

Attachment 7: Evidence that the SEA has submitted high-quality assessments and academic achievement standards to the Department for peer review

Attachment 7A: Comments from Oklahoma's Technical Advisory Committee

Attachment 7B: June 30, 2006, letter from USDE approving Oklahoma's assessment system

Attachment 7C: January 15, 2009, letter from USDE updating Oklahoma's status on some NCLB cornerstones, including Oklahoma's assessment system

Attachment 7D: Webb Alignment Study – December 2011

Attachment 7E: WestEd Alignment Study – June 2010

**Oklahoma Technical Advisory Committee (OK TAC)**  
**for**  
**Oklahoma Core Curriculum Grades 3-8 & End-of-Instruction Tests**

**Technical Advisory Committee: Gary Cook, John Keene, John Olson, Marianne Perie, Robert Terry**

August 8, 2014

Re: TAC Statement on Quality of Oklahoma Assessment System

To: Kerri White, Lisa Chandler, Wes Bruce

From: John Olson, TAC Chair

Per your request, the Oklahoma Technical Advisory Committee (OK TAC) provides the following information and feedback regarding the overall quality of the following tests in the state assessment system:

- OK Core Curriculum Tests (OCCT)
- OK End of Instruction Tests (EOI)
- OK Alternate Assessment Program (OAAP)
- OK English Language Proficiency Test (WIDA)

These tests were designed and developed using current best practice approaches for state assessments and are based on solid blueprints and item/test specifications. The tests have been used operationally for several years, most recently in 2013-14. It is our understanding that these tests and their blueprints will serve as the basis for the new assessments that will be implemented to comply with state law. The OCCT and EOI tests are based on the Oklahoma PASS standards and were found to be aligned (see separate documentation on the alignment studies that were conducted).

In the opinion of the OK TAC, the OCCT and EOI tests are high-quality assessments that met NCLB peer review requirements for valid, reliable, and fair assessments. In prior years, the testing components in the state assessment system (OCCT, EOI, OAAP, WIDA) were evaluated and approved by a formal peer review. Thus the tests have already been okayed by independent reviewers and the USED for their use in Oklahoma.

The criteria used by the OK TAC to make its determination that the assessment system is of high quality include:

- The tests cover the full range of content standards (mathematics, reading and writing) used in the state

- The tests measure adequate breadth and depth of the standards and complex applications of students' knowledge, skills, and abilities
- The tests provide accurate measures of student achievement, from low- to high-achieving students, across the entire range of performance that is expected
- The tests provide accurate measures of student achievement within an academic year and progress from one year to the next
- The tests provide accurate data on student achievement and growth that can be used for the purposes of accountability reporting
- The assessment system is inclusive and assesses all students, including English Learners and students with disabilities; ELP tests and alternate assessments are provided for those students that need to be assessed with these tests

In addition to these criteria, the TAC also evaluated the state assessment on its overall technical quality, the psychometric processes used to scale and equate the tests, the achievement standards that have been set and are used in reporting student proficiency, and the overall quality and usefulness of the assessment results that are reported.

Therefore, based on our ongoing work with OSDE assessment staff to provide them with technical advice, our knowledge of the state assessment system, and our overall evaluation of the OCCT, EOI, and other tests used by the state, the OK TAC acknowledges that the tests meet the conditions for a high-quality assessment as listed in the criteria above.



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## Oklahoma Assessment Letter

June 30, 2006

The Honorable Sandy Garrett  
Superintendent of Public Instruction  
Oklahoma State Department of Education  
Hodge Education Building  
2500 North Lincoln Boulevard  
Oklahoma City, Oklahoma 73105-4599

Dear Superintendent Garrett:

I am pleased to approve Oklahoma's assessment system under Title I of the *Elementary and Secondary Education Act of 1965* (ESEA) as amended by the *No Child Left Behind Act of 2001* (NCLB). I congratulate you on meeting this important NCLB requirement.

My decision is based on input from peer reviewers external to the U.S. Department of Education (the Department) and Department staff who reviewed and carefully considered the evidence submitted by Oklahoma. I have concluded that the evidence demonstrates that Oklahoma's standards and assessment system satisfies the NCLB requirements. Specifically, Oklahoma's system includes academic content and student achievement standards in reading/language arts, mathematics, and science; alternate achievement standards for students with the most significant cognitive disabilities in those subjects; assessments in each of grades 3 through 10 in reading/language arts and mathematics; and alternate assessments for each subject. Accordingly, Oklahoma's system warrants **Full Approval**. This status means that Oklahoma's standards and assessment system meets *all* statutory and regulatory requirements. I understand that Oklahoma will revise and improve the State's alternate assessment. Please be advised that Oklahoma will have to submit the revised alternate assessment for peer review and Department approval before it is applied to the accountability requirements under NCLB.

Please be aware that approval of Oklahoma's assessment system under NCLB is not a determination that the system complies with Federal civil rights requirements, including Title VI of the *Civil Rights Act of 1964*, Title IX of the *Education Amendments of 1972*, Section 504 of the *Rehabilitation Act of 1973*, Title II of the *Americans with Disabilities Act*, and requirements under the *Individuals with Disabilities Education Act*. Finally, please remember that, if Oklahoma makes significant changes in its standards and assessment system, the State must submit information about those changes to the Department for review and approval.

We have found it a pleasure working with your staff on this review. Please accept my congratulations for your State's approved standards and assessment system under NCLB. I wish you well in your continued efforts to improve student achievement in Oklahoma.


Sincerely,

Henry L. Johnson

cc: Governor Brad Henry

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Last Modified: 07/03/2006



# UNITED STATES DEPARTMENT OF EDUCATION

OFFICE OF ELEMENTARY AND SECONDARY EDUCATION

THE ASSISTANT SECRETARY

JAN 15 2009

The Honorable Sandy Garrett  
Superintendent of Public Instruction  
Oklahoma State Department of Education  
Hodge Education Building  
2500 North Lincoln Boulevard  
Oklahoma City, Oklahoma 73105-4599

Dear Superintendent Garrett:

As we approach our seventh year of implementing the accountability provisions of the Elementary and Secondary Education Act, I want to take a moment to thank you and your colleagues for all your hard work to help realize the goals of the *No Child Left Behind Act of 2001* (NCLB) which has led to real and meaningful improvements in student achievement. These outcomes are due, in no small part, to the efforts of the dedicated educators in your state. We have seen an increased attention on high expectations for every child, an improvement in student performance across the board and a decrease in achievement gaps.

As Secretary Spellings is fond of saying, "what gets measured, gets done." With that in mind, I want to take this opportunity to update you on the status of some NCLB cornerstones with respect to Oklahoma. This letter, which includes more current information regarding the state's assessment system, replaces the one sent to you on January 8. Detailed information on specific components of your state's assessment and accountability system is contained in an attachment to this letter.

- Assessment system: An assessment system that produces valid and reliable results is fundamental to an accountability system that holds schools and districts accountable for educating all students. Please accept my congratulations on Oklahoma's standards and assessment system meeting all statutory and regulatory provisions required for reading/language arts and mathematics as of 2007-08. Information regarding both the reading/language arts and mathematics assessment system used in determining adequate yearly progress for schools and districts in your state as well as details of the 2007-08 administration of science assessments are attached.
- Accountability components: The Department's new Title I regulations provide for greater scrutiny to states' accountability systems, including establishing a uniform and more accurate measure of calculating high school graduation rate that is comparable across states and requiring that states ensure that statistical measures maximize the inclusion of students and student subgroups in accountability determinations. Hence, the regulations also require that all states submit portions of their Accountability Workbook for peer review. In the attachment to this letter you will find information on Oklahoma's minimum group size, annual measurable objectives, confidence interval, full academic year definition, and graduation rate.
- Departmental flexibilities: Over the past several years, the Secretary has offered several flexibilities to states, such as growth model and differentiated accountability pilots, assessing students with disabilities and recently arrived limited English proficient students, and discretionary grant programs, such as the Teacher Incentive Fund, Enhanced Assessment Grants, and State Longitudinal Data System Grants. I am pleased to note that Oklahoma is participating in several of these endeavors.

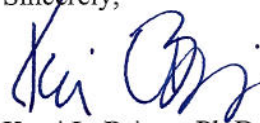
400 MARYLAND AVE. S.W., WASHINGTON, DC 20202  
[www.ed.gov](http://www.ed.gov)

*The Department of Education's mission is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.*

- General Supervision Enhancement Grant: Oklahoma, in partnership with SRI International, received funds to work toward development of an AA-MAAS. (Year 1: \$399,693; Year 2: \$299,913; Year 3: \$299,842)
- Teacher Incentive Fund Grant: Project SMART–System to Motivate and Reward Teachers; Beggs School Districts #4, in partnership with eight high-need local education agencies, plans to develop, implement, and sustain a teacher and principal performance-based compensation system. Total Amount: \$971,179 (Year 1: \$507, 514; Year 2: 463,665)
- Enhanced Assessment Grant:
  - Oklahoma, in partnership with 13 states, received fiscal year 2003 funds to investigate the validity of accommodations in math and English proficiency assessments for limited English proficient students with disabilities (LEP/SD). Amount: \$835,887
  - Oklahoma, in partnership with 15 states, received fiscal year 2002 funds to improve assessments so that they 1) will more closely match content standards, 2) will be applicable for students with disabilities, and 3) will increase capacity for linking across grades. Amount: \$1,442,453

In addition, for your information, I am enclosing a file that provides information across all states on the current assessment status, participation in flexibilities offered by the Department, AYP information, and discretionary grants. I wish you continued success in raising the achievement in Oklahoma. NCLB has focused our attention on closing achievement gaps and increasing the awareness of those students who have often been left behind: economically disadvantaged, limited English proficient, and students with disabilities. I have enjoyed the opportunity to work with you and all your colleagues across the country on such important issues.

Sincerely,



Kerri L. Briggs, Ph.D.

Enclosures

cc: Governor Brad Henry  
Jennifer Stegman

## Assessment System

Your assessment system met the requirements to be considered *Fully Approved*. This means that Oklahoma's system includes academic content and student achievement standards in reading/language arts, mathematics, and science; alternate achievement standards for students with the most significant cognitive disabilities in those subjects; assessments in each of grades 3 through 10 in reading/language arts and mathematics; and alternate assessments for each subject and meets all statutory and regulatory requirements. I encourage you to consider whether there are any areas in which the Department can provide or facilitate technical assistance to Oklahoma in meeting the statutory or regulatory requirements or as you consider changes to your current assessment system.

- Oklahoma's science assessments are not yet fully compliant.
  - In 2007–08, the Department required that the state meet four minimal criteria related to the content area of science: have science content standards; have a general and alternate science assessment; include all students in one of the science assessments (i.e., either the general or alternate); and report the results of the science assessments. Oklahoma appears to meet these requirements and will need to submit evidence that all students were included in the science assessments to document full compliance with the requirements.
  - In 2008–09, the Department will conduct peer reviews of science assessments and expects the assessments to be fully compliant. Since Oklahoma has not brought in its science assessments for peer review to date, it must do so by March 2009 at the latest. Beginning with the 2008-09 school year, science assessments will be included in the states' assessment status. For additional details, please see the enclosed fact sheet.
- I know that Oklahoma submitted evidence regarding your revised academic achievement standards for Algebra in September 2008. My staff has shared the peer notes with you and will send formal feedback as soon as possible.
- Oklahoma has developed an alternate assessment based on modified academic achievement standards (AA-MAAS) and in 2007–08 included in AYP determinations the scores of students who were proficient or above (up to a 2.0 percent cap at the district and state levels) on this assessment. Oklahoma must submit the remaining evidence required for approval of this assessment as outlined in the September 3, 2008 letter and enclosed.
- The Oklahoma Alternate Assessment Program (OAAP, Oklahoma's alternate assessment based on alternate achievement standards) must be submitted to the Department for peer review during the March 2009 review. Please note that evidence is due three weeks prior to the review as outlined in the December 19, 2008 letter from Zollie Stevenson, Jr., Director of Student Achievement and School Accountability Programs.

## Accountability System

- Minimum group size (the state-defined minimum number of students necessary to have valid and reliable AYP determinations): Oklahoma's minimum group size is 30. (The average across all states is approximately 30 students.)
- Annual measurable objectives (AMO) (the yearly target for the percentage of students required to be proficient or above for a school to make AYP):
  - 2008–09: Oklahoma's AMO for this year is 914 and 932 points on the state's performance index in grades 3-8 and high school in reading/language arts and mathematics, respectively (with 1500 points indicating all students are proficient).
  - AMO type: Oklahoma set its AMOs consistent with the statutory requirements, using a mixed method. This means that Oklahoma's AMO's first increased after two years, then in three year increments through 2008–09, then after two years, then annually through 2013–2014.
- Confidence interval: The state applies a confidence interval of 95 percent to the percentage of students scoring proficient or above in the school.
- Full academic year definition (for purposes of determining whether a student's score must be included in AYP determinations): In Oklahoma, a student must be continuously enrolled

beginning within the first ten days of the school year and not had an enrollment lapse of ten or more consecutive days in order to be included in AYP determinations.

- Graduation rate:
  - Currently, Oklahoma is using a graduation rate that can be described as a completer rate, which means that the number of graduates is divided by the number of graduates plus dropouts from each of the previous four years.
  - As required by the recently issued Title I regulations, states must report graduation rate data, in the aggregate and disaggregated by subgroup, using the four-year adjusted cohort graduation rate beginning with report cards providing assessment results for the 2010-11 school year.
  - The graduation rate target Oklahoma requires for the district or school to make AYP is 68.9 percent or improvement from the previous year.
  - According to the National Governor's Association (NGA) 2008 report *Implementing Graduation Counts: State Progress to Date, 2008*, Oklahoma will begin implementing the four-year NGA Compact 4-year graduation rate by 2010.
- Oklahoma currently uses a performance index to make AYP determinations, which provides one point to schools and districts for students scoring at Level 1 (Unsatisfactory), two points for students scoring at Level 2 (Limited) and three points for students scoring at Levels 3 and 4 (Proficient and Advanced). Oklahoma's AMOs were set based on this performance index.

To support Oklahoma's preparation for the successful completion of the peer review process, peer reviewer comments and staff recommendations have been organized and coded to reflect Critical Elements in the *Standards and Assessments Peer Review Guidance: Information and Examples for Meeting Requirements of the No Child Left Behind Act of 2001 (Revised December 21, 2007 to include modified academic achievement standards)\**

## **2.0 – Academic Achievement Standards**

1. Evidence that the standards-setting process included persons knowledgeable about the State's academic content standards and special educators who are knowledgeable about students with disabilities. (2.6)

## **4.0 – Technical Quality**

1. Additional evidence of validity, including: (a) that OMAAP assessment items are tapping the intended cognitive processes and that the items and tasks are at the appropriate grade level; (b) that the OMAAP and item scores are related to internal or external variables as intended; (c) that decisions based on the results of its assessments are consistent with the purposes for which the assessments were designed; (d) whether the OMAAP produces intended and unintended consequences; (4.1c, 4.1e, 4.1f, 4.1g)
2. A clearer explanation of the impact on reliability and validity of fewer items and shorter tests, especially for the sub-domain scores, for the OMAAP than the general assessments, including descriptions of improvements the State may have subsequently initiated for future test administrations; (4.2)
3. Evidence of steps the State takes to ensure consistency of test forms over time. (4.4a)

## **5.0 –Alignment**

1. Evidence demonstrating that for each grade tested the OMAAP assessments are aligned comprehensively to grade-level academic content standards (PASS), meaning that the assessments reflect the full range of the PASS; (5.2i)
2. Evidence demonstrating that for each grade tested the OMAAP assessments reflect the same degree and pattern of emphasis as the PASS; (5.4)
3. Evidence of how Oklahoma has ensured alignment between the PASS and the modified achievement standards; (2.5)
4. Documentation of the procedures the State will use to maintain and improve alignment between the OMAAP and PASS over time, including evidence that the State will make modifications to the academic achievement standards only, basing the OMAAP on modified grade-level academic achievement standards, and not make modifications to the grade-level academic content standards (PASS). (5.7)

## **6.0 – Inclusion**

1. Evidence that that students who are assessed based on modified academic achievement standards have access to the curriculum (PASS), including instruction, for the grade in which the students are enrolled; (6.2.2d)
2. Documentation of the establishment of and monitoring the implementation of guidelines for developing IEPs for students taking the OMAAP that include goals based on academic content

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\* Available at <http://www.ed.gov/policy/elsec/guid/saaprguidance.doc>

standards, specifically the academic content standards for the grade in which the student is enrolled (PASS); (6.2.2c)

3. Evidence that use of documents, such as the *Criteria Checklist for Assessing Students with Disabilities on State Assessments*, which serve as the required guidelines for alternate assessments aligned to modified achievement standards and also to address other requirements (i.e., that students eligible to be assessed based on alternate or modified academic achievement standards may be from any of the disability categories listed in the IDEA; that for OMAAP eligible students the student's disability has precluded the student from achieving grade-level proficiency as demonstrated by objective evidence of the student's academic performance; and that an OMAAP-eligible student's progress to date in response to appropriate instruction, including special education and related services designed to address the student's individual needs, is such that, even if significant growth occurs, the IEP Team is reasonably certain that the student will not achieve grade-level proficiency within the year covered by the student's IEP) is mandatory. (6.2 generally, and specifically 6.2.1b, 6.2.2ai, 6.2.2aii)

**Preliminary Report on the Results of the  
Oklahoma Reading, Mathematics, and Science  
Alignment Studies**

**December 21, 2011**

The findings in this study are those of the independent reviewing team and do **not** represent the opinion of the State of Oklahoma.

