 30,000 eggs--lay about 30,000 eggs a day. So, maybe once those eggs hatch, one of them would become a queen.</p>	explaining - reference main idea	explaining/reference main idea	
<p>Interviewer: Okay, that sounds like a good answer. Is there anything in the passage besides that that helped you know or just the number of eggs?</p>	No evidence	No evidence	No evidence
<p>Student I: No.</p>	No evidence	No evidence	No evidence
<p>Interviewer: Okay. Good job. And so, click on "Finish". That's great. You're doing a great job. So, then we have a</p>	No evidence	No evidence	No evidence
<p>[Item 1 - An Earful] Student I: Which is the best summary of Jacob's problem?</p>	No evidence	No evidence	No evidence
<p>Interviewer: What do you think about those? What is the best summary of Jacob's problem in the passage? What do you think?</p>	No evidence	No evidence	No evidence
<p>Student I: Well, he has homework to do, and he has to read through those [?].</p>	explaining/reference literary elements	explaining/reference literary elements	explaining/reference literary elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: That's a good answer. Which one of those choices do you think fits best?	No evidence	No evidence	No evidence
Student I: Maybe "D".	No evidence	No evidence	No evidence
Interviewer: "D"? Okay, tell me why.	No evidence	No evidence	No evidence
Student I: Because I said he has some homework after school, but he had to ____ [00:22:48] too.	explaining/rationale literary elements	explaining/rationale literary elements	explaining/rationale literary elements
Interviewer: Alright. Thank you.	No evidence	No evidence	No evidence
[Item 2 - An Earful] Student I: ____ [00:22:59] is narrated from what point of view?	No evidence	No evidence	No evidence
Interviewer: What do you think?	No evidence	No evidence	No evidence
Student I: I think third person or unknown narrator.	No evidence	No evidence	No evidence
Interviewer: And why do you think that?	No evidence	No evidence	No evidence
Student I: Because it's not Jacob or Jacob's teacher, because if it was Jacob, he would have said, "I scrambled off the bus."	applying POV	explaining/rationale pov	explaining/rationale pov

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
And if it was Jacob's teacher--which I don't think it is, because "I would email about this person," right?	applying POV	explaining/rationale pov	explaining/rationale pov
Interviewer: Right. Good point.	No evidence	No evidence	No evidence
Student I: And then first person and then the narrator would be like Jacob, but like it's like the third person... that unknown narrator is that Jacob scrambled off the bus.	explaining/reference pov	explaining/reference pov	explaining/reference pov
Interviewer: Okay. Great. That's some good thinking. Thank you. Good job. You really thought that one through.	No evidence	No evidence	No evidence
[Item 3 - An Earful] Student I: A reader can tell that this passage is fiction because it... uses characters that are not real people, because all of these are things that actually do happen because some people live on farms and not in the big city,	explaining/reference genre	explaining/reference genre	explaining/reference genre
Student I: and show some things in order of time is something that I've been told sometimes and gives hidden details about farm animals is non-fictional.	explaining genre	explaining/reference genre	explaining/reference genre
Interviewer: Great.			

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student I: Describe how Jacob's feelings about his homework changed from the beginning of the story to the end of the story, and provide details from the passage to support your answer.</p> <p>Well, he had to do his homework and collect sound.</p>	No evidence	analyzing main idea	No evidence
<p>Student I: And since he had to do the homework sounds, he wants to live in the city instead, because the city would be like... because there are so many sounds like taxis out there, because he thinks nothing really goes on in his house.</p>	analyzing main idea	analyzing main idea	analyzing main idea
<p>Student I: But at the end of the story, there is like the cats meow, the dogs go yike-yike and make a ton of noise, and then he knows what to do about his homework.</p>	analyzing main idea	analyzing main idea	analyzing main idea
END			

School District A—Grade 5 ELA (Student 2)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay, great. Let's talk about it. What does it say here?	No evidence	No evidence	No evidence
<p>[Item 1 - An Earful] Student II: "Which is the best summary of Jacob's problem in the passage? 'He's unhappy living out on the country farm. He wishes he could live in the city instead.'"</p> <p>No, because he's not worried about that. He's worried about how he'll do his homework.</p>	analyzing literary elements	analyzing literary elements	analyzing literary elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay	No evidence	No evidence	No evidence
Student II: So, no. "He has to collect sounds for a homework assignment. He thinks it will be difficult on a farm." Probably.	No evidence	analyzing literary elements	analyzing literary elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: "He isn't able to get his homework done after school. The animals are the farm where he lives are too noseey." No.	No evidence	analyzing literary elements	analyzing literary elements
Interviewer: Why not?	No evidence	No evidence	No evidence
Student II: Because he needs noise for his homework.	explaining - rationale literary elements	explaining - rationale literary elements	explaining - rationale literary elements
Interviewer: Right, okay. Good point.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student II: And then, "He has to do some homework after school, but he has too many chores. There is not enough time to get anything done."</p> <p>No, because he's not worried about his chores. He's worried about his homework--</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>literary elements</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student II: --and it's apparently too quiet.</p>	<p>explaining - rationale</p> <p>literary elements</p>	<p>explaining - rationale</p> <p>literary elements</p>	<p>explaining - rationale</p> <p>literary elements</p>
<p>Interviewer: Right. Right. Right. So, that's the answer.</p> <p>Okay. What's this next one?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>[Item 2 - An Earful] Student II: "Narrated from which point of view?" It's third person.</p>	<p>evaluating</p> <p>pov</p>	<p>evaluating</p> <p>pov</p>	<p>evaluating</p> <p>pov</p>
<p>Interviewer: Why do you think so?</p>			
<p>Student II: Because his teacher isn't talking and she doesn't know what's happening in his life at home.</p>	<p>applying</p> <p>POV</p>	<p>evaluating</p> <p>pov</p>	<p>applying</p> <p>POV</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Right.	No evidence	No evidence	No evidence
Student II: And--	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: --it's not like the teacher said. And it was like she said, "Your homework is to collect sounds." Ms. Olsen said, not I said.	applying POV	evaluating pov	applying POV
Interviewer: Gotcha. That makes sense to me. What about the other two?	No evidence	No evidence	No evidence
Student II: What other two? Like--	No evidence	No evidence	No evidence
Interviewer: Why was that wrong?	No evidence	No evidence	No evidence
Student II: This one was because Jacob did not say "I said—" blah, blah, blah.	applying POV	evaluating pov	applying POV
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: Third person, Jacob's teacher didn't say--	applying POV	evaluating pov	applying POV

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Right.	No evidence	No evidence	No evidence
Student II: --"I said—"blah, blah, blah. And first person by an unnamed narrator maybe, but it's not first person because it's like, "I personally think this should've been happening—"	applying POV	evaluating pov	applying POV
Interviewer: Right.	No evidence	No evidence	No evidence
Student II: "—instead of that."	No evidence	No evidence	No evidence
Interviewer: Okay. Okay, nice.	No evidence	No evidence	No evidence
[Item 3 - An Earful] Student II: "You can tell a passage is fiction because it A) gives details about farm animals B) shows events in order through time C) happens on a farm, not in a big city D) uses characters who are not real people."	No evidence	No evidence	No evidence
Student II: Okay. So, it's not "gives details about farm animals because it's not saying "This animal has like black and white spots all over them."	applying genre	evaluating genre	explain - rationale genre
Interviewer: Okay, yeah. I see your thinking. Go ahead.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: And this one, it's not this because events is not going in time like timelines or anything.	explaining genre	explaining genre	explaining genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: (Dead air/background noise 00:15:55-00:16:00). I'm at this one.	No evidence	No evidence	No evidence
Interviewer: Oops! Here you go.	No evidence	No evidence	No evidence
Student II: "It's on the farm, not in a big city" maybe, not really though.	No evidence	No evidence	No evidence
Interviewer: Why not?	No evidence	No evidence	No evidence
Student II: Because farms are real and so are the big city. And it's fiction. It's fake.	evaluating genre	evaluating genre	evaluating genre
Interviewer: Gotcha.			
Student II: So, "uses characters who are not real people", that would work because -- it's saying because these characters aren't real unless Ms. Olsen is a real person.	applying genre	evaluating genre	evaluating genre
Interviewer: Yeah, okay.	No evidence	No evidence	No evidence
Student II: And that'd be realistic to fiction, but it's not fiction	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Yeah. Yeah, okay. That makes sense. Good job. All right, what's this one?	No evidence	No evidence	No evidence
[Item 4 - An Earful] Student II: "Describe how Jacob's feelings about his homework can change from the beginning of the story to the end of the story. Provide details from the passage to support your answer."	No evidence	No evidence	No evidence
Student II It's super hard for him at first because he doesn't know any—how he could find so many sounds. But in the city, he thinks there's a lot of sounds because of the firetrucks, ambulance, police cars, road like pavement--and all that.	analyzing lit elements	analyzing lit elements	analyzing lit elements
Interviewer: Sure.	No evidence	No evidence	No evidence
Student II: And he thinks it's super quiet where he lives. But around the end of the story it says he kind of understands it now and he can do it better because he hears the birds, his dog.	analyzing lit elements	analyzing lit elements	analyzing lit elements
Interviewer: Right.	No evidence	No evidence	No evidence
Student II: He remembered the bees from when he's--before the birds----started chirping and the door--the gate I mean, and the cat. Oh!	explaining lit elements	explaining lit elements	explaining lit elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Inside a Termite Tower] Student II: "Which sentence from the passage best supports the idea that towers help termites survive? A) These large mounds of dirt are of many different sizes and B) Inside the mounds, large hollow tubes, C) Air flows and carries away the heat or D) Termites always stay inside their tubes and tunnels."</p>	No evidence	No evidence	No evidence
Student II: D is not true because at the end it said that they can get anything they need by going above ground.	explaining - reference key detail	explaining - reference key detail	explaining - reference key detail
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: "Air flows and carries away the heat." Maybe.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: "Inside the mounds are large, hollow tubes." I don't think so.	No evidence	No evidence	No evidence
Interviewer: Okay. Why not?	No evidence	No evidence	No evidence
Student II: Because it's saying that there's large hollow tubes. And there are, but I don't think that's going to help them survive--because they can't get their food from tubes--or more cool from tubes.	explaining - reference key detail	explaining - reference key detail	explaining - reference key detail

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: I'm with you.	No evidence	No evidence	No evidence
Student II: "The large mounds of dirt are of many different sizes." Nope.	No evidence	No evidence	No evidence
Interviewer: Because?	No evidence	No evidence	No evidence
Student II: Because that's not helping them survive and more like air flow. And the air flow is helping them survive.	explaining - rationale key detail	explaining - rationale key detail	explaining - rationale key detail
Interviewer: Okay, great. Good job. Nice thinking. All right, what's this one? Okay.	No evidence	No evidence	No evidence
[Item 2 - Inside a Termite Tower] Student II: If the termite kings and queens stay inside their chambers,	No evidence	No evidence	No evidence
Student II: B) Termite towers have large tubes to help release heat. Maybe.	No evidence	No evidence	No evidence
Student II: I don't think that is right though because it's just saying they stay inside their chambers. That's not going to help--	analyzing key detail	analyzing key detail	analyzing key detail
Student II: C) "Termite workers ____ [00:24:35] until they can find food on their own." Maybe.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: And "Termites have different passageways and tunnels leading to different routes." That's true, but that doesn't help one another.	analyzing key detail	analyzing key detail	analyzing key detail
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: B? No, that's not helping. They're not helping each other.	explaining - rationale key detail	explaining - rationale key detail	explaining - rationale key detail
Student II: That's C) they're helping them.	No evidence	No evidence	No evidence
Interviewer: Right, okay.	No evidence	No evidence	No evidence
Student II: So, C.	No evidence	No evidence	No evidence
[Item 3 - Inside a Termite Tower] "Which research question could best help maybe to find information about the life cycle of termites?"	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: "How termites turn into adults"—I don't think this one's right because it's just saying how big is a full grown termite. Maybe that—	explaining/reference research question	explaining/reference research question	explaining/reference research question

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: Maybe. I don't know the life cycle because it says how they speak to each other--	explaining/reference research question	explaining/reference research question	explaining/reference research question
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: --and "How many different kinds of termites there--" That's going to—not going to help the life cycle.	explaining viable research question	explaining/reference research question	explaining/reference research question
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: So, it would be B.	No evidence	No evidence	No evidence
Interviewer: Okay. Keep going. Good job!	No evidence	No evidence	No evidence
[Item 4 - Inside a Termite Tower] Student II: And "Based on the information in the passage, explain—" so, I would have to explain what would most likely happen to the termite colony if the king or queen were to die. "Provide details from the passage to support your answer."	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: They'd probably nominate a new king or queen.	predicting main idea	predicting main idea	predicting main idea
Interviewer: Nominate a new king or queen?	No evidence	No evidence	No evidence
Student II: Yeah. But before that they would—I don't know what would happen. They would probably just nominate a new king or queen--	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: --to do what they did.	No evidence	No evidence	No evidence
Interviewer: Was there anything in the passage that helped you know that?	No evidence	No evidence	No evidence
Student II: Uh-huh. It said they produce up to like 13,000--	explaining/reference main idea	explaining/reference main idea	explaining/reference main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: --eggs--	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: -- a day.	No evidence	No evidence	No evidence

School District A—Grade 5 ELA (Student 3)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 1 - An Earful] Student III: "Which is the best summary of Jacob's problem in the passage?"	No evidence	No evidence	No evidence
Interviewer Okay. Let's look at the summaries. Which one do you think it is?	No evidence	No evidence	No evidence
Student III: (Dead air/Background noise 00:11:26-00:36:00) B.	No evidence	No evidence	No evidence
Interviewer Why do you think it's B?	No Evidence	No Evidence	No Evidence
Student III: Because the story talks about how he—for his homework he has to find sounds and stuff.	explaining - reference literary elements	explaining/reference lit elements	explaining/reference lit elements
Student III: And then, like he says it'll be difficult because like he doesn't live in the city where there's a lot of sounds.	explaining - reference literary elements	explaining/reference lit elements	explaining/reference lit elements
Student III: He lives on a farm. And then, it says that in B.	explaining - reference literary elements	explaining/reference lit elements	explaining/reference lit elements
Interviewer Okay. That's great. That's really good thinking. Okay. You can go on to the next one.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: (Dead air/Background noise 00:12:05-00:12:10).	No Evidence	No Evidence	No Evidence
Interviewer How would you answer this one? What is it asking us to do?	No Evidence	No Evidence	No Evidence
[Item 2 - An Earful] Student III: Asking about the narrator—from what point of view.	No evidence	No Evidence	No Evidence
Student III: (Dead air/Background noise 00:12:34-00:12:40).	No Evidence	No Evidence	No Evidence
Interviewer Can it remind you of what point of view it is?	No Evidence	No Evidence	No Evidence
Student III: Like if you see like kind of like his. (student is showing something on computer)	explaining - reference POV	explaining/reference pov	explaining - reference POV
Interviewer Oh, right. Right. Right. Okay. So, which one do you think it could be?	No Evidence	No Evidence	No Evidence
Student III: I think it's B.	No Evidence	No Evidence	No Evidence
Interviewer Why do you think that?	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Because in paragraph 1 it says like that the teacher's talking.	explaining - reference POV	explaining/reference pov	explaining - reference POV
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: And it also might be C or D.	No Evidence	No Evidence	No Evidence
Interviewer Hmm, how are you going to decide?	No Evidence	No Evidence	No Evidence
Student III: (Dead Air/Background noise 00:13:15-00:13:30). I think it's D.	No Evidence	No Evidence	No Evidence
Interviewer And why do you think that's D?	No Evidence	No Evidence	No Evidence
Student III: Because like it can't be B because it didn't—if it was like B, it would've said "Ms.—" She would just be talking.	explaining - reference POV	explaining/reference pov	explaining - reference POV
Interviewer Right. Right, okay. So, you say you think it's D?	No Evidence	No Evidence	No Evidence
Student III: Yeah.	No Evidence	No Evidence	No Evidence
Interviewer Okay. You go ahead and click that one. You're doing a great job. What's the next one?	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - An Earful]</p> <p>Student III: (Dead air/Background noise 00:14:00-00:14:06) I think that it says that this passage is _____ [00:14:10] because it's— (Dead air/Background noise 00:14:15-00:14:20).</p>	No Evidence	No Evidence	No Evidence
I think it's D because it didn't really use people that are real.	<p>apply prior knowledge - that is expected within the PLDs</p> <p>genre</p>	<p>Applying (prior knowledge/opinion)</p> <p>genre</p>	<p>Applying (prior knowledge/opinion)</p> <p>genre</p>
Interviewer Oh okay.	No Evidence	No Evidence	No Evidence
Student III: If it was about like real people--	No Evidence	No Evidence	No Evidence
Interviewer Oh sure. And can these be in fiction, or non-fiction, or--	No Evidence	No Evidence	No Evidence
Student III: Like these could be fiction, but these could actually be non-fiction.	<p>apply prior knowledge - that is expected within the PLDs</p> <p>genre</p>	<p>Applying (prior knowledge/opinion)</p> <p>genre</p>	<p>Applying (prior knowledge/opinion)</p> <p>genre</p>
Interviewer Oh sure. Okay. So, that one's the only one that could be--	No Evidence	No Evidence	No Evidence
Student III: Yeah--	No Evidence	No Evidence	No Evidence
Interviewer Okay	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: --because if it was non-fiction they would be like real people.	apply prior knowledge - that is expected within the PLDs genre	Applying (prior knowledge/opinion) genre	Applying (prior knowledge/opinion) genre
Interviewer Good thinking. I like it. That's a good thinker. Here.	No Evidence	No Evidence	No Evidence
[Item 4 - An Earful] Student III: (Dead air/Background noise 00:14:55-00:15:05) "How did ___[00:15:10] feel about this homework assignment from the beginning of the story to the end of the story? Provide details from the passage to support your answer."	No Evidence	No Evidence	No Evidence
Interviewer Okay. Hmm.	No Evidence	No Evidence	No Evidence
Student III: So, at the beginning of the story, he was like he didn't like have—he thinks he didn't have anything else like but sound because he thinks that farm has no sounds and the city has more sound.	analyze literary elements	analyzing literary elements	analyzing literary elements
But at the end, he found out that there's a lot of sound on his farm.	analyze literary elements	analyzing literary elements	analyzing literary elements
Interviewer Okay, great. Were there any sentences in the paragraphs that help you know that?	No Evidence	No Evidence	No Evidence
Student III: I think it was 18 or 20.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer Yeah.	No Evidence	No Evidence	No Evidence
Student III: (Dead air or Background noise 00:15:57-00:16:05) In 21--	No Evidence	No Evidence	No Evidence
Interviewer Yeah.	No Evidence	No Evidence	No Evidence
Student III: It said like Jacob said there was plenty of noises on the farm.	explaining - reference literary elements	explaining/reference literary elements	explaining/reference literary elements
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: And in paragraph like 3 or 8—in paragraph 2, he said like there's like no sounds on the farm. There would be more sounds in the city.	explaining - reference literary elements	explaining/reference literary elements	explaining/reference literary elements
Interviewer That's good thinking. Really nice job. All right, let's go on to the next one. Let's see what's next. So, we'll go over here to "Finish". We'll turn that one in and turn that one in. And oh, one more there. (Dead air/Background noise 00:16:50-00:16:55)	No Evidence	No Evidence	No Evidence
[Item 1 - Inside a Termite Tower] Student III: "Which sentence from the passage supports the idea that towers help termites survive?"	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer Okay. What do you think?	No Evidence	No Evidence	No Evidence
Student III: I think C because like if it falls out and like it falls in.	explanation - rationale key detail	explaining/rationale key details	explaining/rationale key details
And like there's heat outside and like it'll like feel better than outside.	reasoning/inferencing key detail	reasoning key detail	reasoning key detail
Interviewer Oh.	No Evidence	No Evidence	No Evidence
Student III: It won't be like hot.	No Evidence	No Evidence	No Evidence
Interviewer Let's talk about some of the other choices too.	No Evidence	No Evidence	No Evidence
Student III: Okay.	No Evidence	No Evidence	No Evidence
Interviewer How do you know those are wrong?	No Evidence	No Evidence	No Evidence
Student III: D doesn't talk about like how it would help them.	analyze key detail	analyzing key detail	analyzing key detail
It just says like they stay in there.	explaining/rationale key detail	explaining/rationale key detail	explaining/rationale key detail

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer Sure.	No Evidence	No Evidence	No Evidence
Student III: They stay out of the element.	No Evidence	No Evidence	No Evidence
Interviewer Sure, okay.	No Evidence	No Evidence	No Evidence
Student III: Then A, same thing. It talks about how they survive because the question tell how does it help them.	explain - reference key detail	explaining/rationale key detail	explain - reference key detail
Interviewer Right, okay.	No Evidence	No Evidence	No Evidence
Student III: And then, B— (Dead air/Background noise 00:23:10-15) --it just says how, and like the frequency of what it does.	No Evidence	No Evidence	No Evidence
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: So, that's why I think it's C.	No Evidence	No Evidence	No Evidence
Interviewer Okay, all right. I think that's excellent thinking on that one as well. All right, what's this one?	No Evidence	No Evidence	No Evidence
[Item 2 - Inside a Termite Tower] Student III: "Which detail is the best idea that termites help when needed?"	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: (Dead air/Background noise 00:23:36-00:24:53) I think it might be A.	No Evidence	No Evidence	No Evidence
Interviewer It might be A?	No Evidence	No Evidence	No Evidence
Student III: Yeah, because like they help each other like get stuff for the king and queen.	drawing a conclusion/inference (although incorrect) key detail	inferencing key detail	drawing a conclusion/inference (although incorrect) key detail
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: It's not C because the—it says like how the termites help when—C says how the workers help the termites.	explain - reference key detail	explaining/reference key detail	explaining/reference key detail
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: So, it won't be C either.	No Evidence	No Evidence	No Evidence
Interviewer Okay.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: (Dead air/Background noise 00:25:20-00:25:23) And B doesn't say how they helped.	explain - rationale key detail	explaining/rationale key detail	explaining/rationale key detail
It just says how they release heat. And so, it might be D. But I chose A.	No Evidence	No Evidence	No Evidence
Interviewer Okay. (Dead air/Background noise 00:25:43-00:25:48) And why do you think it's not D?	No Evidence	No Evidence	No Evidence
Student III: (Dead air/Background noise 00:25:50-00:25:54) Because like--	No Evidence	No Evidence	No Evidence
Interviewer Go ahead.	No Evidence	No Evidence	No Evidence
Student III: It's like because it didn't talk about it in the passage. It didn't say how they help or anything.	explain - reference key detail	explaining/reference key detail	explaining/reference key detail
But the passage, like it talks about how they help to like queens and kings. They get food and stuff.	explain - reference (incorrectly) key detail	explaining/reference key detail	explaining/reference key detail
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: So, I think it's B.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer All right, good thinking. Great job. All right.	No Evidence	No Evidence	No Evidence
[Item 3 - Inside a Termite Tower]	No Evidence	No Evidence	No Evidence
Student III: Which research question helped you to find out about the life cycle of termites?			
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: (Dead air/Background noise 00:26:35-00:26:40) I think it's B, is that right? It says like how to turn it—like the little ones like turn to like keep them together and stuff.	analyze research question	analyzing research question	analyzing research question
And like C doesn't talk about their life cycle—like how they grow and everything.	explain - describe research question	explain - describe research question	explain - describe research question
And then, D just talks about how different kinds--	explain - rationale research question	explaining/rationale research question	explaining/rationale research question
Interviewer Sure.	No Evidence	No Evidence	No Evidence
Student III: And B just asks how like they turn—like how big termites can grow big--	explain - rationale research question	explaining/rationale research question	explaining/rationale research question

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer Sure, okay.	No Evidence	No Evidence	No Evidence
Student III: --because like B, it like—let's see.	No Evidence	No Evidence	No Evidence
Interviewer It's kay.	No Evidence	No Evidence	No Evidence
Student III: They're like babies kind of, but they keep growing.	interpreting research question	interpreting research question	interpreting research question
Interviewer Okay.	No Evidence	No Evidence	No Evidence
Student III: Right. It'll tell like how they keep growing.	interpreting research question	interpreting research question	interpreting research question
Interviewer Okay. Okay, I think that's a great answer. Good job, great. Let's see here.	No Evidence	No Evidence	No Evidence
Student III: "Based on the information, explain what would most likely happen to the colony if the king and queen were to die. Provide details from the passage to support your answer."	No Evidence	No Evidence	No Evidence
Interviewer Hmm. Okay. What do you think about that one?	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: (Dead air/Background noise 00:27:50-00:28:49) Maybe like one of them stays and they both try it. Then they learn that another person could be.	reasoning/inferencing main idea	reasoning/inferencing main idea	reasoning/inferencing main idea
Like another termite could be king and queen.	reasoning/inferencing main idea	reasoning/inferencing main idea	reasoning/inferencing main idea
Like if one dies, then like probably the other one would just stay there till they die.	reasoning/inferencing main idea	reasoning/inferencing main idea	reasoning/inferencing main idea
Interviewer Oh okay.	No Evidence	No Evidence	No Evidence
Interviewer You're thinking it sounds like they didn't make it. So, you think that if both of them are to die, then maybe what would happen again? Tell me again.	No Evidence	No Evidence	No Evidence
Student III: Like another one would be.	No Evidence	No Evidence	No Evidence
Interviewer Another one would come up?	No Evidence	No Evidence	No Evidence
Student III: Yes.	No Evidence	No Evidence	No Evidence
Interviewer But if only one of them died--	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Yes.	No Evidence	No Evidence	No Evidence
Interviewer --then just one of the other would come up.	No Evidence	No Evidence	No Evidence
Student III: Yeah.	No Evidence	No Evidence	No Evidence
Interviewer Okay, awesome. Good job!	No Evidence	No Evidence	No Evidence

School District A—Grade 5 ELA (Student 4)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Inside a Termite Tower]</p> <p>Student IV: Which sentence from the passage best supports the idea that towers help termites survive? Well, let's look at the answers.</p> <p>First answer, 'These large mounds of dirt are many different sizes.'</p> <p>B. 'Inside the mounds are large hollow tubes.'</p> <p>C. 'Air flows and carries away heat.'</p> <p>D. 'Termites almost always stay inside their tubes and tunnels.'</p>	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student IV: So, it says, 'Which sentence from the passage best supports the idea that towers . . .?' Well, if termites almost always stay in their mounds, it's going to be really hot,	reasoning/drawing conclusions key detail	explaining/rationale key detail	reasoning/drawing conclusions key detail
so when air flows in and carries away heat. So that one is a 'maybe.'	reasoning/drawing conclusions key detail	explaining/rationale key detail	reasoning/drawing conclusions key detail
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: We already know that this, it was in the passage, but it doesn't tell an idea of how do termites survive. So, it's not that one.	explain - rationale key detail	explaining/rationale key detail	explaining/rationale key detail
Inside the mounds are large hollow tubes.' So, maybe there's a lot of termites and they're all going to have to fit. We'll see.	analyze key detail	analyzing key detail	analyzing key detail
These large mounds of dirt are many different sizes.' These two are almost the same, but I think the best answer of these two is B.	analyze key detail	analyzing key detail	analyzing key detail

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
So, and then the best answer between these two, I think, since they're always going to stay inside their tube, I think it'll be really hot,	drawing conclusions key detail	drawing conclusions key detail	drawing conclusions key detail
so then 'Air flows and carries away the heat.'	drawing conclusions key detail	drawing conclusions key detail	drawing conclusions key detail
Interviewer: Good thinking. Nice job.	No Evidence	No Evidence	No Evidence
<p>[Item 2 - Inside a Termite Tower]</p> <p>Student IV: Which detail best supports the idea that termites help one another? Well, let's read the ____ [00:12:41].</p> <p>'Termite kings and queens stay inside their chambers.'</p> <p>'Termite towers have large tubes that help release heat.'</p> <p>'Termite workers feed . . .' what's that word?</p>	No Evidence	No Evidence	No Evidence
Interviewer: Nymphs.	No Evidence	No Evidence	No Evidence
<p>Student IV: Oh, 'nymphs until they can find food on their own.'</p> <p>'Termite cities have passageways and tunnels to link different rooms.'</p> <p>So, 'Which detail best supports the idea termites help one another?' So, I am focusing on the word 'help' and 'best.' So, then . . .</p>	evaluating key detail	evaluating key detail	evaluating key detail
Interviewer: Okay.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: That's a good strategy.	No Evidence	No Evidence	No Evidence
Student IV: This one, it talks about how the tubes help the termites,	analyze key detail	explaining/rationale key detail	analyze key detail
but it doesn't talk about how termites help each other. So, it's not that one.	explain - rationale key detail	explaining/rationale key detail	explaining/rationale key detail
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: 'Termite kings and queens stay inside their chambers.' This one, it doesn't talk about termites help each other.	explain - rationale key detail	explaining/rationale key detail	explaining/rationale key detail
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: So, it [cross talking] _____ [00:13:53]. 'Termite workers feed nymphs until they can find food on their own' or 'Termite cities have passageways and tunnels to link different rooms.' I think, between both of those, this one would be better. So, then the nymphs can grow and . .	explaining/rationale key detail	explaining/rationale key detail	explaining/rationale key detail
Interviewer: Sure.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - Inside a Termite Tower] Student IV: 'Which research question would best help a reader find information about the lifecycle of termites?' So, which research question . . . The life cycle of termites.</p> <p>'How big is full-grown termite?' 'How do termite nymphs turn into adults?' 'How do termites speak with one another?' 'How many different kinds of termites are there?'</p>	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: Well, there might be different kind of termites, I'm not sure.	reasoning research question	reasoning/inferencing research question	reasoning/inferencing research question
But I don't think it would be that question since it only talks about one type of termite. So, I don't think it's that one.	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: 'How do termites speak with one another?', 'How do termite nymphs turn into adults?', 'How big is full-grown termite?'.	No Evidence	No Evidence	No Evidence
In here, it doesn't really talk about that much how a full-grown termite, how big it is. And so, it won't be that one.	explain - rationale research question	explaining/rationale research question	explaining/rationale research question

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student IV: 'How do termite nymphs turn into adults?', 'How do termites speak with one another?' Also, in the passage, it didn't talk about how do termites speak with one another.	explain - rationale research question	explaining/rationale research question	explaining/rationale research question
Interviewer: Sure.	No Evidence	No Evidence	No Evidence
Student IV: So, I think it would be, 'How do term-'	No Evidence	No Evidence	No Evidence
Interviewer: Okay. Nice job.	No Evidence	No Evidence	No Evidence
[Item 4 - Inside a Termite Tower] Student IV: Then this, 'Based on the information in the passage, explain what would most likely happen to the termite colony, if the king or queen were to die. Provide details from the passage to support your answer.'	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: So, '... explain what would most likely happen to the termite colony, if the king or queen would die.'	No Evidence	No Evidence	No Evidence
Interviewer: What do you think?	No Evidence	No Evidence	No Evidence
Student IV: Well, king and queens, they kind of protect the entire termites and all them.	reasoning main idea	reasoning/inferencing main idea	reasoning/inferencing main idea

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
And if the queen, the king and queen were to die, there would probably be a different termite king and queen.	reasoning main idea	reasoning/inferencing main idea	reasoning/inferencing main idea
Interviewer: Oh, yeah, okay.	No Evidence	No Evidence	No Evidence
Student IV: Different, different people to be king or queen.	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student IV: So, then I think that if the king or queen were to die, they would find some different termites being a king or queen.	reasoning main idea	reasoning/inferencing main idea	reasoning/inferencing main idea
Interviewer: Okay. That's really good thinking. Anything else you want to add? [Cross talking] good.	No Evidence	No Evidence	No Evidence
Student IV: I think I'm good.	No Evidence	No Evidence	No Evidence

School District A—Grade 5 ELA (Student 5)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Inside a Termite Tower]</p> <p>What sentence best supports the idea the towers help termites survive? -These large mounds of dirt are many different sizes. Not really, it's just saying what the size is.</p>	<p>analyzing</p> <p>key detail</p>	<p>analyzing</p> <p>key detail</p>	<p>analyzing</p> <p>key detail</p>
<p>Inside the mounds, there are large hollow tubes. That mostly helps them so they can breathe. I don't know if termites breathe or not.</p>	<p>???</p>	<p>No Evidence</p>	<p>evidence of metacognition - not referenced in frameworks</p>
<p>Air flows in and carries away heat. Yeah. It does, but yeah.</p>	<p>analyzing</p> <p>key detail</p>	<p>analyzing</p> <p>key detail</p>	<p>analyzing</p> <p>key detail</p>
<p>Interviewer: Okay. Keep thinking. Mm-hmm.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student V: Termites almost always stay inside their tubes and tunnels.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: Mm-hmm. Okay. I've guess you've got to decide which one to choose.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student V: That's hard. That's three answers.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: That's okay. Let's think them through.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student V: I don't think I'm going to go with B.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. Why do you want to get rid of that one?	No Evidence	No Evidence	No Evidence
Student V: Inside the mound are large hollow tubes. That's just like saying what's inside, not really helping them.	analyzing key detail	analyzing key detail	analyzing key detail
Interviewer: That makes sense.	No Evidence	No Evidence	No Evidence
Student V: Air flows and carries away heat. That's something.	???? Caught her attention, but not sure what HOTS (if any) are being shown.	No Evidence	No Evidence
Termites also always stay inside their tubes and tunnels. Which that also talks about what they're doing.	analyzing- seems like she's parsing the difference between "help" in the question and "do" in the AC. key detail	analyzing key detail	analyzing key detail
Interviewer: What do you think? You're doing a great job. You're really thinking really well. So what is your brain thinking now?	No Evidence	No Evidence	No Evidence
Student V: They mostly stay in the tubes and tunnels so they can work underground, can build what they need to build.	reasoning key detail	reasoning key detail	reasoning key detail
Interviewer: That sounds reasonable.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: Because you have to build the things. That's how it gets--I wonder how long it takes for them to build a tunnel.	No Evidence	No Evidence	No Evidence
Interviewer: That's a good question. I don't know. All right. Which one do you want to go with?	No Evidence	No Evidence	No Evidence
Student V: I think to help them survive they need air flow and to carry away heat. So I'm going to go with C.	drawing conclusion/inference key detail	drawing conclusion/inference key detail	drawing conclusion/inference key detail
Interviewer: Okay. That's a good one. All right. Next thinking. What's this next one?	No Evidence	No Evidence	No Evidence
[Item 2 - Inside a Termite Tower] Student V: Which detail best supports the idea about termites helping one another? Termite kings and queens stay inside their chambers. That's not really one because they're not helping.	evaluate key detail	evaluating key detail	evaluating key detail
Termite towers have large holes to help them release--well, that's not helping one another.	evaluate key detail	evaluating key detail	evaluating key detail
Interviewer: Okay. That makes sense.	No Evidence	No Evidence	No Evidence
Student V: Termite workers feed nymphs until they can find food on their own. Well, that's one way to help one another.	evaluate key detail	evaluating key detail	evaluating key detail

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Termite cities have passageways underground. Well, that's not one. So it's the nymphs.	evaluate key detail	evaluating key detail	evaluating key detail
Interviewer: Okay. Good thinking. Thanks. All right. This one.	No Evidence	No Evidence	No Evidence
[Item 3 - Inside a Termite Tower] Student V: Which research question would best help a reader find information about the lifecycle of termites? How big is a full grown termite? That's not really the lifecycle.	evaluate key detail	evaluating key detail	evaluating key detail
How do termite nymphs turn into adults? That's one, the lifecycle.	evaluate key detail	evaluating key detail	evaluating key detail
How do termites speak with one another? That's not really about the lifecycle of them.	evaluate key detail	evaluating key detail	evaluating key detail
How many different kinds of termites are there? Well, we don't know if there's different kinds of termites or not.	evaluate key detail	evaluating key detail	evaluating key detail
I'm going to go with B because it's talking how termites turn into adults. I think that's lifecycle.	draw conclusion key detail	drawing conclusion key detail	drawing conclusion key detail

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: That makes sense. All right. What's this one?	No Evidence	No Evidence	No Evidence
[Item 4 - Inside a Termite Tower] Student V: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die?	No Evidence	No Evidence	No Evidence
Provide--they'd probably build another--I don't know if termites vote like how we vote for like presidents.	making connections main idea	inferencing (build another start over?) main idea	draw conclusion/inference main idea main idea
Interviewer: Oh, yeah. That's an idea. They might vote for something, find somebody new.	No Evidence	No Evidence	No Evidence
Student V: Yeah. Like if the king or queen dies.	No Evidence	No Evidence	No Evidence
Interviewer: Is there anything in the passage that helps you know that?	No Evidence	No Evidence	No Evidence
Student V: Not really but there's nothing really to say about that. It just says that the king and queen--their entire lives, the queen lays eggs and the king really doesn't--I don't know what he does.	making connections main idea	explaining/referencing main idea	draw conclusion/inference main idea main idea
Interviewer: All right. A new passage. So you're going to do the same thing. So when you're ready to answer the questions, we'll talk through them together. Awesome. Thanks.	No Evidence	No Evidence	No Evidence
Student V reads passages aloud and provides some additional critical thinking as noted below.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: An earful. That's something a parent would say. "Your homework is to collect sounds," Ms. Rollyson said. She handed out sheets of paper shaped like giant ears. Then, she held up a shiny blue kazoo. "Everyone who gets an earful will get one of these." The class laughed. I'd see why she gave them a sheet that had ears.	No Evidence	No Evidence	No Evidence
Interviewer: Let's keep reading.	No Evidence	No Evidence	No Evidence
Student V: Later, Jacob glared out the school bus window. "Not fair," he thought. How would he collect enough sounds on his family's farm? "There are plenty of noises in town. If only lived where tires squealed and sirens wailed."	No Evidence	No Evidence	No Evidence
Well, if you do have animals, that's a sound you could probably listen to.	reasoning/inferencing key detail	reasoning/inferencing key detail	reasoning/inferencing key detail
Interviewer: That's true. Good. Keep going.	No Evidence	No Evidence	No Evidence
Student V: Jacob scrambled off the bus when it screeched to a stop at his mailbox. He wasn't in the mood to wave as he drove away.	No Evidence	No Evidence	No Evidence
He's probably upset that he doesn't have any sounds, probably.	reasoning/inferencing key detail	reasoning/inferencing key detail	reasoning/inferencing key detail
Interviewer: I bet you're right.	No Evidence	No Evidence	No Evidence
Student V: When he threw open the gate, it groaned like a stubborn mule. That was how he felt about the assignment. There's a sound.	explaining - reference key detail	explaining - reference key detail	Explaining-reference key detail
There's a sound.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Yeah. There's one, right?	No Evidence	No Evidence	No Evidence
<p>Student V: On the porch, Jacob knelt beside the kittens curled up on the rug. They sounded like tiny motors when they purred. There's another sound. Oh, my god. "I'm home," Jacob called. He thumped his book down in a kitchen chair. That's kind of a sound. The rocker then noticeably stopped creaking. That's a sound. "How was school?" his mother asked, walking in with his baby brother on her shoulder. She was patting his little back. "I've got homework," Jacob grumbled. The baby burped, and Jacob laughed. "That's what I think about it, too."</p> <p>"Have a snack before you do your chores," his mother said. She took the animal crackers down from the cupboard. Jacob rattled the curtain. "Not many left." He crunched two tigers, three lions, and a seal, then gulped down some milk. If only animal crackers were real, he would have plenty of noises to list. Goldie, Jacob's collie, woofed as Jacob walked toward the barn.</p> <p>Her puppies were yipping in a straw filled stall. Jacob flung dog food pellets into their pen, and the puppies sniffled and crunched. In the chicken house, Jacob shooed two cackling hens from their nest. He slipped their warm eggs in his pocket. Wouldn't it be funny if he forgot about the eggs, and they hatched? He'd have a peeping pocket.</p> <p>In the coral, a black cow napped in the sun. Jacob woke her when he poured corn in her pen. "Moo, thank you," she seemed to say. Tap, clatter, clunk. Dad drove the tractor into the yard. The lead on the tractor smokestack rattled when it chugged and chugged to a stop. "How was school?" Dad asked, stepping down from the cab. Jacob shrugged. "Okay, I guess," he said, "I have some homework." Jacob put the eggs in the kitchen, then climbed to his treehouse.</p> <p>He could see Dad's beehives by the hay field. Six hives usually meant plenty of honey, but today, he couldn't hear it over the scolding of the blue jays. He tried ____ [00:20:26]. "How could a person think? Quiet!" Jacob shouted. Suddenly, he sat up straight. Cows mooed and puppies yipped. Chicken cackled in the yard.</p> <p>When Goldie began barking below, Jacob grinned. There were plenty of noises on the farm. "I hear you," he called. He hurried down from the tree. He had an earful of homework to do. Now, he's saying he has an earful of homework to do? That kind of sounds like what the page would sound like?</p>	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: All right. What is this first question?	No Evidence	No Evidence	No Evidence
[Item 1 - An Earful] Student V: Which is the best summary of Jacob's problem in this passage? He is unhappy living out on the farm. He wishes he could live in the country. Well, that's not really one. He just wants to live in the city so he can have lots of noises.	drawing conclusions key detail	evaluating key detail	evaluating key detail
He has to collect sounds for a homework assignment. He thinks that will be difficult. That is a problem, so I'm going to keep that.	evaluating key detail	evaluating key detail	evaluating key detail
He is unable to get his homework done after school. The animals on the farm where he lives are too noisy. Well, that's not a problem. It's kind of a problem.	evaluating key detail	evaluating key detail	evaluating key detail
He has to do some homework after school, but he has too many chores. There is not enough time to do it. Well, it is a problem. There's three problems.	evaluating key detail	evaluating key detail	evaluating key detail
Interviewer: Let's see if we can figure out which one. Talk it through.	No Evidence	No Evidence	No Evidence
Student V: He does think that it will be difficult on the farm to do that. It'd be pretty easy because you'd just put "A cow moos."	evaluate key detail	evaluating key detail	evaluating key detail

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
He's unable to get his work done. The animals where he lives are too noisy. That's not really one because he can do his homework.	evaluating key detail	evaluating key detail	evaluating key detail
He has to do some homework after school, but he has too many chores. There is not enough time to get everything done. Well, he just finished his chores, so it'd be B.	drawing conclusions key detail	evaluating key detail	drawing conclusions key detail
Interviewer: Okay. Nice.	No Evidence	No Evidence	No Evidence
[Item 2 - An Earful] Student V: "An Earful" is narrated from which point of view? -First person by Jacob, -a third person by Jacob's teacher. That's a no. - First person by an unnamed narrator, well, yeah. - Unnamed, no, that's not one.	No Evidence	No Evidence	No Evidence
Interviewer: Why not?	No Evidence	No Evidence	No Evidence
Student V: Well, it could be because we don't know about one person.	explaining - rationale POV	explaining/rationale pov	explaining/rationale pov
Interviewer: Hey, remind me why you clicked off B? Why was that not the answer?	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: Because it was a third person. Because it was Jacob's teacher. Jacob's teacher doesn't go to his house. That'd just be weird.	explaining - rationale POV	explaining/rationale pov	explaining/rationale pov
Interviewer: Okay. Yeah. I see what you're saying.	No Evidence	No Evidence	No Evidence
Student V: Third person by an unknown narrator. That could be one, but it sounds like he's talking. So we'll get off D.	explaining - rationale POV	explaining/rationale pov	explaining/rationale pov
No, actually, that might be one because it says right here "Later, Jacob glared out the school bus window. 'Not fair,' he thought." Yeah. That sounds like it might be an unknown narrator.	analyzing POV	explaining/rationale pov	No Evidence
It's probably not an unnamed narrator. So we'll get rid of him because it doesn't really say that. It says, "Jacob scrambled off the bus when he screeched to a stop at his mailbox." So it sounds like it's third person.	explaining/rationale pov	explaining/rationale pov	explaining/rationale pov
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
[Item 3 - An Earful] Student V: A reader can tell that this passage is fiction because it - gives details about farm animals, - shows events in order through time, - happens on a farm and not in a big city, - usually characters are not real.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Well, fiction is real, right? I think so. No, non-fiction's not real.	No Evidence	No Evidence	No Evidence
Well, it's not give details about farm animals.	No Evidence	No Evidence	No Evidence
Uses characters who are not real people.	No Evidence	No Evidence	No Evidence
Happens on a farm and not in a big city. That is true. It could happen.	explaining - rationale genre	explaining/rationale genre	explaining/rationale genre
Shows events in order through time. It's not really showing order through time. No, B.	explaining - rationale genre	explaining/rationale genre	explaining/rationale genre
It always does that. No. Now, it's changed to C.	No Evidence	No Evidence	No Evidence
Interviewer: There you go.	No Evidence	No Evidence	No Evidence
Student V: I thought I was not going to be able to do it. [Item 4 - An Earful] Describe how Jacob's feeling about his homework changed from the beginning of the story to the end of the story. Provide details from the passage to support your answer.	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: It sounds like he has lots of noises, so he can do his homework, first off. And his teacher gives him a paper that he has to do about, and he gets a shiny blue kazoo if he--he has to do his chores. He goes up to his treehouse, but he started listening to noises. But he can't really think because it's too loud. But there's so many noises he can list there.	Student V provides a summary rather than addressing the prompt. For a summarizing the Student V uses evaluation - but it's not the best evaluation.	?	No Evidence
Interviewer: Anything else?	No Evidence	No Evidence	No Evidence
Student V: Not really. Oh, the creaking of the baby. Okay. I think that's it.	No Evidence	No Evidence	No Evidence
END			

School District A—Grade 5 ELA (Student 6)

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 1 - An Earful] Student VI: Well it says he's unhappy living at the country at a farm. He wishes he could live in the city, but it sounds like he really likes the farm because it sounds like he has his own personal treehouse and everything.	analysis literary elements	analyzing lit elements	analyzing lit elements
Interviewer: Good point, okay.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student VI: Then B says he has to collect sounds for a homework assignment. He thinks that will be difficult on a farm.</p> <p>Well it did say around the first, second and third paragraph that he thought it was going to be difficult.</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining /reference</p> <p>lit elements</p>	<p>explaining /reference</p> <p>lit elements</p>
<p>Interviewer: Okay.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VI: And then number C says he is unable to get his homework done after school. The animals on the farm where he lives are too noisy.</p> <p>I don't think that could be it because he went straight to his treehouse and then he started working on it, so I don't think that's it.</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining /reference</p> <p>lit elements</p>	<p>explaining /reference</p> <p>lit elements</p>
<p>Interviewer: Okay.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VI: And D says he has to do some homework after school, but he has too many chores. There's not enough time to get everything done.</p> <p>Well it tells he went to his treehouse to do his homework, so it has to be B.</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining /reference</p> <p>lit elements</p>	<p>explaining /reference</p> <p>lit elements</p>
<p>Interviewer: That makes sense. That's some good thinking. Thanks. All right, what does this one say?</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 2 - An Earful]</p> <p>Student VI: An earful is narrated from what point of view?</p> <p>A says first person by Jacob. No because in paragraph one it says your homework is to collect sounds said Ms. Olson.</p>	<p>evaluating</p> <p>POV</p>	<p>evaluating</p> <p>POV</p>	<p>evaluating</p> <p>POV</p>
<p>Third person, Jacob's teacher. No because Jacob's teacher was the first person.</p>	<p>evaluating</p> <p>POV</p>	<p>evaluating</p> <p>POV</p>	<p>evaluating</p> <p>POV</p>
<p>Interviewer: Okay.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VI: _____ [00:12:03] by a main character. No because it says her name right here.</p>	<p>evaluating</p> <p>POV</p>	<p>evaluating</p> <p>POV</p>	<p>evaluating</p> <p>POV</p>
<p>Third person by _____ [00:12:14].</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: Do you want to change your mind and go back and look?</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VI: Yeah.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: Okay. You can.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student VI: Well it's going to have to be first person by, wait, no it's B because I hear in third person it's an earful.	explaining - rationale POV	explaining/ rationale POV	explaining/ rationale POV
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
Student VI: This one.	No Evidence	No Evidence	No Evidence
Interviewer: Okay. Good job, next one.	No Evidence	No Evidence	No Evidence
[Item 3 - An Earful] Student VI: A reader can tell that this passage is fiction because (A) it gives details about farm animal. No because giving details about farm animals would be nonfiction.	applying genre	analyzing genre	applying genre
And then B says shows events in order through time. I'm not sure about that one.	No Evidence	No Evidence	No Evidence
C says half is on a farm and is not in a big city. No because that could happen, so that'd be realistic fiction.	analyzing genre	analyzing genre	analyzing genre
And then you just...characters were not real people. I think it's D.	analyzing genre	analyzing genre	analyzing genre

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay.	No Evidence	No Evidence	No Evidence
<p>[Item 4 - An Earful]</p> <p>Student VI: Describe how Jacob's feelings about this homework changed from the beginning of the story to the end of the story. Provide details from the passage to support your answer.</p>	No Evidence	No Evidence	No Evidence
<p>I think he's feeling kind of nervous about his homework because he can't find any animal sounds. I think he realizes at the end of the story it's just all around him so.</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>literary elements/main idea</p>	<p>analyzing</p> <p>literary elements/main idea</p>
<p>Interviewer: And did you have any details in the passage that helped you to know that?</p>	No Evidence	No Evidence	No Evidence
<p>Student VI: Yeah. I believe it was starting in paragraph 9 or 10. That's when it started making different sounds.</p>	<p>explaining - reference</p> <p>literary elements</p>	<p>explaining /reference</p> <p>lit elements</p>	<p>explaining /reference</p> <p>lit elements</p>
<p>Interviewer: Okay. Good job, nice job. Click finish. And then turn in and then turn in again and then there's just one more. And then you scoot down. Yep, you're doing it. So a brand new passage, and when you're done reading, we can go through the questions again.</p>	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Inside a Termite Tower]</p> <p>Student VI: What sentence from the passage best supports the idea that Towers hoped to survive?</p> <p>He says his first mounds of dirt are in many different sizes. I don't think that could be it.</p>	<p>explaining/ reference</p> <p>key details</p>	<p>explaining/ reference</p> <p>key details</p>	<p>explaining/ reference</p> <p>key details</p>
<p>Interviewer: Why do you think no?</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VI: Well I guess it could but depending on the size of the house they would have ____ [00:17:19].</p>	<p>explain???</p> <p>key detail</p>	<p>explaining/ reference</p> <p>key details</p>	<p>explaining/ reference</p> <p>key details</p>
<p>And B says inside the mounds are large hollow tubes. I also think that could be it because that could be where maybe they sleep and stuff.</p>	<p>explaining/ reference</p> <p>key details</p>	<p>explaining/ reference</p> <p>key details</p>	<p>explaining/ reference</p> <p>key details</p>
<p>Interviewer: All right, okay.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VI: And C air flows and carries away heat. Oh, I think C's it, though, because it carries away heat and it says they have thin skin so.</p>	<p>explain - rationale</p> <p>key detail</p>	<p>explaining/ rationale</p> <p>key details</p>	<p>explaining/ rationale</p> <p>key details</p>
<p>Interviewer: Okay. That's good thinking.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student VI: I'm going to go with C.	No Evidence	No Evidence	No Evidence
Interviewer: Nice job.	No Evidence	No Evidence	No Evidence
[Item 2 - Inside a Termite Tower] Student VI: Which detail best supports the idea that termites help one another? A says termite kings and queens stay inside their chambers. A, no, because the king and queens don't do anything it said in one of the paragraphs. They just said the other ones serves them.	explaining/ reference key details	explaining/ reference key details	explaining/ reference key details
B says termite towers have large tubes to help release heat. No because the termites don't do anything to help with that.	explain - describe key detail	explain - describe key detail	explain - describe key detail
Interviewer: That makes sense.	No Evidence	No Evidence	No Evidence
Student VI: And C is termite workers feed _____ [00:18:22] until they can _____ [00:18:26] food on their own. I think this one because it says they help them.	explaining/ rationale key details	explaining/ rationale key details	explaining/ rationale key details
Interviewer: Okay. That makes sense to me.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student VI: The last one says termite cities have passageways and tunnels filling differently. I think it's C.	No Evidence	No Evidence	No Evidence
Interviewer: Okay. Good thinking, nice job.	No Evidence	No Evidence	No Evidence
<p>[Item 3 - Inside a Termite Tower]</p> <p>Student VI: Which _____ [00:18:44] question would best help the reader find information about the lifecycle of termites?</p> <p>(A) How big is a full-grown termite? That may help.</p>	student is doing some thinking, but is not verbalizing.	No Evidence	No Evidence
(B) How do termite _____ [00:18:59] turn into adults? Okay that's probably it but.	No Evidence	explaining/ reference research question	No Evidence
(C) how do termites speak with one another. That's not it.	No Evidence	explaining/ reference research question	No Evidence
And D how many different kinds of termites are there? I think it's B.	No Evidence	explaining/ reference research question	No Evidence
Interviewer: Okay. Tell me why you think that.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student VI: Because it saying the lifecycle of the baby termites so how do termite ____ [00:19:23] turn into adults.	explain - reference research question	explaining/ reference research question	explaining/ reference research question
Interviewer: Okay. That makes sense.	No Evidence	No Evidence	No Evidence
[Item 4 - Inside a Termite Tower] Student VI: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die.	No Evidence	No Evidence	No Evidence
Well it said the queen, I don't remember the number, but it said it produces a lot of termites every day, so if the queen would die there wouldn't termites anymore.	Drawing conclusions/inference main idea	Drawing conclusions/inference main idea	Drawing conclusions/inference main idea
Interviewer: That makes sense to me. That's great. Let's see, is there anything else?	No Evidence	No Evidence	No Evidence
END			

School District A—Grade 5 ELA (Student 7)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - An Earful]</p> <p>Student VII: Which is the best summary of Jacob's problem in the passage?</p> <p>Okay. He's unhappy living out in the country on a farm. He wishes he could live in the city instead.</p> <p>Well, it didn't really talk about him living in the city, and he didn't talk about anything in the city. Basically, because they're living on the farm and everyone's trying to do farm work and stuff like that.</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>lit elements</p>	<p>analyzing</p> <p>lit elements</p>
<p>B) he has to collect sounds from a homework assignment. He thinks that will be difficult on the farm. He didn't really talk about it being on the farm.</p> <p>He didn't really have to do it on the farm. He could have done it in the house or something because his mom didn't ever say "You can't do it in the house" or anything. Nobody said that. So I don't think it's that one.</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>lit elements</p>	<p>analyzing</p> <p>lit elements</p>
<p>C) he is unable to get his homework done after school. The animals on the farm where he lives are too noisy.</p> <p>Maybe because he was barely even being able to think because the animals were being noisy, so he had to think out loud. Maybe that one.</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>lit elements</p>	<p>analyzing</p> <p>lit elements</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>He has to do some homework after school, but he has too many chores. There is not enough time to get anything done.</p> <p>Probably not that one because he was done with his chores by the time he was doing his homework. So I don't think it's that one. So I think my answer is C.</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>lit elements</p>	<p>analyzing</p> <p>lit elements</p>
<p>Interviewer: Okay. Go ahead and click that one. That's some good thinking there. Awesome job. Why is it so crabby? There we go. All right. Next one.</p>	No Evidence	No Evidence	No Evidence
<p>[Item 2 - An Earful]</p> <p>Student VII: "An Earful" is narrated from which point of view. I'm not very good at narrating.</p>	No Evidence	No Evidence	No Evidence
<p>Interviewer: Well, let's give it a shot and see if you can come up with something. I bet you can. Do you remember what narrated means?</p>	No Evidence	No Evidence	No Evidence
<p>Student VII: No, not really.</p>	No Evidence	No Evidence	No Evidence
<p>Interviewer: Okay. Do you remember what point of view means?</p>	No Evidence	No Evidence	No Evidence
<p>Student VII: No.</p>	No Evidence	No Evidence	No Evidence
<p>Interviewer: You know what? Let's just skip this one and go to the next one. That's okay.</p>	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - An Earful]</p> <p>A reader can tell this passage is fiction because it--maybe because how like all his animals are maybe doing all of them.</p>	No Evidence	No Evidence	No Evidence
<p>But A) gives details about farm animals, no, because that would be--wait.</p> <p>Fiction is wrong, like not right, right? And non-fiction is true?</p>	No Evidence	<p>explaining/describing characteristics</p> <p>genres</p>	<p>explaining/describing characteristics</p> <p>genres</p>
<p>Interviewer: Mm-hmm.</p>	No Evidence	No Evidence	No Evidence
<p>Student VII: Well, gives details about the farm, that's not really talking about anything wrong in the story because talking about farm animals is kind of like a fact.</p>	<p>reasoning</p> <p>literary elements</p>	No Evidence	<p>reasoning</p> <p>genre</p>
<p>If it's like a fact, it'd probably be non-fiction because non-fiction books mainly tell facts about the book and about the thing. So probably not A.</p>	<p>applying</p> <p>genre</p>	<p>explaining/describing characteristics</p> <p>genres</p>	<p>applying</p> <p>genre</p>
<p>B) shows an event in order through time, maybe, but not really. Maybe.</p>	No Evidence	No Evidence	No Evidence
<p>Interviewer: Okay. Let's keep going.</p>	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student VII: Yeah. Happens on a farm and not in a big city.</p> <p>Well, city and on a farm is not really fiction or anything because it doesn't really matter if it's on a farm or not. So probably not C.</p>	<p>explaining - describing genres</p>	<p>explaining/describing characteristics</p> <p>genres</p>	<p>explaining/describing characteristics</p> <p>genres</p>
<p>D) uses characters who are not real people. Maybe. It didn't really say if they were actually true people.</p>	<p>explaining - describing genre</p>	<p>explaining/describing characteristics</p> <p>genres</p>	<p>explaining/describing characteristics</p> <p>genres</p>
<p>Interviewer: Which one do you think you want to pick?</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VII: Maybe B?</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: Okay.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VII: Probably because it shows time by time how it's going through the passage. So probably B.</p>	<p>explaining - describing genre</p>	<p>explaining/describing characteristics</p> <p>genres</p>	<p>explaining/describing characteristics</p> <p>genres</p>
<p>Interviewer: Okay.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: Yeah. Absolutely. Nice work. All right. What's this one?</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - An Earful]</p> <p>Student VII: Describe how Jacob's feeling about his homework change from the beginning of the story to the end of the story. Provide details from the passage to support your answer.</p> <p>Well, probably about his feelings that he didn't really want to do his homework because he kept telling his parents "I have homework tonight."</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>
<p>And it probably meant he wasn't really wanting to do his homework because he was telling them about it like that.</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>
<p>And then probably at the end of the story, he had to do his homework. So he's thinking about it.</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>
<p>But when the animals were making too much noise, it made him not think anymore</p>	<p>explain - reference</p> <p>literary elements</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>	<p>explaining/references details</p> <p>lit elements/main idea</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
and it made him be annoyed	explain - reference literary elements	explaining/references details lit elements/main idea	explaining/references details lit elements/main idea
and not really know what he was doing.	explain - reference literary elements	explaining/references details lit elements/main idea	explaining/references details lit elements/main idea
And it made him sidetrack and offline. So probably that's what I would put.	No Evidence	No Evidence	No Evidence
[Item 1 - Inside a Termite Tower] Student VII: Which sentence from the passage best supports the idea that towers help termites survive? If there's an answer probably from sun because it says they have such thin skin.	reasoning key detail	reasoning key detail	reasoning key detail
A) These large mounds of dirt are many different sizes. That doesn't really matter about how it helps them.	evaluating key detail	evaluating key detail	evaluating key detail
Inside the mounds are large hollow tubes. That makes them get through them but probably not because it doesn't matter how large they are or if they have tubes or not.	explaining - describe key detail	explaining/ describing key details	explaining/ describing key details

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
They could just fall down there or something.	drawing conclusion/inference key detail	drawing conclusions key detail	drawing conclusions key detail
C) Air flows in it and carries away heat. Maybe because that might put in heat. Wait.	No Evidence	No Evidence	No Evidence
Interviewer: What are you thinking?	No Evidence	No Evidence	No Evidence
Student VII: Maybe they put little holes.	inferencing key detail	inferencing key details	inferencing key details
Maybe we could keep that because yeah. It needs air, but it also needs to flow away the heat.	explain - reference key detail	explaining/ describing key details	explaining/ describing key details
If they are under heat, it will just fry them because they have such thin skin.	explain - reference key detail	explaining/ describing key details	explaining/ describing key details

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
D) Termites almost always stay inside their tubes and tunnels. Probably D because they can't really be outside because either it's too cold or it's too hot.	explain - describe key detail	explaining/ describing key details	explaining/ describing key details
So they don't really have a perfect temperature for their skin. So probably D.	explain - rationale key detail	explaining/rational key details	explaining/rational key details
Interviewer: Okay. So that makes sense to me. Go ahead and mark that one. Awesome.	No Evidence	No Evidence	No Evidence
[Item 2 - Inside a Termite Tower] Student VII: Which detail best supports the idea that termites help one another? Probably building maybe the tower of termites.	predicting key detail	predicting key detail	predicting key detail
Interviewer: We'll see.	No Evidence	No Evidence	No Evidence
Student VII: A) Termite kings and queens stay inside their chambers. Didn't really talk about king and queens and how they have termites and stuff, so probably not that.	explaining - reference key detail	explaining/reference key details	explaining/reference key details

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
And it didn't really talk about chambers either.	No Evidence	explaining/reference key details	explaining/reference key details
B) Termite towers have large tubes to help release the heat. Maybe because sometimes that could also put in the heat.	reasoning key detail	explaining/reference key details	reasoning key detail
So if they put little holes, it could also bring out the heat.	reasoning key detail	reasoning key details	reasoning key details
But it could also put in the heat. So maybe that one.	reasoning key detail	reasoning key details	reasoning key details
C) Termite workers feed nymphs until they can find food on their own. They might put something over their skin shell, but it doesn't really talk about that. I'm just thinking that maybe.	reasoning key detail	reasoning key details	reasoning key details
D) Termite cities have passageways and tunnels to link different rooms. Probably not because I would think since it said to get water or something, making little tunnels through the holes so they don't get burned or anything. Yeah. It does that in the tunnels.	explaining - reference key detail	explaining key detail	explaining key detail

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
So I think my best answer might be--I don't know. It's kind of hard. Because I don't think it's D, but I definitely know it's not A.	evaluating key detail	evaluating key detail	evaluating key detail
And I don't think it's D because that's not the best answer.	evaluating key detail	evaluating key detail	evaluating key detail
So B, termite towers have large tubes to help release the heat. It's still going off and on.	No Evidence	No Evidence	No Evidence
Mostly since the sun goes down on the thing instead of going up, that's what makes it more hot.	reasoning key detail	reasoning key detail	reasoning key detail
			reasoning key detail
And the heat doesn't really go up as well, unless it rains and it evaporates.	reasoning key detail	reasoning key detail	reasoning key detail
C) termite works feed nymphs until they can find food on their own. I don't really know what nymphs mean.	No Evidence	No Evidence	No Evidence
Interviewer: Do you think you could figure it out from the passage?	No Evidence	No Evidence	No Evidence
Student VII: Maybe.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Should we go back and check?	No Evidence	No Evidence	No Evidence
<p>Student VII: Sure. (Silence 00:27:11-00:27:26). Yeah. It's right here. Okay. [reads from the passage] The nursery room. What happens to all those eggs? Workers move them to the nursery with the colony. After the egg hatches, workers care for the young termites, which are called nymphs. The workers feed the nymphs until the nymphs can find food on their own.</p> <p>I think it's actually this since it actually says it in the password--passage. And it says that they're whatchacallit feeds the nymphs until their old enough to go into their own, to get food and water and stuff and find their own stuff and live on their own and stuff like that. So I think it is C.</p>	<p>explaining - reference key detail</p>	<p>explaining/reference text key detail</p>	<p>explaining/reference text key detail</p>
Interviewer: All right. That's some great thinking. You worked hard on that one.	No Evidence	No Evidence	No Evidence
<p>[Item 3 - Inside a Termite Tower]</p> <p>Student VII: Which research question would best help a reader find information about the lifecycle of termites?</p> <p>A) how big is a full grown termite. It doesn't really talk about how termites--and how big they get or what full grown is and how big they can get or anything. So I don't think it's A.</p>	<p>explaining - describe research question</p>	<p>explaining/ describing research question</p>	<p>explaining/ describing research question</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>How to termite nymphs turn into adults? I don't really know because it didn't say that in the passage, so I'm just trying to go with what the passage says instead of just random questions.</p>	<p>explain - describe research question</p>	<p>explaining/ describing research question</p>	<p>explaining/ describing research question</p>
<p>Interviewer: Sure.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VII: So probably not that one.</p> <p>How do termites speak with one another? It didn't really say about that in the passage, so probably not that one.</p>	<p>explain - reference research question</p>	<p>explaining/ reference research question</p>	<p>explaining/ reference research question</p>
<p>And D) how many different kinds of termites are there?</p> <p>It didn't really say about that one either. But like I said, I kind of think--so I'm off.</p>	<p>explain - reference research question</p>	<p>explaining/reference research question</p>	<p>explaining/ reference research question</p>
<p>I think it might be A, but I don't really know because it doesn't really say in the passage or anything. So these are kind of like off and on questions.</p>	<p>explain - reference research question</p>	<p>explaining/reference research question</p>	<p>explaining/ reference research question</p>
<p>Interviewer: I hear what you're saying.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student VII: I don't really want to do A because I don't feel like it might be A.	No Evidence	No Evidence	No Evidence
Interviewer: Okay. Which one do you feel like makes the most sense?	No Evidence	No Evidence	No Evidence
Student VII: Well, C, that would just make it fiction because animals can't talk. So I know it's not C and A.	evaluate research question	analyze research question	analyze research question
So I feel like B and D, how to termite nymphs turn into adults? I don't really know, but I feel like if that would be the best of the cycle, maybe that could be it.	analyze research question	analyze research question	analyze research question
How many different kinds of termites are there? That could also be it because, if there's different kinds, they'd just make the cycle bigger and have difference.	explain - describe research question	explaining/reference research question	explain - describe research question
So that's a tough one, but I know it's not these two.	No Evidence	No Evidence	No Evidence
I kind of want to do B because, if it's how do they turn into adults, it's like going in a cycle. So it would be like egg and then baby and then how they grow up in the cycle. That's like kind of going through their whole life because it says how do you turn into them. I bet it's B. I'm going to go for B.	reasoning research question	reasoning research question	reasoning research question
Interviewer: All right. Good choice. All right. Last one.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - Inside as a Termite Tower]</p> <p>Student VII: Based on information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from the passage to support your answer.</p> <p>I would probably say, if one of them or if both of them were to die, they would probably pick one of their oldest or more worked and most—maybe the oldest, so the adult, the baby.</p>	<p>supporting positions using prior knowledge</p> <p>main idea</p>	<p>predicting</p> <p>main idea</p>	<p>drawing conclusion</p> <p>main idea</p>
<p>So they'd probably pick maybe one of those, if they were able to do that, probably. Yeah.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Interviewer: That makes sense to me.</p>	<p>No Evidence</p>	<p>No Evidence</p>	<p>No Evidence</p>
<p>Student VII: Yeah. But it could also be like maybe they'd just not have any other king or queen and maybe wait until one's born.</p>	<p>reasoning</p> <p>main idea</p>	<p>reasoning</p> <p>main idea</p>	<p>reasoning</p> <p>main idea</p>
<p>Maybe there could be another one. Since if the queen dies, does that mean no more termites can be maybe alive or something?</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>
<p>Because I think the queen only makes babies, I think. I don't even know if girl termites can have babies unless they turn into the queen. Probably that.</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>
<p>END</p>			

School District A—Grade 8 ELA (Student 1)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Fit for Life]</p> <p>Student I: Which statement best states the main idea of the selection?</p>	No evidence	No evidence	No evidence
<p>Interviewer: Mm-hmm.</p>	No evidence	No evidence	No evidence
<p>Student I: "Franklin worked to stay fit because he understood the connection between exercise and good health."</p>	No evidence	No evidence	No evidence
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student I: That could be something.</p>	No evidence	No evidence	No evidence
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student I: "Franklin took a scientific approach to exercise – to exercise that included measuring heartbeats and body heat."</p> <p>I think that's more like on the – what is it? More on this side where like telling you about like one thing.</p>	????	No evidence	No evidence
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student I: "Franklin invented swim pallets and studied swimming motions as a means of building strength."</p> <p>Okay, it's not that one because that's like only about a section of the [interruption]...</p>	<p>explain - reference</p> <p>main idea</p>	<p>explain/referencing</p> <p>main idea</p>	<p>explain/referencing</p> <p>main idea</p>
<p>Interviewer: Okay, yeah. That makes sense.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: "Franklin provided that being fit prologue..." – what does that mean?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Prolonged.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: "Prolonged life by..."</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Devising.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: ... devising a new system for counting age." Oh, my.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: [Laugh]</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: "Franklin provided that being fit prolonged life by devising a new system for counting age." Prolonged have to mean like a long life.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Mm-hmm, mm-hmm. Is there any place in the passage that you saw him talking – or that talked about counting age?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student I: [reading passage] "At 66, Franklin lived a long life. In the 1700s, the average [clearing throat] American lived only 40 years and had no understanding of the connection between exercise and good health."</p> <p>And down here, it says, "At the time of his death in 1990, Ben Franklin thought of himself as 56, not, in fact, 84."</p> <p>So, they're saying that because of the way he exercised – exercised and carried himself – he didn't think of himself as an 84-year-old. He thinks of a 56-year-old.</p>	<p>interpreting</p> <p>main idea</p>	<p>interpreting</p> <p>main idea</p>	<p>interpreting</p> <p>main idea</p>
<p>Interviewer: Okay, alright. So, would you say that's the best – states the main idea? Which one do you – which one do you want to – do you think fits the best? How are you going to decide?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: Eenie-meenie-minie-mo.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: [Laughter] I hear you. You're doing a great job.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: Okay, it's not that one. So, that's...</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay. And why do you think no?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: Because it's only about the first part and they said the main idea, which means like about the whole passage.</p>	<p>apply</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>
<p>Interviewer: Okay, okay, alright.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: So, it's not going to be that one.	No evidence	No evidence	No evidence
Interviewer: Good thinking there.	No evidence	No evidence	No evidence
Student I: [Mumbling] I think it's going to be B.	No evidence	No evidence	No evidence
Interviewer: Mm-hmm. And tell me why you think that.	No evidence	No evidence	No evidence
Student I: Because first, my teachers always told me to go with my first instinct. And also, because the top one is only about like the age. They want like the main idea.	explain - describe main idea	explaining	explaining/rational main idea
Student I: Like I get that like it's about like how you like do your age or whatever. But like they want like with the whole paragraph...	explain - rationale main idea	explaining/rational main idea	explaining/rational main idea
Interviewer: Excellent.	No evidence	No evidence	No evidence
Student I: ... I mean, what the essay is about.	No evidence	No evidence	No evidence
Interviewer: Awesome.	No evidence	No evidence	No evidence
Student I: So, I think that it's going to be B.	No evidence	No evidence	No evidence
Interviewer: Alright, that's great. That's great thinking, yup.	No evidence	No evidence	No evidence
Student I: _____ [00:18:45] try to fail.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: [Laugh] Next one.	No evidence	No evidence	No evidence
[Item 2 - Fit for Life] Student I: Which question is answered in paragraph 8? Swimming – we'll fix this. [student reads paragraph] Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor and once learned, was never forgotten. When he was in his 20s and living in New England, Ben had such success teaching a coworker to swim that he thought about opening a swimming school. So, why did Ben Franklin think about opening a swimming school? Okay, it could possibly actually be in here.	reasoning main idea	analyzing main idea	analyzing main idea
Student I: How did swimming benefit both rich and poor? Never said how it benefitted them. It just said it did.	explain - reference main idea	explaining/reference main idea	explaining/reference main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: Why did people – no, that's not it.	No evidence	No evidence	No evidence
Interviewer: Why do you say no?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: [Laugh] Because it's just why do people love swimming so much if...	No evidence	No evidence	No evidence
Interviewer: Just not related?	No evidence	No evidence	No evidence
Student I: Yeah. It said "people" and Ben is just one person.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Mm-hmm, gotcha, okay.	No evidence	No evidence	No evidence
[Item 4 - Fit for Life] Student I: When did Ben Franklin learn to swim? It never told us when he learned to swim. It just told us that he did.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay, great. Nice thinking. You've got this. You're a pro.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student I: Ben Franklin: Fit for Life is considered a biography because</p> <ul style="list-style-type: none"> - it uses someone's actual words, - it tells about a person's life, - it is written in the first person, - it teaches a lesson. <p>Okay, it's not this one because even though it teaches a lesson doesn't mean that it's a biography.</p>	<p>explain - rationale</p> <p>genre</p>	<p>explaining/rationale</p> <p>genre</p>	<p>explaining/rationale</p> <p>genre</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: It's written in first person. Okay, it could possibly be C. It's ____ [00:20:35]. 66, no, it's not.</p>	<p>evaluate</p> <p>genre</p>	<p>evaluate</p> <p>genre</p>	<p>evaluate</p> <p>genre</p>
<p>Student I: Because it would've said, "When I was 66," he would've used "I" words.</p>	<p>explain - rationale</p> <p>genre</p>	<p>explaining/rationale</p> <p>genre</p>	<p>explaining/rationale</p> <p>genre</p>
<p>Interviewer: Sure, okay, yup, okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: It tells about a person's life that uses someone's actual words.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: It tells about a person's life [interruption] so, that's the answer.	apply - prior knowledge (not a bias issue - it is part of the standards) genre	applying prior knowledge genre	applying prior knowledge genre
Student I: Because it's by someone else and she's telling about Ben Franklin's life and how he got fit.	explain - rationale genre	explaining/rationale genre	explaining/rationale genre
Interviewer: Excellent, nice work. Next. Okay.	No evidence	No evidence	No evidence
[Item 4 - Fit for Life] Student I: Summarize Ben Franklin's belief about exercise. Provide details from the passage. Want me to type it?	No evidence	No evidence	No evidence
Interviewer: No, you can just tell me.	No evidence	No evidence	No evidence
Student I: Okay. Ben Franklin believed that if you exercise, you can live a longer life because your heart is pumping more and you're like better in shape so you can carry yourself better.	drawing conclusions/inference summary	drawing conclusions/inference summary	drawing conclusions/inference summary
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: He believed that swimming was also a great way to exercise because it was good for the rich and poor and you never forgot how to do it.	explain - reference summary	explaining/reference summary	explaining/reference summary
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: He believed that when you are exercising that your heartbeat speeds up and your body temperature goes up, which is why you sweat.	explain - reference summary	explaining/reference summary	explaining/reference summary
Interviewer: Mm-hmm.	No evidence	No evidence	No evidence
Student I: And he also proved that with him exercising, he lived a longer life than the average American back in his time.	No evidence	No evidence	No evidence
Interviewer: Wow, that's great. Okay. If you're finished, you push Finish. That was really good thinking.	No evidence	No evidence	No evidence
<p>[Item 1 - Carolina Crow Girl]</p> <p>Student I: How can the reader tell that Caroline Crow Girl is realistic fiction?</p>	No evidence	No evidence	No evidence
Interviewer: Okay, what do you think?	No evidence	No evidence	No evidence
Student I: That includes an animal that relates to humans? I don't know.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: It describes events that happened in the past. No. This happened in the future. Well, present.	explain - rationale genre	explaining/rationale genre	explaining/rationale genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: It features a main character dealing with conflict.	No evidence	No evidence	No evidence
Student I: It presents factual information on specific subjects. It does not.	evaluate genre	evaluating genre	evaluating genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: It features a main character dealing with conflict	No evidence	No evidence	No evidence
Student I: and includes an animal that relates to human. I don't think a crow relates to humans. I think that's a different animal.	analyze	evaluating genre	evaluate
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: So, I think that is going to be B.	No evidence	No evidence	No evidence
Interviewer: Alright.	No evidence	No evidence	No evidence
Student I: Because her conflict was that Sephron...	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Stephan.	No evidence	No evidence	No evidence
Student I: Yeah, Stephan – I don't know if it was a girl or a boy – wanted her to let the bird go and she didn't really want to	analysis	explaining	analyze/explain - rationale
Student I: but then, she was like, "That's the right thing to do."	analysis	explaining	analyze/explain - rationale
Student I: So, she ended up letting him go and then, he came back and then, he flew off again.	explain - rationale	explaining/rationale genre	explaining/rationale genre
Interviewer: Awesome, great job.	No evidence	No evidence	No evidence
[Item 2 - Carolina Crow Girl] Student I: The main purpose of paragraph 7 is [reading to self]. - To show that Stephan has definitely – has difficulty talking to Caroline. - To explain how Caroline and Stephan acquired Crow. - To contrast Crow's world with the human world. - To emphasize the difficulties in Crow's life. All of them.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: I don't know.	No evidence	No evidence	No evidence
Interviewer: How are you going to think through it now?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: So, "acquired" means come in contact, right?	No evidence	No evidence	No evidence
Interviewer: Mm-hmm, to get.	No evidence	No evidence	No evidence
Student I: To get? Well, they didn't get him, right? They already had him.	reasoning main idea	inferencing main idea	reasoning main idea
Interviewer: Mm-hmm, okay.	No evidence	No evidence	No evidence
Student I: So, I don't think that's the answer.	No evidence	No evidence	No evidence
Student I: To show Stephan has difficulty talking to Caroline. No, she does not have – he does not have difficulty talking to her. Because he said he went too far, he didn't mean to.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay, okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student I: To contrast Crow's world with the human world.</p> <p>[reading from passage] "There is no such thing as absolute total freedom, Caroline. We all have things we can't do or won't do or aren't allowed to do." That's what he means to Caroline. He stopped then, embarrassed that he had been gone so long." But Crow belongs to an entire other world.</p> <p>Comparing and contrasting the worlds because he says it right here.</p>	<p>explaining - reference</p> <p>main idea</p>	<p>explaining/reference</p> <p>main idea</p>	<p>explaining/reference</p> <p>main idea</p>
<p>Interviewer: Okay, excellent.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: So, it has to be right.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>[Item 3 - Carolina Crow Girl]</p> <p>Student I: How is Stephan important to the plot?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I:</p> <ul style="list-style-type: none"> - He explains how Crow is different from other birds. - He helps Caroline understand what she must do. - He shows Caroline how to take care of Crow. - He prepares Crow for a different kind of life. 	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: He was trying to get her to take – to let him go so, it wasn't that one.	Analyze literary elements	analyzing lit elements	analyzing lit elements
Student I: And he didn't prepare him for anything. There's nothing to prepare him for.	Analyze literary elements	analyzing lit elements	analyzing lit elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: He explains how Crow is different from other birds. He did not.	Analyze literary elements	analyzing lit elements	analyzing lit elements
Interviewer: Okay, alright.	No evidence	No evidence	No evidence
Student I: He helps Caroline understand what she must do.	not sure there are HOTS here - student just eliminated other options using HOTS	analyzing /conclusion lit elements	analyzing /conclusion lit elements
Interviewer: Excellent.	No evidence	No evidence	No evidence
[Item 4 - Carolina Crow Girl] Student I: Identify what the crow symbolizes in the passage. Provide evidence to support your answers. Okay.	No evidence	No evidence	No evidence
Interviewer: Keep it up, you're doing a great job. You really are.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: I think that the crow symbolizes the fact that she's scared of letting go.	analysis literary elements	analyzing literary elements	analyzing literary elements
But the crow could really come back at any time. Because whenever she had let him go the first time, he came back and sat on her shoulder for the last time and took off again.	explain - reference literary elements	explaining/referencing literary elements	explaining/referencing literary elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: And I think the reason why she can't cry or laugh is because she doesn't know how to feel. Like she knows it was the right thing to let him go but she doesn't – she didn't want to let him go.	analysis literary elements	analyzing literary elements	analyzing literary elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: And so, I think the crow just symbolizes like – I don't know, I think the crow was like a special part in her life.	analysis literary elements	analyzing literary elements	analyzing literary elements
Student I: And so, just like it's like letting go of a loved one, someone dying. That's basically what letting go for her was.	analysis literary elements	analyzing literary elements	analyzing literary elements

School District A—Grade 8 ELA (Student 2)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Carolina Crow Girl]</p> <p>Student II: How can a reader tell that Carolina and Crowe girl is realistic fiction?</p>	No evidence	No evidence	No evidence
Student II: Because, I mean, people take crows in all the time, like rescues. They take them in. They help their wings, or if they like have an illness, they help that. So it's realistic fiction because that and like I'm not really sure how it's fiction but.	apply - prior knowledge	applying/ prior knowledge genre	applying/ prior knowledge genre
Interviewer: Okay, well let's look at these answer choices here.	No evidence	No evidence	No evidence
Student II: Okay. It presents factual information on a specific subject. Not really. I don't give enough facts. It doesn't give anything like, like the last one, if it gave facts in habitat, I would know about the habitat.	analyze genre	analyzing genre	analyzing genre
Interviewer: Right.	No evidence	No evidence	No evidence
Student II: And I would've chose the answer right. It views the main character is dealing with conflict. Yes, it does, but well we're going to leave that as the answer.	No evidence	No evidence	No evidence
Interviewer: Okay yep.	No evidence	No evidence	No evidence
Student II: It describes the events that happened in the past. No.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Why not?	No evidence	No evidence	No evidence
Student II: Because it's happening now. They're letting him go now and it's not going back in past.	explain - rationale genre	explaining/rationale genre	explaining/rationale genre
Interviewer: All right.	No evidence	No evidence	No evidence
Student II: It includes an animal that relates to humans. Not really.	No evidence	No evidence	No evidence
Interviewer: Why?	No evidence	No evidence	No evidence
Student II: Because it includes the animal that relates to humans. No, it's a Pidgin. It would be different if it was like a monkey or something like that but no.	supporting positions using prior knowledge	supporting with prior knowledge/explaining - rationale	supporting with prior knowledge/explaining - rationale
Interviewer: All right.	No evidence	No evidence	No evidence
Student II: It features a main character dealing with conflict.	No evidence	No evidence	No evidence
Interviewer: Okay, awesome. Good thinking.	No evidence	No evidence	No evidence
Student II: Does it happen in the past? No, so B is my final answer.	evaluate genre	evaluating genre	evaluating genre

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: All right, good, next.	No evidence	No evidence	No evidence
[Item 2 - Carolina Crow Girl] Student II: The main purpose of paragraph seven is? Well, I'm going to scroll down to paragraph seven to re-read it.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: There's no such thing as absolute total freedom Carolina. We all have things we can't do or won't do or aren't allowed to do. That's what it means to grow up. He stopped being embarrassed that he had gone on so long, but crow belongs to an entire other world and it's time to let him go there. So that was really about how she wasn't trying to let him go and that he belongs to another, like he don't belong with us. He belong with his peoples.	interpreting	interpreting	interpreting
Student II: The main purpose of paragraph seven is to emphasize the difficulties in crow's life. Not really.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: To contrast crow's world with the human world. I'm not sure.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: To explain how Carolina and Stephan acquire crow. No, not at all, not at all.	evaluate main idea	evaluating main idea	evaluating main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: To show that Stephan has difficulty talking to Carolina. No and no.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: There is no such thing as absolute total freedom. There's a lot of things we can't do. See I didn't pick this one because there's no difficulties on here.	explain - describe main idea	explaining/ describing how main idea	explaining/ describing how main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: It didn't show how he got rescued. It didn't show his wing was broke. It didn't show none of that. So the best answer would be to contrast crow's world with the human world.	analyze main idea	analyzing main idea	analyzing main idea
Interviewer: Nice, okay, great job. Nice thinking.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - Carolina Crow Girl]</p> <p>Student II: How is the following important to the plot?</p> <p>Stephan is important to the plot. He convinced her to let crow go because you don't need to hold on to a bird for that long. It's healed. He's ready to go.</p>	<p>interpreting</p> <p>literary elements</p>	<p>interpreting</p> <p>literary elements</p>	<p>interpreting</p> <p>literary elements</p>
Interviewer: Okay.	No evidence	No evidence	No evidence
<p>Student II: He prepares crow for a different kind of life.</p> <p>No because it's really Carolina doing all the work, but Stephan is there to help Carolina out because you know.</p>	<p>analyze</p> <p>literary elements</p>	<p>analyzing</p> <p>literary elements</p>	<p>analyzing</p> <p>literary elements</p>
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: A crow is different from other birds. Yes.	No evidence	No evidence	No evidence
Interviewer: Okay, tell me why.	No evidence	No evidence	No evidence
<p>Student II: Just because he's pushing her constantly, like telling her to let it go. He deserves to another world. He does not belong here and Stephan said he should be released Carolina. His tail feathers are all grown in, just think about it. She said, you don't know. So he's pushing here.</p>	<p>interpreting</p> <p>explain - reference</p> <p>literary elements</p>	<p>interpreting</p> <p>literary elements</p>	<p>interpreting</p> <p>literary elements</p>
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: He explains how crow is different from other birds. No, not at all.	evaluate literary elements	evaluating literary elements	evaluating literary elements
Student II: He shows Carolina how to take care of the crow. No. I'm pretty sure Carolina already know how to take care of him because she's the one with the most bond, so he helps Carolina.	explain - describe literary elements	explaining/describe literary elements	explaining/describe literary elements
Interviewer: Awesome.	No evidence	No evidence	No evidence
<p>[Item 4 - Carolina Crow Girl]</p> <p>Student II: Identify what the crow symbolized in the passage. Provide evidence from the passage to support your answer.</p> <p>Okay, identify what the crow symbolized in the passage. Like the last one, realistic fiction, it symbolizes attachment because she's attached to crow.</p>	drawing conclusions literary elements	drawing conclusions literary elements	drawing conclusions literary elements
Carolina is attached to crow, so crow has to be like an attachment or something and to let go like a piece or like a symbol or something like that so.	drawing conclusions literary elements	drawing conclusions literary elements	drawing conclusions literary elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay, awesome. So you can click finish. That was really great thinking. Okay turn in, turn in, okay one more. You're doing a great job. All right, so then same kind of thing, just read the passage and we'll talk the questions together.	No evidence	No evidence	No evidence
[Item 1 - Fit for Life] Student II: Which statement best states the main idea of this selection. That's pretty, well me looking at it, there's a whole bunch of main ideas, but we'll go over the first one.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: Franklin provided proof that being fit prolonged life by devising a new system for counting age. This is what this must be about. It was about this and this. Actually, they're all about really keeping fit, exercising and inventing and swimming with success.	drawing conclusions-inferencing main idea	drawing conclusions main idea	drawing conclusions main idea
Student II: That's about you got to be fit to swim, so I'm just going to keep that.	analyze main idea	analyzing main idea	analyzing main idea
Student II: Franklin invented swim palace and studies from emotions as a means of building strength. Okay, that was, but that was just a fact. That's not really an opinion. I mean not really a main idea.	analyze main idea	analyzing main idea	analyzing main idea
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student II: So we're going to X that one.</p> <p>Franklin took a scientific approach to exercise that included measuring heartbeats and body heat.</p>	No evidence	No evidence	No evidence
<p>Student II: Okay, he did do that, but that was only one. Most of these talk about keeping fit and exercising and inventing swimming with success all about the first one.</p>	analyze main idea	analyzing main idea	analyzing main idea
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student II: This one was only in paragraph one or this one keeping fit, so I'm going to X that one out. That's not even the main idea.</p>	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student II: Franklin worked to stay fit because he understood the connection between exercise and good health.</p> <p>Okay, these two are good, so I'm going to re-read it.</p> <p>Franklin proved that being fit prolonged life by devising a new system for counting.</p>	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: Oh, what am I doing? No, this is not it because this one down here is about by devising a new system. This is when he made that new system for counting, so that's not it	analyze main idea	analyzing main idea	analyzing main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: Oh my gosh, I don't know how I didn't get that.	No evidence	No evidence	No evidence
Interviewer: That's okay.	No evidence	No evidence	No evidence
Student II: Franklin worked to stay fit because he understood the connection between exercise. That one's it.	No evidence	No evidence	No evidence
Interviewer: All right, awesome, good job.	No evidence	No evidence	No evidence
<p>[Item 2 - Fit for Life] Student II: Which question is the answer in paragraph eight?</p> <p>Hold on, let me go back, [student reads paragraph 8]</p> <p>swimming with success. Ben loves swimming and thought everyone should learn. It was a skill that could benefit both rich and poor and, once learned, was never forgotten. When he was in his 20s and living in England, Ben had such success teaching a coworker to swim that he thought about opening a swimming school.</p>	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: Okay so when did Ben Franklin learn to swim. No, that's not it because if we go back and re-read it that's not it because he's teaching him how much swimming benefits you.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Right.	No evidence	No evidence	No evidence
Student II: And like how fun it is how Ben loved it. It's not teaching him how Ben learned.	No evidence	No evidence	No evidence
Student II: Do people love swimming so much? No, that's not it because that's an opinion. You can't answer that. That's an opinion.	apply main idea	evaluating main idea	apply then evaluate main idea
Student II: How does swimming benefit both the rich and poor. Not really.	No evidence	No evidence	No evidence
Student II: Why did Ben Franklin open a swimming pool? Hold on. I kind of got lost.	No evidence	No evidence	No evidence
Interviewer: You're good.	No evidence	No evidence	No evidence
Student II: [air] How does swimming benefit both the rich and poor. No, not really. [air] So from all of these answers, the most sensible one will be D.	evaluate main idea	evaluating main idea	evaluating main idea
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: Because I mean, if you go back, when did Ben Franklin learn to swim. There's no...this did not...he's 20. He didn't learn how to swim when he was 20 and it says Ben loves swimming, so that's not it.	analyze main idea	analyzing main idea	analyzing main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: And why do people love swimming so much? It's only talking about Ben and how rich and poor. It's not talking about anybody else except for the coworkers.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: How does swimming benefit both the rich and poor. All right, so I re-read that one and it said it was a skill that could benefit both rich and poor and once learned was never forgotten. So it wasn't really going into detail how it benefits the rich and poor, so the most sensible one would be D.	analyze main idea	analyzing main idea	analyzing main idea
Interviewer: All right, nice.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - Fit for Life]</p> <p>Student II: Ben Franklin Fit for Life was considered a biography</p> <ul style="list-style-type: none"> - he was someone actual words, - it talks about a person's life, - it is written in first person, - it teaches a lesson. <p>That's not written in first person.</p>	No evidence	No evidence	No evidence
	No evidence	No evidence	No evidence
Interviewer: Okay, how do you know?	No evidence	No evidence	No evidence
<p>Student II: Because the older man rests the fingers of one hand on opposite wrist. His lips move silently counting as he looked at his watch, 60 heartbeats in a minute. It says his. If it was in first person, it would be I.</p>	<p>apply - prior knowledge (from other standards)</p> <p>genre</p>	<p>applying prior knowledge</p> <p>genre</p>	<p>applying prior knowledge</p> <p>genre</p>
Interviewer: Gotcha.	No evidence	No evidence	No evidence
<p>Student II: And it also says the older man. It would be like I rested my fingers of however that goes.</p>	<p>apply - prior knowledge (from other standards)</p> <p>genre</p>	<p>applying prior knowledge</p> <p>genre</p>	<p>applying prior knowledge</p> <p>genre</p>
Interviewer: Yeah, yeah, yeah. I'm with you.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: It teaches a lesson. No, that's not what a biography is. I'm pretty sure if it teaches a lesson that's a moral.	apply - prior knowledge (from other standards) genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: It tells about a person's life. It does. That's sensible. It uses some factual words. I mean, yeah, but it's not telling about their life. A biography is telling about the life. Autobiography is telling about their self.	apply - prior knowledge (from other standards) genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: So if it was in first person it would be autobiography, but it's not.	apply - prior knowledge (from other standards) genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: Okay, excellent.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognition Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - Fit for Life]</p> <p>Student II: Tell me why Ben Franklin believes about exercise. Provide supporting details from the passage.</p> <p>All right, so he thinks that exercise is needed because, if you go back, he was telling them about his...it was talking about like it said Ben Franklin had lived a long life and in the 1700s the average American lived only 40 years and had no understanding between the connection of exercise and good health.</p>	<p>drawing conclusions/inference</p> <p>summary</p>	<p>inferencing drawing conclusion</p> <p>summary</p>	<p>inferencing drawing conclusion</p> <p>summary</p>
<p>Student II: So Ben Franklin worked out and worked out, and it says that he once sent his son Matthew a letter. And since he sent that letter he was talking about how like if it was raining outside you could run up the stairs and exercise is important and how you need to just keep on exercising and exercising. And how one mile is riding a horseback and then five in the coach and it keeps on talking about it. It keeps on talking about keeping fit. And, if you go down, it says exercising is inventing. When he was younger did like more strenuous exercises. As a boy, he lived in the seaside city of Boston where he learned early to swim well and to manage both in order to improve his swimming speed he conducted an experiment. Well, this is really talking about how he conducted the experiment, so that was really it. The first one was really it about how today's fitness experts use the word cardiovascular, heart and blood vessels to describe the kind of exercise recommended for people of all ages so</p>	<p>explain - reference</p> <p>summary</p>	<p>explaining/reference</p> <p>summary</p>	<p>explaining/reference</p> <p>summary</p>

School District A—Grade 8 ELA (Student 3)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Fit for Life]</p> <p>Student III: Which statement best states the main idea of this selection?</p> <p>Franklin provided that being fit prolonged life by devising a new system for counting age—no, did not—no, actually. No. No.</p>	No evidence	No evidence	No evidence
Interviewer: Why not?	No evidence	No evidence	No evidence
Student III: Because, he is the—he counted his age backwards.	explain - reference main idea	explaining/refer main idea	explaining/refer main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Exercising throughout your life would not make you count your age backwards.	draw conclusions main idea	predicting main idea	reasoning main idea
Interviewer: Sure. Okay.	No evidence	No evidence	No evidence
Student III: So.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Franklin being—_____ [00:14:31] swim paddles and studied swimming of oceans as a means of building strength. Uh. I will think about that.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Franklin took a scientific approach to exercise. That included measuring heart beats and body heat.	No evidence	No evidence	No evidence
Interviewer: Yeah.	No evidence	No evidence	No evidence
Student III: Franklin would stay fit, because he understood the connection between exercise and good health. So. I do not—it would not be that, because him inventing that would not build strength—would not build strength as much as him just swimming regularly.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Then, this would just be him—would just be telling us that he, uh—it was just his—his scientific solution to doing that.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Mm-hm.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: But, I think the main idea is Franklin worked to stay fit because he understood the connection between good health—exercise and good health.	No evidence	No evidence	No evidence
Interviewer: Okay. Awesome.	No evidence	No evidence	No evidence
[Item 2 - Fit for Life] Student III: Which paragraph is the answer to ____ [00:15:39] Paragraph 8? Uh... Would it not be—would not be A, because it does not answer that	explain - rationale main idea	explaining/ rationale main idea	explaining/ rationale main idea
Interviewer: Mm-kay.	No evidence	No evidence	No evidence
Student III: Then, why did people love swimming so much? Not many people knew how to swim back then.	explain - rationale main idea	explaining/ rationale main idea	explaining/ rationale main idea
Interviewer: Mm-kay.	No evidence	No evidence	No evidence
Student III: How did swimming benefit both the rich and poor? Uh, it would not... I cannot—when you say benefit them once learned,	No evidence	No evidence	No evidence
Student III: but this whole paragraph states why he was thinking about opening up a swimming school.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. Awesome. That is good thinking.	No evidence	No evidence	No evidence
[Item 3 - Fit for Life]	analyze	analyzing	analyzing
Student III: Consider it a biography, because uh... Does not use actual words.	genre	genre	genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: From him. Uh, does not really tell about his life.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Actually... It tells about his late life.	analyze genre	analyzing genre	analyzing genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Not his entire life, really.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: I will think about that.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: It is written in first-person. It is not written in first-person.	apply - prior knowledge from standards genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: How do you know?	No evidence	No evidence	No evidence
Student III: Because, it states in a third-person—saying Ben Franklin and things like that.	apply - prior knowledge from standards genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: States it third-person view.	No evidence	No evidence	No evidence
Interviewer: Okay. [Loud tone.]	No evidence	No evidence	No evidence
Student III: It teaches a lesson and it teaches you about exercise, but it does not really teach you an actual lesson.	analyze genre	analyzing genre	analyzing genre
Interviewer: Okay. That makes sense.	No evidence	No evidence	No evidence
Student III: So, it would be about his—it would be about his late life.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay.	No evidence	No evidence	No evidence
[Item 4 - Fit for Life] Student III: His late belief about exercise. His belief about exercise was that he—exercising more often would help you live a longer lifespan.	reasoning - main idea	reasoning main idea	reasoning main idea
Interviewer: Mm-hm.	No evidence	No evidence	No evidence
Student III: If you started exercising, you would have more of a lifespan, like he did, since usually back then people would live to their 40s.	explain - reference summary	inferencing predicting	explain - reference summary
Interviewer: Right.	No evidence	No evidence	No evidence
[Item 1 - Carolina Crow Girl] Student III: How can we tell the reader—how can the reader tell that Caroline Crow Girl is realistic fiction?	No evidence	No evidence	No evidence
Interviewer: Mm-kay.	No evidence	No evidence	No evidence
Student III: It presents factual information on a specific subject. I will think about that.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: It features a main character dealing with a conflict most stories do, really.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: So, it is not really that.	explain - rationale genre	explaining/rationale genre	explaining/rationale genre
Interviewer: Okay	No evidence	No evidence	No evidence
Student III: It describes events that happened in the past. Nope. Because that would be an historical fiction.	apply prior knowledge from std. Genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: It includes an animal that relates to humans. Well, the crow really is not in relations to a humans. Like, it is not a cousin really, like, the chimpanzee or monkeys.	apply prior knowledge - outside genre	applying prior knowledge genre	applying prior knowledge genre
Interviewer: Mm-hm.	No evidence	No evidence	No evidence
Student III: So, it would not really be that, so it would be "presents factual information on a specific subject".	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Mm-hm.	No evidence	No evidence	No evidence
[Item 2 - Carolina Crow Girl] Student III: What is the main purpose of Paragraph 7? Uh. Uh, to emphasize the difficulties in Crow's life? No, not really. Does not really state that.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: To contrast Crow's world with the human world? Maybe.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: To explain how Caroline acquired crow No.	evaluate main idea	evaluating main idea	evaluating main idea
Interviewer: How do you know?	No evidence	No evidence	No evidence
Student III: Because, it never really tells us how they got Crow.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Anywhere in the story.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: So, it really does not tell how they got Crow.	No evidence	No evidence	No evidence
Interviewer: Mm-hm.	No evidence	No evidence	No evidence
Student III: To show how—that Stephan has to—no. He does not have difficulty to talk to him—talk to her, so.	draw conclusions main idea	explaining/rationale main idea	explaining/rationale or reference main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: It would be B.	No evidence	No evidence	No evidence
[Item 3 - Carolina Crow Girl] Student III: How is Stephan important to the plot? - He prepares Crow for a different kind of life? No. He really does not. It is Crow's natural instincts that help.	draw conclusions literary elements	draws conclusion literary elements	draws conclusion literary elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Uh, he shows Caroline how to take care of Crow. Nowhere in the story he helps.	explain - reference literary elements	explaining/refer literary elements	explaining/refer literary elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: That—he helps Caroline to understand what she must do. Maybe.	No evidence	No evidence	No evidence
Student III: He explained how Crow is different from—Crow really is not different from other birds, he is just a different species of bird.	analyzing to draw conclusion literary elements	analyzing to draw conclusion literary elements	analyzing to draw conclusion literary elements
<p>[Item 4 - Carolina Crow Girl]</p> <p>Student III: Identify how Crow—Identify what the crow symbolizes in passage. Provide evidence from the passage to support your answer. What Crow symbolizes. Huh.</p>	No evidence	No evidence	No evidence
Interviewer: Mm-hm.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Crow symbolizes like a different world.	draw conclusions literary elements	draw conclusions literary elements	draw conclusions literary elements
Interviewer: Mm-hm.	No evidence	No evidence	No evidence
Student III: Compared to the human world, because most humans have to grow up and get a job where crows and different types of birds, once they grow up they are free to what they want to do, which their instincts tell them to fly around, to uh, what is the word? Not hibernate, but uh—	reasoning literary elements	reasoning literary elements	reasoning literary elements
Interviewer: Habitat?	No evidence	No evidence	No evidence
Student III: No, not habitat.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: It is uh... I forgot the word.	No evidence	No evidence	No evidence
Interviewer: That is okay. Keep going. You are doing great.	No evidence	No evidence	No evidence
Student III: But it—but, he has a choice to what he wants to do for the rest of his life after he grows up, but humans have to get up, go to a job, then have a family and stuff if they want to live that happy life.	draw conclusions literary elements	draw conclusions literary elements	draw conclusions literary elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Mm-hm.	No evidence	No evidence	No evidence
Student III: But Crow, him and his—and all birds have a choice to what they do.	No evidence	No evidence	No evidence
END			

School District A—Grade 8 ELA (Student 4)

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Fit for Life]</p> <p>Student IV: So, which statement best states the main idea of this selection? Franklin proved that being fit prolonged the life by devising a new system for counting age.</p> <p>Well, it does suggest that in this letter to his son. I don't think he recalled it to everybody, but he might've.</p>	<p>analyze</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>
Interviewer: Okay.	No evidence	No evidence	No evidence
<p>Student IV: Franklin invented swim pallets and studied swimming motions as a mean of building strength.</p> <p>That was a part of it, but it wasn't the main idea of the passage</p>	<p>analyze</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student IV: Franklin took a scientific approach to exercise that included measuring heartbeats and body heat.</p> <p>That could be one, because he did measure and suggest and stuff.</p>	<p>explain - rationale</p> <p>main idea</p>	<p>explaining/rationale</p> <p>main idea</p>	<p>explaining/rationale</p> <p>main idea</p>
<p>Student IV: Franklin worked to stay fit, because he understood the connection between exercise and good health.</p> <p>Well, he did understand the connection, but I don't think he worked to stay fit.</p>	<p>analyze</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>	<p>analyzing</p> <p>main idea</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student IV: So, I don't think it's A or B, because it doesn't really give a main idea of the passage. It gives ideas, just not the main part.</p>	<p>explain - rationale</p> <p>main idea</p>	<p>explaining/rationale</p> <p>main idea</p>	<p>explaining/rationale</p> <p>main idea</p>
<p>Student IV: So, what I'm suggesting it could be C or D, because they both give a main idea in the passage. It just depends on the wording of it. So, certain words would be able to give the main idea.</p>	<p>explain - rationale</p> <p>main idea</p>	<p>explaining/rationale</p> <p>main idea</p>	<p>explaining/rationale</p> <p>main idea</p>
<p>Interviewer: So, you just read through them then, or to decide or...</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student IV: I would have to look at the words and figure out...</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student IV: ...which one would be able to. I think it was the understood connection, because he did do that.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay. Awesome.	No evidence	No evidence	No evidence
[Item 2 - Fit for Life] Student IV: Which question is answered in paragraph eight? I'd have to go back to paragraph eight and reread it to...	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: ...figure it out. The question that was answered doesn't really state a question, but I could infer from the questions.	No evidence	No evidence	No evidence
Student IV: So, A, when did Ben Franklin learn to swim? It didn't exactly say that, but pretty sure it was because of children.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: Because, it does say that in another paragraph.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student IV: B, why do people love swimming so much? It doesn't really talk about that, it just talks about how we can benefit.	justify main idea	explaining/referencing main idea	explain - rationale main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: So, I'm going to get rid of that answer.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: How did swimming benefit both the rich and the poor? It does mention both the rich and the poor and it says that it should be a skill once learned and never forgotten. But it doesn't say exactly how it could benefit them.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: So, I'm going to eliminate that answer.	No evidence	No evidence	No evidence
Interviewer: Keep going. You're doing great.	No evidence	No evidence	No evidence
Student IV: Why did Ben Franklin think about opening a swimming school? He did think about that, but I'm, but reading from it, it's, talks about him saying that everyone should benefit from learning it.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
So, it could be. I don't think it's Ben Franklin learned to swim, because it didn't really talk about that. Just talked about the benefits. So, I'm going to go with D, because it seems most likely.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea

School District A—Grade 8 ELA (Student 5)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Fit for Life]</p> <p>Student V: Which statement best states the main idea of the section or selection?</p>	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: Improve. I think they...it is not that one.	No evidence	No evidence	No evidence
Interviewer: Why not?	No evidence	No evidence	No evidence
Student V: Because he did not make a new system for counting it.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: That was like the main idea. It was just _____ [00:14:18].	No evidence	No evidence	No evidence
Interviewer: Okay, good thinking. That makes sense. Okay, tell me why you think that.	No evidence	No evidence	No evidence
Student V: It is because the whole thing. Wait. Yeah, this one.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: Because the whole thing he was going through a scientific thing like swim paddles for the exercise and stuff.	explain - rationale main idea	explaining/rationale main idea	explaining/rationale main idea
Interviewer: Okay. Okay, then you would click next. Great. Good job. Keep going. What are you thinking?	No evidence	No evidence	No evidence
[Item 2 - Fit for Life] Student V: I think it is this one.	No evidence	No evidence	No evidence
Interviewer: Tell me why you picked that one.	No evidence	No evidence	No evidence
Student V: It is because he loved swimming, and he thought everyone should learn. He taught a coworker.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Interviewer: Okay, so you thought that was the best one. Did any of the other ones seem interesting or make you think twice? Did you just know right away?	No evidence	No evidence	No evidence
Student V: I am pretty sure it was this one. I went through all those.	No evidence	No evidence	No evidence
Interviewer: All right. Okay good. Next. Okay, and tell me why you picked that one.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 3 - Fit for Life]			
Student V: Because it talks about the person's life here.	apply genre	applying genre	applying genre
Interviewer: Okay. How does that answer the question? How? What is the question asking you about?	No evidence	No evidence	No evidence
Student V: It is considered a biography because. (student is pointing to the key)	No evidence	No evidence	No evidence
Interviewer: Okay, so biographies are books or passages that tell about people. That is what you are thinking.	No evidence	No evidence	No evidence
Student V: Yes.	No evidence	No evidence	No evidence
[Item 4 - Fit for Life]			
Student V: Provide supporting details from the passage. He believes that exercise will make disease – will make you not get a disease.	Draw conclusions summary	analyze/draw conclusions summary	analyze/draw conclusions summary
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: It will help you live longer.	Draw conclusions summary	analyze/draw conclusions summary	analyze/draw conclusions summary

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. Was there evidence in the passage that you could show me that helped you know that?	No evidence	No evidence	No evidence
Student V: He lived longer. Right here.	explain - reference summary	explain - reference summary	explain - reference summary
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: At 66, Franklin had lived a long life. In the 1700s, the average American lived only 40 years.	explain - reference summary	explain - reference summary	explain - reference summary
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: He lived longer than average people.	explain - reference summary	explain - reference summary	explain - reference summary
<p>[Item 1 - Carolina Crow Girl]</p> <p>Student V: How can the reader tell that Carolina Crow Girl is realistic fiction? [air]</p>	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: I don't see anything about this being the past, this whole thing. It's not this one.	analyze genre	analyze genre	analyze genre
Student V: I don't think it's this one because...I'll come back to that one.	analyze genre	analyze genre	analyze genre
Student V: It features a main character dealing with conflict. Okay, this one.	analyze genre	analyze genre	analyze genre
Student V: I remember that any story _____ [00:04:13] the realistic fiction _____ [00:04:28] that's not realistic. Every story _____ [00:04:31] that.	apply genre	apply genre	apply prior knowledge from standards genre
Student V: _____ [00:04:34] It wouldn't be B because there's actual information why she let the crow go.	analyze main idea	evaluate main idea	evaluate main idea
Interviewer: Okay.	No evidence	No evidence	No evidence
[Item 2 - Carolina Crow Girl] Student V: The main purpose of paragraph seven is. [air] I don't see that they acquired Crow in this one, so I can take that off. Take that one off.	explain - rationale main idea	explain - rationale main idea	explain - rationale main idea

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: Because he did not have any difficulty telling her that.	analyze main idea	explain - rationale main idea	explain - rationale main idea
Interviewer: Oh.	No evidence	No evidence	No evidence
Student V: I think this one because it said Crow belongs to an entire other world.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: He's the one who told her to let the Crow go.	No evidence	No evidence	No evidence
[Item 4 - Carolina Crow Girl] Student V: What the crow symbolizes in the passage. Provide evidence from the passage to support your answer. Paragraph seven: "There's no such thing as absolute total freedom." ____ [00:07:29] [air] ____ [00:07:52].	No evidence	No evidence	No evidence