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## Overview

The alignment studies for the *Oklahoma Core Curriculum Test* (OCCT) in grades 3–8 reading and mathematics and grades 5 and 8 science were held on December 1–2, 2011, in Norman, Oklahoma. The purpose of each alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) objectives for a given grade and content area and the test items found on the corresponding OCCT. Each study involved a group of five independent third-party reviewers whose primary roles were to first judge the depth-of-knowledge level of each PASS objective and then to judge the depth-of-knowledge of each test item, including identifying the primary, and possibly a secondary objective to which each item was aligned.

This preliminary report consists of a high-level description of who was involved in each study and of the alignment model that was used, including the process and the four criteria used by independent reviewers to judge the alignment between the PASS objectives for a given content area and grade and the test items found on the corresponding OCCT. This preliminary report also includes summary tables showing the results from each alignment study. The final report of the third-party independent alignment studies will be provided to the Oklahoma State Department of Education (SDE) at a later date. Overall, the alignment relationship for all studies was strong to very strong and clearly demonstrates that the OCCT assessments were aligned well to the respective Oklahoma PASS standards and objectives.

### Alignment Study Participants

As stated previously, each alignment study consisted of five reviewers. Four of the reviewers for each study were Oklahoma educators who had extensive teaching experience and expertise in the assessed content areas (reading, mathematics, science). The fifth reviewer for each alignment study was a national content expert. Each national content expert also had extensive expertise in the given content area (reading, mathematics, science). In addition, each national content expert also had experience in standards development, curriculum and instruction development, assessment development, and alignment studies. In addition to serving as the fifth reviewer, each national content expert also served as a group leader. A list of the reviewers along with each reviewer's alignment qualifications will be provided in the final report.

In addition to the alignment study reviewers, a national alignment study expert, Dr. Carsten Wilmes of the World-Class Instructional Design and Assessment (WIDA) Consortium also participated in the study. Dr. Wilmes is a well-known alignment expert who has broad experience in conducting alignment studies using the Webb model. Over the years he has worked closely with Dr. Norman Webb who is affiliated with WIDA's host institution, the Wisconsin Center for Education Research (WCER). The national alignment study expert's role was to oversee the entire alignment process, ensuring that the process was followed correctly. The national alignment study expert also provided reviewers with training. The training included information related to understanding Webb's depth-of-knowledge levels. The training also provided information to help reviewers understand the alignment process. Dr. Wilmes's resumé will be included in the final report.

## Alignment Approach

The Oklahoma alignment studies were based on the work of Dr. Norman Webb, Wisconsin Center for Educational Research, University of Wisconsin–Madison. In his work, Dr. Norman Webb states that the alignment of the standards or objectives for student learning with assessments for measuring students’ attainment of these expectations is an essential component for an effective standards-based education system. The Oklahoma alignment studies were designed to model Webb’s procedures, including the use of depth-of-knowledge levels, Webb’s definition of alignment (Webb 2002), and the Web Alignment Tool (WAT).

The Webb alignment model provides a reliable set of procedures and criteria for conducting alignment analysis studies. The model combines qualitative expert reviewers’ judgments and quantified coding and analysis of standards and assessment items. The final alignment study reports include a set of statistics for each standard and grade on the degree of alignment between the content embedded in the state content standards and objectives and the content in the items on a given assessment. The Webb alignment model has been used extensively in many reading, mathematics, and science alignment studies throughout the country, and it has been recommended for use by the Chief Council of State School Officers (CCSSO). The alignment criteria in the Webb model also adheres to the guidelines specified in the United States Department of Education’s Standards and Assessments Peer Review documents and is in compliance with the requirements specified by the No Child Left Behind (NCLB) legislation.

Webb’s alignment model is based upon four criteria (categorical concurrence, depth-of-knowledge consistency, range-of-knowledge correspondence, and balance of representation). A brief description of the alignment criteria is provided below.

*Categorical concurrence*—a general indication of how well the assessment includes items that measure content from each standard. According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a very general indication of alignment if the standards and the test incorporate the same content. Webb’s model recommends that at least six items be aligned to objectives within each standard. For this alignment study, this criterion was judged by first allowing reviewers to align the items to the PASS objectives that measured the standards. This information was entered in the WAT, and the WAT provided the statistical data for the categorical concurrence.

*Depth-of-knowledge consistency*—an indication of whether the cognitive demands required of the students on the assessment are consistent with what students are expected to know and do as stated in the standards and objectives. Depth-of-knowledge consistency between standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and be able to do as stated in the standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the objective or one level above the depth-of-knowledge level of the objective. According to the Webb model, as a measure of consistency, at least 50% of the items corresponding to an objective must be at or above the level of knowledge of the objective. For depth-of-knowledge consistency, this criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. This information

was entered in the WAT, and the WAT provided the statistical data for depth-of-knowledge consistency.

*Range-of-knowledge correspondence*—an indication of whether the extent of knowledge expected of students by a standard is the same as the extent of knowledge required of students to answer the assessment items correctly. According to Webb’s model, for standards and the items on a given assessment to be aligned, the breadth of knowledge required by both should be comparable. This is called the range-of-knowledge correspondence. The range-of-knowledge criterion is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the items on the assessment. According to Webb’s model, to attain an acceptable range-of-knowledge correspondence, at least 50% of the objectives within a standard must have at least one item aligned to it. The range-of-knowledge correspondence criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. This information was entered in the WAT, and the WAT provided the statistical data for the range-of-knowledge correspondence.

*Balance of representation*—the degree to which one objective in a standard is given more emphasis on the assessment than another objective within the same standard. The Webb index is used to judge the distribution of the test items. The balance-of-representation criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. This information was entered in the WAT, and the WAT provided the statistical data for the balance of representation.

A summary of Webb’s alignment criteria can be found in Table 1.

**Table 1: Alignment Levels for the Four Criteria**

<b>Alignment Level</b>	<b>Categorical Concurrence</b>	<b>Depth-of-Knowledge Consistency</b>	<b>Range-of-Knowledge Correspondence</b>	<b>Balance of Representation</b>
Yes	mean is 6 or more	50%	50%	.70
Yes*	mean is 5 to 5.9	40%–49%	40%–49%	.60–.69
Weaker	mean is less than 5	less than 40%	less than 40%	less than .60

The results for each of the four criteria were calculated using Webb’s methodology and the reviewers’ averaged ratings. The preliminary results for categorical concurrence, depth-of-knowledge consistency, range-of-knowledge correspondence, and balance of representation are included in the Preliminary Analysis section.

## **Overview of the Alignment Study Process**

Reviewers were asked to determine the degree of alignment among the PASS standards and objectives (what students should know and be able to do) for a given content area and grade and the test items found on the corresponding OCCT. In order to accomplish this task, the alignment study process involved four major parts:

- Training
- Assigning depth-of-knowledge levels to the PASS objectives for a given content area and grade
- Taking each test
- Determining what each item measures and identifying the depth-of-knowledge for each item

The Web Alignment Tool (WAT), developed by the Wisconsin Center for Education Research, University of Wisconsin, (2005) was used in the alignment studies. The tool was designed specifically to facilitate the gathering of independent reviewers' judgments. For the Oklahoma alignment studies, the Web-based application automated the process of aligning the PASS content standards and objectives for a given grade and content area and the test items found on the corresponding OCCT. The item-by-objective codings by reviewers were aggregated and analyzed automatically through the use of the WAT. The WAT also provided opportunities for reviewers to provide additional information regarding items, including providing comments related to source of challenge. The tool and its reports made it possible to gauge the alignment between the standards and objectives and the items on the basis of the criteria in a timely manner. A high-level overview of the alignment process is provided on the following page.

## Alignment Process

### **Step 1: Receiving training**

Reviewers received training on Webb's depth-of-knowledge levels, the alignment process, and the use of the WAT. The training was provided by the national alignment expert, Dr. Carsten Wilmes.

### **Step 2: Dividing into content-area groups**

Reviewers were divided into groups according to content area: reading, mathematics, science. Reviewers received additional hands-on training on the use of the WAT and depth-of-knowledge levels.

### **Step 3: Determining the depth-of-knowledge level of each PASS objective**

Using the WAT, reviewers individually determined the depth-of-knowledge level of each of the PASS objectives. A group discussion followed. Reviewers reached consensus.

### **Step 4: Taking the test**

Reviewers took the OCCT assessment, recording their answers in the test booklet.

### **Step 5: Determining what each item measured and the depth-of-knowledge of each item using the WAT**

Using the WAT, reviewers independently determined what each item measured. They also entered the depth-of-knowledge level for each item. (Note: Reviewers were allowed to align each test item with up to two objectives, one primary and one secondary, and enter the information into the WAT. However, reviewers were allowed to determine and enter only one depth-of-knowledge level for a given item into the WAT.)

Throughout the alignment process, reviewers independently noted any source of challenge for each test item, providing written comments as necessary.

### **Step 6: Answering debriefing questions**

Using the WAT, reviewers independently responded to debriefing questions.

### **Step 7: Participating in a group discussion**

A final group discussion took place. Reviewers shared feedback about the process and/or any other information they wished to share with the group.

## **Preliminary Analysis**

The following sections of the report provide preliminary results of each alignment study: reading, mathematics, and science. The results reflect a high-level overview of the degree to which the PASS objectives for a given content area and grade and the test items found on the corresponding OCCT align. The results provide alignment information beginning with the depth-of-knowledge consensus for each *PASS* objective, followed by the categorical concurrence, depth-of-knowledge consistency, range-of-knowledge correspondence, and balance of representation. The preliminary results shown in the tables for each content area indicate that there is alignment between the content standards and the corresponding items on each of the assessments. In other words, the alignment relationship for all studies was strong to very strong and clearly demonstrated that the OCCT assessments are aligned well to the Oklahoma PASS standards and objectives.

### **READING**

The preliminary results of the alignment relationship between the Oklahoma PASS standards and objectives for reading and the corresponding reading OCCT for grades 3–8 is quite strong. The acceptable level for categorical concurrence, six items, was met for all standards across all grades except for standard 5 (Literature) at grade 3 and standard 5 (Research and Information) in grades 4–6. The acceptable depth-of-knowledge consistency of .5 was met for all standards across all grades. The range-of-knowledge criterion was met for most standards and grades. However, it was not as strong for standard 3 (Comprehension/Critical Literacy) at grade 7 and not as strong or may need improvement for standard 5 at grades 4–6. Balance of representation was sufficient, except for standard 5 at grade 4.

## Depth-of-Knowledge Consensus of the *Priority Academic Student Skills (PASS)* for Reading Objectives

Table 2 is the summary of the consensus of the five reviewers' determination of the depth-of-knowledge levels of the PASS objectives by grade for reading.

**Table 2: Summary of Depth-of-Knowledge Consensus for the Reading Objectives**

Grade	Number of PASS Objectives per Grade	Depth-of-Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			<i>Number</i>	<i>Percentage</i>
3	24	1	9	38
		2	11	46
		3	4	17
4	29	1	8	28
		2	17	59
		3	4	14
5	46	1	12	26
		2	29	63
		3	5	11
6	40	1	12	30
		2	20	50
		3	8	20
7	41	1	8	20
		2	27	66
		3	6	15
8	34	1	4	12
		2	28	82
		3	2	6

## Categorical Concurrence of Standards

The OCCT for reading grades 3–8 included items assessing content in four standards: Vocabulary, Comprehension/Critical Literacy, Literature, and Research and Information. The preliminary results summarized in Table 4 indicate that the acceptable level for categorical concurrence, six items, was met for all standards across all grades with the exception of standard 5 (Research and Information) at grades 4–6 and standard 5 (Literature) at grade 3. In grades 4–6, standard 5 (Research and Information), the categorical concurrence was not as strong as the categorical concurrence of the other standards. At grade 3, the categorical concurrence for standard 5 (Literature) may need improvement. The introduction of items that link more clearly to the associated objectives for this standard could improve the alignment.

**Table 3: Categorical Concurrence Criteria**

<b>Alignment Level</b>	<b>Categorical Concurrence</b>
Yes	mean is 6 or more
Yes*	mean is 5 to 5.9
Weaker	mean is less than 5

**Table 4: Summary of Categorical Concurrence Results for Reading**

<b>Grade</b>	<b>Standard</b>	<b>Categorical Concurrence</b>
3	2	YES
	4	YES
	5	WEAKER
	6	YES
4	1	YES
	3	YES
	4	YES
	5	YES*
5	1	YES
	3	YES
	4	YES
	5	YES*
6	1	YES
	3	YES
	4	YES
	5	YES*
7	1	YES
	3	YES
	4	YES
	5	YES
8	1	YES
	3	YES
	4	YES
	5	YES

## Depth-of-Knowledge Consistency

The preliminary results summarized in Table 6 indicate that acceptable depth-of-knowledge consistency of .5 was met for all standards across all grades.

**Table 5: Depth-of-Knowledge Consensus Criteria**

<b>Alignment Level</b>	<b>Depth-of-Knowledge Consistency</b>
Yes	50%
Yes*	40%–49%
Weaker	less than 40%

**Table 6: Summary of Depth-of-Knowledge Consistency Results for Reading**

<b>Grade</b>	<b>Standard</b>	<b>Depth-of-Knowledge Consistency</b>
3	2	YES
	4	YES
	5	YES
	6	YES
4	1	YES
	3	YES
	4	YES
	5	YES
5	1	YES
	3	YES
	4	YES
	5	YES
6	1	YES
	3	YES
	4	YES
	5	YES
7	1	YES
	3	YES
	4	YES
	5	YES
8	1	YES
	3	YES
	4	YES
	5	YES

## Range-of-Knowledge Correspondence

The preliminary results summarized in Table 8 indicate that the range-of-knowledge criterion was met for most standards and grades. The range of knowledge for grades 4 and 6, standard 5 (Research and Information), and for grade 7, standard 3 (Comprehension/Critical Literacy), were not as strong as the range of knowledge of the other standards. At grade 5 the range of knowledge for standard 5 may need improvement. This may suggest that there is a slight inconsistency in the span of knowledge expected in the standards and those found on the assessment.

**Table 7: Range-of-Knowledge Correspondence Criteria**

Alignment Level	Range-of-Knowledge Correspondence
Yes	50%
Yes*	40%–49%
Weaker	less than 40%

**Table 8: Summary of Range-of-Knowledge Correspondence Results for Reading**

Grade	Standard	Range-of-Knowledge Correspondence
3	2	YES
	4	YES
	5	YES
	6	YES
4	1	YES
	3	YES
	4	YES
	5	YES*
5	1	YES
	3	YES
	4	YES
	5	WEAKER
6	1	YES
	3	YES
	4	YES
	5	YES*
7	1	YES
	3	YES*
	4	YES
	5	YES

**Table 8: Summary of Range-of-Knowledge Correspondence  
Results for Reading (Continued)**

Grade	Standard	Range-of-Knowledge Correspondence
8	1	YES
	3	YES
	4	YES
	5	YES

### **Balance-of-Representation**

The preliminary results summarized in Table 10 indicate that the balance of representation was sufficient, except for standard 5 (Research and Information) at grade 4. An examination to determine whether assessment items are evenly distributed across objectives measuring this standard could be conducted in order to remedy this issue.

**Table 9: Balance-of-Representation Criteria**

Alignment Level	Balance of Representation
Yes	.70
Yes*	.60–.69
Weaker	less than .60

**Table 10: Summary of Balance-of-Representation Results for Reading**

Grade	Standard	Balance of Representation
3	2	YES
	4	YES
	5	YES
	6	YES
4	1	YES
	3	YES
	4	YES
	5	YES*
5	1	YES
	3	YES
	4	YES
	5	YES

**Table 10: Summary of Balance-of-Representation Results for Reading (Continued)**

Grade	Standard	Balance of Representation
6	1	YES
	3	YES
	4	YES
	5	YES
7	1	YES
	3	YES
	4	YES
	5	YES
8	1	YES
	3	YES
	4	YES
	5	YES

**MATHEMATICS**

The preliminary results of the alignment relationship between the Oklahoma PASS standards for mathematics as articulated in the standards for mathematics and the corresponding mathematics OCCT assessments for grades 3–8 is very strong. The acceptable level for categorical concurrence, six items, was met for all standards across all grades. The acceptable depth-of-knowledge consistency of .5 was also met for all standards, except for standard 3 (Geometry) at grade 8, and standard 5 (Data Analysis), at grade 7. The range of knowledge and balance of representation criteria, .5 and .7 respectively, were met for all grades across all standards.