School District B—Grade 5 ELA (Student 1)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Inside a Termite Tower] Student I: Which sentence from the passage best supports the idea that towers help termites survive? _____ [00:17:02 to 00:17:06] which sentence of the passage best supports the idea that towers help termites survive?</p>	Item is asking for students to analyze choices to identify a correct key detail that supports a given main idea.	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: It is not this one because it does not really matter about the size because they live underground.	analyzing/explaining key detail	analyzing key detail	analyzing key detail
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: Inside the mounds are large hollow tubes, those do help it because they need to stay away from the sun because most of them have thin skin and those act like chimneys to get outside air.	explaining because it is explicit in the passage (para 7) key detail	explaining key detail	explaining key detail
Interviewer: Okay.	No evidence	No evidence	No evidence
Student I: Air flows into those to chase away heat.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: So, this termite almost stays inside their tubes and tunnels. It is saying this one does not describe how it helps them though.	explaining key detail	explaining key detail	explaining key detail
Student I: This one it just says air flows and carries away heat.	No evidence	No evidence	No evidence
Student I: This is what this one says too. But this does not really describe where that was, how that helps it. It does not explain how there are tubes and then that is where this comes in.	analyzing/explaining key detail	explaining key detail	explaining key detail
Student I: So, I would say it is probably this one. ____ [00:18:17 to ____ [00:18:34].	No evidence	No evidence	No evidence
<p>[Item 2 - Inside a Termite Tower] Student I: Which detail best supports the idea the termites help one another. -Termite king and queen stay inside their chambers. -Termite towers have large tubes to help release heat. -Termite workers feed nymphs until they can find food on their own. -Termite cities have passageways and tunnels to link different rooms.</p>	Item is asking for students to analyze choices to identify a correct key detail that supports a given main idea.	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: I think it is this one because it says which detail best supports the ideas how they help one another. It is like the termites help the babies until they are grown and then the grown ups have babies which is just generating, but really just the queen	explaining key detail	explaining key detail	explaining key detail
Student I: but it shows that they are making more workers which are helping each other which is helping then the queen might last longer,	reasoning key detail	reasoning key detail	reasoning key detail
Student I: the king and then when they have babies and then those two die then the next two babies, I do not really know are the new queens and then they just get another chamber, en making another change which then helps the queen make more stuff. Because they said we wanted workers and then there would be more food	reasoning key detail	reasoning key detail	reasoning key detail
Interviewer: Oh.	No evidence	No evidence	No evidence
Student I: It seems probably this one. Because those yeah, they make to help each other but it does not really describe what the passageways do or anything.	explaining key detail	explaining key detail	explaining key detail
Student I: That one the termites have large tubes that will release heat. That would help each other but this one helps them more.	reasoning key detail	explaining key detail	analyzing key detail

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: Yeah, they stay inside the chamber which does not describe how they help anyone.	No evidence	No evidence	explain - rationale key detail
Interviewer: Good. _____ [00:20:12 to 00:20:17]	No evidence	No evidence	No evidence
<p>[Item 3 - Inside a Termite Tower]</p> <p>Student I: Which research questions would best help a reader find information about the life cycle of termites? - How big is a full-grown termite? -How do nymphs turn into adults? -How do termites speak to one another? - How many different kinds of termites are there?</p>	Student is being asked to evaluate research questions to determine which best supports a topic	No evidence	No evidence
Student I: It was not this does not really help anyone because it just says different types. It does not tell them about the cycle or yeah cycle of termites.	analyzing viable research question	analyzing research question	analyzing research question
Student I: How the termites speak to each other it does not even say that in the passage. Really do you need that like, probably like ants they like touch antennae's or something?(reason)	analyzing research question	analyzing research question	analyzing research question
Student I: Really do you need that like, probably like ants they like touch antennae's or something?(reason)	reasoning Viable research question	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Good.	No evidence	No evidence	No evidence
Student I: How big is a full-grown termite? Well does that tell anything about how termites live? No.	analyzing Viable research question	analyzing research question	analyzing research question
Student I: How do termites turn into adults? Well that tells how the babies turn into adults, which then those have babies which turn into adults which is the cycle. This one. Next.	reasoning Viable research question	reasoning research question	reasoning research question
[Item 4 - Inside a Termite Tower] Student I: Based on the information in the passage, explain what would most likely happen to the termite colony if the king or queen were to die. Provide details in your answer. Okay. Do I have to type or do I have to talk?	Student is being asked to draw a conclusion based on implicit and explicit information	No evidence	No evidence
Interviewer: No, you can talk.	No evidence	No evidence	No evidence
Student I: Then they would get the baby from like the honeycomb thing _____ [00:21:54 to 00:22:00] move into the nursery within the colony after the eggs hatch workers carry the young termites. So, they have like eggs so then probably the first two that hatch next are a boy and a girl are probably like the new king and they all take care of them and then when they are adults then they would probably lay babies and stuff, eggs. And then just go on from there and then when those two die there would be eggs and then there are sure they would take. So that would also be a cycle.	drawing conclusions/inferencing main idea	inferencing/drawing conclusions main idea	inferencing/drawing conclusions main idea
Interviewer: Turn in.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student I: _____ [00:22:39 to 00:23:00]. In an ideal world because it would be _____ [00:23:04] for homework is to collect sounds _____ [00:23:08] shaped like a giant ear _____ [00:23:15 to 00:23:21]. Later Jacob glared out the school bus window. Not fair, he thought. How could he collect enough sounds on the family's farm? There were plenty of noises in the town. If only he lived where tires squealed and sirens wailed. Jacob scrambled off the bus and screeched to a stop at his mailbox. But he was not in the mood to wait as it drove away. When he threw open the gate it groaned like a stubborn mule. That was how he felt about his homework. On the porch Jacob knelt-knelt beside the kittens, curled up on the rug. They sounded like tiny-tiny motors when they purred. I'm home. Jacob called. He thumped his book bag down on a kitchen chair. The rocker in the nursery stopped creaking. How was school? His mother asked walking in with his baby brother on the shoulder, on her shoulder. She was petting his little back. I've got homework Jacob grumbled. The baby burped and Jacob laughed. That's what I think about it too. Have a snack before you do your chores his mother said. She took the animal crackers down from the cupboard. Jacob rattled the carton, not many left. He crunched-crunched two tigers, three lions and a seal the gulped down with some milk. If only animal crackers were real, he would have plenty of noises to list.</p> <p>Goldie, Jacobs's collie, woofed as Jacob walked toward the barn. Her puppies were yipping in a straw filled stall. Jacob plinked dog food pellets into their pan and the pups sniffed and crunched. In the chicken house, Jacob shooed two crackling hens from their nest. He slipped the warm eggs into his jacket. Wouldn't it be funny if he forgot about the eggs and they hatched? He'd have about a peeping pocket. In the corral a black cow napped in the sun. Jacob woke her when he poured corn into her pan. Moo, thank you she seemed to say. Tap, clatter and clink, dad drove the tractor into the yard. The lid on the tractor's smokestack rattled when he chuffed and chugged-chugged to a stop. How was school? Dad asked stepping down from the cab. Jacob shrugged okay, I guess. He said I have some homework. Jacob put eggs, these eggs, the eggs in the kitchen then climbed to his treehouse.</p> <p>He could not see dad's beehives by the hay fields. Six hives usually meant plenty of humming-humming. But okay he couldn't hear it over the scolding of the blue jays and the chattering of the sparrows. How could a person think? Quiet Jacob shouted. Suddenly he sat up straight. Cows moored and puppies yipped. Chickens crackled in the yard. When Goldie bean barking below, Jacob grinned. There were</p>	<p>reading the passage</p>	<p>repeating the passage text</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
plenty of noises on the farm. I hear you he called. He hurried down from the tree house. He had an earful of homework to do.			
Interviewer: Yes.	No evidence	No evidence	No evidence
<p>[Item 1 - An Earful]</p> <p>Student I: It takes so much. _____ [00:28:16 to 00:28:20] Which pass...which was the best summary of Jacob's problem in the passage? - He is unhappy living out in the country on a farm. He wishes he could live in the city instead. That is a possibility.</p>	No evidence	No evidence	No evidence
Student I: -He has to collect sounds for a homework assignment. He thinks that will be difficult on a farm. That is 99% true, it is going to be _____ [00:28:48].	No evidence	No evidence	No evidence
Student I: -He is unable to get his homework done after school, the animals on the farm where he lives are too noisy. Not this because he needs sounds.	explaining summary	explaining summary	explaining summary
Student I: - He has to do some homework after school, but he has too many chores. There is not enough time to get everything done. That is not true. This he is unhappy and he wishes he could live in the city but it is not the summary,. This would be more of a summary.	explaining summary	explaining summary	explaining summary
Interviewer: Uh-huh.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 2 - An Earful] Student I: An earful is narrated from which point of view? Oh _____ [00:29:31 to 00:29:49]. It says his name so it has to be third person, I am pretty sure. It is like you're, Jacob. But what if it is first person. Have a snack before...I am pretty sure it is this because it tells everyone what they say but it does tell them what they think so. Wait but that is a special kind of third person that is like a special type of third person.</p>	<p>analyzing point of view</p>	<p>analyzing pov</p>	<p>analyzing pov</p>
<p>Interviewer: Uh-huh.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>[Item 3 - An Earful] Student I: I know what it is called. A reader can tell that this passage is fiction because; - gives details about farm animals; - shows events in order through time; - happens on a farm and not in a big city; - uses characters who are not real people.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student I: Well D is this one because it gives you...shows events through time which was in non-fiction it happens on a farm and not in a big city.</p>	<p>reasoning genres</p>	<p>explaining/rationale genres</p>	<p>explaining/rationale genres</p>
<p>Student I: My friend lives on a farm and he stills goes to this school. I say this one.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>making connections genre</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - An Earful] Student I: Describe how Jacob's feelings about his homework changes from the beginning of the story. Provide.</p>	No evidence	No evidence	No evidence
<p>Student I: It changes because he think he is getting nothing because he wants to be in a big city because there are obviously cars that you can hear.</p>	explaining literary elements	explaining lit elements/details	explain - rationale lit elements/details
<p>Interviewer: Uh-huh.</p>	No evidence	No evidence	No evidence
<p>Student I: There are obviously I do not really know what is in the city – cars? What else is there really in the city? Talking. Like maybe I do not really know. I would say there is a much more on a farm. Like he thinks it would be way easier to do it in a big city at first but once he gets home and he settled down and he is trying to think about how he is supposed to get all of this, he hears about, he hears all the dogs that shake and the cows and all the animals there. Then it changes because like it just changes because he thinks it is going to be hard but it is actually going to be easier because he is on a farm and it is not in a city.</p>	explaining literary elements	explaining lit elements/details	explaining lit elements/details
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>END</p>			

School District B—Grade 5 ELA (Student 2)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 1 - An Earful] Student II: Really kind of summarize the story.	No evidence	No evidence	No evidence
Interviewer: Okay, great.	No evidence	No evidence	No evidence
Student II: Jacobs's problem is there is too much noise.	explaining literary element	explaining	explaining literary element
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: _____ [00:15:10] homework which it should not be.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: That is the question statement.	No evidence	No evidence	No evidence
Interviewer: Okay. See which one answer option...	No evidence	No evidence	No evidence
Student II: He is unable to get his homework done after school. The animals on the farm where he lives are too noisy. That matches.	analyze literary element	analyzing lit elements	analyzing lit elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: _____ [00:15:30].	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay, perfect yep.	No evidence	No evidence	No evidence
Student II: _____ [00:15:33 to 00:15:39] he wishes he could live in the city _____ [00:15:42 to 00:15:47]. I do not really know. I mean he wishes he could, he is unhappy _____ [00:15:52] he wants to live in the city. That does not really go with the question.	analyze literary element	analyzing lit elements	analyzing lit elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: So, he has to collect sounds for a homework assignment that he thinks will be difficult. That means _____ [00:16:07 to 00:16:17] and if it was never to be _____ [00:16:20].	explaining literary element	explaining lit elements	explaining lit elements
Interviewer: [laughter] no it is okay. You are doing a great job, a really good job. I like what you are saying, keep talking about it. You are kind of thinking about B now right. Okay so tell me why.	No evidence	No evidence	No evidence
Student II: _____ [00:16:35 to 00:16:41] I mean...	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: Like _____ [00:16:41 to 00:16:46] he has to do homework; too many chores _____ [00:16:51 to 00:16:56]. Okay, um _____ [00:16:57 to 00:17:02] you have to do homework after school but he has too many chores. I do not have to do homework but I do have to do chores.	No evidence	No evidence	No evidence
Interviewer: Uh-huh.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: _____ [00:17:14 to 00:17:27] this goes with what is asked.	No evidence	?	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: And well it is talking about the noise and I mean, basically summarizing the homework. And well these just do not really talk about that, like they just take things out of the story but like not being part of the story.	explaining literary element	explaining lit elements	explaining lit elements
Interviewer: Okay.	No evidence	No evidence	No evidence
[Item 2 - An Earful] Student II: _____ [00:17:49 to 00:17:56] An Earful is narrated from what point of view? _____ [00:17:59 to 00:18:06] Um well I do not read any first person but I really thought it was first person. I am going to go read the story. Oh, there is a she, are there any I's? Do I see I's? _____ [00:18:21 to 00:18:27] third person, wait there are some yours. I do not see any first person. Oh, I guess that they are talking _____ [00:18:36 to 00:18:42] in third.	not really true analyzing supporting position using prior knowledge? Applying? POV	No evidence	applying prior knowledge from standards POV
Interviewer: You think third, why are you telling me that again?	No evidence	No evidence	No evidence
Student II: Because it is saying she, he, they.	explain POV	explaining pov	explaining pov
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: Well this could be...he.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: You are looking at different pronouns.	No evidence	No evidence	No evidence
Student II: Uh-huh.	No evidence	No evidence	No evidence
Interviewer: Okay. That is a good strategy.	No evidence	No evidence	No evidence
Student II: In first, it would not be first person because every time it says I it gives the hint that it is first person, it is talking.	explain POV	explaining pov	explaining pov
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
Student II: See like here and here and for a second person it could possibly be second person because I did see some used pronouns, but I think that was also talking. See yeah talking.	explain POV	explaining pov	explaining pov
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
Student II: I think it is third person, Jacob's teacher. Third person. ____ [00:19:31 to 00:19:37]	explain POV	explaining pov	explaining pov
Interviewer: Next.	No evidence	No evidence	No evidence
[Item 3 - An Earful] Student II: A reader can tell that this passage is fiction because it: gives details about farm animals ____ [00:19:47 to 00:19:51], well because I would ____ [00:19:52 to 00:19:59] fiction.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Tell me ____ [00:20:01].	No evidence	No evidence	No evidence
Student II: Oh wait, no never mind. ____ [00:20:04 to 00:20:06] fiction is when it is ____ [00:20:07].	applying?? Genre	explaining/applying genre	explaining/applying from standard genre
Interviewer: That is true, yeah.	No evidence	No evidence	No evidence
Student II: I was thinking ____ [00:20:11].	No evidence	No evidence	No evidence
Interviewer: Well you are torn.	No evidence	No evidence	No evidence
Student II: No, I said I was thinking ____ [00:20:14].	No evidence	No evidence	No evidence
Interviewer: [chuckles].	No evidence	No evidence	No evidence
Student II: Gives details about farm animals and I mean it-it could that is fiction, wait, is there something I can draw with? ____ [00:20:28 to 00:20:38].	No evidence	No evidence	No evidence
Student II: Cause there is the order through time. I do not really know about that.	explaining genre	explaining genre	explaining genre
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: Um, yeah it could be fiction, like I want both of the ____ [00:20:52], happens on a farm and not in a big city. Well ____ [00:20:57] I mean big city is still fiction.	explaining genre	explaining genre	explaining genre
Student II: Uses-uses-uses characters who are not real people. They might be real people I do not know that.	explaining genre	explaining genre	explaining genre
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
Student II: Uh, hmm ____ [00:21:23] well this would definitely not be the answer actually because um it is like who are not real people it is fiction so we need real people.	explaining genre	explaining genre	explaining genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: I will try to underline that [chuckles]. Happens on a farm and not in a big city. Okay. ____ [00:21:46 to 00:22:01] it can be maybe A or B, I think B because it is cool-ish.	explaining genre	explaining genre	explaining genre
Interviewer: Uh-huh. ____ [00:22:09 to 00:22:11].	No evidence	No evidence	No evidence
Student II: And so, does that, but like this is like this seems more like first cool and this seems more like ____ [00:22:19].	explaining genre	explaining genre	explaining genre
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - An Earful] Student II: How Jacob's feelings about his homework changed from the beginning of the story to the end of the story. Provide details from the passage to support your answer.</p> <p>Okay most of them _____ [00:22:38]. Wants us to tell how Jacobs feelings about being...living on the farm go from like how they change after he is like oh my gosh it is noisy, he realized it was so noisy and it can help him with his homework. So, _____ [00:22:59]</p>	explaining literary elements	explaining lit elements	explaining lit elements
Interviewer: How they changed?	No evidence	No evidence	No evidence
Student II: How his feelings changed so like from the beginning to the end of the story that um at the beginning he is like it is so noisy I cannot even concentrate I wish I could live in the big city.	explaining literary elements	explaining lit elements	explaining lit elements
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
Student II: Where there is like cars screeching and tires rumbling. And um out here um on the farm, I mean it is like oh gosh it is still so noisy and at the end he is like it is perfect what I need _____ [00:23:29 to 00:23:43].	explaining literary elements	explaining lit elements	explaining lit elements
Interviewer: Turn it, turn it. Right so do we have anything left?	No evidence	No evidence	No evidence
Student II: No.	No evidence	No evidence	No evidence
Interviewer: We have got one more okay. Scoot down there it is weird. Alright so, another story a different story now so this one again you can read it in your head, you can read it out loud. What were you telling me that your strategy was before?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: To see what I need to read instead of taking so much time reading whole paragraphs.	No evidence	No evidence	No evidence
Interviewer: Okay so let's try that and see how that works.	No evidence	No evidence	No evidence
[Item 1 - Inside a Termite Tower] Student II: Which sentence from the passage best supports the idea that towers help termites survive? Well since it is the kind of question and it does not tell you ____ [00:24:27] what was this.	No evidence	No evidence	No evidence
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
Student II: I will usually read the whole story.	No evidence	No evidence	No evidence
Interviewer: Okay. Then why don't you go ahead and do that. Does that work for you?	No evidence	No evidence	No evidence
Student II: Okay.	No evidence	No evidence	No evidence
Interviewer: Well I will let you read it. Yeah, I know, termite tower.	No evidence	No evidence	No evidence
STUDENT READS PASSAGE ALOUD - not included	No evidence	No evidence	No evidence
Interviewer: Okay. Now what do we need to find out again from the question?	No evidence	No evidence	No evidence
Student II: ____ [00:29:19 to 00:29:24] Yeah that towers help.	No evidence	No evidence	No evidence
Interviewer: Hmm, yeah.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: These large mounds made of dirt are made to help, the large mounds help them but like many different, tells how they are, not-not really what it does.	analyzing key details	analyzing key details	analyzing key details
Student II: Inside the mounds are large hollow tubes. Well-well they do help, they do like if that was ____ [00:30:04 to 00:30:09] that is kind of a good thing,	No evidence	No evidence	No evidence
Student II: air flows and carries away the heat away. That is kind of a good thing, yeah that is a good thing for termites. Air flows and carries away the heat.	explaining key details	explaining key details	explaining key details
Interviewer: Then the colony stabilizes.	No evidence	No evidence	No evidence
Student II: ____ [00:30:23].	No evidence	No evidence	No evidence
Interviewer: Oh right, yep, yep, yep. Yeah.	No evidence	No evidence	No evidence
Student II: Termites almost always stay in their tubes and tunnels. That does not really show how they, how it helps, it does help them but like it is kind of just another detail. I would probably say C but I am not entirely sure.	evaluating key details	analyzing/evaluating key details	evaluating key details
Interviewer: ____ [00:30:53 to 00:30:59] would be your strategy?	No evidence	No evidence	No evidence
Student II: Um ____ [00:31:00 to 00:31:09].	No evidence	No evidence	No evidence
Interviewer: Okay well why don't you go ahead and do it.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: These large mounds of dirt are of many different sizes. That does not help, I am going to go ahead and take away A.	No evidence	evaluating key details	evaluating key details
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: So ____ [00:31:21 to 00:31:27] kind of just another detail like this one down here.	evaluating key details	evaluating key details	evaluating key details
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: ____ [00:31:31] so I am kind of thinking C is the best answer.	No evidence	No evidence	No evidence
Interviewer: Okay. Alright.	No evidence	No evidence	No evidence
<p>[Item 2 - Inside a Termite Tower] Student II: ____ [00:31:36 to 00:31:42] Which detail best supports the idea that termites help one another. - Okay termite kings and queens stay in their chamber. That does not really help other termites.</p>	evaluating key details	evaluating key details	evaluating key details
Student II: Termite towers have large tubes and tunnels to help release heat. Well that does not show that they are helping one another.	evaluating key details	evaluating key details	evaluating key details
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: Termite workers feed nymphs until they can find food on their own. This does I am going with C.	evaluating key details	evaluating key details	evaluating key details
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: Termite cities have passageways and tunnels to link different rooms. Because this does not really help to show they help, this does not help one another. It just shows where they live.	evaluating key details	evaluating key details	evaluating key details
Interviewer: Sure.	No evidence	No evidence	No evidence
[Item 3 - Inside a Termite Tower] Student II: Which research question would best help a reader find information about the life cycle of termites. [00:33:00 to 00:33:07]	No evidence	No evidence	No evidence
Student II: Um, research question _____ [00:32:47 to 00:32:54] which question best help a reader find information _____	No evidence	No evidence	No evidence
Student II: I do not know. How do termite nymphs, termite nymphs turn into adults? With adults helping _____ [00:33:15 to 00:33:29] interesting.	No evidence	No evidence	No evidence
Student II: What _____ [00:33:30 to 00:33:37].	No evidence	No evidence	No evidence
Interviewer: _____ [00:33:37].	No evidence	No evidence	No evidence
Student II: Yes.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. What else does this help you with interest in the work ____ [00:33:46] [bell ringing] it is a long bell.	No evidence	No evidence	No evidence
Student II: Can I just read it?	No evidence	No evidence	No evidence
Interviewer: Okay yep.	No evidence	No evidence	No evidence
Student II: How do termites speak to one another? I mean based on ____ [00:34:03].	No evidence	No evidence	No evidence
Student II: How many different kinds of termites are there? Um I have heard there is about 3,000 ____ [00:34:15 to 00:34:22].	explain - reference viable research question	No evidence	No evidence
Student II: B I am pretty sure it is B.	No evidence	No evidence	No evidence
Interviewer: You did a really great job, I think you have some really good thoughts in there. I think this is a good end.	No evidence	No evidence	No evidence
Student II: Okay.	No evidence	No evidence	No evidence
Interviewer: Okay. This one.	No evidence	No evidence	No evidence
[Item 4 - Inside a Termite Tower] Student II: Based on the information in the passage explain what would most likely happen to the termite colony if the king or queen were to die.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student II: he writing tells us if they were to die the colony would probably go down with it because they are the ones who lay the eggs and the women would take care of the last bunch of eggs probably, but like at the end because ____ [00:35:03] then they ____ [00:35:07] I do not know how that ____ [00:35:11].	drawing conclusion main idea (?)	analyze/draw conclusion main idea/resolution	drawing conclusion main idea
Interviewer: Good answer. Now, did you want ____ [00:35:20], do you want to add more or do you want to see there are any other questions?	No evidence	No evidence	No evidence
Student II: ____ [00:35:25].	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student II: ____ [00:35:29 to 00:35:35]. Rules by the termites probably ____ [00:35:40] and their life cycle is not that long, but then there would be more termites a colony so I think it was just to kind of ____ [00:35:55 to 00:36:04]. I do not think so.	No evidence	No evidence	No evidence

School District B—Grade 5 ELA (Student 3)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 1 - Inside a Termite Tower] Student III: It is asking us what best supports the idea from the towers of termites to survive.	No evidence	No evidence	No evidence
Interviewer: Okay. Which one do you think?	No evidence	No evidence	No evidence
Student III: ____ [00:13:56 to 00:14:05].	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Like the mounds are large hollow tubes.	No evidence	No evidence	No evidence
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
Student III: Air flows in and carries away heat.	No evidence	No evidence	No evidence
Termites almost always stay inside their tubes and tunnels.	No evidence	No evidence	No evidence
Interviewer: ____ [00:14:23 to 00:14:33] tell me why you clicked that one.	No evidence	No evidence	No evidence
Student III: I clicked that one off because it really did not talk about it that much.	explaining key details	explaining	explain key details
Interviewer: Okay. Okay.	No evidence	No evidence	No evidence
Student III: ____ [00:14:39 to 00:14:53] Talked about this I always get confused.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: A.	No evidence	No evidence	No evidence
Interviewer: ____ [00:15:06] alright. What is this next question want us to do?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 2 - Inside a Termite Tower] Student III: Which detail best supports the idea that termites help one another? Wait, that talks about how they help one another.	No evidence	No evidence	No evidence
Student III: Termite towers have large tubes to help release heat. Well that does not talk about helping.	analyzing key details	analyzing key details	analyzing key details
Student III: Termite workers feed nymphs until they can find their own food. I think that can be.	analyzing key details	analyzing key details	analyzing key details
Student III: Termite cities have passageways and tunnels to link different rooms. I am going to say C because it does not have anything to help one another.	analyzing key details	analyzing key details	analyzing key details
Interviewer: Okay. Okay.	No evidence	No evidence	No evidence
Student III: Which research question would best help a reader find information about the lifecycle of termites?	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: How big is a full-grown termite? I feel that is kind of tricky.	No evidence	No evidence	No evidence
Interviewer: That is okay, read that one, the next one.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - Inside a Termite Tower] Student III: How do termite nymphs turn into adults? - How do termites speak with one another? - How many different kinds of termites are there? - Which research question would best help a reader find information about the life cycle of termites? ____ [00:16:50 to 00:16:57]</p>	No evidence	No evidence	No evidence
Interviewer: Why did you think that was not the right one?	No evidence	No evidence	No evidence
Student III: Because well, it is not ____ [00:17:05 to 00:17:11].	explaining(??) viable research question	explaining research question	explaining research question
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: ____ [00:17:12 to 00:17:19] I am going to exit two because it is not really asking you how, how it does the circle.	explaining(??) viable research question	explaining research question	explaining research question
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: ____ [00:17:29 to 00:17:35]. Where could my ____ [00:17:36] be that is question one. ____ [00:17:41 to 00:17:49]. I go to D because C it is not talking about anything it is just talking about termites talking with one another and that is not with the circle of how they are.	analyzing viable research question	explaining research question	analyzing/explain - rationale viable research question

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. And tell me why D is correct.	No evidence	No evidence	No evidence
Student III: I think D is correct because it is talking about what they are, and how many kinds they are because there are different kinds of termites. That is why.	explaining(??) viable research question	reasoning research question	reasoning/explain rationale (using incorrect reasoning) viable research question
Interviewer: Read this one.	No evidence	No evidence	No evidence
[Item 4 - Inside a Termite Tower] Student III: Based on the information in the passage what would most likely happen to the termite colony if the king or queen were to die? Provide details from the passage to support your answer.	No evidence	No evidence	No evidence
Student III: Because the queen _____ [00:18:48] can die and if they die the queen _____ [00:18:56] nobody else would do.	reasoning main idea	draw conclusion/inference lit elements/ main idea from details	draw conclusion/inference lit elements/ main idea from details
Interviewer: Okay that is really... _____ [00:19:05].	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: She lays 30,000 eggs.	No evidence	No evidence	No evidence
Interviewer: So, if she was gone...	No evidence	No evidence	No evidence
Student III: Nobody else would ____ [00:19:13] A.	reasoning main idea	reasoning main idea	reasoning main idea
Interviewer: ____ [00:19:16 to 00:19:21] Good job. ____ [00:19:22 to 00:19:28] okay. You did a great job, you had some really good thinking processes there, pretty smart. Okay so the same thing here, so you can read the whole story and then we will talk about the questions together. Alright good job.	No evidence	No evidence	No evidence
Interviewer: All finished? Okay, let's do the questions.	No evidence	No evidence	No evidence
[Item 1 - An Earful] Student III: Which is the best summary of Jacob's problem is in the passage? He is unhappy living in the country on a farm. He wishes he could live in the city instead. Well if they talk about that because he thought that there was that many noises to do his homework.	No evidence	explaining lit element	explain -??? Summary
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Student III: He has to collect sounds for a homework assignment. He thinks that will be difficult on a farm.</p> <p>Except that he did he was distracted and he wanted to live so that he could hear the sirens and the tires.</p>	<p>explaining (??)</p> <p>literary element</p>	<p>explaining/ ref information</p> <p>lit element</p>	<p>explaining/ ref information</p> <p>lit element</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student III: And he got that there was no sounds for him on the farm. He is unable to get his homework done after school. The animals on the farm were too noisy. That does not make any sense because then he would be _____ [00:26:09] homework.</p>	<p>reasoning</p> <p>literary element</p>	<p>reasoning</p> <p>literary element</p>	<p>reasoning</p> <p>literary element</p>
<p>Interviewer: Right, that is a good point.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student III: He has to do homework after school, but he has too many chores. There is not enough time to get everything done. I am going to exit out because mom told him do his homework _____ [00:26:29] do it.</p>	<p>explaining</p> <p>literary element</p>	<p>explaining</p> <p>lit element</p>	<p>explaining</p> <p>lit element</p>
<p>Interviewer: Got you okay. Good job.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student III: Click out _____ [00:26:37 to 00:26:43] I am going to 'x' that out.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student III: Because after he thought it was going to _____ [00:26:50] on the farm, but his treehouse, he figured out that as soon as _____ [00:26:59] he started to _____ [00:27:03] started to noise, so I am going to go with A.</p>	<p>explaining</p> <p>literary element</p>	<p>explaining</p> <p>lit element</p>	<p>explaining</p> <p>lit element</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. Repeat the question again.	No evidence	No evidence	No evidence
Student III: He is unhappy living out in the country on a farm, he wishes he could live in a city.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Which is the best summary of Jacob's problem in the passage?	No evidence	No evidence	No evidence
Interviewer: Can you tell me what the word summary means?	No evidence	No evidence	No evidence
Student III: A summary is a short version of a longer story.	No evidence	No evidence	No evidence
Interviewer: Alright. The best summary of Jacob's problem in the passage is that he is unhappy. Okay, alright. The next one.	No evidence	No evidence	No evidence
[Item 2 - An Earful] Student III: An earful is narrated from what point of view? - First person ____ [00:27:55 to 00:28:00] - third person Jacob's teacher, -first person by an unnamed narrator.	No evidence	No evidence	No evidence
Interviewer: Uh-huh.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: Third person by an unknown narrator. ____ [00:28:11 to 00:28:17] I think I am going to 'x' out D because I do not think an unknown narrator as it was somewhere down here ____ [00:28:26 to 00:28:35] where in next area I am going down.	explaining POV	explaining pov	explaining pov
Interviewer: Right.	No evidence	No evidence	No evidence
Student III: And so ____ [00:28:40].	No evidence	No evidence	No evidence
Interviewer: What does that say?	No evidence	No evidence	No evidence
Student III: ____ [00:28:43 to 00:29:49] I think it is this one either.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Because ____ [00:29:52] an unnamed narrator, I think there is like a couple of narrators through them.	explaining POV	explaining pov	explaining pov
Interviewer: ____ [00:30:00] Okay.	No evidence	No evidence	No evidence
Student III: So, I do not think it was them.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Jacob well he was at home when somebody said it so I am going to 'x' it out. So, I am thinking it is A.	explaining POV	explaining pov	explaining pov

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay, okay. Can explain to me what is a narrator?	No evidence	No evidence	No evidence
Student III: A narrator is someone who is telling the story.	No evidence	explaining pov	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: And I think Jacob was probably telling the story.	explaining POV	explaining pov	explaining pov
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Because it was her point of view.	No evidence	explaining pov	explaining pov
[Item 3 - An Earful] A reader can tell that this passage is fiction because it? - Gives details about farm animals; - shows events in order through time; - what happens on a farm and not in a big city; - uses characters who are not real people.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student III: I am going to 'x' out A because in the story fiction or non-fiction is ____ [00:31:10].	explaining (??) genres	explaining genre	explaining genre
Interviewer: Great okay, good point.	No evidence	No evidence	No evidence
Student III: I think fiction is because it is not real ____ [00:31:20 to 00:31:27] any story can show you fiction or ____ [00:31:29].	No evidence	explaining genre	explaining genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: Happens on a farm and not in a big city. Well, like on a farm and not in a big city;	No evidence	No evidence	No evidence
Student III: uses character who are not real people. Well in different stories non-fiction/fiction it could be real people or not so I am going to choose D.	explaining (??) genres	explaining genre	explaining genre
Interviewer: Okay.	No evidence	No evidence	No evidence
Student III: I choose D because it is the thing that describes how it is fiction.	No evidence	No evidence	No evidence
Interviewer: Is it C or did you want to pick D?	No evidence	No evidence	No evidence
Student III: D.	No evidence	No evidence	No evidence
Interviewer: Okay, good thoughts.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - An Earful] Student III: Describe how Jacob's feeling about his homework change from the beginning of the story to the end of the story. Provide details from the passage support your answer.</p> <p>Well he changed his way because ____ [00:32:29 to 00:32:34] got home from school he was not paying attention to all the noise that was going on. So, with the back how going with the ____ [00:32:45] that is when he was hearing all the noises because he was by himself and he was thinking and he was hearing animals on the farm and his little brother so that is, that is how it changed his way of knowing that his homework could be ____ [00:33:05]. ____ [00:33:06 to 00:33:21].</p>	reasoning literary elements	reasoning literary elements	reasoning literary elements
END	No evidence	No evidence	No evidence

School District B—Grade 5 ELA (Student 4)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Inside a Termite Tower] Student IV: It says which sentence from the passage best supports the idea that the towers help termites survive.</p>	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: And because ____ [00:13:22 to 00:13:26] it says that-that the termite would not be ____ [00:13:30] it would not be like a problem in they have like fungi on them. And ____ [00:13:39 to 00:13:45].	No evidence	explaining/reference info key detail	explaining/reference info key detail

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: You have choices here and see what ____ [00:13:49] and those will help answer the questions.	No evidence	No evidence	No evidence
Student IV: ____ [00:13:53 to 00:13:58] I think the answer is B.	No evidence	No evidence	No evidence
Interviewer: Why would you think that one? That is a good answer why would you think that?	No evidence	No evidence	No evidence
Student IV: Because it is saying which best idea so in inside the towers that air flows in and there is not a lot of heat in there so it will just blow it away.	explain - reference key details	explaining/reference info key detail	explaining/reference info key detail
Interviewer: Okay. So you picked that answer.	No evidence	No evidence	No evidence
Student IV: Yeah.	No evidence	No evidence	No evidence
Interviewer: Okay so go ahead and give it a click. Awesome. Great job. Let's look at this one what it says.	No evidence	No evidence	No evidence
[Item 2 - Inside a Termite Tower] Student IV: Which detail best support the idea that termites help one another? ____ [00:14:30 to 00:14:38] Well I do not really think termites' kings and queens do a lot because all they do is like stay inside their chambers.	explaining-reference key details	explaining/reference info key detail	explaining/reference info key detail
Interviewer: Uh-huh	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay why do you think about the next ones? What is your next thought?	No evidence	No evidence	No evidence
Student IV: Termite towers have large tubes to release heat. Well is that not termites are helping one another? _____ [00:15:10 to 00:15:20]	explaining/reference info key detail	explaining/reference info key detail	explaining/reference info key detail
Student IV: I really think it is D because termite workers feed the nymphs and the nymphs are small.	explaining/rationale why key detail	explaining/rationale why key detail	explaining/rationale why key detail
Interviewer: Okay. That is great. Awesome now this one.	No evidence	No evidence	No evidence
<p>[Item 3 - Inside a Termite Tower] Student IV: Research question would best help the reader find information about the life cycle of termites. _____ [00:15:44 to 00:15:51] - How do termite nymphs turn into adults?</p> <p>Because it is a life cycle so like in my day like how they grow and how they _____ [00:16:05].</p>	reasoning key details	reasoning key details	reasoning research question
Interviewer: Good.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - Inside a Termite Tower] Student IV: ____ [00:16:10 to 00:16:18] Based on the information in the passage explain what would most likely happen to the termite colony if the king or queen were to die. Provide details from passage to support your answer. ____ [00:16:33 to 00:16:42]</p> <p>I think it would just be a mess because they are not having like the king or queen to rule and they do not know what to do after that.</p>	reasoning main idea	supporting position with prior knowledge main idea	reasoning main idea
Interviewer: Was that in the passage that would help you to know that? Did you read that?	No evidence	No evidence	No evidence
Student IV: I mean I just thought of it because like I know how bugs are whenever like something happens.	supporting positions using prior knowledge main idea	supporting position with prior knowledge main idea	supporting position with prior knowledge main idea
Interviewer: Sure.	No evidence	No evidence	No evidence
Student IV: ____ [00:17:08 to 00:17:11] Interviewer: That is really good, right, let's see what happens next. Why don't you push finish?	No evidence	No evidence	No evidence
Student IV: Okay.	No evidence	No evidence	No evidence
Interviewer: Now that one is the right one ____ [00:17:22 to 00:17:26]. Alright you are going to do one more, operational session two. You are doing a great job thinking. ____ [00:17:34] Okay so this one so you will do the same thing you will read through the story and then we will talk about the questions together. Awesome.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - An Earful] Student IV: ____ [00:17:41 to 00:21:40] Well he is unhappy living out in the country on a farm and he wishes he could live in the city instead so that his homework could like he could have an earful of noises so that his homework could finish.</p>	<p>explaining literary elements</p>	<p>explaining literary elements</p>	<p>explaining literary elements</p>
<p>Interviewer: Uh-huh,</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student IV: But there is ____ [00:22:02 to 00:22:10].</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student IV: He is unable to get his homework done after school the animals on the farm where he lives are too noisy. He has to do some homework after school but he has too many chores, there is not enough time to get everything done.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student IV: ____ [00:22:34] I kind of think it is A because it says that it is not his it is not fair, he wishes he could live in the city, ____ [00:22:50 to 00:22:53]</p>	<p>explaining - reference literary elements</p>	<p>explaining - reference literary elements</p>	<p>explaining - reference literary elements</p>
<p>Interviewer: Great, great thinking ____ [00:22:53 to 00:23:00] yeah which one. Yeah. Perfect. Nice job. And what is this one asking us about?</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>[Item 2 - An Earful] Student IV: ____ [00:23:09 to 00:23:18] because it is really about him.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Uh-huh.	No evidence	No evidence	No evidence
[Item 3 - An Earful] Student IV: _____ [00:23:21 to 00:23:27] the reader can tell that this passage is fiction because I _____ [00:23:32 to 00:23:40]. Fiction is not real.	No evidence	explaining genre	apply/explain rationale genre
Interviewer: Not real, okay _____ [00:23:43 to 00:23:48].	No evidence	No evidence	No evidence
Student IV: Uses characters who are not real people.	No evidence	No evidence	No evidence
Interviewer: Okay so why did you pick that one?	No evidence	No evidence	No evidence
Student IV: Because fiction is not real and it is just easy, not real people.	explaining - rationale genres	explaining - rationale genres	explaining - rationale genres
Interviewer: Okay.	No evidence	No evidence	No evidence
Student IV: And the person who wrote this used characters who are not real but like the place is real but the people are not.	explaining - rationale genres	explaining - rationale genres	explaining - rationale genres

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Uh-huh, uh-huh, okay that makes sense to me. What does this one say?	No evidence	No evidence	No evidence
[Item 4 - An Earful] Student IV: Describe feelings about his homework changed from the beginning of the story to the end of the story. Provide details from the passage to support your answer.	No evidence	No evidence	No evidence
Interviewer: _____ [00:24:33].	No evidence	No evidence	No evidence
Student IV: His feelings about the homework from the beginning was that he did not like it. But in the end, he was like _____ [00:24:47] homework's done and he is like that was good.	drawing conclusions literary elements	drawing conclusions literary elements	drawing conclusions literary elements
Interviewer: Uh-huh. That is a good answer how did you get that from the story?	No evidence	No evidence	No evidence
Student IV: Because at first, he was like groaning about how he did not like it and then the end is like you guys are an earful.	drawing conclusions literary elements	explain - reference lit elements	explain - reference lit elements
Interviewer: Oh.	No evidence	No evidence	No evidence
Student IV: Something like that.	No evidence	No evidence	No evidence
END	No evidence	No evidence	No evidence

School District B—Grade 5 ELA (Student 5)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - An Earful] Student V: "Which is the best summary of the—of Jacob's problem in the passage?"</p>	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
<p>Student V: [00:18:35-00:18:38]. He's unhappy of—unhappy living out on a farm. He wishes he could live in the city instead. That might be the answer--</p>	No evidence	explaining lit elements	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
<p>Student V: --because it has all the things in the story there.</p>	explaining???? Literary elements	explaining lit elements	explaining - rationale lit elements
Interviewer: Okay. That's a good thought.	No evidence	No evidence	No evidence
<p>Student V: He has to collect something for a homework assignment. He thinks that it would be difficult on a farm. Well, he already—well, now he knows it's difficult on a farm at the end.</p>	explaining???? Literary elements	explaining lit elements	explain - reference lit elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: He is unable to get his homework done after school. The animals on the farm where he lives are too noisy. Well, they're not being noisy. They're just there.	analyzing literary elements	analyzing literary elements	analyzing literary elements
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: He has to do some homework after school, but he has to do the chores. There is not enough time to get everything done. Well, there is enough time to get everything done, but there's just no noise.	analyzing literary elements	analyzing literary elements	analyzing literary elements
Interviewer: Okay. Your answer is A?	No evidence	No evidence	No evidence
[Item 2 - An Earful] Student V: Yep. And it's narrated from what point of view? [00:20:15-00:20:20] I don't know what point of view it is.	No evidence	No evidence	No evidence
Interviewer: Oh okay. Well, let's take a look at it and figure out what this answer actually is here. [00:20:30-00:20:40]	No evidence	No evidence	No evidence
Student V: B because most of that story is narrated by Jacob.	explaining??? POV	explaining pov	explain - rationale POV
Interviewer: So, select your answer and what's this question ask?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 3 - An Earful] Student V: So, this basically asks the details about farming. Give any details about farming life.</p>	<p>NOTE: the question is about genres not farming analyzing genre</p>	<p>analyzing genre</p>	<p>analyzing genre</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student V: It doesn't show the time, but it does show events.</p>	<p>analyzing genre</p>	<p>analyzing genre</p>	<p>analyzing genre</p>
<p>Interviewer: It does.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student V: And it's on the farm and not in a big city. Well, he's at school at first.</p>	<p>analyzing genre</p>	<p>analyzing genre</p>	<p>analyzing genre</p>
<p>Interviewer: Oh okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>
<p>Student V: Let's see. These characters are not real people. They might be. They could be real people.</p>	<p>analyzing genre</p>	<p>analyzing genre</p>	<p>analyzing genre</p>
<p>Interviewer: Okay.</p>	<p>No evidence</p>	<p>No evidence</p>	<p>No evidence</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 4 - An Earful] Student V: [00:21:50-00:21:53] “Describe how his feelings about his homework change from the beginning of the story to the end of the story. Give details that support your answer.”</p>	No evidence	No evidence	No evidence
<p>Interviewer: Okay. How did Jacob’s feelings about his homework change from the beginning to the end of the story? What do you think?</p>	No evidence	No evidence	No evidence
<p>Student V: At the beginning of the story, the teacher gave his homework assignment. So, he was excited because there might—there’s noises at the farm.</p>	<p>Explain literary elements</p>	<p>explaining lit elements</p>	<p>explain - reference lit elements</p>
<p>Interviewer: Uh-huh.</p>	No evidence	No evidence	No evidence
<p>Student V: But there might be not enough of noises because all of his other friends have—are from the city and stuff.</p>	<p>Explain literary elements</p>	<p>explaining lit elements</p>	<p>explain - rationale lit elements</p>
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student V: And at the end of the story, he goes to his house and none of his animals are making noises. And so, then he cannot do his homework.</p>	<p>Explain literary elements</p>	<p>explaining lit elements</p>	<p>explain - rationale lit elements</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
<p>Interviewer: All right, that's a good answer. Hit "finish" and you turn it. One more. Can you do one more? Okay. There you go. You've done that one. So, continue. All right, so a different passage. This one's called "Inside A Termite (SP) Tower". So, I'll let you read it again and then we'll talk about the questions. You're doing a great job! Thanks, Student V.</p>	No evidence	No evidence	No evidence
<p>[Item 1 - Inside a Termite Tower] Student V: ____ [00:27:55] the passage that best supports the idea that ____ [00:28:00] help termites survive.</p>	No evidence	No evidence	No evidence
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student V: These large mounds of dirt are of many different sizes. This doesn't count.</p>	No evidence	explaining key details	No evidence
<p>Interviewer: Okay.</p>	No evidence	No evidence	No evidence
<p>Student V: I think it's because of the sun and the wind.</p>	drawing conclusions key detail	drawing conclusions key detail	drawing conclusions key detail
<p>Interviewer: Okay, great. That makes sense to me. Is there any answer there that fits your thought?</p>	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: _Which one fits all the tubes.	No evidence	analyzing key detail	analyzing key detail
Interviewer: Does that fit or no?	No evidence	No evidence	No evidence
Student V: No.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: Air flows in and carries away heat.	No evidence	explaining key details	No evidence
Interviewer: Does that one go with what you were thinking of?	No evidence	No evidence	No evidence
Student V: Yeah.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: Termites always stays inside the tubes and tunnels. It does not have anything to do to survive.	analyze key details	analyzing key detail	analyzing key detail
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: I think it's C.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: All right. More good thinking there. So, this one?	No evidence	No evidence	No evidence
Student V: Yeah.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
[Item 2 - Inside a Termite Tower] Student V: The termites act as a helper while the termite kings and queen stay inside their chambers. That's called lazy.	explaining key details	explaining key details	explaining - reference key details
Interviewer: Okay. So, what do you think?	No evidence	No evidence	No evidence
Student V: Yeah.	No evidence	No evidence	No evidence
Interviewer: Okay. So, what do you think?	No evidence	No evidence	No evidence
Student V: Maybe, yeah.	No evidence	No evidence	No evidence
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: Termites kind of like have these large tubes that help release heat. The termites are not helping line up. It's the air that's helping.	analyzing key details	analyzing key detail	analyzing key detail
Interviewer: Okay, all right. That's good thinking. I like it.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: Termite workers _____ [00:30:05], so they can find it on their own. That is helping each other.	analyzing key details	analyzing key detail	analyzing key detail
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: Termite cities have bridges and wind tunnels to pass through different realms. The passageways are in realms, not the termites.	analyzing key details	analyzing key detail	analyzing key detail
Interviewer: Good, I like it.	No evidence	No evidence	No evidence
Student V: Oops.	No evidence	No evidence	No evidence
Interviewer: What's the next one going to be? Okay. Hmm.	No evidence	No evidence	No evidence
[Item 3 - Inside a Termite Tower] Student V: What choice—what research question would best help you find out information about the life cycle of termites?	No evidence	No evidence	No evidence
Interviewer: How would you answer that?	No evidence	No evidence	No evidence
Student V: Which research question would best help a reader find information about what life cycle of termites? How big is a full grown termite?	No evidence	No evidence	No evidence
Interviewer: What do you think?	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student V: It's not like life circle.	explaining viable research question	evaluating research question	evaluating research question
Interviewer: Okay. That makes sense to me.	No evidence	No evidence	No evidence
Student V: How do termite _____ [00:31:40] turn into adults? [00:31:44-00:31:48] That is the life circle that shows when they turn into adults.	interpreting viable research question	evaluating research question	interpreting to make an evaluation research question
Interviewer: Okay.	No evidence	No evidence	No evidence
Student V: How do termites speak with one another—with each other? [00:32:02-00:32:12] I still think B's the correct answer.	No evidence	No evidence	No evidence
Interviewer: Okay, good. You got that. You go for it.	No evidence	No evidence	No evidence
Student V: "How many different kinds of termites are there?" That doesn't tell you the life circle.	explaining viable research question	evaluating research question	explain - rationale research question
Interviewer: Okay. Good job.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
[Item 4 - Inside a Termite Tower] Student V: "Based on information in the passage, explain what the most like—what most likely would have happened to the termite colony if the queen—or the king or queen were to die? Provide details from your passage to select your answer."	No evidence	No evidence	No evidence
Student V: I—if their queen dies, all of them will move on to another place and there's another—and then, there's like another--	supporting position using prior knowledge main idea	draw conclusion main idea	draw conclusion main idea
Interviewer: Colony?	No evidence	No evidence	No evidence
Student V: Yeah, another colony. But the oldest people are the king and queen.	supporting position using prior knowledge main idea	No evidence	explain - describe main idea
Interviewer: Okay. Was there anything in the passage that helped you know that or did you come up with that on your own?	No evidence	No evidence	No evidence
Student V: I came up with that on my own.	supporting position using prior knowledge main idea	No evidence	inference main idea
Interviewer: Yeah. I think that's great. That's a great answer. Good job! Okay. You can click "Finished" if you're all set. Nice work!	No evidence	No evidence	No evidence
END	No evidence	No evidence	No evidence

School District B—Grade 5 ELA (Student 6)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - An Earful] Student VI: He said it was too hard to collect sounds for homework because like maybe he thinks that it won't be difficult on the farm. But it was difficult after school.</p>	No evidence	No evidence	No evidence
<p>Student VI: He has too many things to do at that time because she never said he had to do it and he couldn't do his chores. He's unable to get his homework done.</p>	No evidence	No evidence	No evidence
<p>Interviewer: Really?</p>	No evidence	No evidence	No evidence
<p>Student VI: Yeah, because like—because this is basically what it is talking about on A and B. [00:12:15-00:12:30]. He says like where at—the paragraph right here. It's like this paragraph, right?</p>	No evidence	explaining summary?	explain - reference summary
<p>Interviewer: Yeah, but at what point--</p>	No evidence	No evidence	No evidence
<p>[Item 2 - An Earful] Student VI: Yeah, because he's telling them how he thinks it should be. I think it's that first person because the third person's not there, right?</p>	explaining POV	explaining pov	explain - rationale POV
<p>Student VI: Not Jacob's teacher because Jacob's teacher wasn't there or first-person narrator. I think that's right.</p>	explaining POV	explaining pov	explain - rationale POV

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student VI: I don't think it's that because Jacob was telling most of the story. And readers can tell that the _____. [00:13:30].	explaining POV	explaining pov	explain - rationale POV
[Item 3 - An Earful] Student VI: Because it's—yes, due to those events in order. You see the characters. I know it's not that one. Is it—because you can tell it's not that one. It shows you _____. [00:13:58]. I don't really think it's that. [00:14:00—00:14:05]	analyzing genre	analyzing genre	analyzing genre
Student VI: I think it doesn't really say anything more. It happens on a farm, so that can happen.	analyzing genre	analyzing genre	analyzing genre
[Item 1 - Inside a Termite Tower] Student VI: Oops! Okay. Here it is. It's called "Towers for Termites". Termites always stay inside. That's why they like houses.	explaining key details	explaining key details	explaining key details
Student VI: I think it's A.	No evidence	No evidence	No evidence
Student VI: Oh, I'm sure it is because air flow it carries—keeps away heat. Yeah. And termites have order.	explaining key details	explaining key details	explaining key details
[Item 2 - Inside a Termite Tower] Student VI: The termite king and queens stay in chambers.	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Student VI: Termites _____ [00:19:37] which way. I think they help _____ [00:19:55]. But like termites _____ [00:20:05].	No evidence	No evidence	No evidence
Student VI: That doesn't really help them and they don't really have a choice. [00:20:15-00:20:20]	No evidence	explaining key details	No evidence
<p>[Item 3 - Inside a Termite Tower] Student VI: The next question, would best help explain the situation about the life cycle of a termite? How big is a full-grown termite? Termites _____ [00:20:40].</p>	No evidence	explaining key details	No evidence
Student VI: How many different kinds of termites are there? Many? I'll put D.	No evidence	No evidence	No evidence
Student VI: Is this—it's kind of like they're born into it. They're born into the colony and it goes back around.	drawing conclusions viable research question	drawing conclusions viable research question	drawing conclusions viable research question
Student VI: And it looks like it'd be B just because—"	No evidence	No evidence	No evidence
<p>[Item 4 - Inside a Termite Tower] Student VI: Based on the information in the passage, explain why. What would most likely happen to the termite colony if the king or queen were to die and provide details to support your answer."</p>	No evidence	No evidence	No evidence

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. What would they do?	No evidence	No evidence	No evidence
<p>Student VI: They'd run in fear. They'd try to run. I just really don't think so because I watch over my brothers and sisters. So, I watch stuff like that that happens and actually they run. They split up. They—so, where does it talk about—right here. ____ [00:22:05].</p> <p>It talks about if they were to die. Yes, if they were to die--</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>
Interviewer: Okay.	No evidence	No evidence	No evidence
<p>Student VI: --because— [00:22:20-00:22:25]</p> <p>--they'd go away and find a new colony.</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>	<p>drawing conclusions</p> <p>main idea</p>
Interviewer: Is that what it says?	No evidence	No evidence	No evidence
Student VI: Yeah, because like it says they always stay where they're needed and hide.	<p>explain</p> <p>main idea</p>	<p>explaining</p> <p>main idea</p>	<p>explaining - reference</p> <p>main idea</p>

School District B—Grade 8 ELA (Student 1)

Transcribed Responses	Reserved for Cognia Analysis; Leave Blank	Melissa's Coding	Consensus
<p>[Item 1 - Fit for Life]</p> <p>Student I: Okay. Which statement best states the main idea of the selection?</p> <ul style="list-style-type: none"> -Ben Franklin proved that being fit prolonged life by devising a new system for counting age. - Ben Franklin invented swim pallets and studied swimming motions as a main ability and strength. -Franklin took a scientific approach to exercise that include measuring heartbeats and body heat. -Franklin worked to stay fit because he understood the connection between exercise and good health. 	No Evidence	No Evidence	No Evidence
<p>Student I: So this one sounds like a good one. This one was only like the first beginning part.</p>	<p>explaining - reference main idea</p>	<p>explaining/referencing main idea</p>	<p>explaining/referencing main idea</p>
<p>Student I: And this was about...close to the end. So probably not these two.</p>	<p>explaining - reference main idea</p>	<p>explaining/referencing main idea</p>	<p>explaining/referencing main idea</p>
<p>Student I: Well, this was at the end so it's most likely this one. Franklin worked to stay fit because he understood the connection between exercise and good health because it's mainly mostly what it talked about.</p>	<p>explaining - reference main idea</p>	<p>explaining/referencing main idea</p>	<p>explaining/referencing main idea</p>