**Depth-of-Knowledge Consensus of the *Priority Academic Student Skills* (PASS) for Mathematics Objectives**

Table 11 is the summary of the consensus of the five reviewers' determination of the depth-of-knowledge levels of the PASS objectives by grade for mathematics.

**Table 11: Summary of Depth-of-Knowledge Consensus for the Mathematics Objectives**

Grade	Number of PASS Objectives per Grade	Depth-of-Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			<i>Number</i>	<i>Percentage</i>
3	23	1	7	30
		2	13	57
		3	3	13

**Table 11: Summary of Depth-of-Knowledge Consensus for  
Mathematics Objectives (Continued)**

Grade	Number of PASS Objectives per Grade	Depth-of- Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			<i>Number</i>	<i>Percentage</i>
4	27	1	6	22
		2	19	70
		3	2	7
5	19	1	4	21
		2	14	74
		3	1	5
6	18	1	3	17
		2	14	78
		3	1	6
7	17	1	3	18
		2	11	65
		3	3	18
8	16	1	2	12
		2	11	69
		3	3	19

### Categorical Concurrence of Standards

The OCCT for mathematics grades 3–8 included items assessing content in five standards: Algebraic Reasoning, Number Sense and Operations, Geometry, Measurement, and Data Analysis. The preliminary results summarized in Table 13 indicate that the acceptable level for categorical concurrence, six items, was met for all standards across all grades.

**Table 12: Categorical Concurrence Criteria**

Alignment Level	Categorical Concurrence
Yes	mean is 6 or more
Yes*	mean is 5 to 5.9
Weaker	mean is less than 5

**Table 13: Summary of Categorical Concurrence Results for Mathematics**

<b>Grade</b>	<b>Standard</b>	<b>Categorical Concurrence</b>
3	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
4	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
5	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
6	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
7	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

### **Depth-of-Knowledge Consistency**

The preliminary results summarized in Table 15 indicate that acceptable depth-of-knowledge consistency of .5 was met for all standards across all grades except for standard 3 (Geometry) at grade 8, which was not as strong, and for standard 5 (Data Analysis) at grade 7, which may need improvement. This could likely be remedied by slightly increasing the depth-of-knowledge levels of items in the affected standards and grades.

**Table 14: Depth-of-Knowledge Consensus Criteria**

<b>Alignment Level</b>	<b>Depth-of-Knowledge Consistency</b>
Yes	50%
Yes*	40%–49%
Weaker	less than 40%

**Table 15: Summary of Depth-of-Knowledge Consistency Results for Mathematics**

<b>Grade</b>	<b>Standard</b>	<b>Depth-of-Knowledge Consistency</b>
3	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
4	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
5	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
6	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
7	1	YES
	2	YES
	3	YES
	4	YES
	5	WEAKER
8	1	YES
	2	YES
	3	YES*
	4	YES
	5	YES

## Range-of-Knowledge Correspondence

The preliminary results summarized in Table 17 indicate that the range-of-knowledge criterion was met for all grades across all standards.

**Table 16: Range-of-Knowledge Correspondence Criteria**

<b>Alignment Level</b>	<b>Range-of-Knowledge Correspondence</b>
Yes	50%
Yes*	40%–49%
Weaker	less than 40%

**Table 17: Summary of Range-of-Knowledge Correspondence Results for Mathematics**

<b>Grade</b>	<b>Standard</b>	<b>Range-of-Knowledge Correspondence</b>
3	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
4	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
5	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
6	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
7	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

**Table 17: Summary of Range-of-Knowledge Correspondence  
Results for Mathematics (Continued)**

Grade	Standard	Range-of-Knowledge Correspondence
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

### **Balance-of-Representation**

The preliminary results summarized in Table 19 indicate that the balance-of-representation was met for all grades across all standards.

**Table 18: Balance-of-Representation Criteria**

Alignment Level	Balance of Representation
Yes	.70
Yes*	.60–.69
Weaker	less than .60

**Table 19: Summary of Balance-of-Representation Results for Mathematics**

Grade	Standard	Balance of Representation
3	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
4	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
5	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

**Table 19: Summary of Balance-of-Representation Results for Mathematics (Continued)**

<b>Grade</b>	<b>Standard</b>	<b>Balance of Representation</b>
6	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
7	1	YES
	2	YES
	3	YES
	4	YES
	5	YES
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

## **SCIENCE**

The preliminary results of the alignment relationship between the Oklahoma PASS standards for science as articulated in the standards for science (content and process) and the corresponding science OCCT assessments for grades 5 and 8 is very strong. Categorical concurrence was met for all standards across all grades. The depth-of-knowledge consistency was met for all standards across all grades, except for process standard 3 (Experiment) at grade 8. The range-of-knowledge and the balance-of representation criteria were met for all grades across all standards.

### **Depth-of-Knowledge Consensus of the *Priority Academic Student Skills (PASS)* for Science Objectives**

The grade 5 and grade 8 science OCCTs require students to respond to a variety of items linked to two sets of standards: process standards and objectives and content standards and objectives. Table 20 below shows the summary of the consensus of the five reviewers' determination of the depth-of-knowledge levels of the content PASS objectives by grade and the process PASS objectives by grade.

**Table 20: Summary of Depth-of-Knowledge Consensus for the Science Process  
and Science Content Objectives**

Grade	Number of PASS Objectives per Grade	Depth-of- Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			<i>Number</i>	<i>Percentage</i>
Grade 5 Process	9	1	1	11
		2	5	56
		3	3	33
Grade 5 Content	7	1	2	29
		2	5	71
		3	0	0
Grade 8 Process	11	1	3	27
		2	4	36
		3	4	36
Grade 8 Content	10	1	0	0
		2	10	100
		3	0	0

### **Categorical Concurrence of Standards**

The items for grade 5 and grade 8 measure process in four standards: Observe and Measure, Classify, Experiment, and Interpret and Communicate. The assessments for science grade 5 and grade 8 also included items assessing content in three standards for grade 5: Properties of Matter and Energy, Organisms and Environments, and Structure of Earth and the Solar System and five content standards for grade 8: Properties and Chemical Changes in Matter, Motion and Forces, Diversity and Adaptations of Organisms, Structure and Forces of Earth and the Solar System, and Earth's History.

Preliminary results of the science categorical concurrence are provided below in Tables 22 and 23. The preliminary results summarized in Table 22 indicate that the acceptable level for categorical concurrence, six items, was met for all process standards across both grades 5 and 8. The preliminary results summarized in Table 23 indicate that the acceptable level for categorical concurrence, six items, was met for all content standards across both grades 5 and 8.

**Table 21: Categorical Concurrence Criteria**

<b>Alignment Level</b>	<b>Categorical Concurrence</b>
Yes	mean is 6 or more
Yes*	mean is 5 to 5.9
Weaker	mean is less than 5

**Table 22: Summary of Categorical Concurrence Results for Science Process Standards**

<b>Grade</b>	<b>Standard</b>	<b>Categorical Concurrence</b>
5	1	YES
	2	YES
	3	YES
	4	YES
8	1	YES
	2	YES
	3	YES
	4	YES

**Table 23: Summary of Categorical Concurrence Results for Science Content Standards**

<b>Grade</b>	<b>Standard</b>	<b>Categorical Concurrence</b>
5	1	YES
	2	YES
	3	YES
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

**Depth-of-Knowledge Consistency**

The preliminary results summarized in Table 25 indicate that acceptable depth-of-knowledge consistency of .5 was met for all process standards for grade 5 and grade 8, except for standard 3 (Experiment) at grade 8, which may need improvement. This could likely be remedied by slightly increasing the depth-of-knowledge levels of items measuring this process standard. The preliminary results summarized in Table 26 indicate that the acceptable depth-of-knowledge consistency of .5 was met for all content standards for grade 5 and grade 8.

**Table 24: Depth-of-Knowledge Consensus Criteria**

<b>Alignment Level</b>	<b>Depth-of-Knowledge Consistency</b>
Yes	50%
Yes*	40%–49%
Weaker	less than 40%

**Table 25: Summary of Depth-of-Knowledge Consistency for Science Process Standards**

<b>Grade</b>	<b>Standard</b>	<b>Depth-of-Knowledge Consistency</b>
5	1	YES
	2	YES
	3	YES
	4	YES
8	1	YES
	2	YES
	3	WEAKER
	4	YES

**Table 26: Summary of Depth-of-Knowledge Consistency for Science Content Standards**

<b>Grade</b>	<b>Standard</b>	<b>Depth-of-Knowledge Consistency</b>
5	1	YES
	2	YES
	3	YES
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

## Range-of-Knowledge Correspondence

The preliminary results summarized in Tables 28 and 29 indicate that the range-of-knowledge criterion was met for all process standards and all content standards for grade 5 and grade 8.

**Table 27: Range-of-Knowledge Correspondence Criteria**

Alignment Level	Range-of-Knowledge Correspondence
Yes	50%
Yes*	40%–49%
Weaker	less than 40%

**Table 28: Summary of Range-of-Knowledge Correspondence Results for Science Process Standards**

Grade	Standard	Range-of-Knowledge Correspondence
5	1	YES
	2	YES
	3	YES
	4	YES
8	1	YES
	2	YES
	3	YES
	4	YES

**Table 29: Summary of Range-of-Knowledge Correspondence Results for Science Content Standards**

Grade	Standard	Range-of-Knowledge Correspondence
5	1	YES
	2	YES
	3	YES
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

## Balance-of-Representation

The preliminary results summarized in Tables 31 and 32 indicate that the balance-of-representation was met for all grades across all standards.

**Table 30: Balance-of-Representation Criteria**

<b>Alignment Level</b>	<b>Balance of Representation</b>
Yes	.70
Yes*	.60–.69
Weaker	less than .60

**Table 31: Summary of Balance-of-Representation Results for Science Process Standards**

<b>Grade</b>	<b>Standard</b>	<b>Balance of Representation</b>
5	1	YES
	2	YES
	3	YES
	4	YES
8	1	YES
	2	YES
	3	YES
	4	YES

**Table 32: Summary of Balance-of-Representation Results for Science Content Standards**

<b>Grade</b>	<b>Standard</b>	<b>Balance of Representation</b>
5	1	YES
	2	YES
	3	YES
8	1	YES
	2	YES
	3	YES
	4	YES
	5	YES

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**Oklahoma Core Curriculum Tests  
(OCCT)**

**Mathematics Alignment Study Report**

**Grades 3–8**

**December 1–2, 2011**

The findings in this study are those of the independent reviewing team and do **not** represent the opinion of the State of Oklahoma.

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## Overview

The alignment studies for the *Oklahoma Core Curriculum Tests* (OCCT) in grades 3–8 mathematics were held on December 1–2, 2011, in Norman, Oklahoma. The purpose of each mathematics alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) for each grade and the test items found on the corresponding grade-level mathematics OCCT. The mathematics alignment study involved a group of five independent third-party reviewers whose primary role was to first judge the depth-of-knowledge level of each PASS standard and objective and then to judge the depth-of-knowledge level of each test item, including identifying the primary and possibly a secondary objective to which each item was aligned.

This report consists of a description of the independent reviewers and the alignment model that was used, including the process and the four criteria used to judge the alignment between the PASS standards and objectives and the test items found on the corresponding OCCT. This report also includes summary tables showing the results from each grade-level study. Overall, the alignment relationships for the mathematics studies are strong and clearly demonstrate that the OCCT mathematics tests are well aligned to the respective Oklahoma PASS standards and objectives.

### Alignment Study Participants

Five reviewers participated in the mathematics alignment studies. Four of the reviewers for each study were Oklahoma educators who had extensive teaching experience and expertise in mathematics. The fifth reviewer for each alignment study was a national content expert. Each national content expert also had expertise in mathematics and experience in standards development, curriculum and instruction development, test development, and alignment studies. In addition to serving as the fifth reviewer, each national content expert also served as a group leader. The list of reviewers is on the next page, and a brief summary of each national expert's professional qualifications is provided in Appendix F.

In addition to the alignment study reviewers, a national alignment study expert, Dr. Carsten Wilmes of the World-Class Instructional Design and Assessment (WIDA) Consortium, also participated in the study. Dr. Wilmes is a well-known alignment expert who has broad experience in conducting alignment studies using the Webb model. Over the years he has worked closely with Dr. Norman Webb, who is affiliated with WIDA's host institution: the Wisconsin Center for Education Research (WCER). The national alignment study expert's role was to oversee the entire alignment process, ensuring that the process was followed correctly. The national alignment study expert also provided reviewers with alignment training. The training included information related to understanding Webb's depth-of-knowledge levels. The training also provided information designed to help reviewers understand the alignment process. Dr. Wilmes's professional qualifications are also provided in Appendix F.

## **List of Participants**

### **Trainer/Facilitator**

Carsten Wilmes, PhD

### **State of Oklahoma Reviewers**

#### **Grades 3–5**

Linda Hall

Brittany Mason

Primus Moore

Kerry White

### **National Expert**

Linda Bridges, MEd

### **State of Oklahoma Reviewers**

#### **Grades 6–8**

Tammy Bates

David Scherotter

Lena Walker

Dianna Weems

### **National Expert**

Leo Edwards, EdD

## Alignment Study: Approach and Process

The Oklahoma alignment studies were based on the work of Dr. Norman Webb, Wisconsin Center for Educational Research, University of Wisconsin–Madison. In his work, Webb states that the alignment of the standards or objectives for student learning with tests for measuring students’ attainment of these expectations is an essential component for an effective standards-based education system. The Oklahoma alignment studies were designed to model Webb’s procedures, including the use of depth-of-knowledge levels, Webb’s definition of alignment (Webb, 2002), and the Web Alignment Tool (WAT).

Webb’s alignment model is based upon four criteria as follows:

- *Depth-of-knowledge consistency*—an indication of whether the cognitive demands required of the students on the test are consistent with what students are expected to know and do as stated in the standards.
- *Categorical concurrence*—a general indication of how well the test includes items that measure content from each standard.
- *Range-of-knowledge correspondence*—an indication of whether the extent of knowledge expected of students by a strand is the same as the extent of knowledge required of students to answer the test items correctly.
- *Balance of representation*—the degree to which one objective in a standard is given more emphasis on the test than another objective within the same strand. An index (Webb, 2002) is used to judge the distribution of the test items.

The Webb model provides a reliable set of procedures and criteria for conducting alignment analysis studies. The model combines qualitative expert reviewers’ judgments and quantified coding and analysis of standards and test items. This final alignment study report includes a set of statistics for each standard and grade on the degree of alignment between the content embedded in the PASS standards and objectives for a given grade and the content in the items on the corresponding mathematics OCCT.

The Webb model has been used extensively in many alignment studies throughout the country and has been recommended for use by the Chief Council of State School Officers (CCSSO). The alignment criteria in the Webb model also adhere to the guidelines specified in the United States Department of Education’s Standards and Tests Peer Review documents and is in compliance with the requirements specified by the *No Child Left Behind* (NCLB) legislation. A brief description of the alignment criteria is provided below, and detailed information can be found in the section of this report titled Alignment Criteria.

## **Overview of the Alignment Study Process**

Reviewers were asked to determine the degree of alignment between the PASS objectives (what students should know and be able to do) for each grade and the test questions found on the corresponding mathematics OCCT. In order to accomplish this task, the alignment study process involved four major steps:

- Training
- Assigning depth-of-knowledge levels to the mathematics PASS standards and objectives for each grade
- Taking each test
- Determining what each item measures and identifying the depth-of-knowledge level for each item

A high-level overview of the steps in the process is provided on the next page. The alignment study process also involved the use of the Web Alignment Tool (WAT). Information about the tool and its use in the process is provided below.

### **Use of the Web Alignment Tool (WAT)**

The Web Alignment Tool (WAT), developed by the Wisconsin Center for Education, University of Wisconsin–Madison, was used in the alignment studies. The tool was designed specifically to facilitate the gathering of independent reviewers' judgments. For the Oklahoma mathematics alignment studies, the Web-based application automated the process of aligning the PASS content standards and objectives for a given grade and the test items on the corresponding OCCT. The tool and its reports made it possible to gauge in a timely manner the alignment between the standards and the test on the basis of the criteria. In addition, the tool also provided opportunities for reviewers to provide additional information regarding items, including providing comments related to source of challenge. The item-by-objective codings by reviewers were then aggregated and analyzed automatically through the use of the WAT.

The national alignment expert, Dr. Carsten Wilmes, provided training on the overall alignment process and the depth-of-knowledge levels and served as the lead facilitator. Dr. Wilmes has extensive experience training third-party independent review committee members in the use of the WAT (2005). The training provided information not only on understanding the depth-of-knowledge levels but also on how to use the WAT when assigning a depth-of-knowledge level to each objective and item.

## **Steps in the Alignment Process**

### **Step 1: Receiving training**

Reviewers received training on Webb's depth-of-knowledge levels, the alignment process, and the use of the WAT. The training was provided by the national alignment expert, Dr. Carsten Wilmes.

### **Step 2: Dividing into grade-level groups**

Reviewers were divided into groups according to grade level (grades 3–5 and grades 6–8). Reviewers received additional training on the use of the WAT and the depth-of-knowledge levels.