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Interviewer: Okay. Is there any place in the passage that would help you prove that?	No Evidence	No Evidence	No Evidence
Student I: Around...right here. At 66, Franklin had lived a long life. In the 70's, an average American only lived 40 years. There is now understanding between connection between exercise and good health. Franklin believed exercise to be one of...be of the greatest importance to prevent disease.	explaining - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Interviewer: Excellent. Okay. Great. You got it. Next one.	No Evidence	No Evidence	No Evidence
<p>[Item 2 - Fit for Life]</p> <p>Student I: Okay. Which question is answered in paragraph eight?</p> <p>[student rereads paragraph 8 aloud]</p> <p>Swimming with success, Ben loved swimming and thought everyone should learn. It was a skill that could benefit both rich and poor and once learned was never forgotten. When he was in his 20s living in England, Ben had such success teaching a coworker to swim he thought about opening a swimming school.</p>	No Evidence	No Evidence	No Evidence
Student I: When did Ben Franklin learn to swim? It doesn't say in here.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: Why do people love swimming so much? That's not really the point.	analysis main idea	analyzing main idea	analyzing main idea

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: How did swimming benefit both the rich and poor? It says the skill that could both benefit rich and poor, once learned it was never forgotten. That's a maybe.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: Why did Ben Franklin think about opening a swimming school? This one's most likely the answer because it said that Ben had success teaching a coworker to swim and he thought about opening a swimming school.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: Interviewer: Awesome. Good job. You're doing great. You could do this for your job.	No Evidence	No Evidence	No Evidence
<p>[Item 3 - Fit for Life]</p> <p>Student I: "Ben Franklin: Fit for Life" is considered a biography because</p> <ul style="list-style-type: none"> - it uses someone's actual words, - it tells about a person's life, - it is written in first person, - it teaches a lesson. 	No Evidence	No Evidence	No Evidence
Student I: It teaches a lesson, that's probably not it.	No Evidence	No Evidence	No Evidence
Student I: It's written in first person, it's not really because it said when he.	apply genre	applying genre	applying genre

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: It tells about a person's life, most likely because biography is like someone else telling about someone else's life.	apply genre	applying genre	applying genre
Student I: And auto is them telling about their own life.	apply genre	applying genre	applying genre
Student I: It uses someone's actual words, don't think there was anything he said.	explain - rationale genre	explain - rationale genre	explain - rationale genre
Student I: I think it's most likely it tells about a person's life.	drawing conclusion genre	drawing conclusion genre	drawing conclusion genre
Interviewer: Awesome.	No Evidence	No Evidence	No Evidence
[Item 4 - Fit for Life] Student I: Okay. Summarize Ben Franklin's belief about exercising. Provide supporting details from the passage. Okay. So it says right here, Franklin believed exercise to be the greatest importance to prevent disease. So I think he believed that it prevented disease. And I think he...I think that's it.	explain - reference summary	explaining/referencing info summary	explaining/referencing info summary

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: But I also think he believed it to be good and...yeah.	drawing conclusion summary	inferencing/ concluding summary	draw conclusion/inference summary
[Item 1 - Carolina Crow Girl] Student I: Okay. How can the reader tell that Carolina Crow is realistic fiction? - It pre...presents factual information on this specific subject. I don't really think so. Maybe, maybe not.	it is clear there is some thinking going on, but I can't tell what kind.	No Evidence	analyze genre
Student I: It features a main character dealing with conflict. It's one I can entertain but probably not this one.	it is clear there is some thinking going on, but I can't tell what kind.	No Evidence	analyze genre
Student I: It describes events that happened in the past. I mean, no, not really.	it is clear there is some thinking going on, but I can't tell what kind.	No Evidence	analyze genre
Student I: It includes an animal that relates to humans.	No Evidence	No Evidence	No Evidence
Student I: I don't know but all these seem wrong for some reason.	it is clear there is some thinking going on, but I can't tell what kind.	No Evidence	analyze genre
Interviewer: Keep going. You're doing great.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: But I think it's it presents factual information on a specific subject. Probably not. That doesn't sound right.	it is clear there is some thinking going on, but I can't tell what kind.	No Evidence	analyze genre
Student I: It features a main character dealing with conflict. I don't...no, I don't think so.	it is clear there is some thinking going on, but I can't tell what kind.	No Evidence	analyze genre
Student I: It describes events that happened in the past. It's for sure not this one because it didn't say this happened in the past.	explain - reference genre	No Evidence	explain - rationale genre
Student I: It includes an animal that relates to humans. I mean, some animals don't relate to humans a lot.	explain - rationale genre	No Evidence	explain - rationale genre
Student I: Probably not this one.	No Evidence	No Evidence	No Evidence
Student I: It features a main character dealing with conflict.	No Evidence	No Evidence	No Evidence
Student I: It presents factual information on a specific subject. I think it's this one.	No Evidence	No Evidence	analyze genre
Interviewer: Okay. Tell me why.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: I feel like this one is more for non-fiction where it tells facts about the crow.	apply genre	applying genre	applying genre
Student I: And this one seems more like the answer because these two don't seem like it.	No Evidence	No Evidence	No Evidence
Interviewer: Okay. Okay. Great. Good job.	No Evidence	No Evidence	No Evidence
<p>[Item 2 - Carolina Crow Girl]</p> <p>Student I: Okay. What is the main purpose of paragraph seven? The main purpose of paragraph [student reads paragraph 7 aloud] seven is there's no such thing as absolute, total freedom, Caroline. We all have things we can't do or won't do or aren't allowed to do. That's what it means to grow up. He stopped then, embarrassed that he'd gone on for so long. But Crow, Crow belongs to an entire world. It's time to let him go there.</p>	No Evidence	No Evidence	No Evidence
Student I: Okay. To emphasize the difficulties in Crow's life. Probably not that one. He's just...Stephan was just telling Caroline that Crow...like there's no freedom stuff.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: To contrast Crow's world with the human world. I mean, maybe, maybe not.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: To explain how Caroline and Stephan acquired the crow. It didn't say anything how they got the crow so probably not that one.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: To show that Stephan has difficulty talking to Caroline. Well, he's talking to her a lot and just says he was embarrassed that he's gone on so long.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: So to emphasize the difficulty...no, I think it's to contrast Crow's world with the human world.	No Evidence	No Evidence	No Evidence
Interviewer: And give me some information about that. Like why did you go there? Why did you think that one?	No Evidence	No Evidence	No Evidence
Student I: Well, we all have things we can't do or won't do. It says right here, there's no such thing as absolute freedom.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: Oh, wait. No, it says he's never been...he's not...he's never been free. That's what it means to grow up. It says right here, but Crow, Crow belongs to an entire world and it's time to let him go there.	No Evidence	No Evidence	No Evidence
Interviewer: Okay.	No Evidence	No Evidence	No Evidence

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: And these don't really seem like the answers. I don't know why but they didn't say anything about how they caught the crow.	No Evidence	No Evidence	No Evidence
Student I: Stephan can absolutely talk to Caroline, right here.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Student I: To emphasize difficulties in Crow's life, I mean, up here it did say but he's not...he's never been free. So I think it's B.	explain - reference main idea	explaining/referencing main idea	explaining/referencing main idea
Interviewer: Okay. Great.	No Evidence	No Evidence	No Evidence
[Item 3 - Carolina Crow Girl] Student I: How is Stephan important to the plot? He prepares Crow for a different kind of life. No, he's just telling Caroline about it.	explanation - rationale literary elements	explain/rationale literary elements	explain/rationale literary elements
Student I: He shows Caroline how to take care of the crow. I mean, maybe because he's telling Caroline to let go of it.	explanation - reference literary elements	explain/reference literary elements	explain/reference literary elements

Transcribed Responses	Reserved for Cogna Analysis; Leave Blank	Melissa's Coding	Consensus
Student I: He helps Caroline understand what she must do. Most likely this one.	No Evidence	No Evidence	No Evidence
Student I: He explains how Crow is different from other birds. He never says anything about other birds	explanation - rationale literary elements	explain/rationale literary elements	explain/rationale literary elements
Student I: so it's most likely C because he's telling her to let go of Crow because he needs to be free out there.	explanation - rationale literary elements	explain/rationale literary elements	explain/rationale literary elements
Interviewer: Great. Okay. Excellent.	No Evidence	No Evidence	No Evidence
[Item 4 - Carolina Crow Girl] Student I: Okay. Identify what the crow symbolizes in the passage. I think it symbolizes something that you have that you have to let go because it's like you can't keep it forever and it needs to be free. Yeah.	analyze literary elements	No Evidence	analyze literary elements
Interviewer: Okay. And did you have any evidence in the passage that would help you know how to know that answer?	No Evidence	No Evidence	No Evidence
Student I: Well, what does it say? He should be released, Caroline, and...yeah. That's it.	explanation - rationale literary elements	explain/rationale literary elements	explain/rationale literary elements



School District A—Grade 5 Mathematics (Student 1)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 1: [Item 1] Beth completed her reading goal for 10 days. What is the total number of pages Beth read? Beth, Dean, Jake and Maya each set a goal. The table shows their goals. [Student reads the table.] Beth read 15 pages per day. Dean read 125 pages per week. Jake read 110 pages per week. Maya read 40 pages for two days.</p> <p>And they want to know how much Beth read.</p>	no evidence	no evidence	no evidence
Interviewer: That's right.			
Student 1: So 15 times 10, 150.	interpreting place value	interpreting	interpreting place value
Interviewer: How did you know to multiply those 15 times 10?			
Student 1: Because usually they give a chart and it says and then it has 10 or something like the number and it's asking you how much stuff was read.	no evidence	no evidence	no evidence
Interviewer: And how did you know to multiply instead of maybe like add or subtract?			
Student 1: Because all these things, I just always knew how to do that, so I don't really know.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: That's okay, but you got it right so you must have known something. Okay go ahead and choose B and then next.			
<p>Student 1: [Item 2] Use this information on the following three questions. Jake is reading a book that is 389 pages. Based on Jake's reading goal, how many pages of the book will Jake have left to read at the end of three weeks? Dean, Beth, Jake and Maya set a reading goal. [Student reads table.] This shows their goals, reading goals. Beth has 15 per day. Dean has 25 per day. Jake has 110 per week. Maya has 40 pages for two days.</p> <p>I'm going to be subtracting.</p>	no evidence	no evidence	no evidence
Interviewer: Okay. Go ahead and try it.			
Student 1: [air]			
Interviewer: So you did 389 minus 110? [on scrap paper]	interpreting (incomplete)	no evidence	interpreting (incomplete)
Student 1: Um-hum.	no evidence	no evidence	no evidence
Interviewer: How did you know that it was going to be subtraction?			
Student 1: Because it says how many will he have left to read.	no evidence	interpreting	no evidence
Interviewer: Okay so is one of those words a clue that you should subtract?			
	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Um-hum.			
Interviewer: Okay and which answer is that?			
Student 1: 279.	no evidence	no evidence	no evidence
Interviewer: Nice. Okay, how about this one?			
<p>Student 1: [Item 3] Maya completed her goal for two days. The first day she read 22 pages. The second day she read eight pages in the morning. The equation can be found in the number of pages Maya read in the evening on the second day. Forty two minus 22 equals blank plus 8. Which value can be placed for the blank to make a true equation? [Student reads shared stimulus.] Beth, Dean, Jake and Maya set a reading goal to show their goals. Beth read 15 pages per day. Dean read 125 per week. Jake read 110 per week. Maya read 40 pages for two days.</p> <p>Forty minus 22 equals 17.</p>	evaluating	evaluating	evaluating
Interviewer: So you did 40 minus 22 and got 17?			
Student 1: Um-hum.	no evidence	no evidence	no evidence
Interviewer: Okay and then how did that help you?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Because you have to figure out what the question asks, so I have to add 8 to 17.	evaluating (student makes a computation error, but the evaluation is correct)	evaluating	evaluating (student makes a computation error, but the evaluation is correct)
Interviewer: So what did you get?			
Student 1: 17, 18, 19, 20, 21, 22, 23, 24. [Student is trying to count on 7 more.] I don't think that would be right.	no evidence	no evidence	no evidence
Interviewer: Because it wasn't actually here? [not an answer choice]			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: So what would happen on the day of the test if you got an answer and it wasn't a choice? What would you do?			
Student 1: I would go by the closest or try to do it again.	no evidence	no evidence	no evidence
Interviewer: Okay so you choose your strategy. However you think you would like to do.			
Student 1: [air] 19, 20, 21, 22, 23, 24, 25.	no evidence	no evidence	no evidence
Interviewer: Close.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: 40 minus 22...9, 8, 7...3-2 equals 1 so.	no evidence	no evidence	no evidence
Interviewer: So you got the same 17 again when you subtracted?			
Student 1: Um-hum.	no evidence	no evidence	no evidence
Interviewer: So then what would you do?			
Student 1: Plus 8, so 18, 19, 20, 21, 22, 23, 24, 25.	no evidence	no evidence	no evidence
Interviewer: You got it again, so then what would you do?			
Student 1: I would pick the...	no evidence	no evidence	no evidence
Interviewer: Closest answer?			
Student 1: Yeah. [Student selected option C.]	no evidence	no evidence	no evidence
Interviewer: Okay great. Okay, how about number four?			
Student 1: [Item 4] How do you say that word? [Student asked for help pronouncing Duane.]	no evidence	no evidence	no evidence
Interviewer: I would say Duane.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 1: Duane knows what number multiplied by 7 is 21. Which equation can Duane use to figure out his number? [Student re-reads the item.] Duane knows that the number multiplied by 7 is 21. Which equation can Duane use to figure out this number?</p> <p>Twenty one divided by 7.</p>	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: How did you know that?			
<p>Student 1: Because if it's backwards multiplication.</p>	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: Very nice. Go ahead and click that answer, great.			
<p>Student 1: [Item 5] A photo album has 56 pages. Which estimate is the closest to the total number of pages in 43 photo albums?</p> <p>Maybe 56 times 43?</p>	explaining/reasoning	no evidence	no evidence
<p>Interviewer: Try it. Do you want to move the computer so you can write up here or is it okay on your lap? [Student was doing scrap paper calculations on her lap.]</p>			
Student 1: It's fine.	no evidence	no evidence	no evidence
Interviewer: Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: I got 2408 [when computing 56×43 on scrap paper], so the closest estimate would be 2400.	reasonable estimate assessing	assessing reasonable estimate	reasonable estimate assessing
Interviewer: And how did you know that was the closest estimate?			
Student 1: Because only eight [away from the actual answer] and it says which total number of estimate problems and there's no 10 so it's going to be closer to the thousand.	explaining/reasoning	no evidence	explaining/reasoning
Interviewer: Nice. All right, how about this one?			
Student 1: [Item 6] 56 divided by 8 equals 7. I usually sometimes just write out like 56.	fluency with multiplication and division facts	fluency with multiplication and division facts	fluency with multiplication and division facts
Interviewer: You can have tons more paper, so yeah just flip the page. I'm sorry. You said you sometimes write out, what do you write out?			
Student 1: Like 56 times seven to try to figure it out.	no evidence	no evidence	no evidence
Interviewer: Okay sure.			
Student 1: Because that's what I do if I can't figure something out. Wait, I already know it's eight.	no evidence	no evidence	no evidence
Interviewer: How do you already know that?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Because we did multiplication with all the teachers who teach us that.	no evidence	no evidence	no evidence
Interviewer: Well how do you know that you can use multiplication even though that graph says division?			
Student 1: Backwards. Dividing is backwards.	analyzing/applying relationship between multiplication and division	analyzing/applying relationship between multiplication and division	analyzing/applying relationship between multiplication and division
Interviewer: That's great. Okay so go ahead and choose your answer. Okay, how about this one?			
Student 1: [Item 7] The rectangle represents one whole unit. The sum of the fraction represented in the shaded parts of the rectangles below. We're doing fractions right now.	no evidence	no evidence	no evidence
Interviewer: Oh great, maybe something you've done this year can help you.			
Student 1: Eight and three, 8/3.	no evidence	no evidence	no evidence
Interviewer: So how did you get that three?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Oh, the shaded part.	assessing (student is trying to assess the model, but does so incorrectly)	assessing	assessing (student is trying to assess the model, but does so incorrectly)
Interviewer: And how did you get the eight?			
Student 1: Oh, it said plus 1, 2, 3, 4, 5, 6, 7, 8. [Student counted all sections in the 2 rectangles.]	no evidence	no evidence	no evidence
Interviewer: Very nice. Is that a choice?			
Student 1: Yes. [The student said eight-thirds, but chose B, three-eighths.]	no evidence	no evidence	no evidence
Interviewer: Okay great, how about this one?			
Student 1: [Item 8] The students in Ms. Plar's class measured the length of the pencils. They recorded their measurements on the plot, length of pencils (inches). How many pencils were less than one whole and $\frac{4}{8}$ long inches? So $\frac{4}{8}$, there's only one, so yeah one.	interpreting (student is trying to interpret the line plot, but does so incorrectly)	interpreting (incorrectly)	interpreting (student is trying to interpret the line plot, but does so incorrectly)
Interviewer: Can you tell me where you got the one from?			
Student 1: Oh, it said less than. Pencils were less than, how many pencils. Oh, so how many pencils were less was one whole.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: One whole?			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay great, so was that a choice?			
Student 1: Yes.	no evidence	no evidence	no evidence
Interviewer: So it's this one right here is less than the $4\frac{1}{8}$? [Student pointed to the number 4 on the line plot as the number below $4\frac{1}{8}$, even though it does not have any x's.]			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay great.			
Student 1: [Item 9] Which comparison is true? That's [option A] not true because it would be this because there's more spots to fill. This one's equal. This is equal I think. [option C]	no evidence	no evidence	no evidence
Interviewer: How do you know they're equal?			
Student 1: Because this counts as one half and that counts as one half.	assessing	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How does this count as 1/2?			
Student 1: If you slide that over. [Student motions to slide the bottom section for 2/4 to the right to match the 1/2 model.]	analyzing/applying models used to represent fractions	models used to represent fractions	analyzing/applying models used to represent fractions
Interviewer: Very nice, okay number 10.			
Student 1: [Item 10] The fraction model shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? The students in Mr. Valdez's classes measured the height of their bean plants. The table shows their data. B, there's three of those so 1/4 and 1/4 and 1/4 and Mariah's was 3/4, so 3/4. It would be C. Wait, sorry, that's not going to be it. I think it would be, so that would be 3/4 and 3/4, but there's not an answer there.	models used to represent fractions	no evidence	models used to represent fractions
Interviewer: Okay, so what answer are you looking for?			
Student 1: If you add these together it's going to be 3/4 and then that's 3/4 so it would be A.	assessing	assessing	assessing
Interviewer: How do you know it's A?			
Student 1: Because if you add these two together it would be 2/4 and then plus 1/4.	decomposition of fractions	no evidence	decomposition of fractions

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Very nice, great. All right, you have two more.			
<p>Student 1: [Item 11] Okay. Mr. Valdez made this frequency table to show the same information as in the data table of the bean plants. What is the total number of plants that has greater than 1/4 inch? The student's in Mr. Valdez's class measured the heights of their bean plants. The table shows their data.</p> <p>Two.</p>	no evidence	no evidence	no evidence
Interviewer: How do you know that?			
<p>Student 1: Because 1/4 is less than 3/4 and there's two of those.</p>	assessing (student is trying to assess the value of the fractions but does so incorrectly)	interpreting	assessing (student is trying to assess the value of the fractions but does so incorrectly)
<p>Student 1: [Item 12] Which list shows the plants height in inches in order from least to greatest? The students in Mr. Valdez's class measured the height of the bean plants. This table shows their data.</p> <p>It says least to greatest so 1/2 would go first, so it's going to be that one [option B].</p>	no evidence	no evidence	no evidence
Interviewer: How do you know that 1/2 goes first?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Because it's the least.	assessing (student is trying to assess the value of the fractions but does so incorrectly)	assessing (incorrectly)	assessing (student is trying to assess the value of the fractions but does so incorrectly)
Interviewer: And how do you know it's the least?			
Student 1: Wait, it could flip around too.	no evidence	no evidence	no evidence
Interviewer: I don't know. How would you decide?			
Student 1: Well 3/4, you're going to have one to fill and then that one to fill, so it could either be this is I think it would be 1/2 though.	assessing (student is trying to assess, but does so incorrectly)	analyzing/applying (incorrectly)	assessing (student is trying to assess, but does so incorrectly)
Interviewer: So option B is the correct answer?			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: So 1/2 would be the smallest?			
Student 1: Yeah.	no evidence	no evidence	no evidence

School District A—Grade 5 Mathematics (Student 2)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 2: [Item 1] Use this information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth completed her reading goal for 10 days. What is the total number of pages Beth read?</p> <p>It's 15 x 10.</p>	interpreting	interpreting	interpreting
<p>Interviewer: You said it's 15 x 10.</p>			
<p>Student 2: Mm-hmm. [Air]</p>	no evidence	no evidence	no evidence
<p>Interviewer: Then what did you get when you multiplied? [Air] So, when you multiplied 15 x 10, what was the answer you got below the line [on her scrap paper]? Is it 100? ____ [00:07:35].</p>			
<p>Student 2: Yes, I got 100.</p>	no evidence	no evidence	no evidence
<p>Interviewer: So, then did you go back and look at the choices and what might match?</p>			
<p>Student 2: Mm-hmm.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Okay, so what would you do on a test if that happened, if what you got didn't match a choice?</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: I'd try adding it a different way.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 2: I just tried 15 10 times.	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: Okay. However, you would think to solve it. [Air] So, you added 15 10 times and what did you get?			
Student 2: 150.	no evidence	no evidence	no evidence
Interviewer: And why did you choose to add it 10 times? What in the problem helped you figure that out?			
Student 2: I don't know. For me, it's just easier to do that.	no evidence	no evidence	no evidence
Interviewer: And was there a clue in the problem that told you to do it 10 times? How did you know to do that? What does it say right there?			
Student 2: 10 days.	no evidence	no evidence	no evidence
Interviewer: She did it for 10 days. Very nice. Okay, go on and hit "Next."			
Student 2: [Item 2] Jake is reading a book that has 389 pages. [Air]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, you're doing 389×20 ? [Air]	no evidence	interpreting (incorrectly)	no evidence
Student 2: It's not right	no evidence	no evidence	no evidence
Interviewer: So, you did 389 minus 220. What in the problem helped you figure out to do that?			
Student 2: This.	no evidence	no evidence	no evidence
Interviewer: What did they say that gave you that clue?			
Student 2: That it has 389 pages and he's supposed to be reading 110 pages a week. [Student did 389×110 on scrap paper.]	interpreting (student tried to interpret problem, but does not do so correctly)	interpreting (incorrectly)	analyzing/applying
Interviewer: A week. So how did you—			
Student 2: So, I added that together twice.	no evidence	interpreting (incorrectly)	no evidence
Interviewer: Okay.			
Student 2: And I should ____ [00:10:12] from this. Then ____ [00:10:18] three weeks.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. Then, you got an answer that wasn't a choice. So, what would you do if that happened?			
Student 2: Take my best guess.	no evidence	no evidence	no evidence
Interviewer: Sure, which would that be?			
Student 2: ____ [00:10:31]. [Student selected option C.]	no evidence	no evidence	no evidence
Interviewer: Okay, go ahead and choose the next one. Want to go ahead and read this part out loud?			
Student 2: [Item 3] Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening on the second day. $40 - 22 = \text{something} + 8$. The first thing I'll do is $40 - 22$. [Air] It's 18. It's 10.	evaluating	evaluating	evaluating
Interviewer: How did you know that because you said it's 18 and then you said it's 10? How did you get from 18 to 10?			
Student 2: Because I know $8 + 10$ is 18. And $8 + 10$ is 18 and if I had to add 10 to that.	equivalent expressions	equivalent expression	equivalent expression
Interviewer: Very nice. ____ [00:11:45]			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
[Item 4]			
Interviewer: I could tell you or you could call it anything you want. [Student struggles to pronounce Duane.] Do you want me to tell you ____ [00:11:53]? I would call them ____ [00:11:56].			
Student 2: I'll just skip the name.	no evidence	no evidence	no evidence
Interviewer: Yeah, perfect or you could just say "he."			
Student 2: He knows that a number multiplied by 7 is 21. Which equation can he use to figure out this number? Well, first of all, I already know the answer.	no evidence	no evidence	no evidence
Interviewer: You do? What is it?			
Student 2: $7 \times 3 = 21$.	analyzing/applying	fluency with multiplication and division facts	fluency with multiplication and division facts
Interviewer: Okay. How did you choose the correct answer?			
Student 2: It's that one.	no evidence	no evidence	no evidence
Interviewer: It's C? How do you know it's C?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Because division is just backwards multiplication. So, you can see how many times it takes to get 21.	analyzing/applying relationship between multiplication and division	analyzing/applying relationship between multiplication and division	analyzing/applying relationship between multiplication and division
Interviewer: Very nice way to explain it. You're doing great.			
Student 2: [Item 5] A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? [Air] First of all, I _____ [00:13:02].	no evidence	no evidence	no evidence
Interviewer: Okay. How would you do that?			
Student 2: I round that [43] to 40. That [56] would round to around 60. Because it says estimate right there. It doesn't have to be the exact answer.	explaining/reasoning reasonable estimate	explaining/reasoning	explaining/reasoning reasonable estimate
Interviewer: That's right. [Air]			
Student 2: I guess it's 2400.	no evidence	reasonable estimate	no evidence
Interviewer: How did you guess that?			
Student 2: It seems the closest.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: And were you doing—			
Student 2: I did the math in my head.	no evidence	no evidence	no evidence
Interviewer: And what kind of math did you do?			
Student 2: Multiplication.	no evidence	no evidence	no evidence
Interviewer: Okay, so did you multiply two numbers together? Which two numbers?			
Student 2: I multiplied 40 x 56, I mean 40 x 60.	analyzing/applying	no evidence	no evidence
Interviewer: And did you do that in your head?			
Student 2: Yes.	no evidence	no evidence	no evidence
Interviewer: Did you use that chart to help you or how did you figure that out?			
Student 2: I just know that kind of stuff.	no evidence	no evidence	no evidence
Interviewer: You do, okay. Great. Go ahead and choose B then.			
Student 2: [Item 6] Which number would make this equation true? 56 divided by blank equals—that's easy.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Why did you say it's easy? Why is that one easy?			
Student 2: Because I've been doing it since third grade.	no evidence	no evidence	no evidence
Interviewer: And how did you solve that box?			
Student 2: Because I know $7 \times 8 = 56$...	fluency with multiplication and division facts analyzing/applying	relationship between multiplication and division	fluency with multiplication and division facts analyzing/applying
Student 2: ...and that's just backwards.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: Very nice.			
Student 2: [Item 7] A rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? Three-fifths.	no evidence	no evidence	no evidence
Interviewer: How did you get that?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Because I knew the answer. 1,2,3 [student counted the gray rectangles]. 1,2,3,4,5 [student counted the white rectangles].	assessing (student is trying to assess the model, but does so incorrectly)	analyzing/applying (incorrectly)	assessing (student is trying to assess the model, but does so incorrectly)
Interviewer: So, when you were just counting for three-fifths, what did you count first			
Student 2: The ones that are shaded gray.	no evidence	no evidence	no evidence
Interviewer: And you got how many? How many gray?			
Student 2: Three.	no evidence	no evidence	no evidence
Interviewer: Three and then how did you get the second number?			
Student 2: I counted up the white ones.	no evidence	no evidence	no evidence
Interviewer: The white ones, okay.			
Student 2: But five isn't an answer.	no evidence	no evidence	no evidence
Interviewer: Okay. So, anything else that you could try? Or _____ [00:15:30]?			
Student 2: [Air]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you choose three-fourths? Sorry, can we go back for one second? I want to ask you one more question. How did you choose three-fourths?			
Student 2: Because that would be one-third and that would be two-fourths. So, I just added the fractions and that's the closest I got to the answer that I got.	no evidence	reasonable estimate (kind of!)	no evidence
Interviewer: Awesome, thank you.			
Student 2: [Item 8] The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $4 \frac{4}{8}$ inches long? Five.	no evidence	no evidence	no evidence
Interviewer: How did you get five?			
Student 2: I just went to this [$4 \frac{4}{8}$ on the line plot] and added all the ones behind it [to the left of $4 \frac{4}{8}$ on the line plot].	interpreting data as presented in line plots and frequency tables	interpreting data as presented in line plots and frequency tables	interpreting data as presented in line plots and frequency tables
Interviewer: Okay, so you went to $4 \frac{4}{8}$ and then counted what behind it?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: All the x's behind it.	no evidence	no evidence	no evidence
Interviewer: Okay. This one.			
Student 2: [Item 9] Which comparison is true? Give me a second to look at them [the different models]. [Air] This one. [Student points to Option D.]	no evidence	no evidence	no evidence
Interviewer: How do you know D is true?			
Student 2: Because all these other ones, it's like one-half is larger than one-fourth. And those aren't equal. That's larger. Those aren't equal. That's larger. But this is the only one that's true.	assessing (student is trying to assess the fraction comparisons, but does so incorrectly)	assessing	assessing (student is trying to assess the fraction comparisons, but does so incorrectly)
Interviewer: It's the last one. How do you know that it's true?			
Student 2: Actually, it's not true.	no evidence	models used to represent fractions	no evidence
Interviewer: So, now you're thinking maybe which one would be true?			
Student 2: This one. [Option C]	no evidence	no evidence	no evidence
Interviewer: Why is C true?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Because that would add up to one-half. [Student moves the bottom section of 2/4 over to the right.]	assessing models used to represent fractions	analyzing/applying	assessing models used to represent fractions
Interviewer: Okay. Try this one.			
Student 2: [Item 10] This is a fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? [Air]			
[Student selects option A.]	decomposition of fractions assessing	decomposition of fractions	decomposition of fractions assessing
Interviewer: Why did you choose A?			
Student 2: Because I know when I'm adding fractions, the one on the bottom stays the same and you add the two on the top.	no evidence	no evidence	no evidence
Interviewer: And did you use this part [the shared stimulus] over here to help you at all?			
Student 2: Mm-hmm. Because it said Mariah has three-fourths and going off Mariah's bean plant.	no evidence	assessing	no evidence
Interviewer: And did you use this picture to help you at all?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: No, not really.	no evidence	no evidence	no evidence
Interviewer: Not really. Okay, great. Thanks.			
Student 2: [Item 11] Miss Valdez made this frequency table to show the same information as in the data table. What is the total number of plants that have a height greater than one-fourth inch? [Air]	no evidence	no evidence	no evidence
[Student selects option c.]	interpreting	no evidence	no evidence
Interviewer: How did you know it was four?			
Student 2: Because I know one-half and three-fourths is larger than one-fourth and it said there's two students for half inch ____ [00:19:19] not including that. So, this ____ [00:19:24] is up and the ____ [00:19:26] was there.	interpreting data as presented in line plots and frequency tables	interpreting data as presented in line plots and frequency tables	interpreting data as presented in line plots and frequency tables
Interviewer: Great.			
Student 2: [Item 12] Which list shows the plant heights, in inches, in order from least to greatest?	no evidence	no evidence	no evidence
Interviewer: How do you know that A is true?			
Student 2: Because that's less than all the other ones. And three-fourths is larger than one-half.	assessing	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Now did you just know that or did you use something to figure out which one was bigger than the other?			
Student 2: I just knew it.	no evidence	no evidence	no evidence
Interviewer: You just knew. Okay. Great.			

School District A—Grade 5 Mathematics (Student 3)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: [Item 1] Use the information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Beth completed her reading goal for 10 days. Which is the total number of pages Beth read?	no evidence	no evidence	no evidence
Interviewer: So, I think, did you write 15×10 [on scrap paper] and then did you get 110?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Okay. And, did that help you find the right answer?			
Student 3: Mmm-mmm.	no evidence	no evidence	no evidence
Interviewer: How did you know to do 15×10 ?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Because, it says 15 and then 10, and then I times'd it.	interpreting	interpreting	interpreting
Interviewer: Okay. And, so what would you do on the day of the test if you got an answer that isn't a choice? What would you do?			
Student 3: Redo it.	no evidence	no evidence	no evidence
Interviewer: Okay. Do you want to give that a try?			
Student 3: Um-hmm	no evidence	no evidence	no evidence
Interviewer: What did you get this time?			
Student 3: 1,510.	no evidence	no evidence	no evidence
Interviewer: Okay. So, you multiplied and you got 1,510. Did that help you choose an answer?			
Student 3: No.	no evidence	no evidence	no evidence
Interviewer: So, what would you do? Remember that today is not about choosing the right answer, so it's okay if you don't find the right answer. But what would you do on the day of the test?			
Student 3: Probably, keep doing it until I get the right answer.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. I think for today you can go ahead and just choose the one that you think is best, because you already told me how you processed the problem. So, just, you can, or you can hit next. Okay. Great. Go ahead and choose ____ [0:08:45]. Okay. How about this one?			
Student 3: [Item 2] Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per week. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages for two days. Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks?	no evidence	no evidence	no evidence
Interviewer: I think I saw you write 110×3 , and then you got 330, right?	interpreting	interpreting	interpreting
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Why'd you erase it?			
Student 3: Oh, I thought ____ [0:09:55].	no evidence	no evidence	no evidence
Interviewer: Did you think it wasn't a choice?			
Student 3: Yeah.	no evidence	no evidence	no evidence
Interviewer: Yeah. Okay. So, how did you know to do 110×3 ?			
Student 3: Times, 110×3 , and then...	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you, like what made you think you should do that? How did you know?			
Student 3: It says Jake was reading a book at 300 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks.	no evidence	no evidence	no evidence
Interviewer: Okay. So, do you think that's your answer or were you not quite done?			
Student 3: I don't think it was 330.	no evidence	no evidence	no evidence
Interviewer: Okay. So, what, what do you think it could be?			
Student 3: 279.	no evidence	no evidence	no evidence
Interviewer: Okay. So, now you did $389 - 110$ and you got 279. So, is that your answer?	interpreting (partial)	no evidence	interpreting (partial)
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: How did you know to subtract?			
Student 3: Because, it says how many will he have left.	no evidence	interpreting	no evidence
Interviewer: So, did that give you the clue?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. Great. Go ahead and choose your answer. All right. Next one.			
Student 3: [Item 3] Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per week. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. The equation can be used to find the number of pages Maya read this evening on the second day. Which value can be placed in the blank to make this equation true?	no evidence	no evidence	no evidence
Interviewer: That's right. So, what did you do first when you tried to solve it?			
Student 3: I got the 18 for the blank and then I added 8 to the, to the 18. And, got 26.	evaluating	evaluating	evaluating
Interviewer: How did you know to add 8?			
Student 3: Because, it says $40 - 22 = 18 + 8$.	no evidence	no evidence	no evidence
Interviewer: Very nice. Can you choose your answer?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Great job. Okay. How about this one?			
Student 3: [Item 4] Duane knows that the number multiplied by 7 is 21. Which equation can Duane use to figure out this number?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
[Student selected option C.]			
Interviewer: How did you know that [that C is the correct answer]?			
Student 3: Because, 7 divided by 3 equals 21	no evidence	no evidence	no evidence
Interviewer: 7 divided by 3 is 21?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Okay. Great.			
Student 3: Or, no.	no evidence	no evidence	no evidence
Interviewer: You want to go back for one second? Do you want to say it differently?			
Student 3: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 3: 21 divided by 7 equals 3. [option c]	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: And, now where did you come up with 3?			
Student 3: $7 \times 3 = 21$.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. Very nice. Sometimes I mix those up, too.			
Student 3: [Item 5] A photo album has 56 pages. Which, which estimate is closest to the number of pages in 43 photo albums?	no evidence	no evidence	no evidence
Interviewer: What are you thinking about this one?			
Student 3: I don't understand.	no evidence	no evidence	no evidence
Interviewer: Okay. What would you do on the test if you didn't quite get it?			
Student 3: Think or read it.	no evidence	no evidence	no evidence
Interviewer: Yeah. Do you want to read it again?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: You can either read it to me or read it in your head, whatever you like. [Student re-reads problem in her head.] There you go. So, you did 56×43 on scrap paper]?	assessing	no evidence	no evidence
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: And, what did you get?			
Student 3: 22,568.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. So, how will that help you?			
Student 3: Not any.	no evidence	no evidence	no evidence
Interviewer: Okay. How did you know to multiply?			
Student 3: 56, it says a photo album has 56 pages. Which estimate is closest to the number of pages in 43 photo albums?	no evidence	no evidence	no evidence
Interviewer: And, what made you think multiply?			
Student 3: Because, if you multiply _____ [0:16:40] you would get that closest.	no evidence	explaining/reasoning	no evidence
Interviewer: That's right. Okay. So, your answer doesn't seem to _____ [0:16:53] would you do if that happened on the test day? Are you reading it again, trying to figure it out?			
Student 3: Um hmm.	no evidence	no evidence	no evidence
Interviewer: _____ [0:17:24].			
Student 3: A photo album has 56 pages. Which estimate is closest to the number of pages in 43 photo albums?	no evidence	no evidence	no evidence
Interviewer: I think I just heard you say, did you say divided by?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Mmm.	no evidence	no evidence	no evidence
Interviewer: Are you trying to figure out if multiplication...			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: ...is correct or ____ [0:17:52]?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Okay. Are you kind of still confused with this problem?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Do you want to just hit next, the next one? Okay. ____ [0:18:18].			
Student 3: [Item 6] Which number would make this equation true? 8.	no evidence	no evidence	no evidence
Interviewer: How ____ [0:18:26]?			
Student 3: Because, I know that $8 \times 7 = 56$.	fluency with multiplication and division facts analyzing/applying	analyzing/applying fluency with multiplication and division	fluency with multiplication and division facts analyzing/applying

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Now, how did you use times, even though this says divided by?			
Student 3: Because, my teacher said if you put whatever number you know right there and then put the times sign right there, and then times those, you'll get the same answer as that.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: Very nice. I'm glad you listened to your teacher. Go ahead and hit next.			
Student 3: [Item 7] This rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? 3/4.	no evidence	no evidence	no evidence
Interviewer: How do you know it's 3/4?			
Student 3: Because, 1/4 and then I added 2/4 together and I got 3/4.	assessing models used to represent fractions	assessing models used to represent fractions	assessing models used to represent fractions
Interviewer: Great. Now, how did you, what did you do when you added 1/4 and 2/4? You, you did it in your head.			
Student 3: Yeah.	no evidence	no evidence	no evidence
Interviewer: How did you, how did you do that?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Well, I, that and then I went, and then I added those two.	no evidence	no evidence	no evidence
Interviewer: So, you added the top numbers?			
Student 3: And, I got 3 and you don't change the bottom number.	no evidence	no evidence	no evidence
Interviewer: That's right. Great. Okay. Go ahead and choose your answer. Okay.			
Student 3: [Item 8] The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $4 \frac{4}{8}$ inches long?	no evidence	no evidence	no evidence
Student 3: 3?	interpreting (student is trying to interpret the line plot, but does so incorrectly)	interpreting (incorrectly)	interpreting (student is trying to interpret the line plot, but does so incorrectly)
Interviewer: How do you know? How, where did you get 3 from?			
Student 3: I was counting how much the big ones are and then.	no evidence	no evidence	no evidence
Interviewer: So, what were you counting? Can you show me on the screen, yeah, like with your finger or the eraser? Yeah, either way.			
Student 3: That big numbers, because _____ [0:21:13] the big, or the small numbers are bigger than big numbers	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 3: And, I found that 1, 2.	no evidence	no evidence	no evidence
Interviewer: Yeah. 2.			
Student 3: 3.	no evidence	no evidence	no evidence
Interviewer: 3. Okay. So, 3 numbers are above that 4 4/8?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Okay. But then 3 wasn't a choice, so is there anything else you could think about?			
Student 3: Times the x's.	no evidence	no evidence	no evidence
Interviewer: Give that a try and see what happens.			
Student 3: 4.	no evidence	no evidence	no evidence
Interviewer: So, can you show me with your finger or the eraser which x's were you counting?			
Student 3: That one	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 3: That one, that one and that one.	no evidence	no evidence	no evidence
Interviewer: Okay. And, you got 4. Hmm. How did you know which x's to count?			
Student 3: Because, it says lower than 4 and $\frac{4}{8}$.	interpreting (student is trying to interpret the line plot, but does so incorrectly)	interpreting (incorrectly)	interpreting (student is trying to interpret the line plot, but does so incorrectly)
Interviewer: Great. Okay. So, how is, this was one of the ones you counted, right?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: How is $4\frac{7}{8}$ lower? How do you know that			
Student 3: I think it was better than last, better _____ [0:22:20] times then. And, you can times the 4 and the 7. And, you times it and then get the number and you can see which one is bigger.	no evidence	no evidence	no evidence
Interviewer: Okay. Cool. And, then so which choice would you make?			
Student 3: Oh.	no evidence	no evidence	no evidence
Interviewer: If you're not sure, we can go to the next one. It's up to you.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: I think it's 7.	no evidence	no evidence	no evidence
Interviewer: You think it's 7? Okay. What made you think 7?			
Student 3: Since that one didn't have any x's, I found that one. Then I found that one.	no evidence	no evidence	no evidence
Interviewer: Okay. So, show me with your pencil. Do you count, you counted this one?			
Student 3: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 3: And, then that one.	no evidence	no evidence	no evidence
Interviewer: Yeah, yeah.			
Student 3: That one.	no evidence	no evidence	no evidence
Interviewer: Okay. 3.			
Student 3: That one.	no evidence	no evidence	no evidence
Interviewer: 4.			
Student 3: That one.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: 5.			
Student 3: And, then that one	no evidence	no evidence	no evidence
Interviewer: Okay. Great. Okay. So, go ahead and choose 7. The next one. So, what did the problem ask you to do?			
Student 3: [Item 9] Which comparison is true?	no evidence	no evidence	no evidence
Interviewer: All right.			
Student 3: I think those two are equal _____. [0:24:30]. [option B]	no evidence	no evidence	no evidence
Interviewer: Option B?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Oh, yes. Why do you think those two are equal to each other?			
Student 3: Because, if I add them both up, I get three thirds.	assessing (student is trying to assess, but does so incorrectly)	assessing (incorrectly)	assessing (student is trying to assess, but does so incorrectly)
Interviewer: Great. Are you not sure? Are you still thinking about some other ones?			
Student 3: Um-hmm.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 3: Oh, that one. [option C]	no evidence	no evidence	no evidence
Interviewer: Why is that one?			
Student 3: Because, it's $\frac{1}{2}$ and that's $\frac{2}{4}$, so there's the half on that one and then the half on that one.	models used to represent fractions assessing	assessing decomposition of fractions	models used to represent fractions assessing
Interviewer: Very nice. Great. This one.			
Student 3: [item 10] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. _____ [0:25:31] bean plan heights. Anna has a $\frac{1}{2}$. Eva has $\frac{3}{4}$. Kent has $\frac{1}{2}$. Maria has $\frac{3}{4}$ and Peter has $\frac{1}{4}$. This is a fraction model that shows the height of Maria's been plant. Which expression is equal to the height of Maria's bean plant? This one. [option A]	no evidence	no evidence	no evidence
Interviewer: Which one?			
Student 3: A.	no evidence	no evidence	no evidence
Interviewer: A. How did you know that A was equal?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Because, I added 2 and 3, so that makes $\frac{3}{4}$. And, then I added these 3 [from the model], which makes $\frac{3}{4}$.	decomposition of fractions assessing	assessing models used to represent fractions	decomposition of fractions assessing
Interviewer: Very nice. Great. Okay. Next one.			
Student 3: [Item 11] Use information to answer the following three questions. The students in Mr. Valdez's class measured their heights of their bean plants. This table shows their data. Anna has $\frac{1}{2}$. Eva has $\frac{3}{4}$. Kent has $\frac{1}{2}$. Maria has $\frac{3}{4}$ and Peter has $\frac{1}{4}$. Mr. Valdez made this, this frequency table to show the same information as in this data, data table. Bean plant heights. Which, what is the total number of plants that have a height greater than $\frac{1}{4}$ of an inch? 2?	no evidence	no evidence	no evidence
Interviewer: How did you know that 2 was correct?			
Student 3: 1.	no evidence	no evidence	no evidence
Interviewer: 1. How do you know that?			
Student 3: Because, those two [$\frac{1}{2}$ and $\frac{3}{4}$], they're bigger than that one [$\frac{1}{4}$]. So, I count these two and I put 2 away, and then there's just 1 left.	assessing (incorrectly)	interpreting (incorrectly)	assessing (incorrectly)
Interviewer: You put, I'm sorry, can you say that last part again? There was these two, you put them away. What does that mean?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: I took these two away and I _____ [0:28:04] there was only which would be more.	no evidence	no evidence	no evidence
Interviewer: Okay. 1 option that's bigger than $\frac{1}{4}$. Great. Okay. Go ahead and choose 1. Are, are you still thinking?			
Student 3: No.	no evidence	no evidence	no evidence
Interviewer: You're sure? Because, take your time.			
Student 3: Okay. [Item 12] Which list shows the plant, or use this information to answer the following three questions. The student in Mr. Valdez's class measured the heights of the bean plants. This table shows their data. Anna had $\frac{1}{2}$. Eva had $\frac{3}{4}$. Kent had $\frac{1}{2}$. Maria had $\frac{3}{4}$. Peter has $\frac{1}{4}$. Which list shows the plant heights in inches in order from least to greatest?	no evidence	no evidence	no evidence
[Student selects option A]			
Interviewer: How do you know that? That's correct.			
Student 3: Because, $\frac{3}{4}$, it's behind 4 and $\frac{1}{2}$ is in the middle. So, I did that, because $\frac{1}{2}$ is bigger than these two.	no evidence	assessing	no evidence

School District A—Grade 5 Mathematics (Student 4)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 4: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number?</p> <p>Twenty-one divided by 7 would be 3 and 7 times 3 is 21.</p>	analyzing/applying	analyzing/applying	analyzing/applying
<p>Interviewer: Now, how did you know that you could use divided, but then you said 7 times 3 is 21. Those aren't the same. Like one was divided and one was times. How is that okay?</p>			
<p>Student 4: I meant 21 divided by 7.</p>	no evidence	no evidence	no evidence
<p>Interviewer: No. You said it perfectly. You said 21 divided by 7 is 3, and then I think you said 3 times 7 is 21. So how are you allowed to use one divided by and one times? How does that help you? I'm not telling you your answer is wrong. You're actually very smart, but how did you know that?</p>			
<p>Student 4: Because like if you see a division problem you can like look at that number and like 7 times what equals 21?</p>	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
<p>Interviewer: Very nice, great explaining. Okay, go ahead and choose C. So when I ask you the questions, it doesn't mean you're wrong. I just want to know how your brain thinks.</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: [Item 2] A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? [air]	no evidence	no evidence	no evidence
Interviewer: So what are you thinking about?			
Student 4: Like maybe you do something with the 56 and 43, like maybe multiply them.	analyzing/applying	no evidence	analyzing/applying
Interviewer: Okay. What would happen if you did that?			
Student 4: Maybe you would get one of those answers.	no evidence	no evidence	no evidence
Interviewer: Do you want to give it a try?			
Student 4: Last year Ms. Albright taught us turtle [a method for multiplying].	no evidence	no evidence	no evidence
Interviewer: You know what? I saw somebody else do that. I've never seen that before. What do you call it?			
Student 4: Turtle [a trick to use when multiplying].	no evidence	no evidence	no evidence
Interviewer: That's a cool name for it.			
Student 4: [air]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. I saw you multiplied 56 times 43 [on scrap paper] and what did you get?			
Student 4: 2335. I'm thinking like what number is the closest.	no evidence	analyzing/applying	no evidence
Interviewer: What would you round that to?			
Student 4: 2000.	explaining/reasoning (the student is trying to reason to find the best estimate, but does so incorrectly)	no evidence	explaining/reasoning (the student is trying to reason to find the best estimate, but does so incorrectly)
Interviewer: 2000, so choice A. Very nice, all right go ahead and chose next.			
[Item 3]			
Student 4: [air] I'm thinking like one of those numbers times 7 would equal 56.	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: That's a great thing to think about. Do you know which one that might be?			
Student 4: [option] A maybe.	no evidence	no evidence	no evidence
Interviewer: How would you check to see if that's right?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: Work it out probably. I know that 7 times 6 is 41, so I can like add 7 to that. I'm pretty sure it is A.	no evidence	relationship between multiplication and division	no evidence
Interviewer: Okay and you said out loud that you were trying to figure out 7 times something is 56, so how did you know to do times?			
Student 4: Because if you have a question like that you know that like 56 times 7 is going to equal something under 56.	explaining/reasoning (student is trying to reason, but does so incorrectly)	no evidence	explaining/reasoning (student is trying to reason, but does so incorrectly)
Interviewer: Very nice. That was great reasoning. Okay, go ahead. Oh, sorry. You did pick you answer, so go ahead and pick you answer and then hit next. Do you want to read that one to me?			
Student 4: [Item 4] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth completed her reading goal for 10 days. What is the total number of pages Beth read? [air] Maybe you would like multiply 110 by 10 maybe? [Student uses wrong row of table.]	interpreting (but interpreting incorrectly)	no evidence	interpreting (but interpreting incorrectly)
Interviewer: How did you get the 110?			
Student 4: I mean 40.	no evidence	no evidence	no evidence
Interviewer: Where did you see the 40?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: I mean 15. I'm sorry.	no evidence	no evidence	no evidence
Interviewer: That's okay.			
Student 4: That.	no evidence	no evidence	no evidence
Interviewer: From that, very nice. Okay, so what would happen if you did that?			
Student 4: Maybe we'd get one of the answers over there.	no evidence	no evidence	no evidence
Interviewer: Do you want to try it?			
Student 4: [air]	no evidence	no evidence	no evidence
Interviewer: I think you did 15 times 10 on your paper, right? And what did you get?			
Student 4: 150.	interpreting	interpreting	interpreting
Interviewer: Do you think that means that might be the answer?			
Student 4: Um-hum.	no evidence	no evidence	no evidence
Interviewer: And how did you know to multiply those numbers?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: Because like most of the time it is multiplying and sometimes it can be adding, subtracting or dividing	no evidence	no evidence	no evidence
Interviewer: That's great. Okay, go ahead and pick your answer.			
Student 4: [Item 5] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of three weeks? Maybe like 110 divided by 3 or times.	no evidence	no evidence	no evidence
Interviewer: How do you know if it should be divided by or it should be times?			
Student 4: I think it would be times because like if we do like 110 times 3 maybe we can get one of those answers.	interpreting (incomplete)	interpreting (incomplete)	interpreting (incomplete)
Interviewer: Give it a try.			
Student 4: 330.	no evidence	no evidence	no evidence
Interviewer: So is it D.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 4: [Item 6] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Maya completed her goal for two days. The first day she read 22 pages. The second day she read eight pages in the morning. Which equation can be used to find the number of pages Maya read in the evening on the second day?</p> <p>I would subtract like 40-22 and then whatever answer that is would be the answer to the box.</p>	evaluating (student is trying to evaluate for box, but does so incorrectly)	evaluating (incorrectly)	evaluating (student is trying to evaluate for box, but does so incorrectly)
Interviewer: Okay great. Go ahead and try that.			
Student 4: It would be 18.	no evidence	no evidence	no evidence
Interviewer: So you did 40 minus 22 and got 18?			
Student 4: Um-hum.	no evidence	no evidence	no evidence
Interviewer: Is that your answer[option D]? Nice. Okay, how about number seven?			
Student 4: [Item 7] The students in Mr. Valdez's class measured the heights of their beans. This table shows the data. This is a fraction that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plants?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 4: I think it would be B because if you added all of those [all 4 sections in the model] it would be $\frac{4}{4}$, which is one whole. And if you added those it would be $\frac{4}{4}$, which is one whole.</p>	<p>models used to represent fractions (partial)</p> <p>assessing (student is trying to assess the value of the fractions, but does so incorrectly)</p>	<p>assessing</p> <p>decomposition of fractions</p>	<p>models used to represent fractions (partial)</p> <p>assessing (student is trying to assess the value of the fractions, but does so incorrectly)</p>
<p>Interviewer: So if you added...did you use the picture to help you get $\frac{4}{4}$ and then you also knew that that one before you?</p>			
<p>Student 4: Um-hum.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Okay great.</p>			
<p>Student 4: [Item 8] The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as in the data table. Which is the total number of plants that have a height greater than $\frac{1}{4}$ inch?</p> <p>Well $\frac{1}{2}$ and $\frac{3}{4}$ are both bigger than it [$\frac{1}{4}$].</p>	assessing	interpreting (incorrectly)	assessing
<p>Interviewer: So how does knowing that help you get the answer?</p>			
<p>Student 4: [air] I know that I think it would be like $\frac{1}{2}$ is the biggest because it has the biggest space.</p>	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. Yeah, if you scroll down you can see the answer choices to help you choose an answer.			
Student 4: [air]	no evidence	no evidence	no evidence
Interviewer: What are you thinking about?			
Student 4: Well.	no evidence	no evidence	no evidence
Interviewer: Well, at the beginning, you told me that $\frac{1}{2}$ and $\frac{3}{4}$ are bigger than $\frac{1}{4}$, right? And then how could you use that to help you or are you not sure and that's what you're stuck on?			
Student 4: [air]	no evidence	no evidence	no evidence
Interviewer: So what would you do on the day of the test if you weren't sure?			
Student 4: [air] I think it would be two because $\frac{1}{2}$ is the biggest and it has a two right there.	no evidence	no evidence	no evidence
Interviewer: Okay great, so you used this table to help you?			
Student 4: Um-hum.	no evidence	no evidence	no evidence
Interviewer: Go ahead and choose two.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 4: [Item 9] The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. Which list shows the plant heights in inches in order from least to greatest?</p> <p>I think it would be B because $\frac{1}{2}$ is the smallest and then $\frac{1}{4}$ is the second smallest, I mean biggest, and then $\frac{3}{4}$ is the smallest.</p>	<p>assessing (student is trying to assess the value of the fractions, but does so incorrectly)</p>	<p>assessing (incorrectly)</p>	<p>assessing (student is trying to assess the value of the fractions, but does so incorrectly)</p>
<p>Interviewer: Okay, very nice. Go ahead and choose B.</p>			
<p>Student 4: [Item 10] This rectangle represents one whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below?</p> <p>You would like write down the fractions and then you would add them.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Student 4: That would be $\frac{1}{4}$ and the other one would be $\frac{2}{4}$, $\frac{3}{4}$.</p>	<p>assessing</p> <p>models used to represent fractions</p>	<p>assessing</p> <p>models used to represent fractions</p>	<p>assessing</p> <p>models used to represent fractions</p>
<p>Interviewer: You're doing your math[on scrap paper], so $\frac{1}{4}$ plus $\frac{2}{4}$ equals $\frac{3}{4}$ is what you have on your paper. Good job.</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: [Item 11] The students in Mr. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $4\frac{4}{8}$ inches long?	no evidence	no evidence	no evidence
Student 4: I think it would be five because there's there three and then you would add all of those up. [Student points to all x's below $4\frac{4}{8}$.]	data as presented in line plots and frequency tables interpreting	interpreting data as presented in line plots and frequency tables	data as presented in line plots and frequency tables interpreting
Interviewer: And how did you know only to do these ones?			
Student 4: Because $\frac{4}{8}$ is right there and it said less than.	interpreting	interpreting	interpreting
Interviewer: Very, very sweet, so one more.			
Student 4: [Item 12] Which comparison is true?	no evidence	no evidence	no evidence
Student 4: I think it would be D because $\frac{1}{3}$ is bigger.	assessing (student is trying to assess which value is larger, but does so incorrectly)	assessing (incorrectly)	assessing (student is trying to assess which value is larger, but does so incorrectly)
Interviewer: $\frac{1}{3}$ is bigger than $\frac{2}{3}$?			
Student 4: Um-hum	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: And so how do you know that $\frac{1}{3}$ is bigger than $\frac{2}{3}$?			
Student 4: If you were to draw it out it would have bigger space.	no evidence	no evidence	no evidence

School District A—Grade 5 Mathematics (Student 5)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: [Item 1] "Duane knows a number multiplied by seven is 21. Which equation can Duane use to figure out this number?" I'll try, I'll try ... it said 21 divided by seven and then ...	no evidence	no evidence	no evidence
Interviewer: It's on your paper and you did 21 divided by seven and what did you get?			
Student 5: Yes, 21. I mean it's three.	no evidence	no evidence	no evidence
Interviewer: It's three? Okay, how does that help you?			
Student 5: It helps me because Duane wants to know, he knows seven divided by 21 ... I mean something divided by seven is 21. So, if you divide it, it's like the opposite of multiplication.	relationship between multiplication and division analyzing/applying	analyzing/applying relationship between multiplication and division	relationship between multiplication and division analyzing/applying
Interviewer: That's very nice explaining. Good job. How about this one?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: [Item 2] "A photo album has 56 pages. Which estimate is the closest to total the number of pages in 43 number of albums?"	no evidence	no evidence	no evidence
Student 5: Hmm, which is the closest to the number of the pages in ... it would be three.	no evidence	no evidence	no evidence
Interviewer: Okay			
Student 5: Oh.	no evidence	no evidence	no evidence
Interviewer: I think you should read it again. [Student reads problem silently.]			
Student 5: So, you're going to times 56 by 43 and then once you get that answer you can ... I mean you divide, I mean you can estimate ... you can change 56 to 60 and then you can change ... but if the number next to it is higher than a five, then it goes up one, but if the number is lower than a four it stays the same.	reasonable estimate explaining/reasoning	reasonable estimate	reasonable estimate explaining/reasoning
Interviewer: That's great.			
Student 5: So, 40 times 60 –	no evidence	no evidence	no evidence
Interviewer: So, what did you get?			
Student 5: Two hundred, but the closest to 200 would be 2,000. [Student multiplied 40 x 60 on scrap paper and got 200.]	no evidence	assessing (incorrectly)	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, you multiplied 60 times 40 and got 200?			
Student 5: Yeah.	no evidence	no evidence	no evidence
Interviewer: And then you want to estimate that to be -?			
Student 5: Two thousand.	no evidence	no evidence	no evidence
Interviewer: Okay. How did you know to multiply those numbers?			
Student 5: Because it's ... a photo album has 56 pages and the number of pages in the photo ... into the total of the pages in the photo, the 46 ... wait.	no evidence	no evidence	no evidence
Interviewer: You've got it.			
Student 5: The photo album has 56 pages. The total number of the pages is 53, so they only used 53 pages so far out of ... but they haven't used all of the 56, so you would have to times ... you could either estimate uh them two first or you could times them first and then estimate the number.	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: Great. Do you want to choose your answer?			
Student 5: Mm-hmm.	no evidence	no evidence	no evidence
Interviewer: Great job. How about this one?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: [Item 3] Choose a number that would make this quotation true. Wait.	no evidence	no evidence	no evidence
Student 5: Okay. I'm going to ... what I like to do if I can't—if I like know it I would ... it's like nine is bigger than what would make this 63, so I'd go to a number lower than that to find it, so it would be seven times eight, and wait –	analyzing/applying fluency with multiplication and division facts	analyzing/applying	analyzing/applying fluency with multiplication and division facts
Student 5: Then, if ... then it would be 56 because well, if I ever get stumped on a question that's like close to ... if I knew the question, like say this was lower than that, like one less, then I would go to that number if I know the answer. Then, I would just minus the number there so it gives me the answer.	no evidence	explaining/reasoning	explaining/reasoning
Interviewer: That's a great strategy. How did you know that you could multiply on your paper even though this says divide?			
Student 5: Because it's like with ... if it's like if it was that over there but it was times, I could ... it's like how division is the op—yeah, division is the opposite of multiplication and multiplication is the opposite of sub, of division.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: That's right. Great. Let's try the next one.			
Student 5: Oh, wait. Okay. So, it's like when we –	no evidence	no evidence	no evidence
Interviewer: Yes. You know what? This part is the same, but this part is different.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 5: [Item 4] "Use this information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals." Beth, 15 pages per day, Dean, 125 per week, Jake, 110 per week, Maya, 40 pages per two days. "Beth completed her reading goal for 10 days. What is the total number of pages Beth read?"</p> <p>So, I would take times 15 times 10 and ... wait. I think ... it would times it with zoom uh, and then one times one is one, but ... like ... oh, I think I know. Oh. It's ... it would be ... wait.</p>	interpreting	interpreting	interpreting
<p>Interviewer: So, on your paper you wrote 15 times 10 and you got 150. What are you thinking about now?</p>			
<p>Student 5: I'm thinking—because I had another one but it wouldn't be right. So, I'm pretty sure it would be 100 uh because this, all you would have to do is just add the zero to the 15 and then you can get the answer.</p>	no evidence	place value	no evidence
<p>Interviewer: Very nice. Okay, how about number five?</p>			
<p>Student 5: "Use this information to answer the following three questions. Beth, Dean, Jake, and Maya have ..."</p>	no evidence	no evidence	no evidence
<p>Interviewer: Very nice, yeah.</p>			
<p>Student 5: [Item 5] Jake is reading a book that has a total ... that has 389 pages. "Based on Jake's reading goal, how many pages of this book will Jake have let to read by the end of the three weeks?"</p> <p>So, I would ... for Jake, so I would minus 30, 389 minus 110.</p>	interpreting (student is trying to interpret the problem, but does so incorrectly)	interpreting (incorrectly)	interpreting (student is trying to interpret the problem, but does so incorrectly)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 5: Yes, so it would be two, 279.	no evidence	no evidence	no evidence
Interviewer: How did you know to subtract 110?			
Student 5: Because it says how many pages will he have left in this book at the end of the three weeks.	no evidence	no evidence	no evidence
Interviewer: Great.			
Student 5: [Item 6] "Maya completed her goal for two days." The first she read 20, 22 pages, and the second day she read eight pages. Which equation can be used to find the number of pages Maya read evening to the second question? Which is the value of—okay, so 40 minus 22 ... so, I'll do 18 minus eight. Wait. Then, I'll get 10.	evaluating	evaluating equivalent expressions	evaluating
Interviewer: I'm just going to say out loud what you wrote so that I'll remember. You wrote 40 minus 22 equals 18 and that 18 minus eight equals 10 [on scrap paper]. How did you know at the end you wanted to do minus?			
Student 5: Wait, oh wait ...	no evidence	no evidence	no evidence
Interviewer: How did you know to do that?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Because it wants me to find out what number it will be, so then I would minus those two. Then it would give me the ... even though I minus-ed it, that number would probably ... if I added it, it would have too much for these.	evaluating equivalent expressions	equivalent expressions	evaluating equivalent expressions
Interviewer: Very smart. That's great. How about this one.			
Student 5: [Item 7] "Use this information to answer the following three questions. The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data." Okay. "This fraction model shows the height of Maya's bean plant. Which expression is equal to the height of Maya's bean plant?"	no evidence	no evidence	no evidence
Student 5: So, it would be ... so if it's ... I can add those two [on the left side model] plus that [on the right side model] and there's that.	models used to represent fractions	models used to represent fractions	models used to represent fractions
Interviewer: Yes, so when you added you were talking about this picture [the fraction model in the stem]. What did you add up here when you added them?			
Student 5: I got two, two fourths, and then all I had to do was just find which one would add to two-thirds.	no evidence	no evidence	no evidence
Interviewer: Two-thirds?			
Student 5: Well, uh three-fourths.	decomposition of fraction assessing	no evidence	decomposition of fraction assessing
Interviewer: Three-fourths? Very nice. Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Okay, so it's the C. Okay.	no evidence	assessing (incorrectly)	no evidence
Student 5: [Item 8] "Mr. Valdez made a frequency table to show the same information as in the data table." What is the total of plants that have a height of greater than one-fourth inch ... four?	no evidence	no evidence	no evidence
Interviewer: How did you get that?			
Student 5: Because it says which one has a greater, and these two [1/2 and 3/4] are greater than that one.	interpreting	interpreting	interpreting
Interviewer: Okay, so one-half and three-fourths are greater, and then how did—this table helped you find the answer, so how did you get four?			
Student 5: Because the tally marks are for each student that had at least three-fourths or one-half.	data as presented in line plots and frequency tables	data as presented in line plots and frequency tables	data as presented in line plots and frequency tables
Interviewer: Very nice. Great.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 5: [Item 9] "This list shows the, the ... shows the plant's height in inches in the order from least to greatest."</p> <p>Okay, so one-half would be ... wait. Oh, from least to greatest, okay. Oh, wait. No, it can't be that. Wait. Oh, I see. It would be this [option A] because that is only one part of the ... like it's only one-fourth part of something, and then that would be half and that one is the closest to one-half.</p>	assessing	assessing	assessing
Interviewer: Which one is the closest to one-half?			
Student 5: Three fifths. Three fourths.	no evidence	no evidence	no evidence
Interviewer: Very nice. How about number 10?			
Student 5: [Item 10] "The rectangle represents one whole unit. What is the sum of the fractions represented by the shaded parts of the rectangle below?"	no evidence	no evidence	no evidence
<p>Student 5: So, I think it's ... if it is four, four, one-fourth plus two-fourths would equal three-fourths.</p>	<p>assessing</p> <p>models used to represent fractions</p>	<p>assessing</p> <p>models used to represent fractions</p>	<p>assessing</p> <p>models used to represent fractions</p>
Interviewer: Very nice.			
Student 5: [Item 11] "The students in Mrs. Plar's class measured the length of their pencil. They recorded their measurements on one line plot." The length of a ... how many pencils were less than four and four-eighths?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Five.	data as presented in line plots and frequency tables	data as presented in line plots and frequency tables	data as presented in line plots and frequency tables
Interviewer: How did you know which section to count?			
Student 5: Because these are all smaller than four because even some ... like because even though they're ... wait, wait. Because if I had one-eighth of a pencil and the other person four-eighths, then they would have a lot more, they would have at least half of the pencil.	interpreting	interpreting	interpreting
Interviewer: Okay, great and then there's one more. You would hit next.			
Student 5: Okay.	no evidence	no evidence	no evidence
Interviewer: There you go.			
Student 5: [Item 12] "Which comparison is true?"	no evidence	no evidence	no evidence
Student 5: So, no it's that [option C]. It's just that one would probably be it.	assessing models used to represent fractions	models used to represent fractions	assessing models used to represent fractions
Interviewer: Good job.			
Student 5: Yes.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How do you know that C is true?			
Student 5: Because even though they're in different spots, if you move that one over there then it would make one half.	no evidence	analyzing/applying	no evidence

School District A—Grade 8 Mathematics (Student 1)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: [Item 1] Use this information to answer all three questions. Points A, B—triangle BCD is similar to triangle ACE. The length of segment BD is three units and the length of segment AE is six units. If the length of segment ACE is 7.2 inches what is the length in units of segment BC?	no evidence	no evidence	no evidence
Student 1: Wait. So, let's write down these numbers so we can get a little basis so we don't have to look back and get a little bit of whiplash. All right, the triangle BCD is similar to ACD. All right.	no evidence	no evidence	no evidence
Student 1: So, three times six; wouldn't it be that? That don't seem right though.	no evidence	no evidence	no evidence
Student 1: So, wouldn't it be like 7.2 minus eighteen or divide it or something?	no evidence	no evidence	no evidence
Interviewer: Why don't you try it and see what happens.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, you did two over two minus eighteen and got 5.4?			
Student 1: That ain't an answer, so ... 7.2 times one point ... not one point, so times eighteen, sixteen? Six or seven? I know this answer is not really complete, but I've just got to finish this.	no evidence	no evidence	no evidence
Interviewer: Take your time. So, did you do 7.2 times eighteen and you got thirteen –			
Student 1: Thirteen point ninety-six.	no evidence	no evidence	no evidence
Interviewer: And now, why did you multiply by eighteen? How did you figure that part out?			
Student 1: It was just during a guess that went in my head, but –	no evidence	no evidence	no evidence
Interviewer: So, I don't see eighteen on the screen so I think you did something to get that number.			
Student 1: Six times three.	no evidence	no evidence	no evidence
Interviewer: Okay, the numbers are six times three. Okay.			
Student 1: So, next should we subtract, so should we add?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Try that.			
Student 1: That's not an answer either, so –	no evidence	no evidence	no evidence
Interviewer: Nine? That's not a choice either. Hmm.			
Student 1: Well, we should divide it but that's kind of difficult and kind of confusing. So, two to the ... twenty-four, that's something. All right. So, I got something wrong with this. BD is three units in length and segment AE is six units in length and segment AC is 7.2 units both going into these. 7.2, that would be ... well, since this one is shorter it would basically be like divided by something. So, let's see 7.2 divided by ... let's try three first. Two point four; that ain't an answer, but it's close. Then, let's try 7.2 divided by six. One point two, and also not an answer, so that is completely out of the question. Uh, a graph so six?	no evidence	no evidence	no evidence
Student 1: All right, basically so right there was a .123, so I decided that since this is just talking about from A to C this would basically be to try and see if we could divide from or something like that from here to here. That's three and I'm thinking 7.2, 7.2 would either be like ... I'm making sure ... oh, 7.2 is subtracted by three is 4.2.			
Interviewer: You subtracted three and got 4.2?	no evidence	no evidence	no evidence
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: Great. We'll go on to the next one.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: I'm sorry. That too way too long.	no evidence	no evidence	no evidence
Interviewer: There's no rush.			
Student 1: All right. [Item 2] Trapezoid ABDE is translated 11 units to the left and then reflected over to x-axis to form image ABDE. What are the coordinates of the vertices of trapezoid ABDE? Oh, this one seems much more easier than the last one, so –	no evidence	no evidence	no evidence
Interviewer: Great. What are you thinking?			
Student 1: So, this; this is just three to two. This is asking to multiply by the—it's translated 11 units to the left. Oh, okay. This means to the left. I usually think of like getting a little graph for this, but since there's no real other graph I could make ... hold on. What's this?	no evidence	no evidence	no evidence
Interviewer: Oh, it's just the way to use them, another way to use the mouse, but you can use that mouse over there or this one. Yeah, I find that thing kind of hard.			
Student 1: All right. Well, that's just over there. I get a little –	no evidence	no evidence	no evidence
Interviewer: Do you want to try to draw something yourself?			



Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Mm-hmm.	no evidence	no evidence	no evidence
Student 1: So, let's just get the ones that are needed out of the way. Since these are going by ... I must go by three ... since from what these are, the only true ones that matter right now are the lines that are on three and nine, six and seven and nine and six. So, most of them are odds except even ...	no evidence	no evidence	no evidence
L: so from this we can get that so if it's saying 11 units to the left; one, two, three, four, five, six, seven, eight, nine, ten, that would be negative eight [student is counting over from point A].	transformation analyzing/applying	analyzing/applying transformation	transformation analyzing/applying
L: And then E would be one, two, three, four, five, six, seven, eight, nine, ten, eleven, negative three. From what I can see there's no negative eight so that's out of the question from what I can see. So, the first part ... oh, yeah I've got that part.			
Student 1: I got four. Did I skip over one [line]?	no evidence	no evidence	no evidence
Interviewer: Yeah. Try again [Silence, murmuring - 00:14:36 to 00:14:40]			
Student 1: So, it's just negative nine?	no evidence	no evidence	no evidence
Interviewer: Negative nine, yeah so you're counting –			
Student 1: So, all of these are negative nine; one, two, three, four, five, six, seven, eight, nine, ten, eleven, so negative three?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Mm-hmm.			
Student 1: So, it would be negative nine and negative three, a lot of these, and since I see most of these don't have a negative nine it will only ... so, this one I'm assuming are going to be the answer [options C or D].	explaining/reasoning	no evidence	explaining/reasoning
Interviewer: Either C or D?			
Student 1: Either C or D.	no evidence	no evidence	no evidence
Interviewer: Because they both have the negative nine that you were looking for?			
Student 1: Yeah, and since E has negative three and C doesn't have negative three, C would be the answer.	no evidence	no evidence	no evidence
Interviewer: Very nice.			
Student 1: [Item 3] Which segment lies on a line that represents a proportional relationship between X and Y? A proportion relationship? I'm trying to figure out what that also meant.	no evidence	no evidence	no evidence
Student 1: What does that mean, that first -?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Yeah, you know what? I bet you're going to see that [the concept of proportionality] more this year. So, I think I don't want to tell you.			
Student 1: Rats. It's been a really long time since we've done –	no evidence	no evidence	no evidence
Interviewer: A lot of these and this one was hard.			
Student 1: Which segment took ... all right ... so, X and Y ...	no evidence	no evidence	no evidence
Student 1: It would be AC wouldn't it?	no evidence	no evidence	no evidence
Interviewer: Why would it be AC?			
Student 1: Because most of these are not X and Y naturally because these were both kind of beyond the X line. This one only goes up a scale with it.	no evidence	analyzing/applying (incomplete)	no evidence
Interviewer: Great. That's good reasoning. How about this one?			
Student 1: [Item 4] Triangle ABC is similar to triangle DEF as shown below. What is the length of DF? This would be 15 centimeters as well [segment DF], so –	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: So, since I multiplied these two this would be 13 times 15 most likely, so there; that's that. So, those are probably supposed to be added then. Oh, wait it's just trying to get to this one, ain't it?	no evidence	no evidence	no evidence
Interviewer: To this one right here?			
Student 1: Yeah, it's just trying to show that.	no evidence	no evidence	no evidence
Interviewer: Yeah, DF.			
Student 1: So, let's look at the answers first; nine, ten, twelve, and thirteen. Since this is odd it had to be divided by odd if you're talking about division. Fifteen divided by nine; that would be ... so fifteen divided by nine. You can't divide that—one point six, six, six, and six [student did this calculation on calculator]. Fifteen divided by ten is 1.5. I think I might have to let the ten slip past even though it's not an odd. Oh wait. Nine can be divided by three and fifteen can be divided by three, so that most likely would be reasonable since these couldn't, these can't be divided by three natural –	analyzing/applying (incomplete)	analyzing/applying (incomplete)	analyzing/applying (incomplete)
Interviewer: So, you're in agreement that all of them can be divided by three?			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: Great.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 1: [Item 5] Yanni drew the rectangle KLMN on this graph. Yanni will reflect that rectangle over the x-axis. Which ordered pair describes the location of point K after it is reflected over the x-axis?</p> <p>All right.</p>	no evidence	no evidence	no evidence
<p>Student 1: My head is trying to get this wrapped over it.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Take your time.</p>			
<p>Student 1: So, the last one ... so the last time we had an ordered pair those would be x-axis and y-axis. From what I remember it was probably going to have to be like ... so, since this very negative, the one we're trying to get would most likely be either ... it would probably be negative one or something.</p>	no evidence	no evidence	no evidence
<p>Student 1: If we're talking about this one being on the x-axis that would be negative three, but this is also regular three if we're talking about the y-axis.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Mm-hmm.</p>			
<p>Student 1: And if we're trying to get like a negative number down here, just try and keep on that y-axis. This won't go perfectly with this. It will go perfectly with this, so it would be either negative one or three, but I'm thinking yeah it's supposed to be y-axis and x-axis, so thinking about this, this is probably what it was, K and M.</p>	no evidence	analyzing/applying (incomplete)	no evidence
<p>Interviewer: Okay. Which choice would that put that with?</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Since this would be negative three on the x-axis and this is ... no, I can't go with it. And there's no negative one, so it's just ... can I go with my instinct there?	no evidence	no evidence	no evidence
Interviewer: Okay. Which one is that? Do you think it's negative three, positive one? [option B]			
Student 1: Yes.	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 1: [Item 6] Density expresses the proportional relationship between mass and volume of a substance. Density is defined as unit of mass, grams, per unit of volume, cubic meters. Based on the graph, which equation represents the relationship between mass and the volume, v of copper? The density of copper?	no evidence	no evidence	no evidence
Student 1: It's not really wanting a specific number, is it right now? So, if I'm wanting to get ... so, since this one is up to 100 I'll just try to see if that will bring something.	no evidence	no evidence	no evidence
Interviewer: Found it?			
Student 1: I'm used to having these ____ [00:22:14].	no evidence	no evidence	no evidence
Interviewer: I think they want you to order them.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Yeah, I've just got to stick to the math and get the relationship between the mass and the volume, v of copper. So, mass is ... oh.	no evidence	no evidence	no evidence
Student 1: I'm not used to these type of things. Should I just go with my instinct this time?	no evidence	no evidence	no evidence
Interviewer: Sure. Why not?			
Student 1: My instincts kind of tell me to go with nine feet.	no evidence	no evidence	no evidence
Interviewer: Is there something about either the graph or the question that made you choose that?			
Student 1: Like I said, I'm going with my instinct, but it's kind of just confusing most of this. If I get like a math question I have to have like numbers with it so I could get a better idea of what it is.	no evidence	no evidence	no evidence
Interviewer: So, this one is confusing because it has fewer numbers and more letters?			
Student 1: Yes.	no evidence	no evidence	no evidence
Interviewer: Okay. That makes sense.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: And the graph doesn't really show what type it's talking about, so –	no evidence	no evidence	no evidence
Interviewer: Mm-hmm. Do this one.			
Student 1: [Item 7] Tickets to a play cost \$29.00. On the first day of the play, 52 tickets were sold. The manager used twenty to fifty to estimate they had tickets of \$1,000.00.	no evidence	no evidence	no evidence
Student 1: So, this one [problem] is wanting 29, 52, 50	no evidence	no evidence	no evidence
Student 1: [the student reads option A] the manager's estimate is reasonable because the value is close to the actual volume of ticket sales. It was \$29.00 on the first day and 52 tickets were sold, so let's multiply 29 times 52.	no evidence	no evidence	no evidence
Student 1: So, 104; 104 dollars were sold.	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 1: Which statement best describes the situation? The manager's estimate is not reasonable because the value estimates the actual value of the ticket sales by \$500.00. Is that saying that it wants it to be divided by \$500.00?	no evidence	no evidence	no evidence
Interviewer: Hmm. I don't know. Let's see.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: So, \$500.00 divided by one of the ... equals ... so, no that doesn't equal that. And if we used 20 times 50 that's most likely \$2,000.00 ain't it? Oh, yes. \$1,000.00.	no evidence	no evidence	no evidence
Interviewer: One thousand, mm-hmm.			
Student 1: [reading option B] The manager's estimate is reasonable because the value is the exact value of the ticket sales.	no evidence	no evidence	no evidence
Student 1: So, they estimate ticket sales of \$1,000.00 but that's not right because whenever we multiply 29 to 52 that only got 104, so they're like what, \$996.00 off by the rule. _____ [00:25:39],	explaining/reasoning (but, based on a prior incorrect calculation)	explaining/reasoning (based on earlier incorrect math)	explaining/reasoning (but, based on a prior incorrect calculation)
Student 1: so the manager's estimate is not reasonable because the value overestimates the actual value of ticket sales by about \$500.00. So, these two [option A and B] would not be it because they said that it's an estimate of \$1,000.00 and these ones are agreeing with the \$1,000.00, but we did the calculation and got that the manager's estimate is not reasonable because the value underestimates that, the value ... actually value. Okay.	no evidence	no evidence	no evidence
L: About the manager estimate...I'm going to check if I got that correct. It would times 29. \$1,508.00. [Student did 52×29 on calculator.]	assessing	assessing	assessing
Interviewer: Hmm. That was good that you double-checked that.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Yeah, so the manager's estimate either the odd by accident because they probably weren't thinking clearly enough, so –	no evidence	no evidence	no evidence
Interviewer: \$1,508.00 when you re-multiply? Okay.			
Student 1: So, the manager's estimate underestimates the actual value of the sales by \$500.00, but these are still kind of reasonable because this only sits at about \$1,000.00. This one is \$500.00 more dollars away, so the manager's underestimates, so that would be the answer, wouldn't it since it says its estimate is not reasonable but this is just answering both of these.	explaining/reasoning reasonable estimate	explaining/reasoning reasonable estimate	explaining/reasoning reasonable estimate
Interviewer: Okay, so you think it's not reasonable?			
Student 1: Yes.	no evidence	no evidence	no evidence
Interviewer: How did you know that the answer; that is underestimates the actual value? How did you figure that part out?			
Student 1: Because this has \$500.00 more dollars to it, and it's just saying; oh, we got like \$1,000.00. That wouldn't necessarily be the answer.	no evidence	no evidence	no evidence
Interviewer: Great.			
Student 1: I can tell this one might have been tricky for people that kind of over-read it.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Mm-hmm. How about this one?			
Student 1: [Item 8] What is the value of negative three of ...	no evidence	no evidence	no evidence
Student 1: so that would be three times three times three times three times three, so it's three times four threes. So, that would be 81...	exponent assessing	assessing exponent	exponent assessing
Student 1: negative 81 since it's also a negative.	no evidence	no evidence	no evidence
Interviewer: So, you knew it was the negative 81 because this number has the negative in front of it?			
Student 1: Yes. These ones, those were easier [items with numbers and fewer words].	no evidence	no evidence	no evidence
Student 1: Which value is the greatest distance from zero on a number line? This one kind of confuses me most of the time because like from what I can remember or what my mind thinks I remember is that the ones that are further away from like zero; in general they have a decimal, those are the least, but the greatest are the ones that are closer to the decimal.	assessing (the student is trying to assess the distance from zero, but does so incorrectly)	no evidence	assessing (the student is trying to assess the distance from zero, but does so incorrectly)
Interviewer: Oh, okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: So, if this is correct then ... I, like I said I forgot what the ... how to turn a fraction into a regular like decimal or something like that. I kind of forgot how to do that unless ... 100 divided by four equals 25. Three over four equals ... so times 25, times 25 equals 100 total, so four times 25, that would be 75.	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 1: Now, what I forgot is if I need to simplify this, so 100 divided by 75, that would equal ... somehow you don't simplify these by each other, but instead maybe by five? So, 75 divided by five is 15. [Student is trying to use the calculator to turn 3/4 into a decimal.]	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 1: But then, that would just keep on going on for the more ... since you said I've got enough time, uh I shouldn't worry.	no evidence	no evidence	no evidence
Interviewer: No, that's right.			
Student 1: So, that would be ... let's test out 75 divided by 15, so yeah that's five. 100 divided by 15 ... good thing I checked back on that.	no evidence	no evidence	no evidence
Interviewer: Good.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Because 15 and that would equal 20. If we divided these both by five that would be ... this is why I don't really like these because I remember we'd have to go to like 100 for this, but then I keep on going down with it because I think I've got to simplify it even more. So, this would equal three and that would equal four except those are odd, but this ain't the answer.	assessing (student is trying to assess the magnitude of the numbers, but does so incorrectly)	assessing (incorrectly)	assessing (student is trying to assess the magnitude of the numbers, but does so incorrectly)
Interviewer: So, I think that you're having a hard time comparing the fractions to the decimal numbers, right?			
Student 1: Yes. My instincts tell me to like go with either this or this [options A and B].	no evidence	no evidence	no evidence
Interviewer: Okay, so how would you choose between the decimal numbers, the A and the B?			
Student 1: The negative decimal is kind of confusing because ... if it's like I said it's supposed to be the farthest away from zero is the least, but just talking about greatest, but it's basically like going from negative zero to zero and just ... that don't really much sense. So, I'm going to go with the positive because positive is always good. [Student chooses option B.]	no evidence	no evidence	no evidence
Interviewer: Mm-hmm, great. Go on to the next one.			
Student 1: [Item 10] Use this information to answer the following three questions. Students in Mrs. Garcia's class were each given a number at random. The table shows the number. Shawn divided his number by negative nine. Which is the best estimate of his answer?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Yeah, there's ton of papers.			
Student 1: So, if we divide ... so, is it talking about each by it or we get Shawn's and divide it by negative nine?	no evidence	no evidence	no evidence
Interviewer: What do you think?			
Student 1: Yeah, so negative 940 divided by negative nine. Let me get the calculator up here. This does go up to the nineties but it's negative, right?	no evidence	no evidence	no evidence
Interviewer: I'm not sure. It's a fancy eighth grade calculator. I think it will.			
Student 1: Divided by negative nine ... hmm, is it okay if I bring my phone for the calculator real quick?	no evidence	no evidence	no evidence
Interviewer: Sure.			
Student 1: Because that one has a bit more sense with it. I'm not used to the ones where they start going ... all right, so just talking about negative 940 divided by negative nine ... hmm. That would be, that wouldn't be possible.	no evidence	no evidence	no evidence
Interviewer: What did you get when you divided it? 104.444444?			
Student 1: Yep.	no evidence	assessing	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Well, would that help you choose the best answer?			
Student 1: Maybe if we were doing an estimate because then that would just be regular there, but since these cancel each other out because negative 90 ... okay, so let's try regular, and doing just regular.	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 1: So, if we do negative ... so, it just don't work that way, so let's say we're trying to estimate –	no evidence	no evidence	no evidence
Interviewer: Do you want to read the question one more time?			
Student 1: Yes. Let's see ... Shawn divides his number by negative nine and Shawn's is negative 940.	no evidence	no evidence	no evidence
Interviewer: But how about the question? Can you read that one more time?			
Student 1: Which is the best estimate of –?	no evidence	no evidence	no evidence
Interviewer: Yeah.			
Student 1: And I remember since if two negatives cancel each other it becomes a positive, so –	division with negative numbers	division with negative numbers	division with negative numbers

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: That's right.			
Student 1: This would just be 100.	no evidence	reasonable estimate	reasonable estimate
Interviewer: Let's go to the next one.			
Student 1: I'm not wasting anyone's time right now?	no evidence	no evidence	no evidence
Interviewer: No, because you're doing a great job.			
Student 1: [Item 11] Oh. This is saying; what is the value of Rachel's number to the third power? Okay, is it just basically trying to divide it by three?	no evidence	no evidence	no evidence
Interviewer: Let's see.			
Student 1: I've always gotten that confused, so negative seven divided by three ... and I'm not going to be it, whatever it is, so negative seven times three, that would not be an answer.	no evidence	no evidence	no evidence
Interviewer: No? Okay.			
Student 1: So, it would be seven times three, or 21. But since that's a negative I'm thinking ... and since it's the three it doesn't necessarily say the three is a negative, so it would just be negative 21.	assessing (student is trying to compute -7 to the third power, but does so incorrectly)	assessing (incorrectly)	assessing (student is trying to compute -7 to the third power, but does so incorrectly)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Great. All right, there's one more.			
Student 1: And then I can go on my way?	no evidence	no evidence	no evidence
Interviewer: Mm-hmm. I'll have a couple of questions for you then, but they're super-quick.			
Student 1: All right. I'm cool with the questions if you just ask them to me, as long as they're not math problems.	no evidence	no evidence	no evidence
Interviewer: You're doing a great job.			
Student 1: [Item 12] Which of the following students has the number that is the greatest distance from zero on the number line? The greatest distance from zero ... I'd most likely say negative 940, but Shawn isn't on there [not an option].	no evidence	no evidence	no evidence
Interviewer: That's right.			
Student 1: So, the greatest distance from zero? I would go with my gut and say either Leon or Kim.	no evidence	no evidence	no evidence
Interviewer: And is there something that's drawing you to those answers?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Because every time I usually check a—do a fraction if I either use a regular numerator like this or something like that it's either the ones with the fraction that are the farthest away. I don't even understand how, or it's just –	no evidence	no evidence	no evidence
Interviewer: It's tricky.			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: So, go ahead and go with your gut. What's your feeling on this?			
Student 1: And since the bottom denominator is bigger I'm thinking that as well, so I'm going to have to go with Leon.	no evidence	no evidence	no evidence
Interviewer: Leon? Great. You did a wonderful job. Just a couple of questions for you.			

School District A—Grade 8 Mathematics (Student 2)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: [Item 1] Triangle ABC is similar to triangle DEF, as shown below. What the length between D and F? Okay, if A through B equals 15, and A through C equals three, then obviously you've got to multiply by three to get 15 so it would be centimeters.	proportionality analyzing/applying	analyzing/applying proportionality	proportionality analyzing/applying
Interviewer: Ah, so how did you know to multiply by 3?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Well it's because if five would equal 15, you'd have to multiply by three to get 15. And if these two are the exact same shapes, then you'd have to go through A to C to get three and then multiply by three would equal nine.	similarity	similarity	similarity
Interviewer: Very nice.			
[Item 2 is missing.]			
Student 2: If you want me to be more descriptive I can.	no evidence	no evidence	no evidence
Interviewer: You're doing a great job, just the way you did it was awesome.			
Student 2: [Item 3] Density expresses the proportional relationship between mass and volume of a substance. Density is defined as the unit of mass, grams per unit of volume, cubic centimeters. Based on the graph which equation represents the relationship between mass and volume, v of copper. This is a hard one. Okay I'm looking, I can say the points they end up through here equals 20 and then obviously go down the middle of this cube. Relationship between mass and volume via copper. I'm thinking to myself I have absolutely no idea what to do.	no evidence	no evidence	no evidence
Interviewer: Okay so this one has been hard for lots of kids. Is there something maybe on the graph that could give you an idea?			
Student 2: It says, between the mass and the volume. So mass and volume, they both equal and then go down to the middle but they slowly edge off. So. [air]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: It's alright you just started I'm sure you'll learn more this year. [air]			
Student 2: Let me take a gander at this real quick. [Student looks at answer options.] M equals nine v, m equals zero point one v, m equals nine plus v, m equals zero point one plus v. Okay.	no evidence	no evidence	no evidence
Interviewer: Does that help at all.			
Student 2: Probably not. I'm thinking of division here. I feel like I know this question but there's one thing that's keeping me from.	no evidence	no evidence	no evidence
Interviewer: What is it? What part of the question is the hard part?			
Student 2: What is the math equation that I'm required to do to decipher this question. That's what I'm thinking to myself. Volume, cubic feet. So, for volume and cubic, okay. Density is defined as a unit of mass per unit of volume, cubic centimeters. So, these are tough questions it's been a long time.	no evidence	no evidence	no evidence
Interviewer: It's okay.			
Student 2: Based on the graph, which equation represents the relationship between mass and volume? Okay. [air] This would equal two, this is one and they would equal ten [the coordinates (2, 10) on the graph]. I'm thinking of fractions here. So, as these fractions have been equal to this, so I'd have to divide it into a decimal now.	interpreting	interpreting	interpreting

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Sure.			
Student 2: One out of three.	no evidence	no evidence	no evidence
Interviewer: How did you get one out of three?			
Student 2: The other question.	no evidence	no evidence	no evidence
Interviewer: I was going to say because I think you said one to ten.			
Student 2: It's one to ten that would equal as a decimal, well three over one. So these two answers are eliminated.	no evidence	no evidence	no evidence
Interviewer: Okay great. [air]			
Student 2: I don't think there's addition here unless. Multiplication is also a hard course to go to. Honestly, I'm thinking which one is the safer bet.	no evidence	no evidence	no evidence
Interviewer: Yeah. Which one do you think?			
Student 2: Honestly I'm thinking the multiplication one.	no evidence	no evidence	no evidence
Interviewer: Okay great well choose that.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 2: [Item 4] Use the information to answer the following three questions. Points A, B, C, D, and E lie on the same sides of a triangle as shown. Triangle BCD is similar to triangle ACE. The length of segment BD is three units and the length of segment AE is six.</p> <p>The length of segment AC is seven point two units, what is the length of units BC? Okay. [air]</p>	no evidence	no evidence	no evidence
<p>Student 2: Honestly, I would have to take a look at the triangle, for me this is probably literally the key to linking me to this question. Oh you can hide questions [s/b options] okay.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Yeah so if you see an answer that's wrong you can hit the little eyeball and it goes away.</p>			
<p>Student 2: What is the length of units BC? So it said that BCD okay so they're both similar. The length of segment BD from here to here is three. AE from here to here is six, and that's multiplied by two okay.</p>	similarity	similarity	similarity
<p>Student 2: So, length of segment AC, is below BC, no wait. These equilateral triangles. If the length of the segment is AC, seven point two, what is the length in units of segment BC? Oh okay wait AC. So this will be seven point two. Oh I think I have to divide okay.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Why do you think you have to divide how did you know that?</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 2: Because, hard to explain. BD, I'm thinking to myself these are not equilateral triangles because they're kind of leaning to the side. And the length of segment AE is six. The length of segment AC is from here to here. But that wouldn't lead anywhere okay. ACE, and the length of segment AE okay. Honestly these are not equilateral triangles but I feel like this side and this side are equilateral but this side obviously isn't. The length of segment AC okay. I feel like we have to divide here.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Okay, what are you going to divide by?</p>			
<p>Student 2: Two, because if these were divided by two, then like units BD, they're three. And units AE is six. And then well obviously those honestly think six divided by two equals three. So, eliminate this and this. It's the difference between multiplication and this. Units of BC. Wait a minute, oh wait. Okay I got it if the length of segment AC is seven point oh yes it is because it's the smallest side okay. So I'm absolutely right.</p>	proportionality analyzing/applying	proportionality	proportionality analyzing/applying
<p>Interviewer: Very nice reasoning. [air]</p>			
<p>Student 2: [Item 5] Trapezoid AB, ABE.</p>	no evidence	no evidence	no evidence
<p>Interviewer: You're fine take your time.</p>			
<p>Student 2: Trapezoid ABDE is translated 11 units to the left and then reflected over oh God it's one of these. One of the axis to form image ABDE, what is the coordinates of the vertices of trapezoid ABDE?</p> <p>Okay, so this translates to the left. Okay so it's this trapezoid specifically. Translates to the left 11 times, equals two and then, okay.</p>	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: These are not your favorite.			
Student 2: Yeah, these ones are the harder ones, that ones that make me feel like oh no.	no evidence	no evidence	no evidence
Interviewer: Just think about what you would do as your first step.			
Student 2: Honestly, subtracting by that so it would be point nine.	no evidence	analyzing/applying	no evidence
Interviewer: Okay that's great thinking.			
Student 2: So, okay these little. [air]	no evidence	no evidence	no evidence
Interviewer: I think you're doing great so far. So what would you do after that?			
Student 2: Honestly this whole entire thing, can I draw?	no evidence	no evidence	no evidence
Interviewer: Sure you can.			
Student 2: This would go one two three four five okay. So it's go from two. So, go from nine to two. [student moves the bottom right point of the figure from x-coordinate 9 to x-coordinate -2.]	transformation analyzing/applying	transformation	transformation analyzing/applying
Interviewer: I think there's an eraser if you want to erase one of those. [air] [Student is drawing on the coordinate grid on the screen.]			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Okay, oh wait I'm a point up okay.	no evidence	no evidence	no evidence
Interviewer: Yeah, good job. [air]			
Student 2: And then this will go through that, that four. [air]	no evidence	no evidence	no evidence
Student 2: And then this will go slide up here. And obviously I'm too lazy to draw.	no evidence	no evidence	no evidence
Interviewer: That's okay.			
Student 2: And then I have to reflect it now. Okay, but since this is one spot away from, well, zero point, actually two spots. Wait a minute. Wouldn't it be at the exact same place. Or maybe. [air]	no evidence	no evidence	no evidence
Student 2: I think they would be right here because, I'm getting mixed up.	no evidence	no evidence	no evidence
Interviewer: Take your time.			
Student 2: Okay.	no evidence	no evidence	no evidence
Interviewer: You're doing a great job.			
Student 2: If I reflected angles two down to the line, since the numbers are here there's blank the grid so I think they'd be at the exact same place. Which x axis the reflective so I'm guessing they're going to go down here. [air]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: But I've learned that I've been bamboozled like 99 times throughout this specific question here.	no evidence	no evidence	no evidence
Interviewer: You have a great vocabulary. That's a fancy word.			
Student 2: Either go down here, reflected down here. It has to be between those.	no evidence	no evidence	no evidence
Interviewer: Between which two I'm sorry I didn't see.			
Student 2: These two. I was thinking to myself, because this x axis would reflect to x axis. X axis is right here, be flipped down here. Then, I'm stuck. Thank God there is one of these. Three, it'll go three down, negative three, which I think it's right here if I'm not blind.	no evidence	transformation	transformation
Interviewer: Yes.			
Student 2: Three, oh that's just the numbers covering it up.	no evidence	no evidence	no evidence
Student 2: And then this I think if I'm, I think it's right here and I think this one is right here. And now what I'd have to do is put the course together, I'm thinking it will be B.	no evidence	analyzing/applying	no evidence
Interviewer: I'm sorry, did you say B or D?			
Student 2: D.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: D okay. Yeah because you drew the shape, and now you're looking at which coordinate.			
Student 2: It could be positive. [air]	no evidence	no evidence	no evidence
Interviewer: That was great thinking. So you don't think you're very good at that and then you figured it out.			
Student 2: [Item 6] Which segment lies on a line that represents the proportional relationship okay. So, you see they're talking about the zero point? Or, honestly it's telling about the letters but. [air]	no evidence	proportionality	no evidence
Student 2: Stuck on this one.	no evidence	no evidence	no evidence
Interviewer: Is there something in the question that was particularly, that you're stuck on a little bit?			
Student 2: I was thinking proportions.	no evidence	no evidence	no evidence
Interviewer: Yes yes, information.			
Student 2: Which segment lies on a line that represents a proportional relationship between x and y? [air]	no evidence	no evidence	no evidence
Student 2: A lot of this, so that means I have absolutely no idea but. [air]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Last time you told me you weren't sure, you looked at the choices. Maybe that would be helpful on this one?			
Student 2: I'm thinking probably yes. D is I think as I've observed this triangle they're all obviously from point C to point E. And they're always connected to the triangle points C and A to C. Wait a minute. [air]	no evidence	no evidence	no evidence
Student 2: I used to know segment lies on a line that represents a proportional relationship between x and y. What am I not getting here?	no evidence	no evidence	no evidence
Interviewer: Yes I was just going to say I think you figured out that that's the important part from the question, the proportional relationship right?			
Student 2: Between the x and y axis as I'm observing. But there's something I don't get.	no evidence	no evidence	no evidence
Interviewer: Do you know what that means to be a proportional relationship or do you not remember that?			
Student 2: I do not remember.	no evidence	no evidence	no evidence
Interviewer: You will study that later this year, so I think you should just make your best guess and then know that you're going to study that again in the eighth grade.			
Student 2: Yes absolutely.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: And then you'll get to that and you'll be so excited.			
	no evidence	no evidence	no evidence
Student 2: Because I was going to say I missed that one question.			
Interviewer: But remember you're not going to get a score so it's okay if you don't click the right answer.			
Student 2: Oh really. Okay well I don't have to be stressed.	no evidence	no evidence	no evidence
Interviewer: Oh yes I'm sorry. Nobody's going to get a score for this.			
Student 2: Okay. Lies on a line that represents a proportional relationship I'm going to try my best guess. AC.	no evidence	no evidence	no evidence
Interviewer: Great. Okay how about this one.			
Student 2: [Item 7] Shawn divides his number by negative nine. Who's Shawn. To the best estimate of his answer. This is Shawn [points to Shawn on the shared stimulus].	no evidence	no evidence	no evidence
Interviewer: Are you looking for the highlighter I think it's maybe in that other clicker. Oh there it is.			
Student 2: I'm going to highlight Shawn's numbers. They'll probably be the most important. And, I want to work it on paper and pencil.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: There's paper and pencil right there. Help yourself, and there's a calculator or there's a calculator on the computer. Or you can do it on pencil and paper whatever is best for you.			
Student 2: Yeah it pops up [the calculator on the screen]. I've done a lot of these they just pop up randomly. Nine, obviously it's negative nine. All I need to know is, the goal is negative so they're going to be positive. So, okay. I think that's about enough.	division with negative numbers	assessing division with negative numbers	division with negative numbers
Interviewer: Try it again.			
Student 2: Oh it's 940 by one. Ten, but it'd be a positive ten. Oh it's 104. But it goes on forever. So if I were to estimate, what's the best estimate. If it was an estimate, the only thing I need to see is paper and pencil so yeah so. Only answer that's close to it at least since their both negative that'd equal positives.	reasonable estimate assessing	reasonable estimate	reasonable estimate assessing
Interviewer: Very nice.			
Student 2: [Item 8] What is the value of Rachel's number to the third power? Okay so basically either I think it's exponents. Or something related to that. This information isn't important anymore so I need to erase it. Rachel. Seven to the third power, honestly. There's obviously multiplication but that's not it, because I'm thinking it's an exponent. It's between positive and negative. I'm thinking to myself okay it's negative.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you know that?			
Student 2: Because if you divide seven by seven, it would equal positive. If you divide seven by negative 49 I think, then it would equal negative.	assessing (the student is trying to compute -7 to the third power, but does so incorrectly)	assessing (incorrectly)	assessing (the student is trying to compute -7 to the third power, but does so incorrectly)
Interviewer: Very nice. You're doing great.			
Student 2: [Item 9] Which of the following students have the number that is the greatest distance between zero on the number line? Oh it's one of these. Oh they don't have Shawn in the answer okay. The greatest distance from zero on the number line. So one of these, then Leon, then Nina, then Patrick. Oh they all had the lines in the side [absolute value symbol] I used to remember what these were.	no evidence	no evidence	no evidence
Interviewer: Yeah do you remember what that means?			
Student 2: All I remember is that if they're a negative they'll turn in to a positive I think. I think positive will stay the same. As I make my inference here, these two are out of the question, because they're fractions [Leon and Patrick]. I mean these are, so that wouldn't work. Negative eight. [air]	absolute value	drawing conclusions absolute value	absolute value
Student 2: It didn't say between positive and negative so I think it would be Kim.	drawing conclusions distance from zero on a number line	distance from zero on a number line	drawing conclusions distance from zero on a number line
Interviewer: How did you decide it was Kim?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: The five is a positive, it didn't say specifically like which one is more like positively on the other side. You know what I mean.	no evidence	no evidence	no evidence
Interviewer: On the positive numbers?			
Student 2: And then, I didn't put any filter on that so.	no evidence	no evidence	no evidence
[Item 10]			
<p>Tickets that cost twenty-nine dollars on the first day of the play, 52 tickets were sold. The manager used 20 and 50 to estimate the tickets sales of 1,000. Which statement describes this situation?</p> <p>[option A] The manager's estimate is reasonable between value is close to the actual value of the ticket sales. The manager's estimate, I read too fast.</p> <p>[option B] The manager's estimate is reasonable because that value of the exact value of the ticket sales.</p> <p>[option C] The manager's estimate is not reasonable because the value underestimates the actual value of the tickets by about 500. [Student reads option D.]</p>	no evidence	no evidence	no evidence
Student 2: There was 29 tickets sold, sorry 52. So as you can see, it's not reasonable because it is an underestimate. The actual value.	assessing	explaining/reasoning	assessing
Interviewer: Very nice.			
Student 2: Well 1,508.	no evidence	no evidence	no evidence
Interviewer: That's great now two more.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: [Item 11] What is the value of negative three to the fourth power? [air]	no evidence	no evidence	no evidence
Student 2: These are obviously wrong [options B and C]. It's an exponent. You have to multiply three times three times three times three you know. It would equal a positive so, a negative times a negative equals a positive, a negative times a positive okay. Because a negative times a negative equals a positive.	exponent assessing	assessing (incorrectly) exponent	exponent assessing
Interviewer: Okay hang on. You said it would be positive or negative your answer?			
Student 2: Negative.	no evidence	no evidence	no evidence
Interviewer: Negative, you're answering negative, okay.			
Student 2: [Item 12] Which value is the great distance from zero on the number line? [air]	no evidence	no evidence	no evidence
Student 2: So, eliminate this. The greatest okay. Does that count as a filter on positive or negative? I don't know. I'm x-ing these two off [options A and B].	no evidence	no evidence	no evidence
Student 2: And I have to turn eight into a fraction so my first step would be turn eight out of ten and then then see if I can obviously simplify that. And then I simplify it, I think I simplify it by two obviously to get five or three. Oh four sorry.	no evidence	no evidence	no evidence
Interviewer: Okay four out of five.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Then, so four over five and three over four, and then I have to combine like terms. So twenty of them, four divided by five, wait that's 25. Okay I multiplied by four, okay. That would equal 12 so as you can see, this is a negative though. So, eight. Zero point negative zero point because like I say it didn't have any specifics on positive or negative.	assessing (student is trying to assess distance from zero, but does so incorrectly)	assessing (incorrectly)	assessing (student is trying to assess distance from zero, but does so incorrectly)

School District A—Grade 8 Mathematics (Student 3)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: [Item 1] Triangle ABC is similar to triangle DEF as shown below. What is the length of DF?	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: So, I see, this and then that and then 5 and 15 which means you would have to do 15 divided by 5 which is 3 which means then...but to get...so, which means you would have to check your work which would be 5 times 3 equals 15. Which means I would have to do 3 times 5 which equals, no, you would do, you do 3 times 3.	similarity analyzing/applying	analyzing/applying similarity	analyzing/applying similarity
Interviewer: Yeah.			
Student 3: Which equals 9.	proportionality	proportionality	proportionality

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: That was a great explaining your thinking. You can hit next.			
Student 3: [Item 2] Yanni drew the rectangle KLMN on this graph. Yanni will reflect the rectangle over the x-axis. Which ordered pair describes the location of point k after it is reflected over the x-axis?	no evidence	no evidence	no evidence
Student 3: So, reflect is like a mirror and it is like flipped.	transformation	no evidence	transformation
Interviewer: Yes.			
Student 3: So, if you are going to put it over the x, N will be ____ [01:07:09] (-3), (-1) so I think it would be (-1) because it is...no it would be (-3) and then (-1) here. So, N would be right there.	no evidence	analyzing/applying	no evidence
Interviewer: Uh-huh.			
Student 3: Then k would be flipping it (-3) which means it would be (-3), (-3).	transformation analyzing/applying	transformation analyzing/applying	transformation analyzing/applying
Interviewer: Nice job.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>[Item 3] Density expresses the proportional relationship between mass and volume of substance. Density is identified as the unit of mass (grams) per unit of the volume, the volume (cubic centimeters). Based on the graph, which equation represents the relationship between mass and the volume, v, of copper?</p>	no evidence	no evidence	no evidence
<p>Student 3: So, for ever...for every one we did it by 10 so then 2 times 10 ____ [01:08:12] times 10 which then makes it 40 so would be ____ [01:08:18] M equals 9 plus v 2 plus 9 does not equal that. Two times 9 ____ [01:08:32] so then 2 times 0.1 ____ [01:08:37 to 01:08:42] then I do ____ [01:08:43 to 01:08:46] plus zero which would make it 20 so that means that would be my answer.</p>	interpreting	interpreting relationship between variables as presented in a graph, table, or equation	interpreting
<p>Interviewer: Very nice. I just want to say out loud what you did. So, you did 2 times .1 which did you get that from right here?</p>			
<p>Student 3: Yeah, well, because my answer was not right or was not an option on there so then I started trying all my different answers.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Try and where did you get the numbers that you decided to try?</p>			
<p>Student 3: I got 2 because it was the first number I saw and then I was going to 20 because they line up [on the graph].</p>	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Very nice. Great, okay go ahead and hit next.			
Student 3: [Item 4] Use this information to answer the following three questions. Points A, B, and C and E lie on the side of the triangle as shown. Triangle B, C and D is triangle they are similar with triangle A, C, E. The length of the segment BD is 3 units and the length of the segment AE is 6 units. If the length of segment AC is 7 points, 7.2 what is the length in units of segment BC?	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: So, BC right there is 3 and then AC is 6 and to get 3 to 6 because there is this one number you want to times 2.	analyzing/applying proportionality	proportionality	analyzing/applying proportionality
Interviewer: Yes.			
Student 3: Which equals 6 so that means I would have to do 7.2 divided by 7 because AC, oh wait, that is two different numbers okay. So, BD is 3 units and then AE and so if I was doing AC .7 and then I was going to BC I would just ____ [01:10:23 to 01:10:29] one, two, three, four and then because they are not exact, I am going to 4.2.		analyzing/applying (incorrectly)	
	no evidence		no evidence
Interviewer: Okay so you used your pencil to sort of estimate the space.			
Student 3: Yeah and I counted four because my theory or whatever it was ____ [01:10:44].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay, great.			
Student 3: [Item 5] Trapezoid ABDE is translated 11 units to the left and the reflected of the x-axis to form image ABDE. What are the coordinates of verticals of trapezoids ABDE'?	no evidence	no evidence	no evidence
Student 3: So, if it is translated 11 units to the left, ABDE, we are going to do one, two, three, four, five, six, seven, eight, nine, ten, eleven (-7) and 6 which make B equals ____ [01:11:28] and 6.	transformation analyzing/applying	analyzing/applying transformation	transformation analyzing/applying
Interviewer: Do you know what when you said before you wrote you said (-7) and 6 but then you wrote (-11). Do you know which one?			
Student 3: Yeah because I was thinking ____ [01:11:40].	no evidence	no evidence	no evidence
Interviewer: Yes, you said out loud (-7).			
Student 3: And then A one, two, three, four, five, six, seven, eight, nine, ten, eleven; (-9) and 3, (-9) and 3. And D would be one, two, three, four, five, six, seven, eight, nine, ten, eleven; 6 and (-4), (-4) and 6. And then you would be I know it would be 3 because they are on the same line.	no evidence	no evidence	no evidence
Interviewer: That is right.			
Student 3: ____ [01:12:27].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 3: One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve ____ [01:12:35 to 01:12:38].	no evidence	no evidence	no evidence
Interviewer: That is okay, that is okay.			
Student 3: One, two, three, four five, six, seven, eight, nine, ten, eleven (-2). ____ [01:12:49 to 01:12:54] (-9) and then 3, 7, (-9) and 3, (-7) and 6, you get a ____ [01:13:03].	no evidence	no evidence	no evidence
Interviewer: Very nice. Okay how about this one.			
Student 3: [Item 6] What segment lies on the line represents a proportional relationship between x and y?	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: Let me see, C and E ____ [01:13:21 to 01:13:26] 9 and 8.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: ____ [01:13:27 to 01:13:31] and then B and D would be 6 and 7 and 6 which would be ____ [01:13:37].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, when you said B and D will be 7 and 6 can you tell me where those numbers came from?			
Student 3: Well, I do not where I got 7 from.	no evidence	no evidence	no evidence
Interviewer: Oh, okay.			
Student 3: But I got 6 in there.	no evidence	no evidence	no evidence
Interviewer: Six, six okay. So, you went from this number across [the y-axis] to where B and D were?			
Student 3: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 3: Then A and E is 3 and then E is 8.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: So, A and C is 3 and 2; 9 and 6; 3 and 2; 9 and 6 I see. So, you just times 3 on both sides. Like I am just going to make it into a fraction.	proportionality analyzing/applying	analyzing/applying proportionality	proportionality analyzing/applying
Interviewer: Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: ____ [01:14:21] And then to get 6 or 2 to 6 and then 3 and 9 you have to times by 3.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: That would make a proportional relationship.	no evidence	no evidence	no evidence
Interviewer: Very nice. You are the first student who has been able to explain that, very impressive.	no evidence	no evidence	no evidence
Student 3: I think that was 6 and 2 ____ [01:14:43].			
Interviewer: Great job.			
Student 3: [Item 7] Shawn divides his number by (-9). Which is the best estimate of the answer? The students in Miss Garcia's class were each given a number ____ [01:14:55]. Shawn divides his number by (-9) so (-940) divided by (-9) so then (-9) ____ [01:15:06] once, zero and then it is 4 ____ [01:15:11 to 01:15:18] which would go into it 9 times 4 which is 36 which will equal 4 again. [Student is doing long division on scrap paper.]	assessing	assessing	assessing
Interviewer: Uh-huh.			
Student 3: ____ [01:15:32].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, when you divide it what did you get for an answer?			
Student 3: I got 104.	no evidence	no evidence	no evidence
Interviewer: Uh-huh and did that help you?			
Student 3: Kind of it helped me know that I was wrong ____ [01:15:44 to 01:15:46] so now I am just going to times these...			
Interviewer: Okay.			
Student 3: ...together, times my answers by (-9). But because I know that we learn this thing in sixth grade which is called the Dorito Triangle and it is negative, negative ____ [01:16:01]. So, I know that two negatives equal a positive.	division with negative number(s)	division with negative number(s)	division with negative number(s)
Interviewer: Nice.			
Student 3: And because these two are negatives which means they have to be a positive so I know that is going to be either 10 or 4.	no evidence	no evidence	no evidence
Interviewer: That was great reasoning.			
Student 3: ____ [01:16:11 to 01:16:21] So zero ____ [01:16:24 to 01:16:28] so the best estimate would be 100 because that would ____ [01:16:30].	reasonable estimate	reasonable estimate	reasonable estimate