### **Step 3: Determining the depth-of-knowledge level of each PASS standard and objective**

Using the WAT, reviewers individually determined the depth of knowledge of each of the PASS standards and objectives. A group discussion followed, and reviewers reached consensus. (See Appendix B.)

### **Step 4: Taking a test**

Reviewers took the OCCT and recorded their answers in the answer booklet. Reviewers noted any source-of-challenge comments or notes about the test items directly in the test booklet.

### **Step 5: Determining what each item measured and the depth-of-knowledge level of each item**

Using the WAT, reviewers independently determined what each item measured. Reviewers also entered the depth-of-knowledge level for each item. (Note: If reviewers determined that a given item aligned to more than one objective, the WAT provided them with the opportunity to align each test item with a primary objective and a secondary objective. However, the WAT did not allow reviewers to determine more than one depth-of-knowledge level for a given item.)

Throughout the alignment process, reviewers also independently noted any source of challenge for each test item and provided written comments, as necessary.

### **Step 6: Answering debriefing questions**

Using the WAT, reviewers independently responded to debriefing questions.

### **Step 7: Participating in a group discussion**

A final group discussion took place. Reviewers shared feedback about the process and/or any other information they wished to share with the group, the alignment experts, or the Oklahoma State Department of Education.

## Alignment Criteria

Reviewers assessed specific criteria related to the content agreement between the Oklahoma content standards, objectives, and test questions. The four criteria receiving major attention were depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation. For each alignment criterion, an acceptable level was defined by what would be required to ensure that a student had met the standards.

### Depth-of-Knowledge Consistency

For the purpose of this study, Webb's definition of depth-of-knowledge consistency was used. According to Webb (2002), depth-of-knowledge consistency between content standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and do as stated in the content standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the objective or one level above the depth-of-knowledge level of the objective. According to the Webb model, as a measure of consistency, at least 50% of the items corresponding to an objective should be at or above the depth-of-knowledge level of the objective. For depth-of-knowledge consistency, this criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. (See Appendix C.)

The Oklahoma definitions for the depth-of-knowledge levels, which are based on the Webb definitions, were used for this alignment study. The levels are as follows: **Level 1** (Recall and Reproduction), **Level 2** (Skills and Concepts), and **Level 3** (Strategic and Extended Thinking). Additional information concerning the levels can be found in Appendix A.

### Categorical Concurrence

According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a general indication of alignment if the standards and the test incorporate the same content. For these alignment studies, this criterion was judged by first allowing reviewers to make a determination as to whether the test as a whole included questions measuring content from each of the standards. The reviewers used their professional opinions, as well as the Webb guiding principle, to determine that at least six questions measuring content from each standard is a good indicator of categorical concurrence between the standard and the test (Webb, 2002, p. 7).

Using Webb's model, the number of questions used to determine categorical concurrence, six for this study, is based on estimating the number of questions that could produce a reasonably reliable subscale for estimating students' mastery of content on that subscale. Of course, many factors have to be considered in determining a reasonable number, including the reliability of the subscale, the mean score, and the cutoff score for determining mastery. Using a procedure developed by Subkoviak (1988) and assuming that the cutoff score is the mean and that the reliability of one item is 0.1, it was estimated that six questions would produce an agreement coefficient of at least 0.63. This indicates that about 63% of the group would be consistently

classified as either masters or non-masters if two equivalent test administrations were employed. The agreement coefficient would increase if the cutoff score was increased to one standard deviation from the mean to 0.77 and, with a cutoff score of 1.5 standard deviations from the mean, to 0.88.

For the Oklahoma alignment studies, the criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. Six questions were assumed as a minimum for a test measuring content knowledge related to a standard and as a basis for making some decisions about students' knowledge of that standard. If the mean for six questions is three and one standard deviation is one question, then a cutoff score set at four would produce an agreement coefficient of 0.77. Any fewer questions with a mean of one-half of the questions would require a cutoff that would allow a student to miss only one question. This would be a very stringent requirement considering a reasonable standard error of measurement on the subscale. (See Appendix C.)

### **Range-of-Knowledge Correspondence**

For standards and the test questions to be aligned, the breadth of knowledge required on both must be comparable. The range-of-knowledge criterion is used to judge whether the span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the test questions associated with that standard. For an acceptable range of knowledge, at least 50% of the objectives for a standard must have at least one related test question. The range-of-knowledge correspondence criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. (See Appendix C.)

### **Balance of Representation**

The balance of representation is met if the emphasis of content and performance supplied by the questions (primary, secondary, or both) corresponds to the standards for the test as a whole. Reviewers determined whether the test questions were distributed among the objectives that were assessed. (See Appendix C.)

The balance-of-representation criterion is used to indicate the degree to which one objective is given more emphasis on the test than another. An index is used to judge the distribution of the test questions. This index only considers the objective for a standard that has at least one related assessment item. The index in this study was computed by considering the difference in the proportion of objectives and the proportion of hits (questions corresponding to eligible content) assigned to the objectives. An index value of one signifies perfect balance and is obtained if the hits are equally distributed among the content standards. Index values that approach zero signify that a large proportion of the hits are on only one or two of all of the content standards. Depending on the number of content standards and the number of hits, a unimodal distribution has an index value of less than 0.5. A bimodal distribution has an index value of around 0.55 or 0.6. Index values of 0.7 or higher indicate that questions are distributed among all of the content standards, at least to some degree. Index values between 0.6 and 0.7 indicate the balance-of-representation criterion has only been "moderately" met. The balance-of-representation criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards.

A summary of Webb’s alignment criteria can be found in Table 1.

**Table 1: Alignment Levels for the Four Criteria**

<b>Alignment Level</b>	<b>Depth-of-Knowledge Consistency</b>	<b>Categorical Concurrence</b>	<b>Range-of-Knowledge Correspondence</b>	<b>Balance of Representation</b>
Yes	50%	mean is 6 or more	50%	.70
Yes*	40%–49%	mean is 5 to 5.9	40%–49%	.60–.69
Weaker	less than 40%	mean is less than 5	less than 40%	less than .60

\*Indicates acceptable alignment; however, the alignment is not as strong as Yes.

The results for each of the four criteria discussed in this section were calculated using Webb’s methodology, reviewers’ averaged ratings, and reviewers’ comments. The results for depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation are found in Appendix C.

### **Source of Challenge**

The purpose of each mathematics alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) objectives for each grade and the test items found on the corresponding grade-level mathematics OCCT. In addition, the WAT provides opportunities for reviewers to offer comments and/or feedback on how the test questions were written. Reviewers were also encouraged to note whether there was a source-of-challenge issue with a particular test question or questions. A source-of-challenge issue might include a reviewer’s opinion that a particular question contained misleading information or that a particular question might require prior knowledge. All comments about the items and/or source-of-challenge issues were submitted to the Oklahoma State Department of Education (SDE) for review and subsequent action, if required.

The source-of-challenge comments are not provided in this report. The final results of this alignment study reflect only the agreement between the PASS standards and objectives and the corresponding mathematics OCCT. In other words, the purpose of the alignment study was not to provide an opinion or to verify the general quality of the Oklahoma standards and objectives or the test. Rather, the purpose of the study was to determine the degree of alignment.

## Depth-of-Knowledge Alignment Analysis

### Depth-of-Knowledge Consensus of the PASS Standards and Objectives

After training, the first major step in the alignment process involved reviewers' determination of the depth-of-knowledge levels of the PASS standards and objectives. Table 2 summarizes the five reviewers' consensus on the depth-of-knowledge levels of the PASS objectives by grade for mathematics. Appendix B provides the depth-of-knowledge consensus values for each objective and the value for the overall standard as determined by the reviewers.

**Table 2: Depth-of-Knowledge Consensus of the PASS Mathematics Objectives by Grade**

Grade	Number of PASS Objectives per Grade	Depth-of-Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			Number	Percentage
3	23	1	7	30%
		2	13	57%
		3	3	13%
4	27	1	6	22%
		2	19	70%
		3	2	7%
5	19	1	4	21%
		2	14	74%
		3	1	5%
6	18	1	3	17%
		2	14	78%
		3	1	6%
7	17	1	3	18%
		2	11	65%
		3	3	18%
8	16	1	2	12%
		2	11	69%
		3	3	19%

## **Alignment Results**

Using the WAT, reviewers independently determined what each item measured. They also entered the depth-of-knowledge level for each item. The WAT provided the statistical data to determine whether each mathematics test as a whole at a given grade level included items measuring content from each of the standards. The tool also provided the statistical data to determine depth-of-knowledge consistency, range-of-knowledge correspondence, and balance of representation.

A high-level summary alignment analysis for depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation is provided in Table 3. The results of the alignment relationship between the PASS standards for mathematics as articulated in the standards for mathematics and the corresponding mathematics OCCT for grades 3 through 8 is very strong, as noted in the interpretation of Table 3. Detailed information can be found in Appendix C and Appendix D.

**Table 3: Summary of Alignment**

<b>Grade</b>	<b>Standard</b>	<b>Depth-of-Knowledge Consistency</b>	<b>Categorical Concurrence</b>	<b>Range-of-Knowledge Correspondence</b>	<b>Balance of Representation</b>
<b>3</b>	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES
<b>4</b>	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES
<b>5</b>	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES
<b>6</b>	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES
<b>7</b>	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	WEAKER	YES	YES	YES
<b>8</b>	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES*	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES

\*Indicates acceptable alignment; however, the alignment is not as strong as Yes.

### **Interpretation of Alignment Results**

Depth-of-Knowledge Consistency: As stated earlier in this report, depth-of-knowledge consistency between standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and do as stated in the standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the standard or one level above the depth-of-knowledge level of the standard. According to the Webb model, as a measure of

consistency, at least 50% of the items must be at or above the depth-of-knowledge level of the corresponding objective.

As noted in Table 3, the acceptable depth-of-knowledge consistency of 0.5 was met for all standards, except for standard 5 (Data Analysis) at grade 7, which was weaker. This result indicates that for standard 5 there were not enough items aligned to standard 5 corresponding to the depth-of-knowledge level of the objectives within the PASS standard 5. This could likely be remedied by slightly increasing the depth-of-knowledge levels of the items selected for the next grade 7 operational test. Standard 3 (Geometry) at grade 8, while within the acceptable range, should also be noted. The Oklahoma State Department of Education may also want to consider increasing the depth-of-knowledge levels of these items.

Categorical Concurrence: The OCCT for mathematics grades 3–8 included items measuring content in five standards of Algebraic Reasoning, Number Sense and Operations, Geometry, Measurement, and Data Analysis. According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a general indication of alignment if the standards and the test incorporate the same content.

The acceptable level for categorical concurrence of six items was met for all standards across all grades.

Range-of-Knowledge Correspondence: According to Webb’s model, for standards and the items on a given test to be aligned, the breadth of knowledge required on both should be comparable. This is called range-of-knowledge correspondence. The range-of-knowledge criterion is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the items on the test. For an acceptable range-of-knowledge correspondence, according to Webb’s model, at least 50% of the items coded to a given standard should have at least one item aligned to them.

The range-of-knowledge correspondence was acceptable for all grades of mathematics.

Balance of Representation: As stated earlier in this report, balance of representation is the degree to which one objective in a standard is given more emphasis on the test than another objective within the same standard. An index is used to judge the distribution of the test items.

The balance-of-representation index for all grades was above 0.7, which indicates that the items are distributed well among the objectives within each standard.

## Reliability among Reviewers

The intra-class correlation is based on the mean squares from the analysis of variance of a two-way random effects model, reviewers crossed with items (Shrout and Fleiss, 1979) as described in Appendix E. The overall intra-class correlation among the mathematics reviewers' assignment of depth-of-knowledge levels to items was reasonably high for the reviewers. If there is a low variance among the reviewers' coding in assigning depth-of-knowledge levels to items, the intra-class correlation has greater error. Table 4 provides a summary of the intra-class correlation and the percentage of items coded as the same depth-of-knowledge by all reviewers.

**Table 4: Summary of Reliability**

<b>Grade</b>	<b>Intra-Class Correlation</b>	<b>Percentage of Items Coded the Same Depth of Knowledge</b>
<b>3</b>	.76	50%
<b>4</b>	.74	56%
<b>5</b>	.74	62%
<b>6</b>	.74	60%
<b>7</b>	.76	56%
<b>8</b>	.76	62%

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## **Appendix A**

### **Mathematics Depth-of-Knowledge Levels**

# Mathematics Depth-of-Knowledge Levels

## Grades 3 through 8

**Level 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.

**Level 2** (Skills and Concepts) requires the student to make some decision 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.

**Level 3** (Strategic and Extended Thinking) requires complex reasoning, planning, developing, using evidence, and a higher level of thinking. These processes typically require an extended amount of time. The cognitive demands of the item should be high and the work should be complex. In order to be considered at this level, students are required to make several connections (relate ideas *within* the content area or *among* the content areas) and select one approach among many alternatives as to how the situation should be solved. Level 3 activities include: making conjectures; drawing conclusions from observations; citing evidence; developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems.

(Oklahoma Core Curriculum Tests Test and Item Specifications: Mathematics, 2010)

## **Appendix B**

### **Depth-of-Knowledge Consensus Values**

### Grade 3 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Algebraic Reasoning: Patterns and Relationships - The student will use a variety of problem-solving approaches to extend and create patterns.	2
1.1	Describe (orally or in written form), create, extend and predict patterns in a variety of situations (e.g., 3, 6, 9, 12 . . . , use a function machine to generate input and output values for a table, show multiplication patterns on a hundreds chart, determine a rule and generate additional pairs with the same relationship).	3
1.2	Find unknowns in simple arithmetic problems by solving open sentences (equations) and other problems involving addition, subtraction, and multiplication.	1
1.3	Recognize and apply the commutative and identity properties of multiplication using models and manipulative to develop computational skills (e.g., $3 \cdot 5 = 5 \cdot 3$ , $7 \cdot 1 = 7$ ).	1
2	Number Sense and Operation – The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers.	2
2.1a	Number Sense-Place Value	-
2.1a.i	Model the concept of place value through 4 digits (e.g., base-10 blocks, bundles of 10s, place value mats).	1
2.1a.ii	Read and write whole numbers up to 4 digits (e.g., expanded form, standard form).	1
2.1b	Number Sense- Whole Numbers and Fractions	-
2.1b.i	Compare and order whole numbers up to 4 digits.	2
2.1b.ii	Create and compare physical and pictorial models of equivalent and nonequivalent fractions including halves, thirds, fourths, eighths, tenths, twelfths, and common percents (25%, 50%, 75%, 100%) (e.g., fraction circles, pictures, egg cartons, fraction strips, number lines).	2
2.2a	Number Operations-Estimate and find the sum or difference (with and without regrouping) of 3- and 4-digit numbers using a variety of strategies to solve application problems.	2
2.2b	Number Operations-Multiplication Concepts and Fact Families	-
2.2b.i	Use physical models and a variety of multiplication algorithms to find the product of multiplication problems with one-digit multipliers.	2
2.2b.ii	Demonstrate fluency (memorize and apply) with basic multiplication facts up to $10 \times 10$ and the associated division facts (e.g., $5 \times 6 = 30$ and $30 \div 6 = 5$ ).	1
2.2b.iii	Estimate the product of 2-digit by 2-digit numbers by rounding to the nearest multiple of 10 to solve application problems.	2
3	Geometry - The student will use geometric properties and relationships to recognize and describe shapes.	2
3.1	Identify and compare attributes of two- and three- dimensional shapes and develop vocabulary to describe the attributes (e.g., count the edges and faces of a cube, the radius is half of a circle, lines of symmetry).	2
3.2	Analyze the effects of combining and subdividing two- and three-dimensional figures (e.g., folding paper, tiling, nets, and rearranging pieces of solids).	3
3.3	Make and use coordinate systems to specify locations and shapes on a grid with ordered pairs and to describe paths from one point to another point on a grid.	2
4	Measurement - The student will use appropriate units of measure to solve problems.	2
4.1a	Measurement-Choose an appropriate measurement instrument and measure the length of objects to the nearest inch or half-inch and the weight of objects to the nearest pound or ounce.	2
4.1c	Measurement-Develop and use the concept of perimeter of different shapes to solve problems.	2

**Grade 3 Depth-of-Knowledge Consensus (Continued)**

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
4.2a	Time and Temperature-Solve simple addition problems with time (e.g., 15 minutes added to 1:10 p.m.).	2
4.2b	Time and Temperature-Tell time on a digital and analog clock to the nearest 5 minute.	1
4.2c	Time and Temperature-Read a thermometer and solve for temperature change.	2
4.3	Money: Determine the correct amount of change when a purchase is made with a five dollar bill.	2
5	Data Analysis - The student will demonstrate an understanding of collection, display, and interpretation of data and probability.	2
5.1b	Data Analysis-Read graphs and charts, identify the main idea, draw conclusions, and make predictions based on the data (e.g., predict how many children will bring their lunch based on a menu).	3
5.1c	Data Analysis-Construct bar graphs, frequency tables, line graphs (plots), and pictographs with labels and a title from a set of data.	2
5.2	Probability: Describe the probability (more, less, or equally likely) of chance events.	1