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So how did you decide between 10 and 100?			
Student 3: Well because 10 and (-9) equals (-90) and then I just know that 100 times 9, well that would 900.	assessing		assessing
Interviewer: Okay.			
Student 3: And then you just add the negatives in there and that would be the best estimate.	no evidence	no evidence	no evidence
Interviewer: Nice. How about this one?			
Student 3: [Item 8] What is the value of Rachel's number to the 3rd power? ____ [01:16:53 to 01:16:58] (-7)?	no evidence	no evidence	no evidence
Interviewer: Uh-huh. There is tons of paper if you need more space.			
Student 3: That is okay. So (-7) to the 3rd power which would be 7, which is ____ [01:17:11] which would be (-7) times (-7) times (-7).	exponent assessing	assessing exponent	exponent assessing
Interviewer: Uh-huh.			
Student 3: So, these two go 49 times (-7) equals...	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: You have a calculator.			
Student 3: ... _____ [01:17:27] 49 times _____ [01:17:33 to 01:17:38] 343.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: And (-343).	no evidence	no evidence	no evidence
Interviewer: How did you know.			
Student 3: Bring the negative sign.	no evidence	no evidence	no evidence
Student 3: [Item 8] Which of the following statements has the number that is the greatest distance from zero on a number line?	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: _____ [01:17:54 to 01:18:03] I think it would be, oh shoot out of these I was about to say Shawn.	no evidence	no evidence	no evidence
Interviewer: Yeah that is what everyone wanted to say [-940/Shawn].			
Student 3: Kim is (-8), Leon is (-3/4), Nina is 5, and Patrick is 7/3. So, I am going to make the fractions into a decimal because it would be easier to compare.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Sure.			
Student 3: ____ [01:18:29 to 01:18:39] point 75 then 7 divided by 3 equals ____ [01:18:43 to 01:18:59]. And then you have 5 and (-8) which would make it (-8) because this one is a decimal so it is closest and this one is five.	evaluating absolute value	drawing conclusions	evaluating absolute value
Interviewer: Uh-huh. Nice.			
Student 3: Negative 8.	no evidence	no evidence	no evidence
Interviewer: Now, how did you know that it was okay that (-8) even though that is a negative number.			
Student 3: Because on a zero-number line it can go both ways. So, you have zero and then you have (-1) and then you have ____ [01:19:24].	no evidence	distance from zero on a number line	no evidence
Interviewer: Uh-huh.			
Student 3: And (-8) would be down here.	no evidence	no evidence	no evidence
Interviewer: Yes.			
Student 3: All the ____ [01:19:29] would be on the same side just ____ [01:19:31].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Great.			
Student 3: [Item 10] Tickets to play cost \$29. On the first day of the play 52 tickets were sold. The manager used (20)(50) to estimate the sales of tickets. They had ticket sales of \$1,000.	no evidence	no evidence	no evidence
Interviewer: Yeah.			
Student 3: So, they cost \$29 and they sold 52 ____ [01:19:54 to 01:19:58] [reading options] the manager's estimate is reasonable because that value is so close to the actual value of ticket sales. The manager's estimate is reasonable because that is the value of ticket sales.	no evidence	no evidence	no evidence
Student 3: So, I am just going to multiply these two [29 x 52].			
Student 3: [Student chooses option C.]The manager's estimate is not reasonable because that value underestimates the actual value of ticket sales by 500 which would be right.	assessing reasonable estimate	assessing reasonable estimate	assessing reasonable estimate
Interviewer: Because when you multiplied what did you get?			
Student 3: I got \$1,508 and it says it is \$1,000 and he underestimates the value by \$500 and ____ [01:20:49].	no evidence	no evidence	no evidence
Interviewer: Very nice.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: [Item 11] What is the value of (-3) an exponent of 4? (-3) times (-3) times (-3) times (-3) ____ [01:21:07 to 01:21:16] which gets 81.	exponent assessing	assessing exponent	exponent assessing
Interviewer: Uh-huh.			
Student 3: Positive 81.	no evidence	no evidence	no evidence
Interviewer: How did you know it was positive?			
Student 3: Because these two negatives make a positive and then these two negatives make a positive and then positive/positive is a positive.	no evidence	no evidence	no evidence
Interviewer: Very nice. Alright there is one more.			
Student 3: [Item 12] Which value is the greatest distance from zero on a number line?	no evidence	no evidence	no evidence
Student 3: So again, I am just going to put the 3/4 and make it into a decimal.	no evidence	no evidence	no evidence
Student 3: Which ____ [01:21:43 to 01:21:47] and then 1/2 would equal .5.	assessing	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Uh-huh.			
Student 3: ____ [01:21:49] and then (-.8) and so on a number line ____ [01:21:57 to 01:22:01] it is going to equal zero.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: ____ [01:22:03 to 01:22:10] between those it is a (-8) would be ____ [01:22:11].	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 3: So, .75 is the right one it should 3/4.	no evidence	no evidence	no evidence
Interviewer: How did you choose between the .75 and the .8?			
Student 3: Because the .75 is closest to one.	no evidence	no evidence	no evidence
Interviewer: Nice, great.			
Student 3: Because it only takes .25 more.	assessing (student is trying to assess distance from zero, but does so incorrectly)	no evidence	assessing (student is trying to assess distance from zero, but does so incorrectly)



School District A—Grade 8 Mathematics (Student 4)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: [Item 1] Points A, B, C, D and E lie on the three sides of the triangle as shown _____. [00:28:42 to 00:28:46]. [Student takes time to look at the figure.]	no evidence	no evidence	no evidence
Interviewer: Good checking that [the shard stimulus].			
Student 4: The BCD is similar to triangle ACE. The length of the segment BD is 3 units the length of segment AE is 6 units. If the length of segment AC is 7.2 units, what is the length, in units of segment BC?	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: So, AC would be this one.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: And that is 7.2 _____. [00:29:13 to 00:29:26] is 3 units; AE is 6 units _____. [00:29:29 to 00:29:32] in all honesty I do not know.	no evidence	no evidence	no evidence
Interviewer: That is a great thing to say. So, if on the day of the test you did not know what the answer should be, what would you do?			
Student 4: Count squares.	no evidence	no evidence	no evidence
Interviewer: Okay great, give it a try.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: So, there is one, two, three, four squares?	no evidence	no evidence	no evidence
Interviewer: Okay. And with that how does it get you the best answer?			
Student 4: B?	no evidence	no evidence	no evidence
Interviewer: Like you were...			
Student 4: Is this a square?	no evidence	no evidence	no evidence
Interviewer: Can you show me which squares you were counting?			
Student 4: These ones.	no evidence	no evidence	no evidence
Interviewer: From?			
Student 4: B to C. [Student tried to estimate the length of BC using the size of the squares on the coordinate plane.]	no evidence	no evidence	no evidence
Interviewer: B to C okay great. And it is closest to B?			
Student 4: [Item 2] Trapezoid ABDE is translated to 11 units from the left and then reflected over to the x-axis to form image ABDE. Which, what are the coordinates do you say it?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Coordinates.			
Student 4: Coordinates of the following ver-verticals of trapezoid ABDE? so ____ [00:30:32] ____ [00:30:35] it is over here it is reflected down here.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: By 11 units, so we take this one to 11 units so ____ [00:30:47] to ____ [00:30:52] one, two, three, four, five, six, seven, eight, nine, ten, eleven so ____ [00:31:00 to 00:31:12] shoot...I lost my place. [Student is trying to count 11 units to the left of point A.]	no evidence	no evidence	no evidence
Interviewer: Oh, geez okay. You know this little trick about you can use the computer pen and then when you get to where you want to be you can draw a little dot.			
Student 4: Oh, that is, that is smart. ____ [00:31:22 to 00:31:33].	no evidence	no evidence	no evidence
Interviewer: Oh, geez it got in your way I am sorry.			
Student 4: ____ [00:31:35 to 00:31:40] Four.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: Six so then eight, nine, ten, eleven ____ [00:31:43 to 00:31:50] right here. How do you draw?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Oh, much better, okay there you go.			
Student 4: Okay.	no evidence	no evidence	no evidence
Interviewer: And then I think you can move that little thing over there next time so it is not in the way of the grid as much.			
Student 4: Oh, okay. So _____ [00:32:03 to 00:32:10] two, yeah.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: Okay.	no evidence	no evidence	no evidence
Interviewer: So, you got A is that two and then what was your second number?			
Student 4: Nega-negative um (-8).	no evidence	no evidence	no evidence
Interviewer: Negative 8 okay.			
Student 4: _____ [00:32:20 to 00:32:26] one, two, three, four, five, six, seven, eight, nine, ten, eleven.	no evidence	no evidence	no evidence
Student 4: Uh-huh.	no evidence	no evidence	no evidence
Interviewer: So, _____ [00:32:34 to 00:32:43]			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: Is this (-4). Okay.	no evidence	no evidence	no evidence
Student 4: One, two, three, four, shoot. One, two, three, four, five, six, seven, eight, nine, ten, eleven. ____ [00:32:59 to 00:33:12] One, two, three, ____ [00:33:15], six, seven, eight, nine, ten, eleven. ____ [00:33:19 to 00:33:30] Okay so, ____ [00:33:31 to 00:33:35] I did something wrong. ____ [00:33:37]	no evidence	no evidence	no evidence
Interviewer: So, what would you do on the day of the test? You did a lot of work and then it did not match an answer, what would you do on the test day?			
Student 4: ____ [00:33:45] Try to figure out what I did wrong.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 4: ____ [00:33:47 to 00:33:49] So, oh I read the numbers backwards.	no evidence	no evidence	no evidence
Interviewer: Oh, okay, so maybe you flipped them.			
Student 4: Yeah. ____ [00:33:55] so I got but I got a (-8).	no evidence	no evidence	no evidence
Interviewer: Do you want to recount them?			
Student 4: Yeah. One, two, three, four, five, six, seven, eight, nine, ten, eleven.	no evidence	no evidence	no evidence
Interviewer: Oh.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: [chuckles] Maybe I just do not know how to count. So, (-9) and I put 2 because that one is on 2.	no evidence	no evidence	no evidence
Interviewer: Yeah so both of the numbers seem to ____ [00:34:29] choices. Do you want to try to re-read it and see if there was anything that would help if you read it again?			
Student 4: Trapezoid ABDE is translated 11 units to the left, oh that is not the left. See ____ [00:34:45].	no evidence	no evidence	no evidence
Interviewer: Okay there is no time...			
Student 4: So...	no evidence	no evidence	no evidence
Interviewer: There is no time limit.			
Student 4: ____ [00:34:48] The left is this way.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 4: So, one, two, three, four, five, six, seven, eight, nine, ten, eleven. So then 9 and 3 _____ [00:35:02 to 00:35:09] and then one, two, three, four, five, six, seven, eight, nine, ten, eleven. Six and (-7) _____ [00:35:22 to 00:35:28] one, two, three, four, five, six, seven, eight, nine, ten, eleven _____ [00:35:38 to 00:35:51]. One, two, three, four, five...one, two, three, four, five, six, seven, eight, nine, ten, eleven. Six and _____ [00:36:07 to 00:36:16]. One, two, _____ [00:36:15] [bell ringing], three, four, five, six, seven, eight, nine, ten, eleven _____ [00:36:24 to 00:36:42]. So (-3) and 3; (-7) and 6; (-4) and 6; and (-3) and 3. So it is C,</p>	<p>transformation (student understands translation, but not reflection)</p>	<p>analyzing/applying transformation (partial)</p>	<p>analyzing/applying transformation (partial)</p>
<p>Interviewer: Very nice, great job. Okay how about this one.</p>			
<p>Student 4: [Item 3] Use the information to answer the wait. Which line, which segment runs on equal line huh. Which segment lies on the line represents a proportional relationship between x and y?</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Uh-huh.</p>			
<p>Student 4: So that x _____ [00:37:13 to 00:37:31] I do not know what it is asking.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Okay, that is a great thing to say. So, go back to the question and is there a particular part that you are sort of confused on.</p>			
<p>Student 4: Proportional relationship.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Okay and every kid that I have seen has said the same thing so on the day of the test that happens you got to a question that you are not really sure of, what would you do?</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: _____ [00:37:49] I do not know [chuckles].	no evidence	no evidence	no evidence
Interviewer: Would you just like make your best guess?			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: Or look at the choices and...			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: So why don't you go ahead and...			
Student 4: _____ [00:37:58] right here.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 4: A and C is this one. So, I think it is B and D. I think it is this one [option B].	no evidence	no evidence	no evidence
Interviewer: Okay is there a reason that you are thinking that it is that?			
Student 4: Because _____ [00:38:14 to 00:38:16] no maybe it is A and C [option C] because it goes this way, like what is that way called, _____ [00:38:24 to 00:38:26] vertical.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Uh-huh. Okay, great.			
Student 4: I do not know.	no evidence	no evidence	no evidence
Interviewer: That is okay. Let's see. Okay how about this one?			
Student 4: [Item 4] Triangle ABC is similar to triangle DEF, as shown. What is the length of DEF? So, so that is ____ [00:38:44 to 00:38:47] then this one will be times 3 and that one will be times 3 so it would be, that side would be 9.	proportionality analyzing/applying	analyzing/applying proportionality	proportionality analyzing/applying
Interviewer: Very nice.			
Student 4: And then, wait ____ [00:38:58 to 00:39:01] that is what I was ____ [00:39:04] oh okay I do not know why I confused myself.	no evidence	no evidence	no evidence
Interviewer: You did a great job explaining that one. There you go.			
Student 4: [Item 5] Okay, how do you say that name?	no evidence	no evidence	no evidence
Interviewer: I think Yanni.			
Student 4: Yanni will reflect the triangle over the x-axis. Which ordered pair describes the location of the point k after x-axis is reflected? So, ____ [00:39:24 to 00:39:35] it reflected at this one, I think.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 4: So, then k is one, two, three, away ____ [00:39:42 to 00:39:45] two, three down.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: But, hold on, one, two, three, so, it would be a (-3) ____ [00:39:53]. [Student chose option A.]	analyzing/applying transformation	transformation analyzing/applying	analyzing/applying transformation
Interviewer: Let's see ____ [00:39:56].			
Student 4: Right here.	no evidence	no evidence	no evidence
Interviewer: Very nice. Great. The next one.			
Student 4: [Item 6] ____ [00:40:00 to 00:40:05] Density expresses the proportional relationship between the mass and volume of the substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters). Based on the graph which equation represents the relationship between mass and the volume of copper?	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: So, ____ [00:40:28 to 00:40:37] the relationship between ____ [00:40:39 to 00:40:47] this mass and this if volume.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: That is right.			
Student 4: ____ [00:40:49 to 00:40:55] well are you sure, okay so that is my mom, I was scared my mom was going to text me because I was going to marked tardy for the class. [Student got a text message during the cog lab.]	no evidence	no evidence	no evidence
Interviewer: No, you, go ahead and check the message. We will send you back with a pass saying that you were working on these math problems			
Student 4: Yeah, I will be marked tardy until I get there ____ [00:41:04 to 00:41:08].	no evidence	no evidence	no evidence
Interviewer: Oh, oh, oh I am sorry.			
Student 4: That is okay.	no evidence	no evidence	no evidence
Interviewer: But you will not, they will know that you were doing something else.			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 4: Yeah, they will figure it out afterwards.	no evidence	no evidence	no evidence
Interviewer: Okay, good, good.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: ____ [00:41:15 to 00:41:28] I do not know how to do this one.	no evidence	no evidence	no evidence
Interviewer: Okay. What about, what in the question is the confusing part or is there a particular word or a few words that are hard or?			
Student 4: I do not know how I am supposed to find the relationship between the mass and the volume.	no evidence	no evidence	no evidence
Interviewer: Okay. Is there anything in the graph that you think can maybe help you?			
Student 4: ____ [00:41:43] This is mass and this is volume [points to the labels on the axes].	interpreting (partial)	no evidence	interpreting (partial)
Interviewer: Uh-huh.			
Student 4: I do not know how to find the relationship.	no evidence	no evidence	no evidence
Interviewer: Okay so do you want to do the same thing, choose the best answer that you can?			
Student 4: ____ [00:41:53 to 00:41:56] I guess, I do not even know which one will be the best answer.	no evidence	no evidence	no evidence
Interviewer: Okay. Well you could just think if you ____ [00:42:01 to 00:42:04]			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: We will just answer this.	no evidence	no evidence	no evidence
Interviewer: Okay, great, remember there is no score.			
Student 4: [Item 7] Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used, that number, to estimate, they had ticket sales of \$1,000. [reading option A] So the manager's estimate is reasonable because the value _____ [00:42:30 to 00:42:31]. The manager _____ [00:42:32] 50x, where is this one. I do not know what the (20)(50) means.	no evidence	no evidence	no evidence
Interviewer: Oh yeah, okay, here in the item? Do you know that that is a way to show multiplying when the numbers are next to each other in parenthesis? So, it is just, you know, a way to write 20 times 50.			
Student 4: Oh, okay	no evidence	no evidence	no evidence
Interviewer: Sometimes people use the dot that is just another way of showing it.			
Student 4: Okay, so the managers estimate is reasonable because the value is closest. So, if you multiply that it would be \$1,000 because that is the estimate they had. Ticket sales \$1,000. The manager's estimates are reasonable because the value is the exact _____ [00:43:10 to 00:43:14] ticket sales...I think it would be this one [option B] because (20)(50) is \$1,000.	assessing (the student is trying to assess, but does so incorrectly)	assessing (based on a misunderstanding of the question)	assessing (the student is trying to assess, but does so incorrectly)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Uh-huh, very nice. Okay next one.			
Student 4: [Item 8] What value of, what is value, okay so it would be (-34) so (-3) times (-3) times (-3) so that would 9.	no evidence	no evidence	no evidence
Interviewer: Yep.			
Student 4: One, two, three _____ [00:43:44 to 00:43:46].	no evidence	no evidence	no evidence
Interviewer: How did you know how many times you had to write that?			
Student 4: Because it is the to 4th Power.	exponent assessing	assessing exponent	exponent assessing
Interviewer: Very nice.			
Student 4: So, you write it four times...	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: And this one would be 9 times 9 is 81.	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: So, it would be positive 81.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you know it was positive 81?			
Student 4: Because the negatives cancel each other out.	no evidence	no evidence	no evidence
Interviewer: Uh-huh, very nice. Great how about this one?			
Student 4: [Item 9] Which is the value of the greatest distance from the zero on the line? _____ [00:44:15 to 00:44:22] Okay so the number line would be _____ [00:44:24 to 00:44:28] it would be _____ [00:44:29]. I think I would be (-1/2).	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 4: No (-3/4) because 3/4 is bigger.	no evidence	no evidence	no evidence
Interviewer: Okay because 3/4 is bigger than 1/2. And then I heard you compare these two, how about compares to the options A and B?			
Student 4: Negative one _____ [00:44:48] would be further than 0.6, but _____ [00:44:54 to 00:45:01].	no evidence	no evidence	no evidence
Student 4: Eight over ten.			
Student 4: Eight over ten; then 6 over 10 and _____ [00:45:05 to 00:45:39] 8 times 4 is _____ [00:45:40].	assessing	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: You have a calculator.			
Student 4: ____ [00:45:41 to 00:45:47] 32. [Student is trying to compare the fractions to finding common denominators.]	no evidence	no evidence	no evidence
Interviewer: Uh-huh.			
Student 4: So then 6 times 4 is ____ [00:45:52].	no evidence	no evidence	no evidence
Student 4: So, you have a common denominator to compare the fractions.	no evidence	no evidence	no evidence
Student 4: Yeah. Oh so (-.8) would be bigger.	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line
Interviewer: Because what fraction did you end up getting?			
Student 4: Thirty-two over forty ____ [00:46:04 to 00:46:07].	no evidence	no evidence	no evidence
Interviewer: Very nice. Great ____ [00:46:10 to 00:46:13] Three more.			
Student 4: [Item 10] Use this information to answer the following three questions. The students in Miss Garcia's class were given ____ [00:46:20 to 00:46:24]. Shawn divides his number by 9, what is his best estimate? So, Shawn's number is (-940) so if you divide that by 9, can I use the calculator?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Sure.			
Student 4: ____ [00:46:34 to 00:46:43] So his...	no evidence	no evidence	no evidence
Interviewer: What did you got your calculator? One hundred and four.			
Student 4: 104.4 so it would be, his best estimate would be (-100).	assessing reasonable estimate	assessing reasonable estimate	assessing reasonable estimate
Interviewer: How did you know it was (-100)?			
Student 4: Because he divided, oh no it is +100 because he divided by, he divided (-9) by ____ [00:47:02 to 00:47:07].	no evidence	division with negative number(s)	division with negative number(s)
[Item 11]			
What is the value of Rachel's number to the 3rd Power? So, Rachel's number ____ [00:47:13] so it would be (-73) so ____ [00:47:19 to 00:47:24]. So (-7)(-7) is 49?	no evidence	no evidence	no evidence
Interviewer: Uh-huh. Okay.			
Student 4: Then times 7, so 49 times 7 is 343 so it would be (-343).	assessing exponent	assessing exponent	assessing exponent

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Now how did you know that one was negative?			
Student 4: Because these two negatives cancel each other out and then this negative does not have anything to cancel it out so it stays.	no evidence	no evidence	no evidence
Interviewer: Okay, great job. Okay last one.			
Student 4: [Item 12] Which of the following students has the number that is greatest distance from zero on a number line?	no evidence	no evidence	no evidence
Interviewer: There is more paper if you need more space.			
Student 4: Nine forty over ____ [00:48:20 to 00:48:25] is 940.	no evidence	no evidence	no evidence
Interviewer: Okay so which choice would that be?			
Student 4: That one ____ [00:48:29 to 00:48:33].	no evidence	no evidence	no evidence
Interviewer: They try to trick you. [Student wanted to say Shawn, but that was not an answer choice.]			
Student 4: ____ [00:48:32 to 00:49:00] So coming along they would be 12's. ____ [00:49:03 to 00:49:49] I did something wrong. Oh, that is not times 4 this would be times 12 so 7 times 12 is 84. ____ [00:50:02 to 00:50:28] So 60 it would be ____ [00:50:28 to 00:50:33] (-8) I think. [Student compared $\frac{3}{4}$ and $\frac{7}{3}$ using a common denominator.]	assessing	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, you found a common denominator...you turned them all into fractions and then it came down there okay and then you said it would be the one that is 8, which one is that?			
Student 4: (-8).	no evidence	no evidence	no evidence
Interviewer: It is okay that she is negative or how did you know it is okay that she has a negative in front of hers?			
Student 4: Because it was simply farther on that side.	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line

School District A—Grade 8 Mathematics (Student 5)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5:[Item 1] Use this information to answer the following three questions. Points A, B, C, D, and E lie on the sides of the triangle as shown. Triangle BCD is similar to triangle ACE. The length of the segment BD is three units, and the length of segment AE is six units. The length of segment AC is 7.2 units. What is the length in units of segment BC?	no evidence	no evidence	no evidence
Elijah: So AC is 7.2 and A to C is that. We are asking for the length of segment BC. So these are the same length, so then it would just be 7.2 divided by two which would give you 3.6.	proportionality analyzing/applying	analyzing/applying proportionality	proportionality analyzing/applying

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you know that they were the same length?			
Student 5: It is because it is just up one, over two, up one, over two.	no evidence	no evidence	no evidence
Interviewer: Very nice. Okay, how about this one?			
Student 5: [Item 2] Trapezoid ABDE is translated 11 units to the left and then reflected over the X-axis to form image ABDE. What are the coordinates for the vertical trapezoid ABDE? Right, so if it is translated 11 units for now, we will translate with the dots.	no evidence	no evidence	no evidence
Interviewer: Okay. So do you have an idea of what it could mean? Are there like a couple options you are thinking about? Translated.			
Student 5: Like this or like that?	no evidence	no evidence	no evidence
Interviewer: Yeah. Would that give you like a hint on what you could do?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Yeah. You could flip it there. Translated 11 units to the left, so this way 11 units. So it is maybe going by six. Oh, I messed up. Two, three, four, five, six, seven, eight, nine, ten, 11. I am assuming that is where B will be. It will be negative eight and six. So that is wrong.	no evidence	no evidence	no evidence
Interviewer: I was going to say other kids have had an easier time counting with the eraser rather than the mouse.			
Student 5: I got you. One, two, three, four, five, six, seven, eight, nine, ten, 11. There we go. Let us say seven and six.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 5: It would be the negative seven six. This is the only option that you could possibly get. [Student translated and then reflected point B.]	analyzing/applying transformation (partial)	analyzing/applying transformation (partial)	analyzing/applying transformation (partial)
Interviewer: Okay, so you just worked with one coordinate and there was only one [option D] that worked. Okay, that is great.			
Student 5: [Item 3] Use this information. Which segment lies on a line that represents a proportional relationship between X and Y? [Reading the options] Segment CE, segment BD, segment AC, segment AE. Segment AE, right.	no evidence	no evidence	no evidence
Interviewer: How do you know that?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: It is because proportional is like I am trying to think. I mean, my mind just instantly goes there. I cannot really explain myself sometimes.	no evidence	no evidence	no evidence
Interviewer: You were trying to find proportional, and then that one just stuck out to you as correct.			
Student 5: Yes.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 5: ____ [00:08:02]. [Item 4] Triangle ABC is similar to triangle DEF as shown below. ABC. All right, what is the length of DF? That would be nine because if you divide that by three, it is similar. So I would assume you would multiple three by three to get that.	proportionality analyzing/applying	analyzing/applying proportionality	proportionality analyzing/applying
Interviewer: Oh nice. Next?			
Student 5: Oh yeah, I am not even pronouncing that right.	no evidence	no evidence	no evidence
Interviewer: Yeah, you know what? It does not matter. However you want to say it is totally fine.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 5: Okay.</p> <p>[Item 5] Yanni drew the rectangle on KLMN on this graph. It will reflect the rectangle over the X-axis. Which ordered pair describes the location of point K after it is reflected over the X-axis.</p>	no evidence	no evidence	no evidence
<p>Student: It has to be down like that. It is just over the X-axis. Which ordered pair is point K? It would be...seven, three, four. I am assuming it would negative. It would be negative 3. Okay, that is not it.</p>	no evidence	analyzing/applying transformation	no evidence
<p>Interviewer: It is not a negative.</p>			
<p>Student 5: Oh, I never really was adept in this.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Yeah.</p>			
<p>Student 5: I just did not do seventh grade math. So image means like mirrored. Then it would be that, I am assuming.</p>	analyzing/applying (student is trying to apply the definition of reflection, but does not recall the definition)	no evidence	analyzing/applying (student is trying to apply the definition of reflection, but does not recall the definition)
<p>Interviewer: How did you know? You said it would be mirrored. Then how did you know that A was the best choice?</p>			
<p>Student 5: It is because looking at these other answers, I would not imagine that they would be here where point M is.</p>	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So you...			
Student 5: Oh wait. Maybe it would be. I am thinking about the definition of reflect. Gosh, I really need to learn how to do these.	no evidence	no evidence	no evidence
Interviewer: I was not saying your answer was wrong. I was just trying to figure out how you knew it was right.			
Student 5: I am saying the answer is wrong.	no evidence	no evidence	no evidence
Interviewer: Now you are thinking it is B.			
Student 5: Yeah, I think.	no evidence	no evidence	no evidence
Interviewer: Can you show me where this is on the graph?			
Student 5: It is right where the pointer is.	no evidence	no evidence	no evidence
Interviewer: Oh okay.			
Student 5: It is going to swing that over.	no evidence	no evidence	no evidence
Interviewer: Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: [Item 6] Density expresses the proportional relationship between mass and quantity substance. Density is defined as a unit of mass per unit volume cubic centimeters. Based on the graph, which equation represents the relationship between mass and the volume?	no evidence	no evidence	no evidence
Student 5: Mass...so I would assume it would be looking for the M in $Y=MX+B$. It is looking at the unit M. I am putting an educated guess on this one, because I am not too sure.	no evidence	no evidence	no evidence
Interviewer: You said something that was interested. You said you are looking for the M in $Y=MX+B$. What is the M? Do you know?			
Student 5: Oh, I forgot. Let me see. The B is slope. The MX is the X-axis.	no evidence	no evidence	no evidence
Interviewer: How did you? How did you select A? Was there something about it that made you choose it?			
Student 5: It just seemed logical to me. I do not. I mean, it is the most educated guess.	no evidence	no evidence	no evidence
Interviewer: All right, great. That is good insight.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 5: [Item 7] Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used 20 times 50 to estimate. They had ticket sales of \$1000. Which statement best describes the situation?</p> <p>The manager's estimate is reasonable. No, it is not because that would not round down to 20. It underestimates because he rounded down instead of rounding up.</p>	<p>explaining/reasoning</p> <p>reasonable estimate</p>	<p>explaining/reasoning</p> <p>reasonable estimate</p>	<p>explaining/reasoning</p> <p>reasonable estimate</p>
Interviewer: Very nice.			
<p>Student 5: [Item 8] What is the value of negative three to the fourth power? That is really just three. So it is nine times three times three. That should be positive 81.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
Interviewer: How do you know it is positive			
<p>Student 5: You take negative three times negative three, and you get positive nine.</p>			
Interviewer: Okay.			
<p>Student 5: Times negative three is negative 27. Times negative three is positive 81.</p>	<p>assessing</p> <p>exponent</p>	<p>assessing</p> <p>exponent</p>	<p>assessing</p> <p>exponent</p>
Interviewer: Okay, very nice.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: [Item 9] Which value is the greatest distance from zero on a number line? 0.8, 0.6, three-fourths which is .75, and one-half which is .50.	assessing	assessing	assessing
Interviewer: How did you know? Sorry, you went super-fast on that. How did you know that that was the answer? [Student chose option A.]			
Student 5: Okay, so I converted this into decimals because that is just easier for me to look at on a number line.	no evidence	no evidence	no evidence
Interviewer: Yeah.			
Student 5: I drew a picture of the number line in my head.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 5: I had like negative 0.8, then I had negative 0.6, then I had .75, and then I had .50.	distance from zero on a number line drawing conclusions	drawing conclusions distance from zero on a number line	distance from zero on a number line drawing conclusions
Interviewer: Was that okay? I noticed that some had the negative sign. Did you think?			
Student 5: Absolute value. I did not factor in the negative because it said greatest distance.	absolute value	absolute value	absolute value

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Nice. Right.			
Student 5: [Item 10] Use this information to answer the following three questions. Students in Ms. Cristy's class were given a number at random. This table shows their numbers. Shawn divides his number by negative nine. Which is the best estimate for his answer? Let me see. So it would be around 100.	reasonable estimate	reasonable estimate	reasonable estimate
Interviewer: How do you know that? What did you do? Did you get something in your head?			
Student 5: I just see nine. Then I took out the 40 because it said estimate, so my 100.	explaining/reasoning	explaining/reasoning	explaining/reasoning
Interviewer: How did you know if it was negative 100 or positive 100?			
Student 5: Okay. I have to think. You had – it would be negative. I was going to say because it is even, so it would probably be.	no evidence	no evidence	no evidence
Interviewer: Yeah.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Oh God, now I have to work this out. I confused myself. If you divided negative...times 100. Yeah, I do not know. I think. I think it would be positive because it is multiplying by a positive number. It is not multiplying by. It is multiplying by an even number of times.	no evidence	no evidence	no evidence
Interviewer: Okay great.			
Student 5: [Item 11] What is the value of Rachel's number to the third power?	no evidence	no evidence	no evidence
Student 5: So, negative seven times negative seven. It is 21 times negative seven. That is seven and that is 14. It is negative 147. Oh wait, what? To the third power, so I have to do it again. It is negative. Give me a second.	no evidence	no evidence	no evidence
Interviewer: That is okay. Take your time. So...			
Student 5: The third is times that. Oh, that is not 14. It is 21.	no evidence	no evidence	no evidence
Interviewer: First you did negative seven times negative seven, and you got 49. Okay, then what do you do?			
Student 5: Multiply it again by negative seven. It is negative 343.	assessing exponent	assessing exponent	assessing exponent

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Very nice.			
[Item 12] Which of the following students has the number that is greatest distance from zero on the number line?	no evidence	no evidence	no evidence
Student 5: So ____ [00:17:44] negative eight. Hang on. It is five. Nina has five. Patrick has negative eight.	no evidence	no evidence	no evidence
Interviewer: It was nice to see you used process of elimination.			

School District B—Grade 5 Mathematics (Student 1)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? 21 divided by 7 [student read his answer].	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: How did you know that [to do 21 divided by 7]?			
Student 1: Because, if you want to know something multiplied by 7 equals 21, you'd have to divide to get your answer.	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: Okay. Great. Thank you.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: [Item 2] A photo album has 56 pages. Which estimate is closest to the number of pages in 43 photo albums? This is multiplying.	no evidence	no evidence	no evidence
Interviewer: What makes you think that?			
Student 1: Because, it's [the answers] in the thousands.	place value analyzing/applying	place value	place value analyzing/applying
Interviewer: So, the answers gave you a clue. Okay. So, how would you go about choosing the best answer?			
Student 1: This one kind of confused me.	no evidence	no evidence	no evidence
Interviewer: Do you want to read it again and see if it makes more sense?			
Student 1: A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? 56, so I'm estimating 56 to 60 and 43 to 40. ____ [0:07:22], 2,400.	analyzing/applying	explaining/reasoning	explaining/reasoning
Interviewer: So, I saw that you multiplied on your scrap paper, it looks like 60 times 40. How did you get those numbers?			
Student 1: I estimated 40 and 56 to the nearest 10th.	reasonable estimate	reasonable estimate	reasonable estimate

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Very nice. Great.			
Student 1: [Item 3] Which number would make this equation true? 56 divided by 8 equals 7.	fluency with multiplication and division facts	fluency with multiplication and division facts	fluency with multiplication and division facts
Interviewer: How did you know there was an 8 in there? [the actual problem only has a box]			
Student 1: Because, if you count up 7 times to 56, you will get 8.	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: Okay. I'm sorry, one more question. You just said times, but the problem says divide. How did you know to use times to help you?			
Student 1: Dividing is the opposite of multiplication.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: Very nice.			
Student 1: [Item 4] Use this information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Beth completed her reading goal for 10 days. What is the total number [of pages] Beth read? 15 x 10 = 150.	no evidence	relationship between variables as presented in a table	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Now, why did you or how did you know to do times, 15 x 10? What gave you that idea?			
Student 1: Well, because it asks me to go add Beth's goal for 10 days. So, that's what I did.	interpreting	interpreting	interpreting
Interviewer: Very nice. Okay. Choose your answer. Yeah. And, then you can hit next.			
Student 1: [Item 5] Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks? In 3 weeks, this one's kind of, oh, 59.	no evidence	relationship between variables as presented in a table	no evidence
Interviewer: How did you get that?			
Student 1: Well, because he has 110, so if you go three weeks, that equals 330. And, then you have 59 pages left to get the 389, which is how many pages it has in all.	interpreting	interpreting	interpreting
Interviewer: So, you, I think you multiplied first, 110 x 3, right? And, then you got 330. And then how did you use that to help you get your answer?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: I added 59 to it.	no evidence	evaluating	no evidence
Interviewer: You counted up. Very nice.			
Student 1: [Item 6] Use this information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day. Dean, 125 pages per week. Jake, 110 pages per week. Maya, 40 pages per two days. Maya completed her reading goal, her goal for two days. The first day she read 23 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening in, on the second day. $40 - 22 = 18$.	no evidence	no evidence	no evidence
Interviewer: You said something in your head. What did you do in your head?			
Student 1: So, what I did was subtract 40 and 22.	no evidence	evaluating equivalent expression (correct)	evaluating
Interviewer: And, you got 18. Great. And, that's how you knew that was...			
Student 1: Plus 8 equals 26.	interpreting	evaluating equivalent expression (incorrect)	evaluating (incorrectly)
Interviewer: Okay. So, you got 18 on the left and then you added the 8 on the right to get your total?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: I should probably put the 18 right there. That's the answer ____ [0:12:32].	no evidence	no evidence	no evidence
Interviewer: 18 is the answer.			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay. So, I'm sorry, you subtracted on the left, $40 - 22$, and you got 18.			
Student 1: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 1: Plus 8 equals 26.	no evidence	no evidence	no evidence
[Item 7] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. Anna had one, $\frac{1}{2}$ and Eva had $\frac{3}{4}$. Kent had $\frac{1}{2}$. Mariah had $\frac{3}{4}$ and Peter $\frac{1}{4}$. This is a fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? A.			
Interviewer: How did you know A was right?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Because, if you add $2 + 1 = 3$ and she had $\frac{3}{4}$.	assessing decomposition of fractions	assessing decomposition of fractions	assessing decomposition of fractions
Interviewer: Nice. And, did you use this picture [the model in the stem] at all to help you?			
Student 1: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Yeah. How did that picture help you?			
Student 1: It showed me how many fourths she had.	models used to represent fractions	models used to represent fractions	models used to represent fractions
Interviewer: Okay.			
Student 1: How many questions are there on this [on the cog lab]?	no evidence	no evidence	no evidence
Interviewer: You're on number 8 and there are 12.			
Student 1: Okay.			
[Item 8] Use this information to answer the following three questions. The students in Mr. Valdez's class measure the height of their bean plants. This table shows their data. Anna, $\frac{1}{2}$, Eva $\frac{3}{4}$, Kent $\frac{1}{2}$, Mariah $\frac{3}{4}$, Peter $\frac{1}{4}$. Mr. Valdez made this frequency table to show the same information as in the data table. [Student is reading data table.] Plant height, number of students. One had $\frac{1}{4}$, two had $\frac{1}{2}$, and then two had $\frac{3}{4}$. What is the total number of plants that have a higher greater, height greater than $\frac{1}{4}$ inch? Four.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you know it was four?			
Student 1: Because, it says number of students right here. There's two child marks [for 1/2 on the tally chart], so that's two people, that's two people [for 3/4 on the tally chart] and they're [1/2 and 3/4] more than 1/4. So, if you add those [2 = 2] together it equals four.	data as presented in line plots and frequency tables interpreting	interpreting data as presented in frequency table	data as presented in line plots and frequency tables interpreting
Interviewer: Great.			
Student 1: [Item 9] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. Anna 1/2, Eva 3/4, Kent 1/2, Mariah 3/4, Peter 1/4. Which list shows the plant heights in inches in order from least to greatest?	no evidence	no evidence	no evidence
Interviewer: Why did you choose that one [option A]?			
Student 1: Well, because 1/4 is smaller than 1/2, and 1/2 is smaller than 3/4.	analyzing/applying	assessing	assessing
Interviewer: And, how did you know that a fourth was smaller than a half?			
Student 1: Because, a fourth is split into four equal groups and a half is split into two large groups.	no evidence	decomposition of fractions	no evidence
Interviewer: Very nice.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: [Item 10] This rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below? That would equal $\frac{3}{4}$.			
Interviewer: How did you know it equaled $\frac{3}{4}$?			
Student 1: Because, you add the shaded parts together, which equals 3 and 4 in the square [rectangle], so that's $\frac{3}{4}$.	models used to represent fractions analyzing/applying	assessing models used to represent fractions	assessing models used to represent fractions
Interviewer: $\frac{3}{4}$, very nice.			
Student 1: [Item 11] Students in Mr. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than $\frac{4}{8}$ inches long? Okay. ____ [0:17:05] Three.	no evidence	no evidence	no evidence
Interviewer: How did you get that answer?			
Student 1: ____ [0:17:16] Oh, no maybe it's five.	no evidence	no evidence	no evidence
Interviewer: How did you get five?			
Student 1: If you add $3 + 2 = 5$.	data as presented in line plots and frequency tables	data as presented in line plot	data as presented in line plots and frequency tables

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you know which section to add, which sections to add up?			
Student 1: Because, this is 4 and $\frac{4}{8}$, so everything behind it is less than 4 and $\frac{4}{8}$.	interpreting	interpreting	interpreting
Interviewer: There, and you add all of those x's for those sections?			
Student 1: Um-hmm.	no evidence	no evidence	no evidence
Interviewer: Great job.			
Student 1: [Item 12] Which comparison is true? C.	assessing	models used to represent fractions assessing	models used to represent fractions assessing
Interviewer: How do you know C is true?			
Student 1: Because, $\frac{2}{4}$ is half of a whole.	applying/analyzing	no evidence	applying/analyzing

School District B—Grade 5 Mathematics (Student 2)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 2: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number?</p> <p>21 divided by 7?</p>	<p>relationship between multiplication and division</p>	<p>relationship between multiplication and division</p>	<p>relationship between multiplication and division</p>
<p>Interviewer: How did you know that that was the right answer?</p>			
<p>Student 2: Because, 3 times 7 is 21. In, in division, well, to find out the answer, you, all you have to do is know what 7 is multiplied by and it will get that answer.</p>	<p>analyzing/applying</p>	<p>analyzing/applying</p>	<p>analyzing/applying</p>
<p>Interviewer: Very nice. Great. Go ahead and choose C. That was great explaining. Next, yep. All right.</p>			
<p>Student 2: [Item 2] A photo album has 56 pages. Which estimate, which estimate is closest to the total number of pages in 43 photo albums? ____ [0:08:42]. It will be ____ [0:09:18].</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: I want to make sure they're hearing you and not the other student, there's another student over there. [researcher moves iPad closer]</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: 6 ____ [0:09:39] is 200 ____ [0:09:49], so zero into ____ [0:09:53], 2408. [Student computes 56×43 on scrap paper and gets 2,408.]	no evidence	no evidence	no evidence
Interviewer: Okay. And, how can you use that to help you?			
Student 2: I can estimate it to the closest number.	no evidence	no evidence	no evidence
Interviewer: And, which would that be in this case?			
Student 2: 2,400.	assessing reasonable estimate	assessing reasonable estimate	assessing reasonable estimate
Interviewer: Wow. I'm just going to for one second show the video how you actually solved that, because that was a really neat strategy that you used to multiply those numbers. ____ [0:10:46] like a bunch of different steps and then put it all together. That was really neat. Okay. How about the next one?			
Student 2: [Item 3] 56 divided by blank equals 7. So, it's not 9 because 7×9 is 63. It's 8 equals, $7 \times 8 = 56$.	analyzing/applying fluency with multiplication and division facts	assessing fluency with multiplication and division facts	assessing fluency with multiplication and division facts
Interviewer: And, now I noticed that you said 7 times 8, but this [the problem] says division. How did you know to use multiplication?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Because, to find out the answer to division, you just have to know what number multiplied by the answer equals 56.	analyzing/applying relationship between multiplication and division	evaluating relationship between multiplication and division	assessing relationship between multiplication and division
Interviewer: Very nice. Okay. Choose your answer. Great. And, then the next one.			
Student 2: [Item 4] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Beth completed her reading goal for 10 days. What is the total number of pages Beth read? ____ [0:11:49] So, it would be 3 extra days, so 150 pages.	no evidence	relationship between variables as presented in a table	no evidence
Interviewer: How did you figure that out?			
Student 2: Because, it says she read 15 pages per day, and then you can do 15×10 and that equals 150. Because, you just have to add the zero.	interpreting	interpreting	interpreting
Interviewer: So, I can see you didn't use your paper, so you knew $10 \times 15 = 150$ in your head? Okay. Great.	place value	fluency with multiplication and division facts	place value
Student 2: [Item 5] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of 3 weeks? Hundred ____ [0:12:39] pages per week, so 389×125 .	no evidence	interpreting (incorrect) relationship between variables as presented in a table (incorrect)	interpreting (incorrectly)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: ____ [0:12:51].			
Student 2: Never done this before, like this before [multiplied 3 digits by 3 digits], so I don't know how to draw a box. But they both have three numbers in it, so...[Student tries to compute 389 x 125 on scrap paper using the box method.]	no evidence	no evidence	no evidence
Interviewer: They both have three numbers. Great.			
Student 2: ... ____ [0:13:43] thousand, so 8,000 equals 30,000 ____ [0:14:31] 900 equals 30,000 times ____ [0:14:36]. 6,000 equals 9, 10, 11. Four carries, ____ [0:15:06] thousand plus ____ [0:15:10] 16, ____ [0:15:14] hundred ____ [0:15:22] plus 6 ____ [0:15:36] 180 ____ [0:15:45] 6, 4, ____ [0:15:50] 3 x 4, 5 x 3 is 15, so ____ [0:16:01] 30, 6 plus 5 is, ____ [0:16:15]. ____ [0:16:24] times 80, 4 plus zero ____ [0:16:30] hundred ____ [0:16:39] five, eight plus, 9 x 5 =45. ____ [0:16:50] 40,625. That doesn't ____ [0:17:12]. [Student is explaining her work while trying to compute 389 x 125 on scrap paper using the box method.] [She gets an answer, but is it is not an option.]	no evidence	place value	no evidence
Interviewer: Right. So, what do you, what would you do on the day of a test if you did all that hard work and then it wasn't a choice?			
Student 2: I'd do division instead.	no evidence	relationship between variables as presented in a table	no evidence
Interviewer: All right. Want to give it a try?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: 389 divided by 125 [0:17:32]. Well, now I've never done it with 3 numbers on the left side [the divisor].	no evidence	no evidence	no evidence
Interviewer: Okay. Do you want to give that a try or are you not sure how to do that when there are three numbers [digits] you are dividing by?			
Student 2: I'm not sure how...	no evidence	no evidence	no evidence
Interviewer: Not sure. Okay. So, then do you want to just make your best guess on the correct answer? Remember, you're not going to get a score, so it's not really about getting the correct answer for this. You did really good explaining about your thinking.			
Student 2: 279. [Option C]	no evidence	no evidence	no evidence
Interviewer: Yeah. Go ahead and choose that [Option C]. Okay. And, then we'll do the next problem.			
Student 2: [Item 6] Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening on the second day. So, 40, 40 minus 22 equals box plus 8.	no evidence	no evidence	no evidence
Interviewer: Do you want more paper? Do you want a new piece of paper? Or, you're okay ____ [0:19:12]?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: I'm good. ____ [0:19:16]. 40 minus 22 ____ [0:19:23] carry one over ____ [0:19:27] 3 then minus 2 is 8, 3 minus 2 is one. So, 18. [Student did 40-22=18 on scrap paper.] Plus 8 equals 26.		evaluating, equivalent expression (incorrect)	
Interviewer: How did you know to add the plus 8?			
Student 2: Because, it says like that's where the answer goes and then you, it said to add 8.	interpreting (student is trying to interpret the given information, but does so incorrectly)	evaluating (incorrect)	evaluating (student is trying to evaluate the given information, but does so incorrectly)
Interviewer: Add 8. Great.			
Student 2: [Item 7] The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. This fraction is a model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? This one? [Student points to Option A.]	no evidence	no evidence	no evidence
Interviewer: How do you know that?			
Student 2: Because, it's 2 over 4 plus a 1 over 4, which would make that 3 [the numerator] and this [the denominator] would stay the same.	assessing decomposition of fractions	assessing decomposition of fractions	assessing decomposition of fractions
Interviewer: Very nice. Did you use this picture [model in the stem] at all to help you, or no?			
Student 2: Well, I looked at how many it had colored in.	models used to represent fractions	models used to represent fractions	models used to represent fractions

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: And, how many did it have colored in?			
Student 2: 3 out of 4.	no evidence	no evidence	no evidence
Interviewer: Very nice.			
Student 2: [Item 8] The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as the, that, as in the data table. So, what is the total plants that have height greater than $\frac{1}{4}$ inch. Well, one student there [for $\frac{1}{4}$ in the table], two students there [for $\frac{2}{4}$ in the table], two here [for $\frac{3}{4}$ in the table]. So, four, five [Student computed $1+2+2=5$]?	data as presented in line plots and frequency tables interpreting	interpreting data as presented in a frequency table (incorrect)	data as presented in line plots and frequency tables interpreting
Interviewer: How did you figure that out?			
Student 2: Because, these are all over $\frac{1}{4}$ [all numbers on left side of table], because the $\frac{1}{2}$ is $\frac{2}{4}$.	no evidence	decomposition of fractions	no evidence
Interviewer: So, you added up all the numbers on this side [right side of the table].			
Student 2: [Item 9] The students in Mr. Valdez's class measured the height of their bean plants. This table shows their data. Which list shows the plant heights, in inches, in order from least to greatest? So, $\frac{1}{4}$, $\frac{3}{4}$, that one's wrong, because it's starting with the 2 over 4.	analyzing/applying	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 2: That one's starting with 3 over 4, so this, this one?	no evidence	assessing	no evidence
Interviewer: How did you know that the ones that started with 2 over 4 and 3 over 4 were wrong? [Student was able to eliminate options B, C, and D by just looking at the first number in each list.]			
Student 2: Because, these $1/2$ and $3/4$ (in options B, C, D) are all more than 1 over 4.	analyzing/applying	decomposition of fractions	analyzing/applying
Interviewer: Great.			
Student 2: [Item 10] The rectangle is 1 whole unit. What, what's the sum of the fractions represented by the shaded part of the rectangles below? 3 over 8.	no evidence	no evidence	no evidence
Interviewer: So, how did, did you use this picture to help you?			
Student 2: Yes. I saw that there's 4 in each square [rectangle] and 4 plus 4 equals 8. And, then this [rectangle on left] has 1 colored in and that one [rectangle on right] has one, so that's 3 over 8.	no evidence	models used to represent fractions (incorrect)	no evidence
Interviewer: Okay. So, the, the, how did you get the 3?			
Student 2: I added 1 plus 2.	no evidence	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay, I understand how you got the 3. Okay. And, then how did you get that 8?			
Student 2: There's 4 plus 4 is 8. [4 rectangles on the left and 4 on the right]	no evidence	models used to represent fractions (incorrect)	no evidence
Interviewer: Very nice.			
Student 2: [Item 11] The students in Mrs. Plar's class measured the length of their pencils. They recorded their measurements on a line plot. How many pencils were less than 4, $\frac{4}{8}$ inches long? Three?	no evidence	no evidence	no evidence
Interviewer: How did you get that?			
Student 2: Because, right here, [everything smaller than 4 $\frac{4}{8}$ on the line plot] it's less than 4 $\frac{4}{8}$, 1, 2, 3, 4, 5 [Student counted the 5 x's less than 4 $\frac{4}{8}$].	interpreting data as presented in line plots and frequency tables	interpreting data as represented in line plot	interpreting data as presented in line plots and frequency tables
Interviewer: So, how did you get 5? I think I saw what you were doing, but can you tell me what you were doing to get 5?			
Student 2: It says less than 4, 4 and $\frac{4}{8}$, and 4 and 4, it says right here. And, I saw 3 wasn't the answer, I reread the question and _____ [0:24:34] so I counted all the ones [x's] under 4 and $\frac{4}{8}$ and that equal 5.	no evidence	interpreting	no evidence
Interviewer: Recounted all the X's that were below. Very nice. Okay. Go ahead onto the last one.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 2: [Item 12] Which comparison is true?</p> <p>That one's [option A] wrong, because _____ [0:24:53] $\frac{1}{4}$ is not, is not more than half. But if this one was filled in [another section on the $\frac{1}{4}$ model in option A], too, it would be, it would be the same.</p>	assessing	decomposition of fractions	<p>assessing</p> <p>models used to represent fractions</p>
Interviewer: That's right.			
<p>Student 2: This one's [option B] wrong, because that one has more colored in and it's the same number. This one? [option C]</p>	applying/analyzing	assessing	assessing
Interviewer: You think that one [option C] is true?			
<p>Student 2: Yes, because this _____ [0:25:15] has colored it, too, and so if this was right here, it would just be a half like that one [student showed on the screen moving the bottom left shaded piece to the bottom right]. And, this one has the same denominator, but different numerators, because this one's bigger and then this one's smaller, so it would be this one.</p>	analyzing/applying	models used to represent fractions	<p>models used to represent fractions</p> <p>analyzing/applying</p>

School District B—Grade 5 Mathematics (Student 3)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 3: [Item 1] Duane knows that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number?</p> <p>Well, if 7 divided by, if 7, 21 divided by 7 = 3. So, then it would, it could be 21 divided by 7 equals box.</p>	analyzing/applying	analyzing/applying	analyzing/applying
<p>Interviewer: So, how did you know to use divided by even though in the problem they didn't say divided by?</p>			
<p>Student 3: Because, it, it, it says multiplication and multiplication, multiplication is the opposite of division.</p>	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
<p>Interviewer: Very nice. Thank you.</p>			
<p>Student 3: [Item 2] A photo album has 56 pages. Which estimate is closest to the number of pages of 43 photo albums?</p> <p>So, to figure that out, I will, I will do 56×43, $3 \times 6 = 18$, 3×5 is 15, but then you add 3 more. That would be 17 and 3×5 is 15, plus 1, so that would be 16. And, then $4 \times 6 = 24$, and then you would add the, you would add 2 right here. And, then the $4 \times 5 = 20$ plus 2. It will be 22 ____ [0:09:53] 24 and then ____ [0:10:04] $4 + 7 = 11$, $2 + 6$ would equal 8 plus 1 and that would be 9. And, then $2 + 1$ would equal 3. [Student tried to compute 56×43 on scrap paper and got 391.]</p>	no evidence	place value (incorrect)	no evidence
<p>Interviewer: Okay. ____ [0:10:45] help you. What are you thinking about?</p>			
<p>Student 3: ____ [0:11:15]. I'm just trying to figure out how it could help me...</p>	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay.			
Student 3: ...work on the computers.	no evidence	no evidence	no evidence
Interviewer: So, you multiplied 56×43 , right. And, you got 391, and you're trying to figure out how that can help you choose the best answer. What would you do if it was the day of the real test and you got to this point in your, sort of what you got, and it didn't match an answer choice?			
Student 3: I would skip ahead.	no evidence	no evidence	no evidence
Interviewer: Okay. Do you want to, do you want to do that and then come back to it at the end? Okay. So, you can just hit next. Oh, I didn't know that, tricky [student flagged the item for later]. And, then it reminds you to come back to that.			
Student 3: We have these on, on here ____ [0:12:17]. [the flagging feature]	no evidence	no evidence	no evidence
Interviewer: Yeah. Wow. That's great. Okay. So, yeah, just ____ [0:12:20]. We'll do that at the end. Okay.			
Student 3: [Item 3] Which number would make this equation true? 56 divided by blank equals 7 . A thing that we use in my class is 56 is 7×8 . So, that would mean that it would be 8 .	analyzing/applying	analyzing/applying fluency with multiplication and division facts	analyzing/applying fluency with multiplication and division facts
Interviewer: Now, you said 7×8 , but the problem says division. How did you know to say 7×8 ?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Because, it's the opposite, so then it would, if you just flipped it around, it would be the same.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: Very nice. Okay. How about this one [item 4]?			
Student 3: [Item 4] This information to answer the following three questions. Beth, Dean, Jake and Maya each set a reading goal. The table shows their goal. Beth completed her reading goal for, for 10 days. What is the number of pages Beth read? So, if it's 15 pages per day and it's 10 days, you would multiply that, you would multiply 15 x 10, and then 0 x 5 would be 0, and 0 x 1 is 0. And, then 1 x 5 would be 5, and then 1 x ____ [0:14:08] would be ____ [0:14:09]. [Student explains work while using the traditional multiplication algorithm.]	interpreting	relationship between variables as presented in a table interpreting	interpreting
Interviewer: So, when you multiplied, you got 15 and then I saw you erase that. Why did you erase that? [Student did 10 x 15 on scrap paper and got an answer of 15. He forgot to include the place holder zero in the second row.]			
Student 3: Because, at the, at the beginning, it's 15 pages per day, and it needs to be, it needs, their goal is for 10 days.	no evidence	no evidence	no evidence
Interviewer: That's right. Is there some, a different strategy you could use?			
Student 3: Well, from multiplication, I know that 10, usually 10 times anything would just add a zero to it.	place value	place value	place value
Interviewer: Yeah. So, does that help?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Yes. So, that would mean it would be 150.	no evidence	no evidence	no evidence
Interviewer: Right. Great. Okay. How about the next one?			
<p>Student 3: [Item 5] Use this information to answer the following three questions. Beth, Dean, Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Jake is reading a book that has four hun, 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read in three weeks?</p> <p>So, if his, if his goal is 110 pages per week, then you could, you could multiply that by 3. 3×0 is 0, 3×1 is 3, 3×1 is 3, so then that'd be 330. And, then 330, if it needs to be three weeks, and if that would want to, and if the 3 stands for weeks, and the 110 stands for pages, then 3×110 would be, that would be three weeks. And, and he needs to, his goal is for three weeks, so it's 330.</p>	interpreting (incomplete)	<p>interpreting (incomplete)</p> <p>relationship between variables as presented in a table</p>	interpreting (incomplete)
Interviewer: 330. Very nice. Great thinking. Okay. Next one.	no evidence	no evidence	no evidence
<p>Student 3: [Item 6] Use this information to answer the follow three questions. Beth, Dean, Jake and Maya each set a reading goal. This table shows their goals. Maya completed her goal for two days. The first day she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening and on the second day. Which value can be placed in the square to make this equation true?</p> <p>So, 40 minus, $40 - 22$ would be, you would need to borrow from the 4 and make it a 3 ____ [0:18:59]. Then $10 - 2$ is 8, and $3 - 2$ is 1. So, then it would be 18, and $18 + 8 =$, if $8 + 8$ equals 16, you put the 6 down there and add the 1, so $1 + 1 = 2$, that'd be 26.</p>	no evidence	<p>evaluating</p> <p>equivalent expression (incorrect)</p>	no evidence
Interviewer: Now, how did you know to add that 8 after you got 18?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Because, on the problem, it says $40 - 22 =$ that [the box]. And, then that, you need to add 8 more to it.	no evidence	no evidence	no evidence
Interviewer: Great. ____ [0:19:46].			
Student 3: [Item 7] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data. This fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? If it's, it shows $\frac{3}{4}$ [the model], ...	models used to represent fractions	models used to represent fractions	models used to represent fractions
Student 3: ...then if you go down to [option] A, it's $2 + 1$, and if you add fractions, the bottom number stays the same. But the top numbers change, so then that would be $\frac{3}{4}$.	assessing decomposition of fractions	assessing decomposition of fractions	assessing decomposition of fractions
Interviewer: Great. Nice. Good explaining.			
Student 3: [Item 8] Use this information to answer the following three questions. The students in Mr. Valdez's class measure more heights of the bean plants. This table shows their data. Mr. Valdez made this frequency table to show the same information as the data table. What is the total number of plants that have a height greater than $\frac{1}{4}$ inch? Well, on this chart, $\frac{1}{4}$ is smaller than $\frac{3}{4}$ and $\frac{1}{2}$. So, then you would add the, those two together [the tallies for $\frac{1}{2}$ and $\frac{3}{4}$] and that would equal 4. So, then the answer would be 4.	data as presented in line plots and frequency tables interpreting	interpreting data as presented in frequency table	data as presented in line plots and frequency tables interpreting
Interviewer: Great.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 3: [Item 9] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the height of bean plants. The table shows their data. Which list shows the plants heights in inches from order least to greatest?</p> <p>On A, $\frac{1}{4}$ is, is the smallest of all of them, and then $\frac{1}{2}$ is a little bit bigger, then $\frac{3}{4}$ is there, a little bit bigger than that. On B, then $\frac{1}{2}$, I know it's not right, because $\frac{1}{4}$ is smaller than that. On this one [option C], $\frac{3}{4}$ is, I know it's the biggest one. And, same with D. So, the answer is A.</p>	analyzing/applying	assessing decomposition of fractions	assessing decomposition of fractions
Interviewer: Now, did you find it hard to explain out loud _____ [0:22:31]?			
Student 3: No, not really.	no evidence	no evidence	no evidence
Interviewer: You did a really nice job. Great. Go ahead and try the next one.			
<p>Student 3: [Item 10] This rectangle represents 1 whole unit. What is the sum of the fractions represented by the shaded parts in the rectangles below?</p> <p>Well, on this side, there's only $\frac{1}{4}$ that is shaded. And, then on this side, there's only $\frac{2}{4}$. So, if you add $\frac{1}{4}$ plus $\frac{2}{4}$, it would equal $\frac{3}{4}$.</p>	analyzing/applying models used to represent fractions	assessing models used to represent fractions	assessing models used to represent fractions
Interviewer: Now, how did you know that $\frac{1}{4}$ plus $\frac{2}{4}$ equal $\frac{3}{4}$?			
Student 3: Because, if you imagine all the white ones were gone and you drag the, the shaded one over there, that would be three out of four.	analyzing/applying	no evidence	analyzing/applying
Interviewer: Very nice.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 3: [Item 11] The student in Mr. Plar's class measured the length of their pencils. They recorded the measurements on a line plot. How many pencils were less than $4 \frac{4}{8}$ inches long?</p> <p>So, on here, if you want to figure that out, you go to $4 \frac{4}{8}$ [on the line plot], which, then you go to all the ones before it and then there's a one on that one [$4 \frac{1}{8}$] and a three on that one [$4 \frac{2}{8}$], then a one on that one [$4 \frac{3}{8}$]. So, you would add $1 + 3 + 1$, and you could, you could ignore the 3 right now and do the $1 + 1$, and that would be 2. And, then $2 + 3 = 5$.</p>	<p>interpreting</p> <p>data as presented in line plots and frequency tables</p>	<p>interpreting</p> <p>data as presented in frequency table</p>	<p>interpreting</p> <p>data as presented in line plots and frequency tables</p>
Interviewer: Very nice. Last one.			
<p>Student 3: [Item 12] Which comparison is true?</p> <p>On A, it's $\frac{1}{2}$ is less than $\frac{1}{4}$, so that's not true. On B, it's $\frac{1}{3}$ is equal to $\frac{2}{3}$, which isn't true. $\frac{2}{4}$ is equal to $\frac{1}{2}$, that is true. But, and on D, $\frac{2}{4}$ is less than $\frac{1}{3}$, or yeah, $\frac{2}{3}$ is less than $\frac{1}{3}$, and that's not true.</p>	<p>assessing</p>	<p>assessing</p>	<p>assessing</p>
Interviewer: How do you know that C is true?			
<p>Student 3: Because, with, if you take the shaded ones and put this one to the side [student moves the top gray section on the left model to the top left], then half of it [the model on the left] will be shaded and half of it won't be, like on this side [the right side model].</p>	<p>models used to represent fractions</p>	<p>models used to represent fractions</p>	<p>models used to represent fractions</p>
Interviewer: Great. And, then did you want to go back [to the item he skipped earlier - item 2]?			
Student 3: ____ [0:25:15].	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
Interviewer: You want to read it again?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: [Trying item 2 again] A photo album has 56 pages. Which estimate is closest to the total number of pages in, in 43 photo albums? This time, I'm going to, this one's really confusing for me.	no evidence	no evidence	no evidence
Interviewer: So, tell me what you're thinking about.			
Student 3: I'm just thinking that if I work this out on, if I worked out 56×43 , I don't see how it could get up to 2,000 and over.	no evidence	place value (incorrect)	no evidence
Interviewer: Okay. So, how did you know to do 56×43 ?			
Student 3: Because, the number is getting bigger.	no evidence	no evidence	no evidence

School District B—Grade 5 Mathematics (Student 4)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
[Item 1] Use the information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals. Beth, 15 pages per day; Dean, 125 pages per week; Jake, 110 pages per week; Maya, 40 pages per two days. Beth completed her reading goal for 10 days. What is the total number of pages Beth read?	no evidence	no evidence	no evidence
Student: 15... that's 35.	no evidence	no evidence	no evidence
Interviewer: How did you get 35?			
Student: Oh, 30.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. How did you get 30?			
Student: Because 5 plus 5 is 10, so you add zero, and you put the one above the two 1s, and that's a 3.	no evidence	no evidence	no evidence
Interviewer: And why were you adding 15 plus 15?			
Student: Because Beth used ten days, so I'm doing two.	no evidence	no evidence	no evidence
Interviewer: Okay, great. Keep going. Sorry for interrupting.			
Student: So, that's 4.	no evidence	no evidence	no evidence
Interviewer: So, that would be 4 for 40?			
Student: Yes.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student: That's 40. And then this is ____ [00:08:19].	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student: And then, there's two more days left. 30.	interpreting	interpreting	interpreting

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, let me understand. So, you found, first, how many was two days, and then you used that to get 4, and then to get 8, and then you added another two. Very nice. So, which choice do you think is best?			
Student: [option] A.	no evidence	no evidence	no evidence
Interviewer: Okay. How about the next one?			
Student: [Item 2] Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of this book will Jake have left to read at the end of three weeks? It's [option] D.	no evidence	no evidence	no evidence
Interviewer: I'm just going to say out loud what you did. [On the scrap paper], You did 110 plus 110, and then you got 220. And then you added another 110, and then you got 330. Just because the... No, that's okay. You're doing great.	interpreting	no evidence	interpreting
Student: And... _____ [00:10:08] I think it's 330.	no evidence	no evidence	no evidence
Interviewer: Okay. How did you know to add 110 to 110, and then another 110.			
Student: Because I know how much pages per week.	no evidence	no evidence	no evidence
Interviewer: And then how many times did you add it?			
Student: Three.	no evidence	interpreting	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you know it's three?			
Student: Because if I added that plus that number or the same number, that'd make it 440.	no evidence	no evidence	no evidence
Interviewer: Okay, so you stopped at three because it matched an answer choice?			
Student: Yes.	no evidence	no evidence	no evidence
Interviewer: Okay. On to the next one.			
Student: [Item 3] Maya completed her goal for two days. The first day, she read 22 pages. The second day she read 8 pages in the morning. This equation can be used to find the number of pages Maya read in the evening on the second day. $40 \text{ minus } 22 \text{ equals } \text{box plus eight}$. 10 minus 2 is 8 and 3 minus 2 is 1. Plus 8... 16 plus 1, that's 2.	no evidence	evaluating	no evidence
Interviewer: How did you know ____ [00:12:10]?			
Student: Because it says it right there, and that's what I did.	no evidence	no evidence	no evidence
Interviewer: Okay. Next.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student: [Item 4] Duane know that a number multiplied by 7 is 21. Which equation can Duane use to figure out this number? 21×7.</p> <p>7 goes in 1, 7... wait. How I learned 7×1 is technically a song that my teacher made up, because 3, 6, 9, 12, 15, 18, 21. And that's how I know all.. 1 through 12.</p>	no evidence	no evidence	no evidence
Interviewer: So, how did you know that "A" was the best answer?			
Student: Because 21×7 no, wait... 21 divided by 7.	no evidence	no evidence	no evidence
Interviewer: So, how did you know that "C" was the best answer.			
Student: Because 21 divided 7, 7 can't go into... it's technically easy. I did this a long time... 7 can't go into 2, so you put a zero. [Student 4is trying to do the traditional division algorithm on scrap paper.] How many times can 7 can go into 21? And then you count by saying 7, 14, 21... and the answer is 3.	no evidence	no evidence	no evidence
Interviewer: Now, up here it says "multiplied", and then your answer had "divided". How did you know that that was okay?			
Student: Because if you...a number multiplied by 7 is 21, so... 3 is multiplied by 7. That's 21. So, you see that if you multiply every number that you can till you get to 21.	analyzing/applying	analyzing/applying relationship between multiplication and division	analyzing/applying
[Item 5]			
Student: A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums? 43 times 56, right?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Uh-huh. So, you multiplied 43 times 57, and you have 473?			
Student: No, wait, I got this wrong. I'm supposed to add a 0, and then 0, and that's 3, and that's 2 [Student 4 is doing computation on scrap paper].	no evidence	no evidence	no evidence
Interviewer: And then 2300. How did you get that?			
Student: Well, you can't... like do this all at once, so you have to go 6 times 3 equals 18... wait... yeah. And then, put the 8 down, and that's too big because you can't put it right there, so you have to do plus one. On the next line, so 6 times 4 is 24, plus 1, that's 25. So, you put a 25, and then you have to bring down the 0 right here. And then 5 times 3 is 15, so add the 5, and then you've got to do plus 1. Then 5 times 4 is 20, plus 1, that's 21. [Student 4 is explaining the algorithm used.] And that's how I got it.	no evidence	assessing	no evidence
Interviewer: Okay. And then which answer would you choose?			
Student: B.	no evidence	no evidence	no evidence
Interviewer: And why "B"?			
Student: Because "B" is... if you don't have the right answer, and you see the wrong one up there, that might be the closest to the answer. You add up until you get that answer.	no evidence	reasonable estimate	no evidence
Interviewer: Okay. Great. Thank you. Next one.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: [Item 6] 56... that's 8.	no evidence	no evidence	no evidence
Interviewer: How do you know that?			
Student: Because 7 times 7 is 49, plus 7, that's 56.	analyzing/applying fluency with multiplication and division facts	analyzing/applying fluency with multiplication and division facts	analyzing/applying fluency with multiplication and division facts
Interviewer: And how did you know... you said 7 times 8, but this says "divided by"...			
Student: Yeah, 56 divided by 7--I mean divided by 8.	no evidence	relationship between multiplication and division	no evidence
[Item 7] [Some text seems to be missing here.]			
Interviewer: How did you get the 3?			
Student: When you put those together, I mean that's 3, because that's 2, that's 1. And then you add up all those.	models used to represent fractions	assessing models used to represent fractions	assessing models used to represent fractions
Interviewer: All the different parts.			
Student: Yeah.			
Interviewer: Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: [Item 8] The students in Mrs. Plar's class measured the lengths of their pencils. They recorded their measurements on a line plot. How many pencils were less than 4 and four-eighths inches long?	no evidence	no evidence	no evidence
Interviewer: Which fraction are you focused on [on the line plot]?			
Student: That's 4 and four-eighths [points to 4 4/8 on line plot]. So, that's 3 inches [because of the 3 x's]. That's 1 inch, 2 inch, 3, 4 inch, and 5 inch, because they're all equal. Then... no it's five.	no evidence	no evidence	no evidence
Interviewer: How do you know it's 5?			
Student: Because less than inches, that's one, that's two, that's three, that's four, that's five. Because you don't add these... because this is lower than this one, so you count that one; that's lower than that one, so you count that one. That's the same, so you count that one, and that's one. [Student 4 is using a misunderstanding for how to read the line plot.]	interpreting (Student 4 is trying to interpret the line plot, but does so incorrectly)	interpreting (incorrectly)	interpreting (Student 4 is trying to interpret the line plot, but does so incorrectly)
Interviewer: So, you added up every fraction that had less than three Xs to get your answer?			
Student: Yeah.	no evidence	no evidence	no evidence
[Item 9 seems to be missing]			
Interviewer: Okay, great.			
[00:19:46] - [00:20:03] [Inaudible]			
Student: That's true.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How do you know it's true?			
Student: Because if you put that over there, that's, that is it.	no evidence	no evidence	no evidence
Interviewer: Very nice.			
Student: [Item 10] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data.	no evidence	no evidence	no evidence
Student: This is a fraction model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant? Yeah, that one. [Student 4points to Option D on screen.]			
Interviewer: Option D?			
Student: Yeah.	no evidence	no evidence	no evidence
Interviewer: How did you know D was the right answer?			
Student: Wait a minute. That one.	no evidence	no evidence	no evidence
Interviewer: A or B?			
Student: A.	no evidence	no evidence	no evidence
Interviewer: How did you know A was correct?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: Because 2 plus 1 is 3, and you add those together.	assessing	assessing decomposition of fractions	assessing decomposition of fractions
Interviewer: Okay. And did you use this table to help you?			
Student: Yes.	no evidence	no evidence	no evidence
Interviewer: And which part of it did you use?			
Student: Because one, two, three... those are three and then there's four.	no evidence	no evidence	no evidence
Interviewer: Okay. Next.			
Student: [Item 11] Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data.	no evidence	no evidence	no evidence
Mr. Valdez made this frequency table to show the same information as in the data table. Wait, why is that a 2? Oh, it's okay.	no evidence	no evidence	no evidence
What is the total number of plants that have a height greater than one-quarter inch? Um... three plants.	no evidence	no evidence	no evidence
Interviewer: What's your answer?			
Student: 2.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, how did you know that it's two?			
Student: Because one, two.	interpreting (Student 4 is trying to interpret the frequency table, but does so incorrectly)	interpreting (incorrectly)	interpreting (Student 4 is trying to interpret the frequency table, but does so incorrectly)
Interviewer: So, there were two that had... which measurement?			
Student: Three-fourths.	no evidence	no evidence	no evidence
Interviewer: Two that had three-fourth. [Student 4 identified the two tally marks for 3/4 inch.] Great. Next.			
Student: [Item 12] Which list shows the plant heights, inches, in order from least to greatest? [Option] B.	no evidence	no evidence	no evidence
Interviewer: How do you know B is correct?			
Student: Because that's a 2, and that's a 1, that's 1 and that's a 4. That's the biggest number, that's one of the least, but that's the least because it has two, and the others have four.	no evidence	analyzing/applying (incorrectly)	no evidence

School District B—Grade 5 Mathematics (Student 5)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: [Item 1] Duane knows that a number multiplied by seven is 21. Which equation can Duane use to figure out this number? Um, 21 divided by 7.	relationship between multiplication and division	relationship between multiplication and division	relationship between multiplication and division
Interviewer: How do you know that it's divided by?			
Student: Because if you divide it by 21 you get three.	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: I notice that up here it says multiply but then your answer had divide it. Why is that?			
Student: Because it said multiply by three, so you'd get 21 but in this one it's asking how much would you get if you get it?	no evidence	no evidence	no evidence
Interviewer: Great. Awesome. Pick you choice, and then you can hit next.			
Student: [Item 2] "A photo album has 56 pages. Which estimate is closest to the total number of pages in 43 photo albums?"	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Interviewer: So, you multiplied 56 times 43. [Student did this on the scrap paper.] How did you get the right answer? Hmm. What did you write for your answer?	analyzing/applying	analyzing/applying (incorrectly)	analyzing/applying
Student: That it's two million. It's 20,000.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Mm-hmm, so what would you do on the day of the test if you got an answer that doesn't match what the choices were?			
Student: I would try a different operation.	no evidence	no evidence	no evidence
Interviewer: Yeah, do you want to give that a try?			
Interviewer: So, it looks like you tried to divide 56 by 43? [Student did this on the scrap paper.]			
Student: Mm-hmm.	no evidence	no evidence	no evidence
Interviewer: And then did that help on the choice of response?			
Interviewer: So, which operation makes the most sense to you; adding, subtracting, multiplying, or dividing given what they showed you?			
Student: Probably multiplying.	no evidence	no evidence	no evidence
Interviewer: Multiplying? Okay, so what made you think of multiplying?			
Student: Because you'd get at least 2,000.	assessing	reasonable estimate	assessing
Interviewer: Great. Okay, so then do you have an idea of which one [answer] would be the best choice?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: Uh, this one.	no evidence	no evidence	no evidence
Interviewer: Great. Go ahead and choose that one. Awesome, and then you can hit next. Can you read this one out loud?			
Student: [Item 3] Yes. "Which number would make the equation true; 56 divided by what equals seven?" I think it's A.	no evidence	no evidence	no evidence
Interviewer: Why do you think it's 8?			
Student: Because I did seven times eight would equal 56.	relationship between multiplication and division analyzing/applying	analyzing/applying fluency with multiplication and division facts	relationship between multiplication and division analyzing/applying
Interviewer: How do you know you can do seven times eight even though it says divided by?			
Student: Because you can check your work. You can see if it equals the same.	no evidence	relationship between multiplication and division	relationship between multiplication and division
Interviewer: Awesome. Choose the best answer.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: [Item 4] "Use the information to answer the following three questions. Beth, Dean, Jake, and Maya each set a reading goal. This table shows their goals." Beth had 15 pages per day, Dean had 125 pages per day, and Jake had 110 pages per week. Dean had 125 pages per week and Maya had 40 pages for two days. "Beth completed her reading goal for 10 days. What is the number of pages Beth read?"	no evidence	no evidence	no evidence
Interviewer: So, you were counting five times 40. Where did you get those numbers from?			
Student: Right here—it's 40 and it says Beth completed her reading goal for 10 days, but it says ... oh, I read it wrong.	no evidence	no evidence	no evidence
Interviewer: That's okay. So, what would you like to do instead?			
Student: 15 pages times 10 –	interpreting	interpreting	interpreting
Interviewer: Mm-hmm.			
Student: I think 150.	no evidence	no evidence	no evidence
Interviewer: I saw you wrote on your paper 10 times 15 equals 150, but I think your brain something to get that answer. How did you get that answer?			
Student: I was doing 15 times five, but I did it twice.	no evidence	no evidence	no evidence
Interviewer: Very nice strategy. Great, so go ahead and choose your answer.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: Do I have to read that? [the shared stimulus that is the same from item 4]	no evidence	no evidence	no evidence
Interviewer: It's up to you. Does it look familiar?			
Student: Yes.	no evidence	no evidence	no evidence
Interviewer: So, if it's the same –			
Student: [Item 5] "Jake is reading a book that has 389 pages. Based on Jake's reading goal, how many pages of the book will Jake have left to read at the end of three weeks?"	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student: I think it would be 59 pages.	no evidence	no evidence	no evidence
Interviewer: On your paper you divided 389 by 110, and then how did you know 59 was the answer?			
Student: Because I subtracted 389 minus 330 and I got that answer.	interpreting	interpreting	interpreting
Interviewer: How did you know from the problem to do 389 divided by 110?			
Student: Because Jake reads 110 pages per week and it says 389 pages and it says how many left pages would he have left at the end of the three weeks.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Very nice. Great, so go ahead and pick your answer and you can hit next.			
Student: [Item 6] "Maya completed her goal for two days. The first day she read 22 pages. The second day she read eight pages in the morning. Which equation can be used to find the number of pages Maya read on the second day?"	no evidence	no evidence	no evidence
Student: It would be 26.	no evidence	no evidence	no evidence
Interviewer: Now, you wrote down 18 plus 8 equals 26. How did you get to this number, 18?			
Student: Because 20 minus 40 equals 20 and then there's two left, so I subtracted 20 minus two and it got me to 18.	no evidence	evaluating	evaluating
Interviewer: How did you know to add eight to that?			
Student: Because it would equal 18 plus eight.	no evidence	evaluating (incorrectly)	evaluating (incorrectly)
Interviewer: Great. Go ahead and pick your answer please. How about this one?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student: [Item 7] "Use this information to answer the following three questions. The students in Mr. Valdez's class measured the heights of their bean plants. This table shows their data." Anna one-half, Eva three-fourths, Kent one-half, Mariah three-fourths, and Peter one-fourth. "This fraction is a model that shows the height of Mariah's bean plant. Which expression is equal to the height of Mariah's bean plant?"</p> <p>I think it's A.</p>	assessing	assessing	assessing
<p>Interviewer: Why do you think it's A?</p>			
<p>Student: Because two plus one is three, but you can't change the bottom two numbers.</p>	decomposition of fractions	decomposition of fractions	decomposition of fractions
<p>Interviewer: Did you use this picture to help you solve that?</p>			
<p>Student: No.</p>	no evidence	no evidence	no evidence
<p>Interviewer: You didn't use it? Okay, great. Thanks. You can just click it. There you go.</p>			
<p>Student: [Item 8] "Mr. Valdez made this frequency table to show the same information as the data on the table." Bean plant heights; plant heights were one-fourth, one-half, and three-fourths. "What is the total number of plants that have a height greater than one-fourth?"</p> <p>Four.</p>	interpreting	interpreting	interpreting
<p>Interviewer: How did you know that?</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: Because I looked over here and I saw two and I saw them each here which made four [student pointed to the tallies for 1/2 and 3/4].	data as presented in line plots and frequency tables	data as presented in line plots and frequency tables	data as presented in line plots and frequency tables
Interviewer: Why did you not include that one [the tally for 1/4]?			
Student: Because it said which one is greater than one-fourth?	analyzing/applying	interpreting data as presented in line plots and frequency tables	interpreting data as presented in line plots and frequency tables
[Item 9]			
Student : "Which list shows the plant highest in inches and order from least to greatest?" I think it's A.	no evidence	no evidence	no evidence
Interviewer: Why?			
Student: Because it's the order from which the greatest and one-fourth is least, what is least and one-half of one-half is least out of three-fourths.	assessing	assessing	assessing
Interviewer: Okay.			
Student: [Item 10] "This rectangle represents one whole unit. What is the sum of the fractions represented by the shaded parts of the rectangles below?" I think it would be three-fourths.	no evidence	assessing	no evidence
Interviewer: How did you get that three-fourths?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student: Because the dark spots would be, and then it says plus and then the dark spots, there's three of them so I added those together and then there's four over here and four over here.	models used to represent fractions assessing	models used to represent fractions	models used to represent fractions assessing
Interviewer: Nice.			
Student: [Item 11] "The students in Ms. Plar's class measured the length of the pencils. They recorded their measurements on a line plot. How many pencils were less than four and four-eighths inches long?"			
Student: I think it's five.	no evidence	no evidence	no evidence
Interviewer: How did you get five?			
Student: Because it says which one is less than four and four-eighths and I simply counted that one, which is four and that one, which is five.	interpreting (incorrectly)	interpreting data as presented in line plots and frequency tables	interpreting (incorrectly)
Interviewer: Nice.			
Student: [Item 12] "Which comparison is true?" I think it's this one [option C].	no evidence	models used to represent fractions	models used to represent fractions
Interviewer: Why do you think that one?			
Student: Because this one is in two-fourths and it's actually in half. You can make it smaller.	assessing	applying/analyzing	assessing

School District B—Grade 8 Mathematics (Student 1)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 1: [Item 1] 'Points A, B, C, D, and E lie on the sides of a triangle.' 'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of segment AE is 6 units. If the length of segment AC is 7.2, what is the length, in units, of segment BC?'</p> <p>Okay, so it's BD is 3 units long and AE is 6. But AC is 7.3, no AC. That would be [pause] 3.6 units.</p>	<p>analyzing/applying similarity</p>	<p>analyzing/applying similarity</p>	<p>analyzing/applying similarity</p>
<p>Interviewer: So, can you tell me how you found that length, 3.6?</p>			
<p>Student 1: I took 7.2 divided by 2, because B is ____ [00:17:24] C.</p>	<p>proportionality</p>	<p>proportionality</p>	<p>proportionality</p>
<p>Interviewer: Okay, thank you. Thanks for sharing. So, yeah, if you can hit Next.</p>			
<p>Student 1: [Item 2] 'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertices of trapezoid A'B'D'E'?</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>So, if it's asking to reflect it, would it be this way or down?</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Yeah. So, if you go back to the problem, do you think you can figure out if, which way they want it to go?</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Like with x-axis, so it could go down. So, C would be -9. Or would it? This one would be (-9, 6), so those not actually ____ [00:18:19]. It would be six negative. B is (-6, 4). B doesn't have (-6, 4) [as a possible answer].	analyzing/applying (student is trying to apply the transformation, but does so incorrectly)	interpreting (incorrectly)	analyzing/applying (student is trying to apply the transformation, but does so incorrectly)
Interviewer: Okay. So, what would you do if you were taking the test on that day? And what you think is the answer isn't appearing as a choice?			
Student 1: I would have just guessed.	no evidence	no evidence	no evidence
Interviewer: Okay. So, do you want to do that here, then?			
Student 1: I'm just trying to see if I can find that's [cross talking]	no evidence	no evidence	no evidence
Interviewer: Sure. Yeah, take your take your time. There's no rush.			
Student 1: Yeah, the answer for A has a 3, but it's on a 2. So, . . .	no evidence	no evidence	no evidence
Interviewer: Which?			
Student 1: Guess again on that one.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 1: E would have been 8, but they're saying (3, 3)s. All of them, yeah. I want to say it was flipped, and then flipped upside down. So, it would have been 9. So, it would probably have been this was flipped, and then flipped down.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. All right. So, on this one, can you do this one and say out loud what you're thinking?			
Student 1: [Item 3] 'Which segment lies on a line that represents a proportional relationship between x and y?'	no evidence	no evidence	no evidence
I'm just trying to remember what we did for this. Because . . .	no evidence	no evidence	no evidence
Interviewer: So which part are you trying to remember?			
Student 1: How to actually do the problem. Like the proportional relationships. Let's see. Which line represent _____ [00:20:23] between x and y. I don't really know.	no evidence	no evidence	no evidence
Interviewer: Okay. So, what would you do again, if this was a real test and you knew your teacher couldn't help you, what would you do?			
Student 1: I would try to do it on my own until like a certain point, and then I would probably just guess.	no evidence	no evidence	no evidence
Interviewer: Okay, so why don't you go ahead give that a try. [pause] Okay, how about this next one?			
Student 1: [Item 4] 'Triangle ABC is similar to DEF, as shown.'	no evidence	no evidence	no evidence
Student 1: The length of DF.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: [The item] Wants the length of DF.	no evidence	no evidence	no evidence
Student 1: It's centimeters, but ____ [00:21:15]. Taking a guess, that'd probably be 10 more centimeters right there, would be ____ [00:21:24], then it's bigger. So, this one [DF] would have been 13 centimeters.	analyzing/applying (the student is trying to analyze the figures, but is doing so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (the student is trying to analyze the figures, but is doing so incorrectly)
Interviewer: Okay. So, how did you, can you just say out loud a little bit more about how you determined DF was 13?			
Student 1: By looking at the numbers we were given, this one was 5, and this one's 15. How big they were, too. This one, it's like the same triangle but that's bigger, too. So, since this one's 15, I thought this one might be 13, because we've got 3 over there.	no evidence	explaining/reasoning (incorrectly)	no evidence
Interviewer: Okay, great. Thanks.			
Student 1: [Item 5] 'Yanni drew a rectangle KLMN on this graph. 'Yanni will reflect this over the x-axis. Which ordered pair describes the location of point K after it is reflected over?'	no evidence	no evidence	no evidence
Student 1: So, we've got (3, -3). If we flipped it over, we would have gotten maybe -3 and -3. So, [clicks A] because it's reflected over.	transformation applying/analyzing	interpreting transformation	transformation applying/analyzing
Interviewer: So, what is that, 'reflected'?			
Student 1: That means that I took it and flipped it over onto the bar [PH].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Very nice. Thank you. Okay, the next one.			
Student 1: [Item 6] 'Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit mass (grams) per unit of volume (cubic meters [sic]).'	no evidence	no evidence	no evidence
Student 1: 'Based on this graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'	no evidence	no evidence	no evidence
Student 1: So 2 would have been about 20 [looking at graph]. If it was about that. Let's see. 'Volume of a substance.' Okay, so just going up by 10, it'd be multiplied. Because we got, there's no words, we got 1 right there, 2, 3, 4, it's going up by 10 [the numbers on the y-axis].	analyzing/applying (student starts to analyze the graph)	interpreting (incorrectly)	interpreting (incorrectly)
'Based on this graph, which equation . . .' [pause] I don't know.	no evidence	no evidence	no evidence
Interviewer: Okay. So, what would you do again if it was the day of the test and you did not know what to do?			
Student 1: I would have guessed on it, when I got to a certain point.	no evidence	no evidence	no evidence
Interviewer: Okay. So, is there something that would make you choose one of the options over the others?			
Student 1: Probably, would be based on ____ [00:24:05].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. So, why don't you go ahead and do that. Okay, how about this one?			
Student 1: [Item 7] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used 2 [sic] (50)s to estimate they had ticket sales of \$1,000. Which statement describes this situation?'	no evidence	no evidence	no evidence
Student 1: [Reading option a] Manager's estimate is reasonable because the value is close to the actual value of the tickets.	no evidence	no evidence	no evidence
Student 1: [Reading option b] Manager estimate is reasonable because that value is the exact value of the ticket sales.	no evidence	no evidence	no evidence
Student 1: [Reading option c] The manager's estimate it's not reasonable because the value under statements the actual value of the tickets by \$500.	no evidence	no evidence	no evidence
Student 1: [Reading option D] The manager's estimate is not reasonable because of that value estimates the actual value of tickets sales by about 500.	no evidence	no evidence	no evidence
Student 1: How, manager used to estimate about. _____ [00:25:24] it's reasonable because the value is close enough to actual value of tickets sold.	no evidence	explaining/reasoning (incorrectly)	no evidence
Interviewer: So, option A?			
Student 1: Yes.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. What did you think about this problem? Did you think it's hard, it's not easy, or sort of in the middle?			
Student 1: It was sort of hard, but not.	no evidence	no evidence	no evidence
Interviewer: Okay. And then, how about talking out loud about it? Is that hard to do for this problem, easy, or about the same?			
Student 1: Meh. Kind of, kind of not.	no evidence	no evidence	no evidence
Interviewer: And so, what made you choose option A?			
Student 1: Because I'm not really good with word problems, so I would have went for what I would have thought was it.	no evidence	no evidence	no evidence
Interviewer: Great. Thanks. Okay. Go ahead and select A, and then you can hit Next.			
Student 1: [Item 8] 'What is the value of $(-3)^4$? The 4th power is. So, if you take, . . .	no evidence	no evidence	no evidence
Interviewer: Yeah, take this [Interviewer handed Student 1 a calculator].			
Student 1: There's -9 and again. I'm used to the big . . .	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Yes, I was just going to say--. Do they let you use those [scientific calculators] on ____ [00:26:22]?			
Student 1: For 8th grade, our [cross talking].	no evidence	no evidence	no evidence
Interviewer: Yeah, do you have one?			
Student 1: Yes.	no evidence	no evidence	no evidence
Interviewer: Oh, sorry about that. Yes, you can use that.			
Student 1: It's all right. This one's ____ [00:26:44], so. You take -3, multiply it by -3, so it's this. -27. But I put 3, so.	no evidence	assessing	no evidence
Interviewer: So, how many times did you put it in this time?			
Student 1: Four.	exponent	exponent	exponent
Interviewer: Okay. And what did you get?			
Student 1: 81.	no evidence	no evidence	no evidence
Interviewer: Now, how did you know to put it in four times?			
Student 1: Because it's to the 4th power, equals the, like 3 equals whatever 3 to 3 [cross talking] point 3.	assessing	assessing	assessing

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Great. Okay. Can you hit Next?			
Student 1: [Item 9] 'Which value is the greatest distance from zero on a number line?' What, let's see, that's [absolute value of -0.8] 75, that's [absolute value of 0.6] 60, that's [absolute value of 3.4] 80, this one [absolute value negative 1/2] would have rolled backwards because it's forwards, forward, backwards. Saying going on this one, because it's greater than the other ones. Unless, I don't know, you're this. The decimals might be a little bit more than this, but.	assessing (student is trying to assess distance from zero, but does not quite have the concept down completely)	drawing conclusions (incorrectly) absolute value (partial)	assessing (student is trying to assess distance from zero, but does not quite have the concept down completely)
Interviewer: Okay, now how about this one?			
Student 1: [Item 10] 'Use this information on the following three questions.	no evidence	no evidence	no evidence
Mrs. Garcia's class was given a random number. As shown on On the table it show their number.	no evidence	no evidence	no evidence
[Student is reading table] Bailey, 1/3	no evidence	no evidence	no evidence
Kim, absolute -8	no evidence	no evidence	no evidence
Leon, absolute -3/4	no evidence	no evidence	no evidence
Nina, absolute 5	no evidence	no evidence	no evidence
Patrick, absolute 7/3	no evidence	no evidence	no evidence
Richard [sic], -7	no evidence	no evidence	no evidence
Shawn, -940.	no evidence	no evidence	no evidence
Student 1: Which is the best estimate of his answer?	no evidence	no evidence	no evidence
Student 1: Shawn divides his number by -9.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, what are you going to put in [to your calculator]?			
Student 1: -940 divided by -9. Got that. Which would have the best estimate, would have been -100. Because that's the closest number.	assessing	assessing	assessing
Interviewer: Can you say out loud what you got in your calculator?			
Student 1: -931.	no evidence	no evidence	no evidence
Interviewer: Okay, and then the closest to that is?			
Student 1: Is -100.	no evidence	reasonable estimate	reasonable estimate
Interviewer: Okay. So how did you know that that was the best answer?			
Student 1: Because it was closest to the number that he divided.	no evidence	no evidence	no evidence
Interviewer: Okay. Thanks.			
Student 1: [Item 11] 'What is the value of Richard's number to the 3rd power?' Richard, or Rachel's. I've been saying that wrong.	no evidence	no evidence	no evidence
Interviewer: That's okay.			
Student 1: So, it'd be -7, multiplied by -7, multiplied by -7. Which would be -7, three times by itself, you get -343. Which is option A.	assessing exponent	interpreting exponent	assessing exponent
Interviewer: And did you find that question easy, hard, medium?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 1: Pretty easy.	no evidence	no evidence	no evidence
Interviewer: Pretty easy, okay.			
Student 1: [Item 12] 'Which of the following students has the number that is greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
[student reads the table] 1/3, absolute -8, absolute -3/4, absolute 5, absolute 7/3, -7, and 940.			
Student 1: It really determines, because Shawn right now, if he was an option, he would have been the furthest one. But we got Patrick, which is absolute 7/3, Kim, Nina, that's absolute 5, Leon, absolute -3/4. Kim that has absolute -8. Kim would be the farthest if it was backwards, but it's absolute -8, so that would translate it to 8, because any absolute number that is negative would turn into a positive. Unless it has a negative sign outside, then it would have been a negative. So, Kim is option A. And then Finish.	assessing (student is trying to assess distance from zero on a number line, but does so incorrectly)	drawing conclusions absolute value	assessing absolute value

School District B—Grade 8 Mathematics (Student 2)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Mm-kay.			
[Item 1]			
Student 2: 'Triangle ABC is similar to triangle DEF, as shown below. 'What is the length of D to F?'	no evidence	no evidence	no evidence
Student 2: Okay, so, since this is 15, going to same length, this would be 15. Or, no. Since they're not the same length. 10 because this one looks like it's a few less, so it would be 10.	analyzing/applying (student is trying to analyze the figure, but does so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (student is trying to analyze the figure, but does so incorrectly)
Interviewer: It looks like a few less than the 15?			
Student 2: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay, great. So, go ahead and hit 10. And now, did you find that question sort of hard, easy, medium?			
Student 2: Mm, it was kind of medium, since it didn't have a scale to show the other sides.	no evidence	no evidence	no evidence
Interviewer: Okay, great. How about this one?			
Student 2: [Item 2] 'Yanni drew the rectangle KLMN on this graph.' 'Yanni will reflect the rectangle over an x-axis. Which ordered pair describes the location of point K after it is reflected on the x-axis?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: So, x-axis, it's like this, so it's switch over to (2, 3). Wait, (3, 3). It's 1 over this, would switch over and it would go . . . (3, 3) So it'd be (-3, 3).	transformation	transformation	transformation
Interviewer: Okay. So, how did you determine that it was (-3, -3)? What did you do?			
Student 2: Well, since it's an x-axis, I would switch it over this way. [Student shows how to reflect over the x-axis.]	analyzing/applying	analyzing/applying	analyzing/applying
Interviewer: Wow.			
Student 2: And x-axis is down here, like this, so I would switch down. And (-3, 3).	no evidence	no evidence	no evidence
Interviewer: You're doing great. Thank you. And next.			
Student 2: Okay.	no evidence	no evidence	no evidence
Student 2: [Item 3] 'Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit mass (grams) per unit of volume (cubic centimeters).' 'Based on the graph, which equivalent represents the relationship between mass, m, and the volume, v, of copper?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Okay, so, the 1 would be right here [student points to the line on the x-axis before 2]. And the first number it connects with is 10.	interpreting	interpreting	interpreting
Student 2: So, it would be, 10, no, it would be 10m, it's a little bit underneath. So, it would be actually a 9. 1v, or $m=9v$.	making connections relationship between variables as presented in a graph, table, or equation	making connections relationship between variables as presented in a graph, table, or equation	making connections relationship between variables as presented in a graph, table, or equation
Student 2: I'm not good at thinking out loud.	no evidence	no evidence	no evidence
Interviewer: You're doing a great job. Okay, how about this one?			
Student 2: [Item 4] 'Use the information to answer the following three questions.'	no evidence	no evidence	no evidence
Student 2: 'Point A, B, C, D, and E lie on the side of the triangle, as shown.' 'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of the segment AE is 6 units. 'If the length of the segment AC is 7.2 units, what is the length, in units, of segment BC?'	no evidence	no evidence	no evidence
Student 2: Well, since BD is 3 and AE is 6, it's 3 more than this.	similarity	similarity	similarity

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: So, I'm going to think since AC is 7 units, a find half of the, wait now, yeah, I would find half this, which would be half of 7.2. So, I'd do 7.2 divided by 2, I'd get 3.6.	analyzing/applying proportionality	analyzing/applying proportionality	analyzing/applying proportionality
Interviewer: Okay. I'm sorry, back, if you just think about that question for just a second, was it hard to think out loud _____ [00:10:43]?			
Student 2: Kind of. Because it's like, a lot of information is given to you. But they should, like, make it where there are too many words, you can see the numbers clearly.	no evidence	no evidence	no evidence
Interviewer: Okay, thank you. Okay, how about this one?			
Student 2: [Item 5] 'Use the information to answer the following three questions.'	no evidence	no evidence	no evidence
Student 2: It's the same as it was last time [the shared stimulus].	no evidence	no evidence	no evidence
Student 2: 'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertical trapezoid A'B'D'E'?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: 'kay, so. This one is kind of hard to understand, because there's a lot of unneeded information in the words. They should just have the main stuff.	no evidence	no evidence	no evidence
Interviewer: Okay. So, can you pull out the main stuff to make it understandable?			
Student 2: Yeah, they don't tell me if this has already been reflected. So, I don't know if I should reflect it or not. I'm just going to say it's already been reflected.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 2: ABDE. A is at (3, 2), or, yeah, (3, 2). Oh, so it is reflected from what I can get from the answers, it's been reflected. So, I'd bring it down . . .	no evidence	no evidence	no evidence
Interviewer: So, I'm sorry, what about the answers made you know it was reflected?			
Student 2: Because A is 2, (3, 2), and there isn't a (3, 2) on this. So, I realized it's been reflected. So, A go down 3, bring it from, it would be, huh, . . . x-axis. It would go down 3, so it would be . . . I don't get this. Wait, unit, 11 units to the left. So . . . go this way, 1, 2, 3, . . . 6, 7, 8, 9, 10, 11. So it would be -9 and go down 3. And be, since it would go over 11, [clears throat] sorry, my voice is cracking.	transformation analyzing/applying (incorrectly)	analyzing/applying (incorrectly) transformation	transformation analyzing/applying (incorrectly)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: That's okay.			
Student 2: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. That'd be (-7, 4). No -7s. So, it's one of these two, since these don't have -7.	no evidence	no evidence	no evidence
Interviewer: Okay. So, you're narrowing your choices.			
Student 2: Yeah. D would go 11 units, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. It's -4 and go down. So, it would be this one because it's the only one with a (-4, -6). Because it go to the x-plane. It'd be D.	no evidence	no evidence	no evidence
Interviewer: Great. Okay. Did you find that question to be hard, easy, or medium?			
Student 2: Hard.	no evidence	no evidence	no evidence
Interviewer: Hard, okay. Great. Thanks. And the next one.			
Student 2: [Item 6] It's the same information as shown. [The coordinate grid/shared stimulus.]	no evidence	no evidence	no evidence
Student 2: 'Which segment lies on a line that represents a proportional relationship between x and y?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Hmm. Okay, so I'm trying to match up ones that would be the same, so . . .	no evidence	no evidence	no evidence
Interviewer: What's the first ____ [00:15:03]?			
Student 2: It would be, the first one is A, which is 3 and 2 [the coordinates of point A]. But that wouldn't be right, because they're not the same numbers. B is 6 and 4 [the coordinates of point B], that wouldn't be right. I think it would be A and E because they go in the same line segment. So, I think it would be A and E.	analyzing/applying (student is trying to analyze the figure, but does so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (student is trying to analyze the figure, but does so incorrectly)
Interviewer: Okay. And was there a vocabulary word, or a concept in the problem that you were thinking about, as you were trying to solve it?			
Student 2: The proportional relationship.	no evidence	no evidence	no evidence
Interviewer: Okay, great. Thank you. ____ [00:15:43]			
Student 2: [Item 7] 'Use the information to answer the following three questions.' 'The students in Miss Garcia's class were given a number at random. The table shows their numbers.' And it's the same as the question before [student means the shared stimulus is the same as a practice item].	no evidence	no evidence	no evidence
Student 2: 'Shawn divides his number by -9.' 'Which is the best estimate to his answer?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: So, I'm going to find Shawn. His is -940. Well, since he's dividing a negative by a negative, I would make it a positive. So, I would find it, 940 divided by 9, which is 104. I think I did wrong. So, I'm going to try 9 divided by 940. So, I got it right the first time. Which was a 104.	assessing division with negative number(s)	assessing division with negative number(s)	assessing division with negative number(s)
Student 2: So, using estimates, I would go to 100, because 4 would round down.	reasonable estimate	reasonable estimate	reasonable estimate
Interviewer: Great. And now how did you know that that was the best estimate? Oh, sorry, you can hit the Back if you want to look at the choices again to explain it. So, how did you know that the was the best choice?			
Student 2: Because if you divide a negative by a negative, it becomes a positive. And then it said 'estimate' which made me think rounding. So.	no evidence	no evidence	no evidence
Interviewer: Very nice. Thank you.			
Student 2: [Item 8] 'What is the value of Rachel's number to the 3rd power?'	no evidence	no evidence	no evidence
Rachel has -7. So that'd be -7 times -7, which would be a positive, times -7 again. So, 7 times 7 times 7 would be a -343. Because 3rd power means the number times itself 3 times.	exponent assessing	assessing exponent	assessing exponent
Interviewer: Great. And how did you think, was it hard to pick out one ____ [00:17:46] your answer on that question?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Not really, no.	no evidence	no evidence	no evidence
Interviewer: Okay, great. Okay, how about this one?			
Student 2: [Item 9] Okay, so it's the same table. 'Which of the following students has the number that is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
Student 2: I believe it would 8, because it has this [absolute value symbol] , which means the number on a number line...	drawing conclusions absolute value	drawing conclusions absolute value	drawing conclusions absolute value
Student 2: ...which would be a positive 8.	no evidence	no evidence	no evidence
Interviewer: What means the number on a number line?			
Student 2: The lines right here.	no evidence	no evidence	no evidence
Interviewer: The lines, okay. Thank you.			
Student 2: So, it would automatically become a positive. And none of them, the highest one they have that is a positive is Nina. So, I believe it's Kim.	no evidence	no evidence	no evidence
Interviewer: Great. Okay, great.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: [Item 10] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used $(20)(50)$ to estimate they had a sale of \$1,000.' 'Which statement best describes this situation?'	no evidence	no evidence	no evidence
Student 2: Well, it wouldn't be 20, you'd round it to 30. So, he's already off by that. And 52 would round to 50. So, I would do 30 times 50 to find the correct answer. 30 times 50. I guess he is being reasonable, because it's close to the number of ticket sales.	assessing (student is trying to assess reasonableness of the estimate, but does so incorrectly)	explaining/reasoning	explaining/reasoning
Interviewer: Okay. So, which would that be?			
Student 2: It'd be A.	no evidence	no evidence	no evidence
Interviewer: And so, what did you get in the calculator?			
Student 2: \$1,500.	no evidence	no evidence	no evidence
Interviewer: And so, how did you, you said that was reasonable or not reasonable?			
Student 2: Because the one that says it's not reasonable is 500. Oh, wait, it'd be not reasonable, because he underestimates the value of 500. I didn't read the question, the answer fully.	reasonable estimate assessing	reasonable estimate	reasonable estimate assessing
Interviewer: Okay. Take your time. Okay, great, go ahead and select Next, then.			
Student 2: [Item 11] 'What is the value of $(-3)^4$?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 2: Well, -3 times -3. It'd be a positive, because it's timing itself by an even number. So, it'd be 3 times 3 to the second power, times 3, which is third, times 3 which is fourth. And it'd be positive 81.	assessing exponent	assessing exponent	assessing exponent
Interviewer: So now, did you find that question to be easy, hard, . . . ?			
Student 2: Easy.	no evidence	no evidence	no evidence
Interviewer: Okay, great. Thanks.			
Student 2: [Item 12] 'What is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
Student 2: Okay, so I change $\frac{3}{4}$ [option C] to a decimal, so it would be 4 divided by 100, no that would be, that would actually 75, because, so that would be 75. That would be 0.50 [option D]. This one would be highest [option A], because 80 is over 75.	drawing conclusions distance from zero on the number line	drawing conclusions distance from zero on the number line	drawing conclusions distance from zero on the number line
Student 2: So, A would be the highest number.	absolute value	no evidence	absolute value

School District B—Grade 8 Mathematics (Student 3)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: [Item 1] 'Triangle ABC is similar to triangle DEF, as shown below.'	no evidence	no evidence	no evidence
Interviewer: And then keep going.			
Student 3: Okay. 'What is the length of D and F?'	no evidence	no evidence	no evidence
Student 3: I look at DEF. Compare it to ABC.	no evidence	similarity	no evidence
Student 3: So, if 5 is 15, I know that 5 times 3 is 15, so 3 times 3 would be 9.	proportionality analyzing/applying	analyzing/applying proportionality	proportionality analyzing/applying
Interviewer: Great. That was great explaining.			
Student 3: So, I would say 9. To equal that DF.	similarity	no evidence	similarity
Interviewer: Nice.			
Student 3: Thanks.			
[Item 2]			
Student 3: 'Yanni drew this rectangle KLMN on this graph.'	no evidence	no evidence	no evidence
Student 3: 'Yanni will reflect the rectangle over the x-axis. Which ordered pair describes the location of point K after it is reflected over the x-axis?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: [pause] So, I would have to reflect. So, it would be like a mirror. So, it would be on the lower portion. And if -1 is the bottom, and 3 is the top, I know that's 4, 5 spaces. So, move it down 5 spaces.	analyzing/applying (student is trying to apply a transformation, but does so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (student is trying to apply a transformation, but does so incorrectly)
Interviewer: Okay.			
Student 3: So, it would be -5 and -1.	no evidence	no evidence	no evidence
Interviewer: See if that's a choice.			
Student 3: That's not.	no evidence	no evidence	no evidence
Interviewer: So, does that maybe make you rethink what you want to do?			
Student 3: It's a good hint.	no evidence	no evidence	no evidence
Interviewer: The answer's not there. What else?			
Student 3: Would I reflect it from this way over? From left to right?	no evidence	no evidence	no evidence
Interviewer: I would maybe go back to the question and see what they told you to do.			
Student 3: 'Yanni will reflect the rectangle over the x-axis.' So, it'd be this way. So, it would be down.	analyzing/applying	analyzing/applying	analyzing/applying