#### Grade 4 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Algebraic Reasoning: Patterns and Relationships - The student will use a variety of problem-solving approaches to create, extend, and analyze patterns.	2
1.1	Discover, describe, extend, and create a wide variety of patterns using tables, graphs, rules, and verbal models (e.g., determine the rule from a table or “function machine”, extend visual and number patterns).	3
1.2	Find variables in simple arithmetic problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, and division with whole numbers.	2
1.3	Recognize and apply the associative property of multiplication (e.g., $6 \cdot (2 \cdot 3) = (6 \cdot 2) \cdot 3$ ).	1
2	Number Sense and Operation – The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers and fractions.	2
2.1a	Number Sense- Place Value	-
2.1a.i	Apply the concept of place value through 6 digits (e.g., write numbers in expanded form).	1
2.1a.ii	Model, read, write and rename decimal numbers to the hundredths (e.g., money, numerals to words).	1
2.1b	Number Sense-Whole Number, Fraction, and Decimal	-
2.1b.i	Compare and order whole numbers and decimals to the hundredths place (e.g., pictures of shaded regions of two-dimensional figures, use $>$ , $<$ , $=$ symbols).	2
2.1b.ii	Use 0, $\frac{1}{2}$ , and 1 or 0, 0.5, and 1 as benchmarks and place additional fractions, decimals, and percents on a number line (e.g., $\frac{1}{3}$ , $\frac{3}{4}$ , 0.7, 0.4, 62%, 12%).	2
2.1b.iii	Compare, add, or subtract fractional parts (fractions with like denominators and decimals) using physical or pictorial models. (e.g., egg cartons, fraction strips, circles, and squares).	2
2.2a	Number Operation-Estimate and find the product of up to three-digit by three-digit using a variety of strategies to solve application problems.	2
2.2b	Number Operation-Division Concepts and Fact Families	-
2.2b.i	Demonstrate fluency (memorize and apply) with basic division facts up to $144 \div 12$ and the associated multiplication facts (e.g., $144 \div 12 = 12$ and $12 \times 12 = 144$ ).	1
2.2b.ii	Estimate the quotient with one- and two-digit divisors and a two- or three-digit dividend to solve application problems.	2
2.2b.iii	Find the quotient (with and without remainders) with 1-digit divisors and a 2- or 3-digit dividend to solve application problems.	2
3	Geometry - The student will use geometric properties and relationships to analyze shapes.	2
3.1	Identify, draw, and construct models of intersecting, parallel, and perpendicular lines.	1
3.2	Identify and compare angles equal to, less than, or greater than 90 degrees (e.g., use right angles to determine the approximate size of other angles).	2
3.3	Identify, draw, and construct models of regular and irregular polygons including triangles, quadrilaterals, pentagons, hexagons, heptagons, and octagons to solve problems.	2
3.4	Describe the effects on two-dimensional objects when they slide (translate), flip (reflect), and turn (rotate) (e.g., tessellations).	2
4	Measurement - The student will solve problems using appropriate units of measure in a variety of situations.	2
4.1a	Measurement- Estimate the measures of a variety of objects using customary units.	2
4.1b	Measurement-Establish benchmarks for metric units and estimate the measures of a variety of objects (e.g., mass: the mass of a raisin is about 1 gram, length: the width of a finger is about 1 centimeter).	2

**Grade 4 Depth-of-Knowledge Consensus (Continued)**

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
4.1c	Measurement-Select appropriate customary and metric units of measure and measurement instruments to solve application problems involving length, weight, mass, area, and volume.	2
4.1d	Measurement-Develop and use the concept of area of different shapes using grids to solve problems.	2
4.2a	Time and Temperature-Solve elapsed time problems.	2
4.2b	Time and Temperature-Read thermometers using different intervals (intervals of 1, 2, or 5) and solve for temperature change.	2
4.3	Money: Determine the correct amount of change when a purchase is made with a twenty dollar bill.	2
5	Data Analysis - The student will demonstrate an understanding of collection, display, and interpretation of data and probability.	2
5.1a	Data Analysis-Read and interpret data displays such as tallies, tables, charts, and graphs and use the observations to pose and answer questions (e.g., choose a table in social studies of population data and write problems).	3
5.1b	Data Analysis-Collect, organize and record data in tables and graphs (e.g., line graphs (plots), bar graphs, pictographs).	2
5.2	Probability: Predict the probability of outcomes of simple experiments using words such as certain, equally likely, impossible (e.g., coins, number cubes, spinners).	2
5.3	Central Tendency: Determine the median (middle), and the mode (most often) of a set of data.	1

## Grade 5 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Algebraic Reasoning: Patterns and Relationships – The student will use algebraic methods to describe patterns and solve problems in a variety of contexts.	2
1.1	Describe rules that produce patterns found in tables, graphs, and models, and use variables (e.g., boxes, letters, pawns, number cubes, or other symbols) to solve problems or to describe general rules in algebraic expression or equation form.	2
1.2	Use algebraic problem-solving techniques (e.g., use a balance to model an equation and show how subtracting a number from one side requires subtracting the same amount from the other side) to solve problems.	2
1.3	Recognize and apply the commutative, associative, and distributive properties to solve problems (e.g., $3 \times (2 + 4) = (3 \times 2) + (3 \times 4)$ ).	1
2	Number Sense and Operation – The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.	2
2.1a	Number Sense- Apply the concept of place value of whole numbers through hundred millions (9 digits) and model, read, and write decimal numbers through the thousandths.	1
2.1b	Number Sense-Represent with models the connection between fractions and decimals, compare and order fractions and decimals, and be able to convert from one representation to the other to solve problems. (e.g., use 10x10 grids, base 10 blocks).	2
2.1c	Number Sense-Identify and compare integers using real world situations. (e.g., owing money, temperature, or measuring elevations above and below sea level).	2
2.2a	Number Operations-Estimate, add, or subtract decimal numbers with same and different place values to solve problems (e.g., $3.72 + 1.4$ , $\$4.56 - \$2.12$ ).	2
2.2b	Number Operations- Estimate add, or subtract fractions (including mixed numbers) to solve problems using a variety of methods (e.g., use fraction strips, use area models, find a common denominator).	2
2.2c	Number Operations-Estimate and find the quotient (with and without remainders) with two-digit divisors and a two- or three-digit dividend to solve application problems.	2
3	Geometry - The student will apply geometric properties and relationships.	2
3.1	Compare and contrast the basic characteristics of circle and polygons (triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons).	2
3.2	Classify angles (e.g., acute, right, obtuse, straight).	1
4	Measurement - The student use appropriate units of measure to solve problems in a variety of contexts.	2
4.1a	Measurement-Compare, estimate, and determine the measurement of angles.	2
4.1b	Measurement-Develop and use the formula for perimeter and area of a square and rectangle to solve application problems.	2
4.1c	Measurement-Convert basic measurements of volume, mass and distance within the same system for metric and customary units (e.g., inches to feet, hours to minutes, centimeters to meters).	2
4.2	Money: Solve a variety of problems involving money.	2
5	Data Analysis - The student will use data analysis, statistics and probability to interpret data in a variety of contexts.	2
5.1	Data Analysis-Compare and translate displays of data and justify the selection of the type of table of graph (e.g., charts, tables, bar graphs, pictographs, line graphs, circle graphs, Venn diagrams).	3

**Grade 5 Depth-of-Knowledge Consensus (Continued)**

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
5.2a	Probability-Determine the probability of events occurring in familiar contexts or experiments and express probabilities as fractions from zero to one (e.g., find the fractional probability of an event given a biased spinner).	2
5.2b	Probability-Use the fundamental counting principle on sets with up to four items to determine the number of possible combinations (e.g. create a tree diagrams to see possible combinations).	2
5.3	Central Tendency: Determine the range (spread), mode (most often), and median (middle) of a set of data.	1

## Grade 6 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Algebraic Reasoning: Patterns and Relationships – The student will use algebraic methods to describe patterns, simplify and write algebraic expressions and equations, and solve simple equations in a variety of contexts.	2
1.1	Generalize and extend patterns and functions using tables, graphs, and number properties (e.g., number sequences, prime and composite numbers, recursive patterns like the Fibonacci numbers).	2
1.2	Write algebraic expressions and simple equations that correspond to a given situation.	2
1.3	Use substitution to simplify and evaluate algebraic expressions (e.g., if $x = 5$ evaluate $3 - 5x$ ).	2
1.4	Write and solve one-step equations with one variable using number sense, the properties of operations, and the properties of equality (e.g., $1/3x = 9$ ).	2
2	Number Sense and Operation – The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.	2
2.1	Number Sense: Convert, compare, and order decimals, fractions, and percents using a variety of methods.	2
2.2a	Number Operations-Multiply and divide fractions and mixed numbers to solve problems using a variety of methods.	2
2.2b	Number Operations-Multiply and divide decimals with one- or two-digit multipliers or divisors to solve problems.	1
2.2c	Number Operations-Estimate and find solutions to single and multi-step problems using whole numbers, decimals, fractions, and percents (e.g., $7/8 + 8/9$ is about 2, $3.9 + 5.3$ is about 9).	2
2.2d	Number Operations-Use the basic operations on integers to solve problems.	2
2.2e	Number Operations-Build and recognize models of multiples to develop the concept of exponents and simplify numerical expressions with exponents and parentheses using order of operations.	2
3	Geometry - The student will use geometric properties and relationships to recognize, describe, and analyze shapes and representations in a variety of contexts.	2
3.1	Compare and contrast the basic characteristics of three-dimensional figures (pyramids, prisms, cones, and cylinders).	1
3.2	Compare and contrast congruent and similar figures.	1
3.3	Identify the characteristics of the rectangular coordinate system and use them to locate points and describe shapes drawn in all four quadrants.	3
4	Measurement - The student will use measurements within the metric and customary systems to solve problems in a variety of contexts.	2
4.1	Use formulas to find the circumference and area of circles in terms of pi.	2
4.2	Convert, add, or subtract measurements within the same system to solve problems (e.g., 9' 8" + 3' 6", 150 minutes = __ hours and __ minutes, 6 square inches = __ square feet).	2

**Grade 6 Depth-of-Knowledge Consensus (Continued)**

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
5	Data Analysis - The student will use data analysis, probability, and statistics to interpret data in a variety of contexts.	2
5.1	Data Analysis: Organize, construct displays, and interpret data to solve problems (e.g., data from student experiments, tables, diagrams, charts, graphs).	2
5.2	Probability: Use the fundamental counting principle on sets with up to five items to determine the number of possible combinations.	2
5.3	Central Tendency: Find the measures of central tendency (mean, median, mode, and range) of a set of data (with and without outliers) and understand why a specific measure provides the most useful information in a given context.	2

## Grade 7 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Algebraic Reasoning: Patterns and Relationships – The student will use number properties and algebraic reasoning to identify, simplify, and solve simple linear equations and inequalities.	2
1.1	Identify, describe, and analyze functional relationships (linear and nonlinear) between two variables (e.g., as the value of x increases on a table, do the values of y increase or decrease, identify a positive rate of change on a graph and compare it to a negative rate of change).	2
1.2	Write and solve two-step equations with one variable using number sense, the properties of operations, and the properties of equality (e.g., $-2x + 4 = -2$ ).	2
1.3	Inequalities: Model, write, solve, and graph one-step linear inequalities with one variable.	2
2	Number Sense and Operation – The student will use numbers and number relationships to solve a variety of problems.	2
2.1a	Number Sense-Compare and order positive and negative rational numbers.	1
2.1b	Number Sense-Build and recognize models of perfect squares to find their square roots and estimate the square root of other numbers (e.g., the square root of 12 is between 3 and 4).	2
2.2a	Number Operations-Solve problems using ratios and proportions.	2
2.2b	Number Operations-Solve percent application problems (e.g., discounts, tax, finding the missing value of percent/part/whole).	2
2.2c	Number Operations-Simplify numerical expressions with integers, exponents, and parentheses using order of operations.	2
3	Geometry - The student will apply the properties and relationships of plane geometry in a variety of contexts.	2
3.1	Classify regular and irregular geometric figures including triangles and quadrilaterals according to their sides and angles.	1
3.2	Identify and analyze the angle relationships formed by parallel lines cut by a transversal (e.g., alternate interior angles, alternate exterior angles, adjacent, and vertical angles).	2
3.3	Construct geometric figures and identify geometric transformations on the rectangular coordinate plane (e.g., rotations, translations, reflections, magnifications).	2
4	Measurement - The student will use measurement to solve problems in a variety of contexts.	2
4.1	Develop and apply the formulas for perimeter and area of triangles and quadrilaterals to solve problems.	2
4.2	Apply the formula for the circumference and area of a circle to solve problems.	1
4.3	Find the area and perimeter of composite figures to solve application problems.	3
5	Data Analysis - The student will use data analysis, probability, and statistics to interpret data in a variety of contexts.	3
5.1	Data Analysis: Compare, translate, and interpret between displays of data (e.g., multiple sets of data on the same graph, data from subsets of the same population, combinations of diagrams, tables, charts, and graphs).	3
5.2	Probability: Determine the probability of an event involving “or”, “and”, or “not” (e.g., on a spinner with one blue, two red and two yellow sections, what is the probability of getting a red or a yellow?).	2
5.3	Central Tendency: Compute the mean, median, mode, and range for data sets and understand how additional data or outliers in a set may affect the measures of central tendency.	3

## Grade 8 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Algebraic Reasoning: Patterns and Relationships – The student will graph and solve linear equations and inequalities in problem solving situations.	2
1.1a	Equations-Model, write, and solve multi-step linear equations with one variable using a variety of methods to solve application problems.	2
1.1b	Equations-Graph and interpret the solution to one- and two-step linear equations on a number line with one variable and on a coordinate plane with two variables.	2
1.1c	Equations-Predict the effect on the graph of a linear equation when the slope or y-intercept changes (e.g., make predictions from graphs, identify the slope or y-intercept in the equation $y = mx + b$ and relate to a graph).	3
1.1d	Equations-Apply appropriate formulas to solve problems (e.g., $d=rt$ , $I=prt$ ).	1
1.2	Inequalities: Model, write, solve, and graph one- and two-step linear inequalities with one variable.	2
2	Number Sense and Operation – The student will use numbers and number relationships to solve a variety of problems.	2
2.1	Number Sense: Represent and interpret large numbers and numbers less than one in exponential and scientific notation.	1
2.2a	Number Operations-Use the rules of exponents, including integer exponents, to solve problems (e.g., $7^2 \cdot 7^3 = 7^5$ , $3^{-10} \cdot 3^8 = 3^{-2}$ ).	2
2.2b	Number Operations-Solve problems using scientific notation.	2
2.2c	Number Operations-Simplify numerical expressions with rational numbers, exponents, and parentheses using order of operations.	2
3	Geometry - The student will use geometric properties to solve problems in a variety of contexts.	2
3.1	Construct models, sketch (from different perspectives), and classify solid figures such as rectangular solids, prisms, cones, cylinders, pyramids, and combined forms.	2
3.2	Develop the Pythagorean Theorem and apply the formula to find the length of line segments, the shortest distance between two points on a graph, and the length of an unknown side of a right triangle.	3
4	Measurement - The student will use measurement to solve problems in a variety of contexts.	2
4.1	Develop and apply formulas to find the surface area and volume of rectangular prisms, triangular prisms, and cylinders (in terms of pi).	2
4.2	Apply knowledge of ratio and proportion to solve relationships between similar geometric figures.	2
4.3	Find the area of a “region of a region” for simple composite figures and the area of cross sections of regular geometric solids (e.g., area of a rectangular picture frame).	3
5	Data Analysis - The student will use data analysis, probability, and statistics to interpret data in a variety of contexts.	2
5.1	Data Analysis: Select, analyze and apply data displays in appropriate formats to draw conclusions and solve problems.	2
5.3	Central Tendency: Find the measures of central tendency (mean, median, mode, and range) of a set of data and understand why a specific measure provides the most useful information in a given context.	2

# **Appendix C**

## **Summary Tables**

**Grade 3**

**Table M1: Depth-of-Knowledge Consistency between Standards and Test**

Standards			Hits		Depth-of-Knowledge Levels					DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	9.2	2.86	12.22	11	69.05	20	18.73	19	YES
<b>2 Number Sense and Operations</b>	8	18.8	3.96	11.28	10	47.49	20	41.24	11	YES
<b>3 Geometry</b>	3	7	0	48.57	34	51.43	34	0	0	YES
<b>4 Measurement</b>	6	8.4	0.55	13.89	9	76.94	17	9.17	9	YES
<b>5 Data Analysis</b>	3	9.2	2.28	39.83	21	45.37	28	14.8	14	YES
<b>Total</b>	23	52.6	2.97	21.67	12.4	55.89	20	22.43	8.5	