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
So, I would, somebody's got me confused. [Laughs] [pause]			
Interviewer: So, earlier you said you would flip it like a mirror. So, what would happen if you did that?			
Student 3: Oh, K and L would be the bottom, and N and M would be top.	no evidence	transformation (partial)	no evidence
Interviewer: Yes.			
Student 3: [pause] The location of point K. So, K would be -1 and N would be 3?	no evidence	no evidence	no evidence
Interviewer: All right. See if that's a choice. That's okay, you've done great thinking out loud, if you just want to pick one. Or you cannot pick one, and hit Next. Whatever you think is best. Okay.			
Student 3: [Item 3] 'Density expression the proportional relationships between mass and volume of a substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters).' 'Based on the graph, which equation represents the relationship between the mass, m , and the volume, v , of copper?'	no evidence	no evidence	no evidence
Student 3: So the arrow is pointing straight up, and it goes [background noise] back 11. So, [pause]. So, it would 1 and every 10th, because 1 and 10 match up with arrow. Which would be m equals that times v .	interpreting	interpreting relationship between variables as presented in a graph, table, or equation	interpreting relationship between variables as presented in a graph, table, or equation

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Now, you said out loud, every 10. So how did you turn "every 10" into this [option B], $m=0.1v$.			
Student 3: Because 10 are multiples or whatever.	making connections (student is trying to make connections between the graph and the equations, but does so incorrectly)	no evidence	making connections (student is trying to make connections between the graph and the equations, but does so incorrectly)
Interviewer: Okay, great, thanks. And go ahead on to the next one.			
Student 3: [Item 4] 'Use the information to follow three questions.' 'Points A, B, C, D, and E lie on the sides of a triangle, as shown.' 'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of segment EA is 6 units. 'If the length of segment AC is 7.2 units, what is the length, in units, of segment BC?'	no evidence	no evidence	no evidence
Student 3: We did this last year. [Laughs]	no evidence	no evidence	no evidence
Interviewer: Good.			
Student 3: I think I forgot I did this. [Laughs]	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 3: ____ [00:11:44] And that's 6.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: _____ [00:11:48] so the section is 3 and that section is 6. How can you use that to help you?			
Student 3: What can it do? _____ [00:12:02] here is 6. [pause]	no evidence	no evidence	no evidence
Interviewer: You're not sure how to do that? Okay. Is there a particular word or words in the question that you remember from last year, but you're having a hard time remembering like how to do it because of the words? Is there something that was . . . ?			
Student 3: Not really. I just forgot. You know the expression would be for it.	no evidence	no evidence	no evidence
Interviewer: Okay, great. All right. Go ahead and hit Next.			
Student 3: [Item 5] 'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertical trapezoid A'B'D'E'?	no evidence	no evidence	no evidence
Student 3: It is 11 units to the left. So, 1, 2, 4, 5, 6, 7, 8, 9, 10, and 11 [student is counting over from point A]. So it would be -8 and 6 [Point A prime]. So A would be right over here. So that means, and then it is reflected over the x-axis, so it would be flipped down to be at. It would be here, I believe. Wait, no, it would be on the x-axis. So, it would be -8. A would be at -10. So, it might be -9. [laughs]	no evidence	transformation	no evidence
Can you . . .			
Interviewer: Can you use that _____ [00:14:35]?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Use this, or this?	no evidence	no evidence	no evidence
Interviewer: I guess either one, however you can re-assess now based on what you were looking for wasn't a choice.			
Student 3: Okay, so, did I count wrong? So, 11 units to the left. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. So, I did count wrong. So, [cross talking]	no evidence	no evidence	no evidence
Interviewer: That's okay. Just right-click and then that should go away. There you go.			
Student 3: So, there. Then A is . . .	no evidence	no evidence	no evidence
Interviewer: So, do you want to write anything down, so that you don't miss . . .			
Student 3: Strike. [Laughs] So, while we're . . . E's at -7, and A would be a -9. So, E is 3 units to the right of B, so it would be -4. And E, wait, no D is ____ [00:15:54] And then E to B, 6 units from A. So, it would be on unit ____ [00:16:12], so it's a -3. And then, so I have all the coordinates. But now, I flip it. So, they didn't get -3? And then B would be that, -6. ____ [00:16:51] -3, E is 6. And then, come down, so it's yeah, that would be [laughs]. That's how it goes, so. Let's look. ____ [00:17:29] Probably be a (-3, 6). So, B or A would be it. (-9, 3). So, nothing they [background noise].	analyzing/applying (student is trying to apply the transformations, but des so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (student is trying to apply the transformations, but des so incorrectly)
Interviewer: Great. Now, ____ [00:17:58] there's no rush.			
Student 3: [Item 6] 'Which segment lies on the line that represents a proportional relationship between x and y?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: Proportional. Portion is size, I think. So, if we took xy, BD, I think that was there. But it doesn't have a letter. [pause] If it was proportional relationship. [pause] I have no idea.	no evidence	no evidence	no evidence
Interviewer: So, you said out loud, 'proportional relationship.' Do you remember what that means from last year?			
Student 3: I might. The size of something, which is same shape, but different size.	no evidence	no evidence	no evidence
Interviewer: Okay, but then you're not sure how to use that to pick the correct answer.			
Student 3: Yes.	no evidence	no evidence	no evidence
Interviewer: All right. Do it. Take your best guess.			
Student 3: A and E is the closest to what I was thinking [option D].	no evidence	no evidence	no evidence
Interviewer: Okay. Great. And then go ahead and hit Next.			
Student 3: [Item 7] 'Use this information to answer the following three questions.'	no evidence	no evidence	no evidence
'The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.'	no evidence	no evidence	no evidence
[student reads the table] Bailey, 1/3	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Kim, absolute value of -8.	no evidence	no evidence	no evidence
Leon, absolute value of $-3/4$.	no evidence	no evidence	no evidence
Nina, absolute value of 5.	no evidence	no evidence	no evidence
Patrick, absolute value of $7/3$.	no evidence	no evidence	no evidence
Rachel, -7	no evidence	no evidence	no evidence
Shawn, -940.	no evidence	no evidence	no evidence
'Shawn divides his number by -9.'	no evidence	no evidence	no evidence
'Which is the best estimate of his answer?'	no evidence	no evidence	no evidence
Student 3: So, his [Shawn's], divided by -9. We'll round negative -940 to -900, because it's lower than 5. And then I would divide which -900 divided by -9, would be . . .	explaining/reasoning reasonable estimate	explaining/reasoning reasonable estimate	explaining/reasoning reasonable estimate
Student 3: So are negatives. 900 divided by 9. I get 100, which would translate to 100, because a negative divided by a negative is positive.	division with negative number(s)	division with negative number(s)	division with negative number(s)
Interviewer: Okay, great. Mm-hmm.			
Student 3: Is that right?	no evidence	no evidence	no evidence
Interviewer: Negative divided by negatives a positive. Is that what you want to say?			
Student 3: I know it's not addition. So, it would be -100.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Because a negative divided by a negative ends up on the negative answer.			
Student 3: Yes.	no evidence	no evidence	no evidence
Interviewer: Okay, great.			
Student 3: [Item 8] 'What is the value of Rachel's number to the 3rd power?'	no evidence	no evidence	no evidence
Z: So, Rachel's number is -7. To the third power. I know negative -7 to the third power would be -7 times -7 times -7. And -7 times -7 is 24. -7 multiplied by 24 is 168. And then, that is not right. [laughs]	assessing	assessing	assessing
Interviewer: So could you check your work maybe?			
Student 3: So, -7 times -7 times -7. So, -7 times -7 times -7, 343. And it's negative, so it would be -343.	exponent	exponent	exponent
Interviewer: How did you know it was a negative answer?			
Student 3: Because -7.	no evidence	no evidence	no evidence
Interviewer: Because you started with a negative?			
Student 3: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay, great. So, go ahead and choose the A button. There you go. Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Go ahead and ____ [00:23:07] this one.			
Student 3: [Item 9] 'Which of the following students has the number that is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
Z: 'Distance to zero'. So, distance is clearly ____ [00:23:20] negative and positive.	distance from zero on a number line	distance from zero on a number line	distance from zero on a number line
Z: And that Bailey's $1/3 = 0.33$. So that's really close [to zero]. And -8 would be positive 8, which is farther than Bailey.	absolute value	absolute value	absolute value
Z: ... And then Leon's $3/4$ equals 0.75 and it's negative, so it's still farther than Bailey's. And Nina's 5 is further than Bailey's number. Patrick's $3/7$ [sic], I don't really have an exact answer to that, but I know it would be over 2, because 3 and 7, divide from the 2. Rachel's -7 is higher than Bailey's and Shawn's is farther than Bailey's.	drawing conclusions	drawing conclusions	drawing conclusions
So, it's the greatest distance. So, Shawn's 940 is farther than the rest of these. So, Shawn would be the answer. Only Shawn's not there. [Laughs]	no evidence	no evidence	no evidence
'Which student has the number that is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
So, Kim, -8, which would be positive 8. And then Leon, which was 0.75, and then Nina is 5. And that would be $2\frac{1}{3}$. So, out of the choices, Nina has the most.	no evidence	no evidence	no evidence
Interviewer: Okay. And how did you decide that Nina was the one that was the most?'			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: I, Kim, wait, no. Kim has the most, because hers equals 8 and 8 is larger than 5.	drawing conclusions	drawing conclusions	drawing conclusions
Interviewer: Okay, great. All right. Try this one.			
Student 3: [Item 10] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used (20)(50) to estimate they had ticket sales of \$1,000.'	no evidence	no evidence	no evidence
Student 3: So, tickets to the play cost \$29. On the first day of the play, 52 tickets were bought.			
Student 3: It looks like he rounded, but that wouldn't round out right. _____ [00:26:22]	assessing	explaining/reasoning	explaining/reasoning
Student 3: [option A] 'The manager's estimate is reasonable because that value is close to the actual value of the ticket sales.'	no evidence	no evidence	no evidence
Student 3: [option B] 'The manager's estimate is reasonable because that value is the exact value of the ticket sales.'	no evidence	no evidence	no evidence
Student 3: [option C] 'The manager's estimate is not reasonable because that value underestimates the actual value of the ticket sales by about \$500.'	no evidence	no evidence	no evidence
Student 3: [option D] 'The manager's estimate is not reasonable because that value overestimates the actual value of the tickets sales by about \$500.'			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 3: So, if I do 29 times 52, it equals \$1,508, which is over \$500, which C and D say. And it overestimates the value, because he rounds down, instead of rounding up, which he should have done.	assessing	assessing	assessing
Student 3: So, the answer would be D.	no evidence	no evidence	no evidence
Interviewer: Thanks. Please talk about the next item.			
Student 3: [Item 11] 'What is the value of $(-3)^4$?'	no evidence	no evidence	no evidence
Student 3: So, know that 3 to the power of 4, is 3 times etcetera. So, 3 times 3 times 3 times 3 is 81. And it's negative, so it would be -81.	assessing (student is trying to assess this expression, but does so incorrectly)	assessing (incorrect) exponent	assessing (student is trying to assess this expression, but does so incorrectly)
Interviewer: So the negative attached to the -3 makes the answer negative?			
Student 3: I believe so.	no evidence	no evidence	no evidence
Interviewer: Okay. There's one more.			
Student 3: [Item 12] 'Which value is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
So, negative $\frac{1}{2}$, negative 0.8 is largest. Just because it's the larger number.	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: How did you compare the numbers, decide which one was the largest?			
Student 3: $-.8$ is larger than $.6$. And I know that $\frac{3}{4}$ equals 0.75 , which is still smaller than $-.8$. And then $\frac{1}{2}$ is smaller than $-.8$.	no evidence	no evidence	no evidence
Interviewer: Great.			
Student 3: So, that was my final decision.	no evidence	no evidence	no evidence

School District B—Grade 8 Mathematics (Student 4)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: [Item 1] So, what is the length of D and F?	no evidence	no evidence	no evidence
Student 4: Well, to do, I take those [segment DF], and I like pull it downwards, and kind of like estimate with those. [Student is visually dragging DF on top of AC to estimate length.]	no evidence	no evidence	no evidence
Interviewer: Okay, mm-hmm. So that's on the, is that hard on the screen? Because it's not like on paper?			
Student 4: No, it's like fine.	no evidence	no evidence	no evidence
Interviewer: Okay, great. So how would you do that?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: So, I would like measure it down, except for it's like, that's also close. I figure that one would be a like a 12 [segment DF], and that one would be probably like 10, maybe. Because I think it's too short to be 9.	no evidence	no evidence	no evidence
Interviewer: Too short to be 9. Okay. Great. And then did you find that question hard, medium, easy?			
Student 4: Easy.	no evidence	no evidence	no evidence
Interviewer: Easy? Okay, great. Try this one.			
Student 4: [Item 2] 'Yanni drew the triangle KLMN on the graph. 'Yanni will reflect the triangle over the x-axle. Which of the ordered pair describes the location of the point K after it is reflex on axis?	no evidence	no evidence	no evidence
J: So, the x one [x-coordinate] is this one. And you'll like flip it. So, right now it's on 3. Now, I'd think that you'd flip it, so it would probably go on the other 3. And you'd have to think, so it'd be like going downwards, so it would be the same thing, except (3, 3).	analyzing/applying (student is trying to apply the transformation, but does so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (student is trying to apply the transformation, but does so incorrectly)
Interviewer: Very nice. Great. Okay, how about this one?			
Student 4: [Item 3] 'Density equeshes . . .	no evidence	no evidence	no evidence
Interviewer: Expresses			
Student 4: . . . expresses the propretation . . .	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Proportional.			
Student 4: . . . proportional relationship between the mass and the volume of a substance. Density is defined as the unit mass (grams) per unit of volume.	no evidence	no evidence	no evidence
'Based on the graph of the quality expression . . . I can't. [Cross talking].	no evidence	no evidence	no evidence
Interviewer: Why don't you read the question again?			
Student 4: 'Based on the graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'	no evidence	no evidence	no evidence
Student 4: So, 'based on the graph' _____ [00:09:07] between the mass and the volume. So, that's the volume, that's the mass. I get tricked on these one.	no evidence	no evidence	no evidence
Interviewer: So, what are you trying to figure out?			
Student 4: The relationship between the mass and the volume.	no evidence	no evidence	no evidence
Interviewer: Yeah. And you said it was tricky. What about it makes it tricky?			
Student 4: I don't remember like, my head goes everywhere, so I don't even remember how to do some of these. And that's like the hard part about it. Makes it tricky.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. Well, you said that this is the volume, and that this is the mass.			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: How can that help you?			
Student 4: It like tells you the number of it. So, these are naming the mass, and volume. Doesn't give you a number, you have to look at ____ [00:10:13].	no evidence	no evidence	no evidence
Interviewer: Well, it gives you some numbers in that.			
Student 4: Yeah, down here	no evidence	no evidence	no evidence
Interviewer: Right. So, will any of these numbers help you go back to the graph, maybe? Or no.			
Student 4: Yeah. Because like, the 9 could go here	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 4: With note like, well, volume and mass I'm looking at volume. I want to say like $9 + v$, because like, you go 9 up and then ____ [00:10:42]. Whatever you 9-up and then like plus the v .	interpreting (the student is trying to interpret the graph but does so incorrectly)	interpreting (incorrectly)	interpreting (the student is trying to interpret the graph but does so incorrectly)
Interviewer: Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: So, I'm going to say like $9 + v$.	no evidence	no evidence	no evidence
Interviewer: Okay, and what did you think about that problem? Did you find that one pretty hard, . . .			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: . . . medium or easy?			
Student 4: hard			
Interviewer: That one felt hard to you?			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: Ok, thanks.			
Student 4: [Item 4] 'Use the information to answer the following three questions.'	no evidence	no evidence	no evidence
Points A, B, C, D, and E lie on the side of a triangle, as shown.'	no evidence	no evidence	no evidence
'Triangle BCD is similar to the triangle ACE. The length of segment BD is 3 units and the length of segment AE is 6 units.'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
So, I'm looking at these ones, because it's at points around these ones. See how they're similar. If I get it, and just by do with the BCD and the ACE. So, see how they're similar? And I get it. But that ACE would be bigger than the, because of the width and stuff.	no evidence	no evidence	no evidence
'If the length of segment AC is 7.2, what is the length of the segment BC?'	no evidence	no evidence	no evidence
So, A and C is like, longer than B and C. So, I know it can't be like 14.4 because that's too long. And it has to be one of these two.	explaining/reasoning	explaining/reasoning	explaining/reasoning
Interviewer: So, either A or B. That's right.			
Student 4: And it gives you like 1, 2, 3, 4, 5, 6, 7 for the ____ [00:12:32]. So, for B and C, it would give like 1, 2, 3. So it'd have to be like 3.6 maybe. [Student tried to count from BC.]	no evidence	explaining/reasoning	no evidence
Interviewer: Very nice. So, you were counting the spaces.			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay, great.			
Student 4: Spaces.	no evidence	no evidence	no evidence
Interviewer: What's the next one?			
[Item 5]			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: I know what that part said [the shared stimulus]. I remember it. So, I'm going to read [the question].	no evidence	no evidence	no evidence
'Trapezoid ABDE is translated 11 units to the left and then reflected over the x-axis to form A'B'D'E'. What are the coordinates of the vertical trapezoids A'B'D'E'?	no evidence	no evidence	no evidence
So, it says reflects over the x-axis. That means we're going to flip it over again. So, I figure it A and E are probably go like -3 and so. But there's no -3 so you don't. Well, it does say 'flipped.' So, probably don't have to -3 except for it doesn't flip, it says reflect. So, maybe it would be like -3, like it gives you like 9.	no evidence	no evidence	no evidence
Interviewer: So, they all have that in common, right?			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: So, could you go back up here and look, read it to either out loud or to yourself again and see if there's another clue in there.			
Student 4: 'Trapezoid ABDE is translated 11 units' . . . So, to the left. Wait, so it goes this way.	no evidence	analyzing/applying	no evidence
Interviewer: Mm-hmm.			
Student 4: So, 1, 2, 3, 4, 5, 6,7, 8, 9, 10, 11. So it go right here.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Yes.			
Student 4: And then reflects, so it'd go downwards. So, it go 1, 2, 3, 4, . . . 1, 2. So like -7, no, it's -9 for a fact. And reflect, I want to say like going over but I also want to say no.	no evidence	analyzing/applying transformation	no evidence
Interviewer: So, it's that word 'reflect' that you think is so hard.			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay, so you think it means flipping over.			
Student 4: Yeah, so I want to go like (-9, -3) for the A. And that gives me two more options left	no evidence	no evidence	no evidence
Interviewer: Great.			
Student 4: And then, B. B would go like 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. And then it would go flip downwards. So, it's like 7. So, it'd be -7. Then ____ [00:15:59] flip down, I feel like it'd be -6, so that means that with these two, again. No, it would be this one. Because that one's not a negative. So, it would have to be D.	transformation analyzing/applying	analyzing/applying	transformation analyzing/applying
Interviewer: So, you used, by process of elimination . . .			
Student 4: Yeah.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: . . . to figure that out? Okay. And did you find that question hard, easy, medium?			
Student 4: Like, medium.	no evidence	no evidence	no evidence
[Item 6]			
'Which segment lies on the line that represents a proportional relationship between x and y?'	no evidence	no evidence	no evidence
So, segment likes on a line. _____ [00:16:37] x and y. I want to say C because that's automatic. It's like, goes both ways. With that one [cross talking]	no evidence	no evidence	no evidence
Interviewer: Option C or point C? [Cross talking]			
Student 4: I don't know, but I also want to say A and E, because they go down, too. That means all these could get down, but they can also just _____ [00:17:06]. I want to say A and E, because they go down this way, and they both can lead to the x and y.	no evidence	no evidence	no evidence
Interviewer: Okay. Was there a vocabulary word or words up here that helped you figure out your answer?			
Student 4: 'Which segment lies on the line that represents a portion relationship between x and y?' The x and y and then like E will like go on down to x and A will go down to both y.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay, thank you. How about the next one?			
Student 4: [Item 7] 'Use this information to answer the following three questions.'	no evidence	no evidence	no evidence
'Mrs. Garcia's class were each given a number at random. This table shows their number.'	no evidence	no evidence	no evidence
'Shawn divides his number by 9.'	no evidence	no evidence	no evidence
First, we'll have to find out Shawn's number. Which is that, and divides, which his number is -940. He divides it by, I don't know if that's how you can, he was to divide it by -9.	assessing	assessing	assessing
Interviewer: What did you get in your calculator?			
Student 4: Like 104.444 go on.	no evidence	no evidence	no evidence
So, it's like 100 to estimate it. There's the round it the nearest, so it would be like 100.	reasonable estimate	reasonable estimate	reasonable estimate
Interviewer: Okay. And how did you know if the answer was -100 or positive 100?			
Student 4: Because it doesn't have a negative on the calculator.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. All right. Thank you. How about the next one?			
Student 4: [Item 8] 'What is the value of Rachel's number to the 3rd power?'	no evidence	no evidence	no evidence
So, Rachel's number is -7. -7, and that's like to the 3rd power is -7 times -7, that gives you 49. So, it would have to be a negative, because on paper, like to the power is like times it by each other. And then it's like negative, so it would have to be a negative, because a negative times a negative is a positive, times another negative is a negative. So, it would be negative.	assessing	assessing	assessing
And 7 times 7, it would be 343.	exponent	exponent	exponent
Interviewer: Very nice. So which option is that?			
Student 4: It'd be a negative, because [cross talking].	no evidence	no evidence	no evidence
Interviewer: Great job. Okay. Now did you find that question hard?			
Student 4: Easy.	no evidence	no evidence	no evidence
Interviewer: Easy, okay. How about this answer?			
Student 4: [Item 9] 'Which of the following students has a number that is the greatest distance from zero on the number line?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
[Audio distortion] has the greatest distance? I want to say that means like, closer to the number line.	no evidence	no evidence	no evidence
Interviewer: Okay			
Student 4: And that means we have to find like [distortion], well, at least these ones [cross talking].	no evidence	no evidence	no evidence
Interviewer: Mm-hmm. Sorry.			
Student 4: I want to draw a box, and then I like write their names on it. The one's out here, so you know which one that they are, and _____ [00:21:04]. So, I'll write Kim, Leon, I want to say, Nina, and Patrick. [Student draws a number line and tries to place each person on the number line.]	no evidence	no evidence	no evidence
And then I'll, I'm going to write like, make a 3-down, so I can write the correct answer on there, see what [distortion]. And Kim's is -8. Leon is 3 above 4. Nina is 5. And then Patrick is 7 over 3. Which is Nina knows definitely a 5.	no evidence	no evidence	no evidence
Interviewer: How do you know?			
Student 4: Because the lines in between it, it means nothing change, and it just goes to like a regular number. And then Kim's is just going to be 8, because there cannot be a negative.	absolute value	absolute value	absolute value
For all these, I use these [cross talking] [distortion].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: It's okay. You're a regular ____ [00:22:19]. Oops, sorry. [cross talking].			
Student 4: It's fine. And then you have to figure out the fraction of this, which it would be like 3 divided by 4. So, that's like a 0.75. ____ [00:22:47] And so that would be a 0.75, ____ [00:22:56]. And then 7 divided by 3, because that's how you find an improper fraction. That is like . . .	assessing	assessing	assessing
Interviewer: Here, we have to write our [background noise]. [Laughs].			
Student 4: So, it'd be 2.58. And that would make Leon the closest, because he's like 0.75. So that would make the closest to like the greatest. Or not like the greatest, would be the most.	no evidence	no evidence	no evidence
Interviewer: So, would that change your answer?			
Student 4: Yeah.	no evidence	no evidence	no evidence
Interviewer: Okay. So now . . .			
Student 4: So, if all these students have the number that is the greatest distance from zero on the number line. [Background noise] is a, Bailey is the highest. Well, the lowest. And then the highest would be Kim.	no evidence	no evidence	no evidence
So, between Leon and Kim over the most to.	no evidence	no evidence	no evidence
Interviewer: Okay, which one do you think it is?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: I want to say it's Leon, but I want to say it's K-, I don't know.	no evidence	no evidence	no evidence
Interviewer: Well, could you go back to the question and see if that gives you a clue?			
Student 4: 'Which of the following students has the number that is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
Because greatest means highest. I want to say Kim because greatest means highest, and she . . .	distance from zero on a number line	distance from zero on a number line	distance from zero on a number line
Interviewer: I'm just going to take this for one second. Because you made such a nice chart. I just want to make sure that we capture that. _____ [00:24:51]			
All right. How about this one			
Student 4: [Item 10] 'Tickets that cost \$29. On the first day of the play, 52 tickets were sold. The manager used (20)(50) to estimate they had ticket sales for \$1,000.'	no evidence	no evidence	no evidence
'Which statement best describes this situation?'	no evidence	no evidence	no evidence
[option A]'The manager's estimate is reasonable because that value is close to the actual value of the ticket sales.'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
[option B] 'The manager's estimate is reasonable . . .	no evidence	no evidence	no evidence
Well, it's not like estimation, because it tells you that it's 1,000 because it was 20 times 50. That gives you the answer.	no evidence	no evidence	no evidence
Interviewer: Hmm.			
Student 4: 'The manager's estimate is not reasonable because that value underestimates 1,000.	no evidence	no evidence	no evidence
'The manager's estimate is not reasonable because that value underestimates	no evidence	no evidence	no evidence
I want to say it's A, because it was closest. Except for the 29 is not closest to that [distortion]. It would be a 30. I want to say it's A because it was close. And it was about 1,000. It would be about 1,000. It would be about 1,642. With 3 cents. What got it 3 cents?	assessing (student is trying to assess the situation, but does so incorrectly)	explaining/reasoning	assessing (student is trying to assess the situation, but does so incorrectly)
Because ____ [00:26:36], they're about 500. So, I want to say it's A.	no evidence	no evidence	no evidence
Interviewer: And what made you select A?			
Student 4: The manager's estimation is reasonable because the value is not, is close to the actual value of the tickets sold. And they're saying that 1,000 tickets were sold, which it's not being, well, C and D because it was not about 500. As I looked up on the calculator, it is 1,642 and 33 cents. And so, it was about the reasonable value.	no evidence	no evidence	no evidence
Interviewer: Okay. Thank you. How about the next one?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 4: [Item 11] 'What is the value of $(-3)^4$ '	no evidence	no evidence	no evidence
I'm doing this on this [calculator].	no evidence	no evidence	no evidence
Interviewer: Sure. [Laughs] That's good.			
Student 4: Which, it would be a positive, this time, because 3 times 3 is a positive, times a negative is a negative, times another negative is a positive. So, it would be like a positive 3, and it's like 3 times 3 times 3 times 3. Would be 81. So, it's a positive 81.	evaluating exponent	assessing exponent	assessing exponent
Interviewer: Which is an answer, great. And did you find it hard to talk out loud as you were answering that question?			
Student 4: Not really.	no evidence	no evidence	no evidence
Interviewer: You did a really nice job on that. Great.			
Student 4: I just like stutter. It would get [cross talking] want to say.	no evidence	no evidence	no evidence
Interviewer: You're doing a great job.			
Student 4: [Item 12] 'Which value is the greatest distance from zero on a number line?'	no evidence	no evidence	no evidence
Looks like A, B, C, and D, which A and B, well, they're all like in the [absolute value] lines. Which mean they can't be a negative, at all. So, it would be 0.8, and then 0.6.	absolute value	absolute value	absolute value

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
And then, for like, the calculator, it would be 3 divided by 4, would be 0.75. And that would automatically $\frac{1}{2}$, because 1 over 2 is $\frac{1}{2}$, so that would be 0.5. And so, the greatest from zero on the number line, which would be the highest, [cross talking] . . .	assessing	assessing	assessing
Interviewer: [Laughs] Nice.			
Student 4: Would be A, because 0.8 would also be 0.80, and 0.6 would also be 0.60, and then, 0.5 would also be 0.50. And so, it would be 80, because 80 is the largest number.	distance from zero on a number line	distance from zero on a number line	distance from zero on a number line

School District B—Grade 8 Mathematics (Student 5)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
[Item 1] Student 5: 'Triangle ABC is similar to triangle DEF, as shown below. What is the length of DF?'	no evidence	no evidence	no evidence
Student 5: So, right now, I'll be looking at the letters, and so right now I'm looking at DF, I'm looking at the measurements _____ [00:07:53] on it. Bring it to the small number, and be like, if it could help me see something, if I try.	no evidence	no evidence	no evidence
Interviewer: Yeah.			
Student 5: Sorry, that's a moment, I'll be looking at AB and D and E. I'll see what's the difference and how can that help me. So, to get D and F. [pause] At A and B on the first triangle, the small one, it says 5 cm. I'll compare that one with A and C. So, there are 2 cm that are taken away. That's less than. I see _____ [00:08:34], in here, so right now, it's a _____ [00:08:37] for D and F. So, I'll see the choices it's giving me. So, not to figure it out. [pause]	analyzing/applying (student is trying to analyze the figure, but does so incorrectly)	analyzing/applying (incorrectly)	analyzing/applying (student is trying to analyze the figure, but does so incorrectly)

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
So, now, what I'm going to be thinking is like imagining to see if it feels right or not. So, I don't know how to say, but _____ [00:09:08] like that's right or not. I don't know. So, [pause] I'll choose D because I . . .	no evidence	no evidence	no evidence
Interviewer: Why'd you choose D?			
Student 5: I chose D, because the first triangle's a small one. It's 3 cm on A to C. And A to B is 5 cm. So, what I'm thinking right now is that D and E, that's 15 cm, so I subtracted 2 cm from it, I _____ [00:09:56] 13. So that's [cross talking]	no evidence	no evidence	no evidence
Interviewer: Great. Thanks, okay, how about the next one?			
Student 5: [Item 2] 'Yanni drew the rectangle KLMN on this graph. Yanni will reflect the triangle over the x-axis. Which ordered pair describes the location of point K after it reflected over the x-axis?'	no evidence	no evidence	no evidence
So, right now I'll be looking at the graph, and looking at the letters. And I'll be like which one is the x-axis, and the y-axis . . .	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 5: . . . [cross talking] _____ [00:10:32]. Focusing on that, and _____ [00:10:35] the area. And I'll be looking at what it says. And _____ awkward. [pause] So I'll be looking at point K, and I'll see where it reflects over the x-axis. So, I'll be like, it's like, _____ [00:11:03], out here, so I'm counting [pause]	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Sure.			
Student 5: So, now it'll be -3, __ by . . . [pause]	no evidence	no evidence	no evidence
Interviewer: So, I think I saw you count up 3 spaces to get to K. Is that what you did?			
Student 5: Mm-hmm.	no evidence	no evidence	no evidence
Interviewer: And then how did you determine the bottom one?			
Student 5: So, I reflected it [sound distorted].	no evidence	no evidence	no evidence
Interviewer: And where did you end up when you did that?			
Student 5: (-3, -5).	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 5: So now I'm looking over at the choices they've given me, and something's wrong. So, now I have to be checking [cross talking].	no evidence	no evidence	no evidence
Interviewer: What I can check it again, sure.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Yeah. [pause] I don't think that I _____ [00:11:55] my help, is like, looking at the choices, and figuring out the chart and see what I did wrong.	no evidence	no evidence	no evidence
Interviewer: Sure. [pause]			
Student 5: Not, not, okay. [pause] Now, I guess that's me learning my x-axis.	no evidence	no evidence	no evidence
Interviewer: That's okay. [pause 00:12:46 to 00:13:39] So, what are you doing right now? Are you comparing something, or what are you doing?			
Student 5: Right now, I'm not, I'm looking at the choices, and seeing which one right now, I'm doing a guess.	no evidence	no evidence	no evidence
Interviewer: Okay, great.			
Student 5: Seeing which one would make sense, and which ones wouldn't.	no evidence	no evidence	no evidence
Interviewer: Okay, so how about choice A. Does that make sense, or does that one not make sense?			
Student 5: My _____ [00:14:05] would make sense, because it says, it reflected over the x-axis, and that looks reflected over the x-axis, so it would _____ [00:14:11].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay, how about B?			
Student 5: B. It's not, like it didn't, I don't feel like it reflected, it's still kind of on the y-axis. On 1/3, it's right here, it's still on the y-axis, so right now, it's not a great choice for me right now. And then -3. I mean, yeah, it's over the y-axis, but -3, -2, would make a third choice because that's where the straight line would change things today then.	no evidence	no evidence	no evidence
Interviewer: Great. Okay, go ahead and choose that one. [pause]			
Student 5: You want me to read it?	no evidence	no evidence	no evidence
Interviewer: Yes, please.			
Student 5: Okay.	no evidence	no evidence	no evidence
[Item 3] 'Density expresses the proportional relationship between mass and volume of a substance. Density is defined as a unit of mass (grams) per unit of volume (cubic centimeters).'	no evidence	no evidence	no evidence
'Based on the graph, which equation represents the relationship between the mass, m, and the volume, v, of copper?'	no evidence	no evidence	no evidence
So, it's up in the v chart the graph, whatever they've given me. Now they will ____ [00:15:31]. Then I'll be looking at the choices they have given me, so that will give me a hint what I'm doing with the chart. So, I'm going to be looking for the question they're asking me for.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
So right now, I'm looking at the beginning of the chart [graph], right there where it starts. I'm looking at mass. Get started at zero. So did volume. So, I'm going to be looking for the second point. So, it's 10 and the volume's 1. [pause] At this point I'll be looking at the numbers on the chart to see if they like how . . . [pause]	interpreting	interpreting	interpreting
So, at this point, I'll be thinking, it will be the first choice.	no evidence	no evidence	no evidence
Interviewer: What made you think that?			
Student 5: I think that's the first choice, because I'm starting to look at the chart. It's not actually, I'm at the point where 10's at. So, it's not the, it's not that, I'm thinking. And 9's an estimate where I'm taking, because it's kind of close to it.	no evidence	interpreting	interpreting
Interviewer: Great. And then how did you it was $9v$ instead of $9 + v$, because they both have the 9?			
Student 5: Because [pause]. I think the reason why I didn't choose it was like I guess because, oh, yeah, I see, because straight line it's to m , right? And right now, we're looking up to where the volume's at. So, right now I'm like 90, and if I chose C , $9+v$ it shouldn't make sense at that point. Would it? Because then, it would have been hiding another 9, because that's where volume's at.	making connections relationship between variables as presented in a graph, table, or equation	making connections relationship between variables as presented in a graph, table, or equation	making connections relationship between variables as presented in a graph, table, or equation
Interviewer: Okay. How about the next one?			
Student 5: [Item 4] 'Use this information to answer the following three questions.'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
'Points A, B, C, D, and E lie on the sides of a triangle, as shown.'	no evidence	no evidence	no evidence
'Triangle BCD is similar to triangle ACE. The length of segment BD is 3 units and the length of segment AE is 6 units.'	no evidence	no evidence	no evidence
'If the length of segment AC is 7.2 units, what is the length, in units, of segment BC?'	no evidence	no evidence	no evidence
So, right now, I would kind of not pay attention to that one [the shared stimulus]. I'll pay attention to the question. At this point I'll be looking at A and C since it's 7.2 units. And I'll be looking B and C. So, what I'm noticing right now is that A and C is the whole segment and that's 7.2 units. And BC is half of that. So, what I will be doing is divide 7.2.	analyzing/applying proportionality	analyzing/applying proportionality	analyzing/applying proportionality
Interviewer: Great.			
Student 5: And I'm going to do 3.6 units since that's one of my choices. It was my _____ [00:20:22] would think. It would be. And if it didn't show _____ [00:20:25] and I would have done something bad. So, they do win it.	no evidence	no evidence	no evidence
Interviewer: Sure, okay. So, you did in the calculator 7.2, and what did you do?			
Student 5: And I divided by 2.	similarity	similarity	similarity

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: To see what's half of it, great. Okay, how about the next one?			
[Item 5]			
Student 5: Okay. 'Use this information to answer the following three questions.'	no evidence	no evidence	no evidence
Are there three questions? Oh, wait. Never mind.	no evidence	no evidence	no evidence
Interviewer: Oh, so this part is the same as the previous one. The left is the same, but the question is going to be, yeah.			
Student 5: I was like, wait a minute. There were three questions. Okay.	no evidence	no evidence	no evidence
'Points A, B, C, D, and E lie on the sides of a triangle, as shown.'	no evidence	no evidence	no evidence
'Trapezoid ABDE is translated . . . yeah, displays the line?	no evidence	no evidence	no evidence
Interviewer: Mm-hmm.			
Student 5: . . . 11 units to the left and then reflected over the x-axis to form image A'B'D'E'. What are the coordinates of the vertex of trapezoid A'B'D'E'?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>So, I'll be looking at the triangles right now. So, in my mind, I'm going through step-by-step. So, like, it's giving me. So, I'll be looking at trapezoid ABDE. So, I'll be looking at those. So, it's telling me to move 11 units to the left. So, then I'll start from point A and start A and then I'll go to 11 to the left. So, I'm coming to that point. So, I'm _____ [00:22:26], while my mind will be going through is like, when the steps and I'm seeing, and it said reflected over the x-axis to find image A'B'D'E'. So now my mind will be going like, so it's like, so that what I'll be looking at. And now it's asking for the coordinates. [pause] So, then I'll remember to look over here, where I can write it down, with _____ [00:23:06]. That's _____ [00:23:08]. [pause]</p>	<p>transformation analyzing/applying</p>	<p>analyzing/applying transformation</p>	<p>transformation analyzing/applying</p>
<p>And I'll go over here and count.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Mm-hmm.</p>			
<p>Student 5: So, at this point, it's just like there's [cross talking]</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: So, you're the counting the distance from A to B.</p>			
<p>Student 5: Yeah.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Okay.</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: So, like, I'm counting the lines now. It will be like my guidance counting them. So, then I'll go back over here, and I count. So, got them to right here. So, and I'll remember when I see it or how the ____ [00:23:58] looked like. Or I would draw it, but I didn't know if something from, I draw it my own and I'll see it an image of like how it would look like. So right I'll write down like a close estimate. Like of where it would be. [pause]	no evidence	no evidence	no evidence
Then I'll get the transform the next one. So, it would be like 9 E to B. So, that just moves the same spaces, am [cross talking] I right? So, they are coming to three units, -4.	no evidence	no evidence	no evidence
Now, I'll be looking at the rest, D and E. So, like gave me an estimate. - 1 and 3. So, now that I've found where it would be at once it was reflected over the x-axis, now I'll be looking at B and the choices they've given me to see which one would be the right one, too. The measurements that I got, and I guess, because I'm always looking at the numbers, we'll look at them, with the bring where I left them, I guess. So that one ____ [00:26:12]. [pause]	no evidence	no evidence	no evidence
So, point A would be here. So now that I'm look at it, it would be like this one, since it's given to me right now, I will be thinking on this one.	no evidence	no evidence	no evidence
Interviewer: Okay.			
Student 5: Because it's giving the right measurement right there.	no evidence	no evidence	no evidence
Interviewer: For point A. Yeah. Okay.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: Then I'll be looking at point B. And I guess, that's not my role. I should have talked it out and looked at it. [pause] And that this bring one. And I did something wrong.	no evidence	no evidence	no evidence
Interviewer: That's okay.			
Student 5: Yes, it's like, the first one I did, kind of got like, they got it right. But I guess again. Because I don't know.	no evidence	no evidence	no evidence
Interviewer: Okay. So how did you get from this, I think this is where started, this point A to somewhere over here? How did you do that?			
Student 5: I saw the restrictions where it says 11 units to the left.	no evidence	no evidence	no evidence
Interviewer: Okay, so first you went 11 to the left. And then, what was the second thing you did?			
Student 5: The second thing I did was like, kind of like, move all of the them to that side. And then I had an image of how it would look if I moved it over here, and instead it reflected over the x-axis. So, then I moved, like flipped them.	no evidence	no evidence	no evidence
Interviewer: Great.			
Student 5: So, I'm coming to this point. Now I'm kind of the thinking it over, because it's giving me a different measurement than [cross talking].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, what did you get this time?			
Student 5: I'm, I got $(-7, 3)$. But I guess it's the wrong way, and it's giving B the $(-7, 6)$. So, right now, I'm looking at what you've said when 6 would be.	no evidence	no evidence	no evidence
Interviewer: So, does it match up with the choice that you've made?			
Student 5: And that does up with this ones. So, I'm kind of thinking that's wrong. Because it's in 11 units to the left, and then reflected over the x-axis. But it wasn't reflected yet. It's still the same from where it was 11 units to the left.	no evidence	no evidence	no evidence
Interviewer: So, then, what does that mean, if it's going to be reflected over the x-axis?			
Student 5: I'd be like looking it over again, and asking questions, maybe. Like what did you do wrong? Looking at all the measurements right now. So, I'd be looking, wondering why I'm not, would this look right?	no evidence	no evidence	no evidence
Interviewer: Okay, sure. So, go ahead and try that.			
Student 5: So, I'm looking at where point A would have been if I would have chose the first one. So that led me to that one. So, at that point, I would think it would be wrong. Because it said it went to the left. So that would be eliminated [cross talking].	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Okay. Nice. Yeah. Okay.			
Student 5: Be focusing on that. Then I'll do the same thing over here. And I would think that one would be wrong as well, because that one's, like, it's on top. The coordinates are top, the y-axis was at. And it said, to the left, And it's still on the right side. So, I would think that would be wrong as well.	no evidence	no evidence	no evidence
So, now I'm left with two choices, and I'll be looking at them over and see which one, like, would be the best estimate that I could take. So, I'll be looking at the coordinates. [pause] And I'll be putting on and checking on them.			
Interviewer: Okay.			
Student 5: Sorry.	no evidence	no evidence	no evidence
Interviewer: That's okay. So, you're checking one by one, each coordinate. Okay.			
Student 5: Yes, I'm checking one by one to see if the coordinates match up the shape or are they in the right order. See which things they got wrong, and then I'll be checking ones to see. Compare them to and I'll see, make a guess on which one's right, where my mind which one's right. [pause]	no evidence	no evidence	no evidence
So, now that I've been like halfway there, I'm starting to think it must not be, because it's still on top of the y-axis. So, now, since it said to reflect over the x-axis, it would be D.	transformation analyzing/applying	analyzing/applying transformation	transformation analyzing/applying

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: Option D, okay great. Okay, very nice. Go ahead and try the next one.			
Student 5: [Item 6] 'Use this information to answer the following three questions.'	no evidence	no evidence	no evidence
'Points A, B, C, D, and E lie on the sides of the triangle, as shown.'	no evidence	no evidence	no evidence
'Which segment lies on a line that represents a proportional relationship between x and y?'	no evidence	no evidence	no evidence
So, I'm looking at the choices they have given me. So, it's CE, BD, AC, AE. So, the front in my mind right now is saying, you got to remember this. But it's asking for, and the answer choices it's giving me, and I'll be looking at these segments. So, I'll be looking at where CE is at, and I'll be going through one by one to see which one would be right. [pause]	no evidence	no evidence	no evidence
At this point, I'm visualizing.	no evidence	no evidence	no evidence
Interviewer: Sure, okay. And you're visualizing them trying to find what? Which one is . . . ?			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 5: Like which one would be right. And right now, I'm like, my brains going through saying, 'this doesn't look right.' 'This does look right' 'This, like, I've seen this' it's around like I've seen basic questions. And right now, I'm looking at BAC. Because like in _____ [00:34:06] you usually see them starting from at this point to this point. And it wouldn't be wrong if it started at this point and I think that's where my mind goes to. I'd be like, I'll eliminate those that doesn't look right. And I'm choosing AC.</p>	analyzing/applying	analyzing/applying	analyzing/applying
<p>Interviewer: Great. And was there a vocabulary word or anything in the question that helped you choose that?</p>			
<p>Student 5: I guess it would be the segment, which one lies on the line. And that is it. That it represents proportional relationship between y and x.</p>	no evidence	no evidence	no evidence
<p>Interviewer: And do you know what proportional relationship means?</p>			
<p>Student 5: It's like [pause] I have to think.</p>	no evidence	no evidence	no evidence
<p>Interviewer: You're not sure?</p>			
<p>Student 5: I mean, I know it. But I can't explain it.</p>	no evidence	no evidence	no evidence
<p>Interviewer: Okay. That's fine. Okay, go ahead and do the next one. Thanks.</p>			
<p>Student 5: [Item 7] 'Use this information to answer the following three questions.'</p>	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
'The students in Miss Garcia's class were each given a number at random. The table shows their numbers.'	no evidence	no evidence	no evidence
'Shawn divides his number by -9.'	no evidence	no evidence	no evidence
'Which is the best estimate of his answer?'	no evidence	no evidence	no evidence
So that now I've said the best estimate. So, that word, that's what got me on my mind. And now I'm saying, oh, yeah, it's an estimate. And I'll be rounding.	no evidence	no evidence	no evidence
Interviewer: Yes.			
Student 5: And which one is right. And I guess, because I've written it down, that will be kind of helpful for me. So, I'm looking Shawn's, and he said he divided his number by -9. So, I'll take Shawn's number and divide it by -9. So that got me to 139, which kind of looks wrong.	no evidence	no evidence	no evidence
Interviewer: Try it again.			
Student 5: I guess I did something with the calculators. Well, I got ____ [00:36:27]. 900 divided by 9 and since I know that they're both negatives, I can keep the negative sign.	no evidence	no evidence	no evidence
Interviewer: Okay, so they're both negatives. And so, what does that mean for the answer when both numbers are negative?	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: It will be negative as well.			
Interviewer: Okay, so then would the 104.44444 on the calculator help you?	no evidence	no evidence	no evidence
Student 5: Since this, which is the best estimate. So right now, 100 is close. So, I'll do 100, and that will be 100. But then when I am thinking so deep, I'm now eliminated by, I eliminated choices B and C.	reasonable estimate	reasonable estimate	reasonable estimate
Student 5: So now I'm looking at A and D. And I'm thinking, if it's -940 divided by -9, they're both negatives. The answer won't be negative. It will be a positive, so then I'll chose D as my answer.	assessing division with negative number(s)	assessing division with negative number(s)	assessing division with negative number(s)
Interviewer: Awesome. Next one.			
Student 5: [Item 8] 'Use this information to answer the following three questions.'	no evidence	no evidence	no evidence
'The students in Mrs. Garcia's class were each given a number at random. This table shows their numbers.'	no evidence	no evidence	no evidence
'What is the value of Rachel's number to the 3rd power?'	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>So, to the 3rd power, now I'm thinking. There's going to be a number to the third power. So, now I'm looking at Rachel's number, which is -7. So, now that I've seen that, I'll do it to the 3rd power. So, right now, I'm multiplying 7 times 7 times 7. Three times. I won't do that again, because I did it wrong. Okay, so that's what it got me to. And since 3 is an odd number, it will be a negative 343.</p>	<p>exponent assessing</p>	<p>assessing exponent</p>	<p>exponent assessing</p>
<p>Interviewer: Nice.</p>			
<p>Student 5: And if it was an even number, it would be a positive. Nice choice of thing.</p>	<p>no evidence</p>	<p>exponent</p>	<p>no evidence</p>
<p>Interviewer: Awesome. Okay. Next one.</p>			
<p>Student 5: [Item 9] 'Use this information to answer the following three questions.'</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>'The students in Miss Garcia's class were each given a number at random. This table shows their numbers.'</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>'Which of the following students has the number that is the greatest distance from zero on a number line?'</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
So, I've written it down, and now we look here. Be thinking giving me a number line right there. Thinking where 0 is at, and which one would be the farthest. It can not be which one's like, who are the positive side and the negative side. So, I'll be looking at the numbers. Right now, what I would be thinking would be putting the numbers on the number line, to see which has the greatest distance. [pause]	distance from zero on a number line	distance from zero on a number line	distance from zero on a number line
And I have to point, if I don't know, at this point, say, I will be looking at the answer choices in front of me, and I'll be looking at Ken's, and Leon and Nina and Patrick's numbers. I'll be looking at their numbers. [pause]	no evidence	no evidence	no evidence
Interviewer: Okay, what are you looking at?			
Student 5: [pause] So, I'll be looking at these four numbers. That's what I'll be looking at. And I'll be putting a 0 and I'll see which one has a farther, most distance. At this point, I'll be thinking it would be, well, my mind's going through the process of seeing where the numbers are, it's supposed to go in. And it would be Kim's. It says -8, but it's asking for the absolute value, since it has the parallel lines, like, around it. So, at that moment, I'll put them, it's the absolute value of it, so they'll be 8. Which is the furthest from zero.	assessing absolute value	assessing absolute value	assessing absolute value
Interviewer: And so, how did you know she was the furthest from the zero?			
Student 5: She was the furthest, because she has the bigger number. And, like approved choice. The other ones that would beat Kim.	no evidence	no evidence	no evidence
Interviewer: Okay, yeah. Let's try the next one.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: [Item 10] 'Tickets to a play cost \$29. On the first day of the play, 52 tickets were sold. The manager used (20)(50) to estimate they had ticket sales of \$1,000.'	no evidence	no evidence	no evidence
'Which statement best describes this situation?'	no evidence	no evidence	no evidence
Let me read the answers.	no evidence	no evidence	no evidence
Interviewer: Read them here:			
Student 5: So, A. 'The manager's estimate is reasonable because the value is close to the actual value of the ticket sales.'	no evidence	no evidence	no evidence
B. 'The manager's estimate is reasonable because the value is the exact value of the ticket sales.'	no evidence	no evidence	no evidence
C. 'The manager's estimate is not reasonable because that value underestimates the actual value of the ticket sales by about \$500.'	no evidence	no evidence	no evidence
D. 'The manager's estimate is not reasonable because the value overestimates the actual value of the tickets sales by about \$500.'	no evidence	no evidence	no evidence
So, at this point, I'll be looking at what ____ [00:42:16], and which best describes of those words to my mind will be like, which one best describes. You're taking an estimate at this point, my mind is thinking. So, now, [pause].	no evidence	no evidence	no evidence
I was multiply the cost of the ticket and how much were sold.	no evidence	no evidence	no evidence

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Interviewer: So, you needed 52 times 29.			
Student 5: So, I got \$1,508. So that helps me answer the question. So, now I'll be looking what the manager, the estimate, if it's sensible for 1,000. And I'll be looking at the choices they've given me, like which one of them makes sense. And which one wouldn't. [pause]	assessing	assessing	assessing
Where I am right now, if it's reasonable.	no evidence	no evidence	no evidence
Interviewer: Yeah, how are you deciding between reasonable or not reasonable?			
Student 5: Looking at what it's saying and seeing if it is or not. And if it's not, then I'll eliminate that one. So now that I see the answer choices as it's talking more about the manager's estimate. So, I'll be looking at the manager's estimate and seeing if it's reasonable.	no evidence	no evidence	no evidence
Interviewer: So, what was the manager's estimate?			
Student 5: The manager's estimate was 1,000. And we're looking at these answer choices and seeing it's reasonable or not. And I'm getting one by one to see if it would make sense or not.	no evidence	no evidence	no evidence
Interviewer: Okay, sure.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
<p>Student 5: [pause] At this point, I've already calculated, put it in the calculator 29 and 52, multiply those. Looking at my choices right now are C and D, because it's saying it's not reasonable, and it's not reasonable because the estimate was about 1,508. And his estimate wasn't that close. I mean, it kind of was, but it was off like 500. So, I'm looking at what it's saying.</p>	<p>reasonable estimate assessing</p>	<p>assessing reasonable estimate</p>	<p>assessing reasonable estimate</p>
<p>Interviewer: So, what's the difference between C and D?</p>			
<p>Student 5: I'm looking at C and it's saying 'underestimate' and D it's 'overestimate.' So right now, my mind is saying it would be D, because it's saying it's overestimate. That would be if it would have been more. So now, I'll be thinking about C, because it's underestimate. But right now, I'm confused at the moment. So, I'm trying to understand when going over and under.</p>	<p>assessing (trying)</p>	<p>no evidence</p>	<p>assessing (trying)</p>
<p>Yeah, it would be C. Because overestimates means going over.</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>Interviewer: Mm-hmm. Great. Okay, go ahead and choose C. And there's two more.</p>			
<p>Student 5: Okay,</p>	<p>no evidence</p>	<p>no evidence</p>	<p>no evidence</p>
<p>[Item 11] 'What is the value of $(-3)^4$?'</p>			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
So, right now, I'm looking at the number -3 and it's 4th power. Right now, my mind's saying that the answer is going to be positive since 4 doesn't have negative. If it was an odd number, it would be a negative. So, right now I'm like, multiply those two. So, I get twelve.	assessing exponent	exponent	assessing exponent
Interviewer: What did you multiply in the calculator?			
Student 5: 3	no evidence	no evidence	no evidence
Interviewer: 3 times 4? Okay, and you got 12. Okay, how does that help you?			
Student 5: It helps select, now that I know it's 12, that's the value. And in this case, I didn't think it was right, I would do 3 times 3 times 3 times 3. Four times. Right now, it's giving me 81.	assessing exponent	assessing exponent	assessing exponent
Interviewer: So that time you did 3 times 3 times 3 times 3? Okay, and got 81. Then what do you think that helps you decide?			
Student 5: It makes me like [cross talking]. See if it or not, but saying which one would be the right answer. Because right now, I'm looking at the answer choices, both of those numbers, I got them. And in my mind, I'm saying one of them is not right.	no evidence	no evidence	no evidence
Interviewer: Right.			

Transcribed Responses	Content Specialist's Coding	Scoring Specialist's Coding	Consensus Coding
Student 5: So, in my mind right now, it would be saying, I would eliminate A and B, since they're both negatives.	explaining/reasoning	no evidence	explaining/reasoning
K: So, now I'm looking C and D. So, I'll get that one off my mind and not focus on those numbers. So, right now, I think it would be 81. Because saying -3 four times. And if I did 3 times 4, it's 12, but it's not like, you're just multiplying those two.	no evidence	no evidence	no evidence
Interviewer: That's right. Mm-hmm. Very nice. Okay, then we have one more.			
Student 5: [Item 12] Okay. 'Which value is the greatest distance from zero on a number line?'			
At this point, I have two fractions. So, I would reduce them into a form where I can get a decimal. So, on $\frac{3}{4}$, I know it's 0.75. And I will go, the last one is, since I haven't _____ [00:50:27] on the way back.	assessing	no evidence	assessing
Interviewer: Nice.			
Student 5: And I went with focusing on negatives, because it's kind of asking for the actual value. And so absolute value for 0.8 is positive, and so it is for answer D.	absolute value	absolute value	absolute value
Student 5: So, these are my answer choices. And it's asking for the greatest, and my greatest number is the top one. So, it's A.	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line	drawing conclusions distance from zero on a number line