**Table M2: Categorical Concurrence between Standards and Test**

Standards			Level by Objective		Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	1 3	2 1	66.67 33.33	9.2	2.86	YES
<b>2 Number Sense and Operations</b>	8	1 2	3 5	37.5 62.5	18.8	3.96	YES
<b>3 Geometry</b>	3	2 3	2 1	66.67 33.33	7	0	YES
<b>4 Measurement</b>	6	1 2	1 5	16.67 83.33	8.4	0.55	YES
<b>5 Data Analysis</b>	3	1 2 3	1 1 1	33.33 33.33 33.33	9.2	2.28	YES
<b>Total</b>	23	1 2 3	7 13 3	30 57 13	52.6	2.97	

Grade 3 (Continued)

Table M3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Test

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Algebraic Reasoning	3	9.2	2.86	2.8	0.45	93.33	14.91	YES	17	5	0.78	0.09	YES
2 Number Sense and Operations	8	18.8	3.96	6.4	0.55	78.06	5.41	YES	36	7	0.77	0.03	YES
3 Geometry	3	7	0	3.4	0.55	100	0	YES	13	1	0.84	0.13	YES
4 Measurement	6	8.4	0.55	4.8	0.45	80	7.45	YES	16	0	0.78	0.06	YES
5 Data Analysis	3	9.2	2.28	2.8	0.45	93.33	14.91	YES	18	5	0.79	0.05	YES
Total	23	52.6	2.97	4	1.55	88.94	9		20	9	0.79	0.03	YES

**Grade 4**

**Table M1: Depth-of-Knowledge Consistency between Standards and Test**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	7.8	2.95	42.86	26	57.14	26	0	0	YES
<b>2 Number Sense and Operations</b>	9	16.4	3.65	11.26	8	40.81	11	47.94	5	YES
<b>3 Geometry</b>	4	9	0	26.67	26	66.67	28	6.67	15	YES
<b>4 Measurement</b>	7	9.8	1.1	26.67	34	68.89	31	4.44	10	YES
<b>5 Data Analysis</b>	4	8.2	1.1	22.86	20	72.14	27	5	11	YES
<b>Total</b>	27	51.2	1.3	23.05	19.5	58.59	22.6	18.36	8.7	

**Table M2: Categorical Concurrence Between Standards and Test**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Standard	Mean	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	1 2 3	1 1 1	33.33 33.33 33.33	7.8	2.95	YES
<b>2 Number Sense and Operations</b>	9	1 2	3 6	33.33 66.67	16.4	3.65	YES
<b>3 Geometry</b>	4	1 2	1 3	25 75	9	0	YES
<b>4 Measurement</b>	7	2	7	100	9.8	1.1	YES
<b>5 Data Analysis</b>	4	1 2 3	1 2 1	25 50 25	8.2	1.1	YES
<b>Total</b>	27	1 2 3	6 19 2	22 70 7	51.2	1.3	

**Grade 4 (Continued)**

**Table M3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Test**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Objectives Hit		% of Total			Percent of Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Algebraic Reasoning	3	7.8	2.95	3	0	100	0	YES	15	6	0.89	0.15	YES
2 Number Sense and Operations	9	16.4	3.65	7.2	1.3	80	14.49	YES	32	7	0.74	0.04	YES
3 Geometry	4	9	0	4	0	100	0	YES	18	0	0.92	0	YES
4 Measurement	7	9.8	1.1	5.6	0.89	80	12.78	YES	19	2	0.8	0.05	YES
5 Data Analysis	4	8.2	1.1	3.6	0.55	90	13.69	YES	16	2	0.88	0.05	YES
Total	27	51.2	1.3	4.7	1.71	90	10		20	7	0.85	0.07	

Grade 5

**Table M1: Depth-of-Knowledge Consistency between Standards and Test**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	12.6	0.89	9.51	17	73.99	23	16.5	13	YES
<b>2 Number Sense and Operations</b>	6	16	2.92	18.72	17	71.09	24	10.2	12	YES
<b>3 Geometry</b>	2	7.2	0.45	24.29	19	64.64	25	11.07	12	YES
<b>4 Measurement</b>	4	7	1.22	24.76	27	71.9	27	3.33	7	YES
<b>5 Data Analysis</b>	4	8.4	1.14	27.66	29	60.04	32	12.3	8	YES
<b>Total</b>	19	51.2	1.3	19.53	19	69.14	24.3	11.33	10.2	

**Table M2: Categorical Concurrence between Standards and Test**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Standard	Mean	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	1 2	1 2	33.33 66.67	12.6	0.89	YES
<b>2 Number Sense and Operations</b>	6	1 2	1 5	16.67 83.33	16	2.92	YES
<b>3 Geometry</b>	2	1 2	1 1	50 50	7.2	0.45	YES
<b>4 Measurement</b>	4	2	4	100	7	1.22	YES
<b>5 Data Analysis</b>	4	1 2 3	1 2 1	25 50 25	8.4	1.14	YES
<b>Total</b>	19	1 2 3	4 14 1	21 74 5	51.2	1.3	

Grade 5 (Continued)

Table M3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Test

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Objectives Hit		% of Total			Percent of Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Algebraic Reasoning	3	12.6	0.89	2.8	0.45	93.33	14.91	YES	25	2	0.79	0.08	YES
2 Number Sense and Operations	6	16	2.92	4.8	0.45	80	7.45	YES	31	5	0.72	0.07	YES
3 Geometry	2	7.2	0.45	2	0	100	0	YES	14	1	0.8	0.04	YES
4 Measurement	4	7	1.22	3.8	0.45	95	11.18	YES	14	3	0.87	0.04	YES
5 Data Analysis	4	8.4	1.14	4	0	100	0	YES	16	2	0.73	0.05	YES
Total	19	51.2	1.3	3.5	1.09	93.67	8		20	8	0.78	0.06	

Grade 6

**Table M1: Depth-of-Knowledge Consistency between Standards and Test**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Algebraic Reasoning</b>	4	13.4	1.67	20.24	20	60.12	28	19.64	17	YES
<b>2 Number Sense and Operations</b>	6	15.4	1.95	17.12	16	74.26	18	8.62	6	YES
<b>3 Geometry</b>	3	8	0.71	49.68	5	43.1	13	7.22	11	YES
<b>4 Measurement</b>	2	7.6	0.89	11.43	19	69.21	28	19.37	13	YES
<b>5 Data Analysis</b>	3	8.4	2.07	26.43	27	54.88	29	18.69	19	YES
<b>Total</b>	18	52.8	4.15	23.48	15.2	61.74	19.6	14.77	9.7	

**Table M2: Categorical Concurrence between Standards and Test**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Algebraic Reasoning</b>	4	2	4	100	13.4	1.67	YES
<b>2 Number Sense and Operations</b>	6	2	5	83.33	15.4	1.95	YES
<b>3 Geometry</b>	3	3	1	33.33	8	0.71	YES
<b>4 Measurement</b>	2	2	2	100	7.6	0.89	YES
<b>5 Data Analysis</b>	3	2	3	100	8.4	2.07	YES
<b>Total</b>	18	3	1	6	52.8	4.15	

Grade 6 (Continued)

Table M3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Test

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Objectives Hit		% of Total			Percent of Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Algebraic Reasoning	4	13.4	1.67	4	0	100	0	YES	25	2	0.86	0.08	YES
2 Number Sense and Operations	6	15.4	1.95	5.2	0.84	86.67	13.94	YES	29	3	0.79	0.04	YES
3 Geometry	3	8	0.71	3	0	100	0	YES	15	1	0.81	0.07	YES
4 Measurement	2	7.6	0.89	2	0	100	0	YES	14	1	0.77	0.03	YES
5 Data Analysis	3	8.4	2.07	3	0	100	0	YES	16	4	0.85	0.06	YES
Total	18	52.8	4.15	3.4	1.21	97.33	6		20	7	0.82	0.04	

**Table M1: Depth-of-Knowledge Consistency between Standards and Test**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	14.4	2.19	24.56	22	61.65	28	13.79	10	YES
<b>2 Number Sense and Operations</b>	5	9.4	1.14	19.37	22	63.42	26	17.21	6	YES
<b>3 Geometry</b>	3	8.6	1.52	14.4	14	75.43	19	10.18	11	YES
<b>4 Measurement</b>	3	10.2	0.45	39.27	19	45.27	20	15.45	11	YES
<b>5 Data Analysis</b>	3	9.2	1.1	66.5	17	27	13	6.5	6	WEAKER
<b>Total</b>	17	51.8	1.64	31.66	14.2	55.21	18.8	13.13	6.3	

**Table M2: Categorical Concurrence between Standards and Test**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Standard	Mean	Standard Deviation	
<b>1 Algebraic Reasoning</b>	3	2	3	100	14.4	2.19	YES
<b>2 Number Sense and Operations</b>	5	1 2	1 4	20 80	9.4	1.14	YES
<b>3 Geometry</b>	3	1 2	1 2	33.33 66.67	8.6	1.52	YES
<b>4 Measurement</b>	3	1 2 3	1 1 1	33.33 33.33 33.33	10.2	0.45	YES
<b>5 Data Analysis</b>	3	2 3	1 2	33.33 66.67	9.2	1.1	YES
<b>Total</b>	17	1 2 3	3 11 3	18 65 18	51.8	1.64	

Grade 7 (Continued)

Table M3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Test

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Objectives Hit		% of Total			Percent of Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Algebraic Reasoning	3	14.4	2.19	3	0	100	0	YES	28	4	0.9	0.08	YES
2 Number Sense and Operations	5	9.4	1.14	4.8	0.45	96	8.94	YES	18	2	0.82	0.05	YES
3 Geometry	3	8.6	1.52	3	0	100	0	YES	17	3	0.88	0.04	YES
4 Measurement	3	10.2	0.45	3	0	100	0	YES	20	1	0.81	0.04	YES
5 Data Analysis	3	9.2	1.1	3.2	0.45	100	0	YES	18	2	0.84	0.05	YES
Total	17	51.8	1.64	3.4	0.79	99.2	2		20	4	0.85	0.04	

Grade 8

**Table M1: Depth-of-Knowledge Consistency between Standards and Test**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Algebraic Reasoning</b>	5	15.4	1.34	27.12	22	67.88	25	5	5	YES
<b>2 Number Sense and Operations</b>	4	11.2	1.1	19.99	14	76.48	16	3.54	5	YES
<b>3 Geometry</b>	2	9	0.71	56.11	12	39.67	12	4.22	6	YES*
<b>4 Measurement</b>	3	7.2	0.84	23.69	26	70.6	26	5.71	13	YES
<b>5 Data Analysis</b>	2	7.2	0.84	29.29	31	62.02	35	8.69	8	YES
<b>Total</b>	16	50	0	30.4	15.6	64.4	19.5	5.2	4.6	

**Table M2: Categorical Concurrence between Standards and Test**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Standard	Mean	Standard Deviation	
<b>1 Algebraic Reasoning</b>	5	1	1	20	15.4	1.34	YES
		2	3	60			
		3	1	20			
<b>2 Number Sense and Operations</b>	4	1	1	25	11.2	1.1	YES
		2	3	75			
<b>3 Geometry</b>	2	2	1	50	9	0.71	YES
		3	1	50			
<b>4 Measurement</b>	3	2	2	66.67	7.2	0.84	YES
		3	1	33.33			
<b>5 Data Analysis</b>	2	2	2	100	7.2	0.84	YES
<b>Total</b>	16	1	2	12	50	0	
		2	11	69			
		3	3	19			

**Grade 8 (Continued)**

**Table M3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Test**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Objectives Hit		% of Total			Percent of Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Algebraic Reasoning	5	15.4	1.34	4.8	0.45	96	8.94	YES	31	3	0.86	0.04	YES
2 Number Sense and Operations	4	11.2	1.1	4	0	100	0	YES	22	2	0.84	0.05	YES
3 Geometry	2	9	0.71	2	0	100	0	YES	18	1	0.97	0.03	YES
4 Measurement	3	7.2	0.84	2.8	0.45	93.33	14.91	YES	14	2	0.9	0.07	YES
5 Data Analysis	2	7.2	0.84	2	0	100	0	YES	14	2	0.94	0.07	YES
Total	16	50	0	3.1	1.25	97.87	3		20	7	0.9	0.05	

## **Appendix D**

### **Depth-of-Knowledge Levels by Item and Reviewers**

### Grade 3

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	2	2	1	2
2	2	2	2	2	1
3	2	2	2	2	2
4	2	2	2	2	2
5	1	1	3	1	2
6	1	1	2	2	1
7	1	1	1	1	1
8	1	1	2	1	1
9	2	2	2	3	2
10	1	1	1	1	1
11	2	2	1	2	2
12	1	2	1	2	1
13	2	2	1	1	3
14	1	2	1	1	2
15	2	3	3	2	2
16	2	2	2	2	2
17	1	2	3	2	2
18	2	2	1	1	2
19	2	2	2	2	2
20	1	1	2	1	1
21	1	2	2	2	1
22	1	1	1	1	1
23	3	3	3	3	2
24	3	2	2	2	2
25	2	1	1	1	1
26	2	2	3	1	2
27	2	2	3	2	2
28	1	1	1	1	1
29	3	1	1	2	1
30	2	2	1	2	1
31	1	1	2	2	1
32	3	2	2	2	2
33	2	2	2	2	3
34	2	1	3	1	1
35	2	2	2	2	2
36	1	1	1	1	1
37	3	2	3	3	2
38	1	2	3	1	2
39	3	2	3	2	1
40	2	1	1	2	2
41	2	2	2	1	2
42	2	1	3	1	1
43	1	2	1	1	2
44	1	1	1	1	1
45	2	2	1	2	1
46	2	1	2	2	1
47	3	3	3	3	3
48	2	2	1	1	2

**Grade 3 (Table D1 Continued)**

<b>Item</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>R5</b>
<b>49</b>	2	1	1	1	1
<b>50</b>	2	2	2	1	2
<b>51</b>	2	1	3	1	1
<b>52</b>	1	2	1	1	2
<b>53</b>	1	1	1	1	1
<b>54</b>	2	2	1	2	1
<b>56</b>	2	1	2	2	1
<b>57</b>	3	3	3	3	3
<b>58</b>	2	2	1	1	2
<b>59</b>	2	1	1	1	1
<b>60</b>	2	2	2	1	2

## Grade 4

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	1	2	1	1
2	2	1	2	2	1
3	1	1	1	1	1
5	2	2	2	2	2
6	1	2	2	2	2
7	1	2	2	1	2
9	2	2	2	2	2
10	1	1	3	1	1
11	1	1	1	1	1
12	1	1	2	2	1
13	3	3	2	2	2
14	1	1	3	2	1
15	3	2	2	2	1
16	1	1	1	1	1
19	2	1	1	1	1
20	2	2	2	2	2
21	3	3	3	3	2
22	2	2	2	2	2
24	2	2	3	1	2
25	3	2	1	2	2
26	2	2	2	2	1
27	2	2	2	2	1
29	1	2	3	2	1
30	3	2	2	2	2
31	2	2	3	1	2
32	2	2	2	2	1
34	2	2	2	1	2
35	3	2	2	2	1
36	2	2	2	2	2
37	1	1	2	1	1
38	1	2	2	1	1
39	3	2	2	2	1
41	2	2	2	1	1
42	3	2	3	2	2
43	2	1	1	1	1
44	2	2	1	2	1
45	1	2	2	2	1
46	2	2	2	2	2
47	2	2	2	1	1
48	3	2	2	2	1
49	2	2	2	2	1
50	2	2	1	1	1
52	2	1	1	1	1
53	1	1	1	1	1
54	1	1	1	1	1
54	2	2	1	1	1

**Grade 4 (Table D1 Continued)**

<b>Item</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>R5</b>
<b>55</b>	2	1	2	2	1
<b>57</b>	2	2	2	1	2
<b>58</b>	2	2	2	2	1
<b>59</b>	1	1	1	1	1
<b>60</b>	2	1	2	1	1

## Grade 5

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	2	2	2	1
2	1	2	2	1	1
3	3	3	3	2	2
4	2	2	2	2	1
5	2	1	2	2	1
7	2	2	2	2	1
8	2	3	3	2	2
9	3	3	2	2	2
10	2	1	2	1	2
12	2	1	2	1	1
13	3	3	3	3	2
15	3	2	3	2	3
16	2	2	1	2	2
17	2	2	1	2	1
18	2	1	2	2	2
19	2	2	2	2	2
20	2	2	2	2	2
21	1	1	1	2	1
23	2	1	2	2	1
24	2	2	2	2	1
26	2	1	2	2	1
27	2	2	2	2	1
28	2	2	2	2	1
29	2	2	2	2	2
30	3	2	2	2	3
31	2	2	1	2	2
32	1	1	2	1	1
33	3	3	2	2	2
34	2	1	2	2	1
36	3	3	2	2	2
37	2	2	2	2	1
38	1	1	1	1	1
39	2	1	2	2	1
40	2	2	3	2	1
42	3	2	3	2	1
43	2	1	1	1	1
44	1	2	2	2	1
45	2	1	2	1	1
46	2	1	1	1	1
48	2	2	2	2	1
49	2	2	2	2	1
50	3	1	1	2	2
52	3	1	2	2	2
53	2	2	2	2	2
54	1	1	2	2	1

**Grade 5 (Table D1 Continued)**

<b>Item</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>R5</b>
<b>55</b>	2	2	2	2	2
<b>57</b>	2	1	1	1	2
<b>58</b>	2	2	2	2	1
<b>59</b>	2	1	2	2	1
<b>60</b>	1	1	2	2	1

## Grade 6

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	1	2	1	2
2	1	2	2	2	2
3	1	2	2	1	2
6	2	2	3	2	2
7	2	1	2	1	2
8	2	2	2	1	2
9	2	1	2	2	2
10	2	2	2	1	2
11	3	2	3	3	2
12	1	1	2	2	2
14	2	1	2	2	2
15	1	2	2	2	2
16	2	3	2	2	2
17	1	1	3	1	2
18	1	1	1	1	1
19	2	2	2	2	2
20	2	1	2	1	2
21	3	1	2	2	2
23	1	2	2	2	2
24	1	1	1	2	2
25	1	1	2	2	2
26	1	1	2	3	3
27	2	2	2	3	2
28	2	1	2	1	2
30	3	2	3	3	2
31	2	1	2	2	2
32	2	3	3	3	2
33	1	1	2	2	2
34	2	1	1	1	2
36	2	2	2	1	2
37	1	2	2	1	2
39	2	2	2	2	2
40	1	1	1	1	1
41	2	1	3	2	2
42	2	2	2	2	2
43	1	1	1	3	1
44	2	2	2	2	2
45	2	2	2	1	2
48	2	1	2	1	2
49	3	3	3	3	2
50	2	1	2	1	2
51	1	1	1	1	1
52	1	1	1	1	1
53	1	1	1	1	1
54	2	1	3	3	2

**Grade 6 (Table D1 Continued)**

<b>Item</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>R5</b>
<b>56</b>	2	2	2	1	2
<b>57</b>	3	3	3	3	2
<b>58</b>	2	3	2	3	2
<b>59</b>	2	2	2	2	2
<b>60</b>	2	2	2	1	2

## Grade 7

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	1	1	1	1
2	2	1	2	1	2
3	1	1	1	1	2
4	3	1	2	2	2
6	2	1	1	1	2
7	2	1	1	2	2
8	1	1	2	2	2
10	2	2	2	2	2
11	2	2	2	2	2
12	2	1	2	1	2
13	2	2	2	1	2
14	2	2	3	2	2
15	1	2	2	1	1
17	1	1	2	2	2
18	2	1	2	2	2
19	1	1	2	1	1
20	2	2	2	2	2
21	3	2	2	2	2
22	1	1	3	1	3
24	1	2	1	2	2
25	2	2	2	2	2
26	1	1	2	2	2
27	1	1	2	2	2
29	1	2	1	3	1
30	3	3	3	3	2
31	2	2	2	3	2
32	2	2	2	2	2
34	1	1	1	1	1
35	1	1	1	2	1
36	2	2	2	3	2
37	1	1	2	1	2
39	2	2	2	2	2
40	1	1	2	1	1
41	2	2	3	2	2
42	3	3	3	3	2
43	2	2	2	2	2
45	1	1	2	1	1
46	3	3	3	3	2
47	2	3	2	2	2
48	1	1	2	1	2
49	3	3	2	2	2
50	2	2	1	2	1
51	2	2	2	2	2
53	3	2	2	3	2
54	1	2	3	2	2

**Grade 7 (Table D1 Continued)**

<b>Item</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>R5</b>
<b>55</b>	3	2	2	2	2
<b>57</b>	2	3	2	2	2
<b>58</b>	2	1	2	1	2
<b>59</b>	1	2	2	2	1
<b>60</b>	1	1	2	1	2

## Grade 8

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	2	2	1	2
2	1	2	2	1	2
3	1	1	2	1	2
4	1	2	2	1	2
5	2	1	2	1	1
7	1	2	2	2	2
8	2	1	2	2	2
9	1	1	1	1	2
10	3	2	3	3	2
11	2	3	2	2	2
12	3	2	2	2	2
13	2	2	2	2	2
14	2	1	2	2	2
15	2	2	3	3	2
16	2	3	2	2	2
17	2	1	2	1	2
18	2	2	2	1	2
21	1	2	1	2	2
22	3	3	3	3	3
23	2	1	1	1	1
24	2	2	2	1	1
25	2	1	2	1	2
27	1	1	1	1	2
28	2	2	3	2	2
29	2	2	2	1	1
30	2	2	2	1	2
31	2	3	2	3	2
33	2	1	1	2	1
34	2	2	2	2	2
37	2	1	2	1	1
38	1	1	2	1	2
39	2	2	2	2	2
40	2	2	2	3	2
41	2	1	1	2	1
42	1	2	1	1	2
43	2	1	2	1	2
45	2	2	2	1	2
46	2	1	2	1	2
47	2	1	2	1	2
48	2	2	2	2	2
49	2	2	2	2	2
50	2	2	3	3	2
51	3	3	3	2	3
52	2	1	2	1	1
53	2	3	2	2	2

**Grade 8 (Table D1 Continued)**

<b>Item</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>R5</b>
<b>55</b>	3	3	2	3	2
<b>56</b>	2	1	2	2	2
<b>58</b>	2	3	2	2	2
<b>59</b>	2	1	2	1	1
<b>60</b>	2	1	2	2	2

### Grade 3

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low		High	
1-2	3	4	5
Item	Objective: Number of Reviewers		
1	1.2:2	2.2a:3	
2	2.1a.1 :1	2.1b.1:4	5.1b:1
3	2.2b.2:2	4.1a:5	
4	1.1:4	2.2a:1	5.1b:1
6	2.1a.1:4	3.2:1	
7	3.3:5		
8	1.2:4	1.3:1	2.2b.1:1
9	3:01	3.1:4	
10	4.3:5		
12	4.2b:5		
13	2:01	2.1a.1 :1	2.2a:3
14	1.2:5		
15	2.1a.1 :5	2.1b.1:2	
17	1.2:3	2.2a:2	
18	5.1b:5		
19	3.3:4	5.1c:1	
20	5.1b:2	5.1c:3	
21	5.1b:1	5.2:5	
23	4.1c:5		
24	4.1a:5		
25	2.1b.2:5		
27	2.1a.1 :5		
28	3.2:5		
29	2.2b.2:1	5.1b:4	5.1c:1
30	5.2:5		
31	2.1a.1 :4	2.1b.1:1	5.1b:1
32	1.2:1	5.1b:5	
33	2.1a.2:5		
35	5.2:5		
36	2.1b.1:3	2.2b.1:1	5.1b:1
37	2.2b.1:5		
38	1.2:2	2.2a:3	
40	2.2b.1:2	4.1a:5	
41	3:02	3.1:2	3.2:1
42	2.1b.2:5		
43	1.3:5		

**Grade 3 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>		
<b>45</b>	1.1:2	5.1b:3	
<b>46</b>	1.2:1	2.2a:3	5.1b:1
<b>47</b>	3.2:5		
<b>48</b>	4.2a:4	4.2b:1	
<b>49</b>	4.3:5		
<b>51</b>	3.1:4	3.2:1	
<b>52</b>	1.2:2	2.2a:3	
<b>53</b>	1.3:5		
<b>54</b>	1.2:5		
<b>56</b>	2.1a.2:1	2.1b.2:4	
<b>57</b>	2.2a:2	4.3:2	5.1b:1
<b>58</b>	1.2:2	2.2a:3	
<b>59</b>	1.3:1	2.2b.1:3	2.2b.2:1
<b>60</b>	1.2:1	2.2a:4	

## Grade 4

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low		High	
1-2	3	4	5

Item	Objective: Number of Reviewers			
1	3.4:5			
2	4.1a:3	4.1b:1	4.1c:2	
3	3.1:5			
5	1.2:1	2.2b.1:1	2.2b.2:1	2.2b.3:2
6	5.2:5			
7	3.4:5			
9	1.2:1	2.2a:4		
10	2.1b.1:4	5.1a:1		
11	5.3:5			
12	1.2:5			
13	1.1:2	5.1a:3	5.2:1	
14	2.1a.1:1	2.1b.1:2	2.2b.1:1	5.1a:1
15	3.2:5			
16	2.1a.1:5			
19	2.1a.1:1	2.1a.2:4		
20	1.2:1	2.2a:4		
21	1.1:5			
22	1.2:1	2.2b.3:4		
24	1.1:5			
25	2.1a.1:5			
26	2.2a:5			
27	2.1b.2:5			
29	2.1b.3:5			
30	4.2b:5			
31	5.1a:5			
32	3.3:5			
34	1.2:1	2.2a:4		
35	2.2a:4	2.2b.2:1		
36	4.2a:5			
37	1.2:5			
38	3.2:5			
39	4.1a:3	4.1c:4		
41	4.1a:3	4.1c:3		
42	5.1a:2	5.1b:3		
43	3.1:5			
44	3.1:1	3.3:4		
45	5.2:5			

**Grade 4 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>			
<b>46</b>	1.2:1	2.2b.1:1	2.2b.3:4	
<b>47</b>	2.1b.2:3	4.1b:2		
<b>48</b>	3.3:4	3.4:1		
<b>49</b>	2.2a:5			
<b>50</b>	2.1a.2:1	4.3:4		
<b>52</b>	5.3:5			
<b>53</b>	1.3:5			
<b>54</b>	5.3:5			
<b>55</b>	2.1a.2:1	4.3:4		
<b>57</b>	4.1b:5			
<b>58</b>	1.2:1	2.2a:4		
<b>59</b>	4.1a:2	4.1b:3		
<b>60</b>	1.3:5			

## Grade 5

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low		High	
1-2	3	4	5
Item	Objective: Number of Reviewers		
1	4.1b:5		
2	2.2a:5		
3	1.1:3	4.1b:1	5.1:1
4	5.2b:5		
5	2.1a:1	2.1b:4	
7	1.1:5		
8	5.1:5		
9	1.1:5		
10	1.1:1	2.1a:4	
12	2.1b:5		
13	5.1:5		
15	3.1:4	5.1:2	
16	5.3:5		
17	3.1:4	3.2:2	
18	2.1a:1	2.1b:4	
19	1.1:5		
20	4.1b:5		
21	1.3:5		
23	3.1:1	3.2:4	
24	2.2a:4	4.1c:1	
26	4.1c:5		
27	3.1:5		
28	5.2a:5		
29	1.1:5		
30	2.2b:5		
31	1.3:1	2.2c:4	
32	3.1:5		
33	2.2a:3	4.2:3	
34	2.1b:5		
36	2.2b:2	3.1:1	5.1:2
37	1.1:2	1.2:3	
38	3.2:5		
39	4.1a:5		
40	5.1:5		
42	1.1:3	5.1:2	
43	1.3:5		

**Grade 5 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>		
<b>44</b>	1.1:2	1.2:3	
<b>45</b>	2.1b:5		
<b>46</b>	5.3:5		
<b>48</b>	1.1:5		
<b>49</b>	2.2a:4	4.1c:1	
<b>50</b>	1.3:5		
<b>52</b>	2.1a:3	2.1b:2	
<b>53</b>	2.2a:2	2.2b:1	4.2:4
<b>54</b>	3.1:5		
<b>55</b>	2.2c:5		
<b>57</b>	1.3:5		
<b>58</b>	2.2a:5		
<b>59</b>	4.1a:1	4.1c:4	
<b>60</b>	2.1a:2	2.1b:3	

## Grade 6

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low		High		
1-2		3	4	5
Item	Objective: Number of Reviewers			
1	1.1:5			
2	1.3:5			
3	1.3:4	2.2d:1	2.2e:1	
6	1.1:5	5.1:1		
7	4.2:5			
8	2.2a:4	4.2:1		
9	5.3:5			
10	1.1:4	1.2:1	1.4:1	
11	1.1:4	1.2:1		
12	2.2c:4	4.2:1		
14	2.1:4	5.2:1		
15	1.2:5	1.3:1	1.4:1	
16	2.1:4	2.2c:1		
17	5.1:5			
18	3.3:4	5.1:1		
19	2.2a:4	2.2c:1		
20	1.4:5			
21	4.1:5			
23	2.1:5			
24	3.3:5			
25	2.2e:5			
26	3.2:4	3.3:1		
27	2.2a:4	2.2c:1	4.2:1	
28	1.2:1	1.3:3	3.3:1	
30	5.1:1	5.3:5		
31	4.1:5			
32	1.1:3	1.2:1	5.1:1	
33	2.2e:5			
34	2.2b:4	4.2:1		
36	5.2:5			
37	1.2:1	1.4:4		
39	2.2c:5			
40	3.3:5			
41	2.2c:1	5.1:5		
42	2.1:5			
43	3.1:5			

**Grade 6 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>			
<b>44</b>	4.2:5			
<b>45</b>	2.1:4	5.1:1		
<b>48</b>	5.2:5			
<b>49</b>	1.1:1	1.2:5	1.3:1	5.1:1
<b>50</b>	2.1:1	5.1:5		
<b>51</b>	3.3:5			
<b>52</b>	3.1:5			
<b>53</b>	3.2:5			
<b>54</b>	1.2:5			
<b>56</b>	2.2b:2	2.2c:3	2.2d:1	
<b>57</b>	2.2a:2	4.2:4		
<b>58</b>	2.2c:1	4.2:4		
<b>59</b>	4.2:5			
<b>60</b>	2.2c:4	4.2:1		

## Grade 7

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low		High	
1-2	3	4	5

Item	Objective: Number of Reviewers		
1	3.1:5		
2	3.2:5		
3	3.1:5		
4	2.2b:3	5.1:2	
6	1.1:1	1.2:1	2.2c:4
7	4.1:4	4.3:2	
8	2.1a:1	2.2a:4	
10	2.1b:3	4.1:3	4.3:1
11	2.2b:5		
12	1.2:5		
13	3.3:4	5.1:1	
14	5.1:3	5.2:4	
15	3.2:5		
17	4.1:5		
18	2.1a:1	2.2a:4	
19	4.1:5		
20	2.1b:3	3.3:2	
21	1.2:2	4.1:1	4.3:2
22	5.1:5		
24	2.2a:1	3.1:4	
25	3.2:5		
26	1.3:5		
27	2.1b:5		
29	2.1a:4	5.1:1	
30	1.1:4	3.3:1	
31	1.1:3	5.1:2	
32	3.3:5		
34	5.3:5		
35	4.1:1	4.2:4	
36	1.1:2	5.0:1	5.1:2
37	1.1:1	1.2:4	
39	1.1:5		
40	5.3:5		
41	5.1:5		
42	1.1:4	3.3:1	
43	1.2:5		

**Grade 7 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>		
<b>45</b>	5.3:5		
<b>46</b>	4.1:4	4.3:4	
<b>47</b>	1.2:5		
<b>48</b>	1.3:5		
<b>49</b>	4.1:1	4.3:4	
<b>50</b>	4.2:5		
<b>51</b>	1.3:5		
<b>53</b>	5.2:5		
<b>54</b>	4.1:1	4.3:4	
<b>55</b>	1.3:5		
<b>57</b>	2.1a:1	2.2a:3	3.3:1
<b>58</b>	1.2:5		
<b>59</b>	2.1a:5		
<b>60</b>	1.3:5		

## Grade 8

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low		High	
1-2	3	4	5

Item	Objective: Number of Reviewers		
1	4.1:5		
2	1.1a:1	2.2c:4	
3	1.1a:5		
4	4.1:5		
5	3.2:5		
7	3.1:4	4.3:1	
8	1.2:5		
9	2.1:4	2.2b:1	
10	1.1c:5		
11	1.1a:5		
12	1.1a:5		
13	3.1:5		
14	1.2:5		
15	1.1c:5		
16	4.1:1	4.2:4	
17	2.2c:5		
18	5.1:5		
21	2.1:2	2.2b:3	
22	4.3:5		
23	1.1d:4	2.2c:1	
24	3.1:5		
25	1.2:5		
27	2.1:4	2.2b:1	
28	3.2:5		
29	2.2a:4	2.2c:1	
30	1.1b:4	5.1:1	
31	3.1:5		
33	1.1d:3	4.1:1	4.3:1
34	1.1c:1	5.1:4	
37	5.3:5		
38	2.2a:5		
39	1.1b:4	5.1:1	
40	3.2:5		
41	3.1:5		
42	2.1:3	2.2a:1	2.2b:1
43	5.1:1	5.3:4	

**Grade 8 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>		
<b>45</b>	1.1b:4	1.1c:1	
<b>46</b>	4.1:5		
<b>47</b>	5.3:5		
<b>48</b>	2.2c:5		
<b>49</b>	2.2a:4	2.2b:1	
<b>50</b>	1.1c:5		
<b>51</b>	4.3:5		
<b>52</b>	5.3:5		
<b>53</b>	2.2a:1	2.2b:4	
<b>55</b>	5.1:5		
<b>56</b>	1.2:5		
<b>58</b>	2.2a:1	3.2:1	4.2:3
<b>59</b>	3.2:5		
<b>60</b>	1.1a:1	1.2:4	

### Grade 3

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Items	Objectives						
1	1.2	1.2	2.2a	2.2a	2.2a		
2	2.1a.1	2.1b.1	2.1b.1	2.1b.1	2.1b.1	5.1b	
3	2.2b.2	2.2b.2	4.1a	4.1a	4.1a	4.1a	4.1a
4	1.1	1.1	1.1	1.1	2.2a	5.1b	
6	2.1a.1	2.1a.1	2.1a.1	2.1a.1	3.2		
7	3.3	3.3	3.3	3.3	3.3		
8	1.2	1.2	1.2	1.2	1.3	2.2b.1	
9	3	3.1	3.1	3.1	3.1		
10	4.3	4.3	4.3	4.3	4.3		
12	4.2b	4.2b	4.2b	4.2b	4.2b		
13	2	2.1a.1	2.2a	2.2a	2.2a		
14	1.2	1.2	1.2	1.2	1.2		
15	2.1a.1	2.1a.1	2.1a.1	2.1a.1	2.1a.1	2.1b.1	2.1b.1
17	1.2	1.2	1.2	2.2a	2.2a		
18	5.1b	5.1b	5.1b	5.1b	5.1b		
19	3.3	3.3	3.3	3.3	5.1c		
20	5.1b	5.1b	5.1c	5.1c	5.1c		
21	5.1b	5.2	5.2	5.2	5.2	5.2	
23	4.1c	4.1c	4.1c	4.1c	4.1c		
24	4.1a	4.1a	4.1a	4.1a	4.1a		
25	2.1b.2	2.1b.2	2.1b.2	2.1b.2	2.1b.2		
27	2.1a.1	2.1a.1	2.1a.1	2.1a.1	2.1a.1		
28	3.2	3.2	3.2	3.2	3.2		
29	2.2b.2	5.1b	5.1b	5.1b	5.1b	5.1c	
30	5.2	5.2	5.2	5.2	5.2		
31	2.1a.1	2.1a.1	2.1a.1	2.1a.1	2.1b.1	5.1b	
32	1.2	5.1b	5.1b	5.1b	5.1b	5.1b	
33	2.1a.2	2.1a.2	2.1a.2	2.1a.2	2.1a.2		
35	5.2	5.2	5.2	5.2	5.2		
36	2.1b.1	2.1b.1	2.1b.1	2.2b.1	5.1b		
37	2.2b.1	2.2b.1	2.2b.1	2.2b.1	2.2b.1		
38	1.2	1.2	2.2a	2.2a	2.2a		
40	2.2b.1	2.2b.1	4.1a	4.1a	4.1a	4.1a	4.1a
41	3	3	3.1	3.1	3.2		
42	2.1b.2	2.1b.2	2.1b.2	2.1b.2	2.1b.2		
43	1.3	1.3	1.3	1.3	1.3		
45	1.1	1.1	5.1b	5.1b	5.1b		
46	1.2	2.2a	2.2a	2.2a	5.1b		

**Grade 3 (Table D3 Continued)**

<b>Items</b>	<b>Objectives</b>						
<b>47</b>	3.2	3.2	3.2	3.2	3.2		
<b>48</b>	4.2a	4.2a	4.2a	4.2a	4.2b		
<b>49</b>	4.3	4.3	4.3	4.3	4.3		
<b>51</b>	3.1	3.1	3.1	3.1	3.2		
<b>52</b>	1.2	1.2	2.2a	2.2a	2.2a		
<b>53</b>	1.3	1.3	1.3	1.3	1.3		
<b>54</b>	1.2	1.2	1.2	1.2	1.2		
<b>56</b>	2.1a.2	2.1b.2	2.1b.2	2.1b.2	2.1b.2		
<b>57</b>	2.2a	2.2a	4.3	4.3	5.1b		
<b>58</b>	1.2	1.2	2.2a	2.2a	2.2a		
<b>59</b>	1.3	2.2b.1	2.2b.1	2.2b.1	2.2b.2		
<b>60</b>	1.2	2.2a	2.2a	2.2a	2.2a		

## Grade 4

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Items	Objectives						
1	3.4	3.4	3.4	3.4	3.4		
2	4.1a	4.1a	4.1a	4.1b	4.1c	4.1c	
3	3.1	3.1	3.1	3.1	3.1		
5	1.2	2.2b.1	2.2b.2	2.2b.3	2.2b.3		
6	5.2	5.2	5.2	5.2	5.2		
7	3.4	3.4	3.4	3.4	3.4		
9	1.2	2.2a	2.2a	2.2a	2.2a		
10	2.1b.1	2.1b.1	2.1b.1	2.1b.1	5.1a		
11	5.3	5.3	5.3	5.3	5.3		
12	1.2	1.2	1.2	1.2	1.2		
13	1.1	1.1	5.1a	5.1a	5.1a	5.2	
14	2.1a.1	2.1b.1	2.1b.1	2.2b.1	5.1a		
15	3.2	3.2	3.2	3.2	3.2		
16	2.1a.1	2.1a.1	2.1a.1	2.1a.1	2.1a.1		
19	2.1a.1	2.1a.2	2.1a.2	2.1a.2	2.1a.2		
20	1.2	2.2a	2.2a	2.2a	2.2a		
21	1.1	1.1	1.1	1.1	1.1		
22	1.2	2.2b.3	2.2b.3	2.2b.3	2.2b.3		
24	1.1	1.1	1.1	1.1	1.1		
25	2.1a.1	2.1a.1	2.1a.1	2.1a.1	2.1a.1		
26	2.2a	2.2a	2.2a	2.2a	2.2a		
27	2.1b.2	2.1b.2	2.1b.2	2.1b.2	2.1b.2		
29	2.1b.3	2.1b.3	2.1b.3	2.1b.3	2.1b.3		
30	4.2b	4.2b	4.2b	4.2b	4.2b		
31	5.1a	5.1a	5.1a	5.1a	5.1a		
32	3.3	3.3	3.3	3.3	3.3		
34	1.2	2.2a	2.2a	2.2a	2.2a		
35	2.2a	2.2a	2.2a	2.2a	2.2b.2		
36	4.2a	4.2a	4.2a	4.2a	4.2a		
37	1.2	1.2	1.2	1.2	1.2		
38	3.2	3.2	3.2	3.2	3.2		
39	4.1a	4.1a	4.1a	4.1c	4.1c	4.1c	4.1c
41	4.1a	4.1a	4.1a	4.1c	4.1c	4.1c	
42	5.1a	5.1a	5.1b	5.1b	5.1b		
43	3.1	3.1	3.1	3.1	3.1		
44	3.1	3.3	3.3	3.3	3.3		
45	5.2	5.2	5.2	5.2	5.2		
46	1.2	2.2b.1	2.2b.3	2.2b.3	2.2b.3	2.2b.3	
47	2.1b.2	2.1b.2	2.1b.2	4.1b	4.1b		

**Grade 4 (Table D3 Continued)**

<b>Items</b>	<b>Objectives</b>						
<b>48</b>	3.3	3.3	3.3	3.3	3.4		
<b>49</b>	2.2a	2.2a	2.2a	2.2a	2.2a		
<b>50</b>	2.1a.2	4.3	4.3	4.3	4.3		
<b>52</b>	5.3	5.3	5.3	5.3	5.3		
<b>53</b>	1.3	1.3	1.3	1.3	1.3		
<b>54</b>	5.3	5.3	5.3	5.3	5.3		
<b>55</b>	2.1a.2	4.3	4.3	4.3	4.3		
<b>57</b>	4.1b	4.1b	4.1b	4.1b	4.1b		
<b>58</b>	1.2	2.2a	2.2a	2.2a	2.2a		
<b>59</b>	4.1a	4.1a	4.1b	4.1b	4.1b		
<b>60</b>	1.3	1.3	1.3	1.3	1.3		

**Grade 5**

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Items	Objectives						
1	4.1b	4.1b	4.1b	4.1b	4.1b		
2	2.2a	2.2a	2.2a	2.2a	2.2a		
3	1.1	1.1	1.1	4.1b	5.1		
4	5.2b	5.2b	5.2b	5.2b	5.2b		
5	2.1a	2.1a	2.1b	2.1b	2.1b	2.1b	
7	1.1	1.1	1.1	1.1	1.1		
8	5.1	5.1	5.1	5.1	5.1		
9	1.1	1.1	1.1	1.1	1.1		
10	1.1	2.1a	2.1a	2.1a	2.1a		
12	2.1b	2.1b	2.1b	2.1b	2.1b		
13	5.1	5.1	5.1	5.1	5.1		
15	3.1	3.1	3.1	3.1	5.1	5.1	
16	5.3	5.3	5.3	5.3	5.3		
17	3.1	3.1	3.1	3.1	3.2	3.2	
18	2.1a	2.1b	2.1b	2.1b	2.1b		
19	1.1	1.1	1.1	1.1	1.1		
20	4.1b	4.1b	4.1b	4.1b	4.1b		
21	1.3	1.3	1.3	1.3	1.3		
23	3.1	3.2	3.2	3.2	3.2		
24	2.2a	2.2a	2.2a	2.2a	4.1c		
26	4.1c	4.1c	4.1c	4.1c	4.1c		
27	3.1	3.1	3.1	3.1	3.1		
28	5.2a	5.2a	5.2a	5.2a	5.2a		
29	1.1	1.1	1.1	1.1	1.1		
30	2.2b	2.2b	2.2b	2.2b	2.2b		
31	1.3	2.2c	2.2c	2.2c	2.2c		
32	3.1	3.1	3.1	3.1	3.1		
33	2.2a	2.2a	2.2a	4.2	4.2	4.2	
34	2.1b	2.1b	2.1b	2.1b	2.1b		
36	2.2b	2.2b	3.1	5.1	5.1		
37	1.1	1.1	1.2	1.2	1.2		
38	3.2	3.2	3.2	3.2	3.2		
39	4.1a	4.1a	4.1a	4.1a	4.1a		
40	5.1	5.1	5.1	5.1	5.1		
42	1.1	1.1	1.1	5.1	5.1		
43	1.3	1.3	1.3	1.3	1.3		
44	1.1	1.1	1.2	1.2	1.2		
45	2.1b	2.1b	2.1b	2.1b	2.1b		
46	5.3	5.3	5.3	5.3	5.3		

**Grade 5 (Table D3 Continued)**

Items	Objectives						
<b>48</b>	1.1	1.1	1.1	1.1	1.1		
<b>49</b>	2.2a	2.2a	2.2a	2.2a	4.1c		
<b>50</b>	1.3	1.3	1.3	1.3	1.3		
<b>52</b>	2.1a	2.1a	2.1a	2.1b	2.1b		
<b>53</b>	2.2a	2.2a	2.2b	4.2	4.2	4.2	4.2
<b>54</b>	3.1	3.1	3.1	3.1	3.1		
<b>55</b>	2.2c	2.2c	2.2c	2.2c	2.2c		
<b>57</b>	1.3	1.3	1.3	1.3	1.3		
<b>58</b>	2.2a	2.2a	2.2a	2.2a	2.2a		
<b>59</b>	4.1a	4.1c	4.1c	4.1c	4.1c		
<b>60</b>	2.1a	2.1a	2.1b	2.1b	2.1b		

## Grade 6

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Items	Objectives							
	1.1	1.1	1.1	1.1	1.1			
1	1.1	1.1	1.1	1.1	1.1			
2	1.3	1.3	1.3	1.3	1.3			
3	1.3	1.3	1.3	1.3	2.2d	2.2e		
6	1.1	1.1	1.1	1.1	1.1	5.1		
7	4.2	4.2	4.2	4.2	4.2			
8	2.2a	2.2a	2.2a	2.2a	4.2			
9	5.3	5.3	5.3	5.3	5.3			
10	1.1	1.1	1.1	1.1	1.2	1.4		
11	1.1	1.1	1.1	1.1	1.2			
12	2.2c	2.2c	2.2c	2.2c	4.2			
14	2.1	2.1	2.1	2.1	5.2			
15	1.2	1.2	1.2	1.2	1.2	1.3	1	
16	2.1	2.1	2.1	2.1	2.2c			
17	5.1	5.1	5.1	5.1	5.1			
18	3.3	3.3	3.3	3.3	5.1			
19	2.2a	2.2a	2.2a	2.2a	2.2c			
20	1.4	1.4	1.4	1.4	1.4			
21	4.1	4.1	4.1	4.1	4.1			
23	2.1	2.1	2.1	2.1	2.1			
24	3.3	3.3	3.3	3.3	3.3			
25	2.2e	2.2e	2.2e	2.2e	2.2e			
26	3.2	3.2	3.2	3.2	3.3			
27	2.2a	2.2a	2.2a	2.2a	2.2c	4.2		
28	1.2	1.3	1.3	1.3	3.3			
30	5.1	5.3	5.3	5.3	5.3	5.3		
31	4.1	4.1	4.1	4.1	4.1			
32	1.1	1.1	1.1	1.2	5.1			
33	2.2e	2.2e	2.2e	2.2e	2.2e			
34	2.2b	2.2b	2.2b	2.2b	4.2			
36	5.2	5.2	5.2	5.2	5.2			
37	1.2	1.4	1.4	1.4	1.4			
39	2.2c	2.2c	2.2c	2.2c	2.2c			
40	3.3	3.3	3.3	3.3	3.3			
41	2.2c	5.1	5.1	5.1	5.1	5.1		
42	2.1	2.1	2.1	2.1	2.1			
43	3.1	3.1	3.1	3.1	3.1			
44	4.2	4.2	4.2	4.2	4.2			
45	2.1	2.1	2.1	2.1	5.1			
48	5.2	5.2	5.2	5.2	5.2			

**Grade 6 (Table D3 Continued)**

<b>Items</b>	<b>Objectives</b>							
<b>49</b>	1.1	1.2	1.2	1.2	1.2	1.2	1	5
<b>50</b>	2.1	5.1	5.1	5.1	5.1	5.1		
<b>51</b>	3.3	3.3	3.3	3.3	3.3			
<b>52</b>	3.1	3.1	3.1	3.1	3.1			
<b>53</b>	3.2	3.2	3.2	3.2	3.2			
<b>54</b>	1.2	1.2	1.2	1.2	1.2			
<b>56</b>	2.2b	2.2b	2.2c	2.2c	2.2c	2.2d		
<b>57</b>	2.2a	2.2a	4.2	4.2	4.2	4.2		
<b>58</b>	2.2c	4.2	4.2	4.2	4.2			
<b>59</b>	4.2	4.2	4.2	4.2	4.2			
<b>60</b>	2.2c	2.2c	2.2c	2.2c	4.2			

**Grade 7**

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Items	Objectives							
1	3.1	3.1	3.1	3.1	3.1			
2	3.2	3.2	3.2	3.2	3.2			
3	3.1	3.1	3.1	3.1	3.1			
4	2.2b	2.2b	2.2b	5.1	5.1			
6	1.1	1.2	2.2c	2.2c	2.2c	2.2c		
7	4.1	4.1	4.1	4.1	4.3	4.3		
8	2.1a	2.2a	2.2a	2.2a	2.2a			
10	2.1b	2.1b	2.1b	4.1	4.1	4.1	4	
11	2.2b	2.2b	2.2b	2.2b	2.2b			
12	1.2	1.2	1.2	1.2	1.2			
13	3.3	3.3	3.3	3.3	5.1			
14	5.1	5.1	5.1	5.2	5.2	5.2	5	
15	3.2	3.2	3.2	3.2	3.2			
17	4.1	4.1	4.1	4.1	4.1			
18	2.1a	2.2a	2.2a	2.2a	2.2a			
19	4.1	4.1	4.1	4.1	4.1			
20	2.1b	2.1b	2.1b	3.3	3.3			
21	1.2	1.2	4.1	4.3	4.3			
22	5.1	5.1	5.1	5.1	5.1			
24	2.2a	3.1	3.1	3.1	3.1			
25	3.2	3.2	3.2	3.2	3.2			
26	1.3	1.3	1.3	1.3	1.3			
27	2.1b	2.1b	2.1b	2.1b	2.1b			
29	2.1a	2.1a	2.1a	2.1a	5.1			
30	1.1	1.1	1.1	1.1	3.3			
31	1.1	1.1	1.1	5.1	5.1			
32	3.3	3.3	3.3	3.3	3.3			
34	5.3	5.3	5.3	5.3	5.3			
35	4.1	4.2	4.2	4.2	4.2			
36	1.1	1.1	5	5.1	5.1			
37	1.1	1.2	1.2	1.2	1.2			
39	1.1	1.1	1.1	1.1	1.1			
40	5.3	5.3	5.3	5.3	5.3			
41	5.1	5.1	5.1	5.1	5.1			
42	1.1	1.1	1.1	1.1	3.3			
43	1.2	1.2	1.2	1.2	1.2			
45	5.3	5.3	5.3	5.3	5.3			
46	4.1	4.1	4.1	4.1	4.3	4.3	4	4
47	1.2	1.2	1.2	1.2	1.2			

**Grade 7 (Table D3 Continued)**

<b>Items</b>	<b>Objectives</b>							
<b>48</b>	1.3	1.3	1.3	1.3	1.3			
<b>49</b>	4.1	4.3	4.3	4.3	4.3			
<b>50</b>	4.2	4.2	4.2	4.2	4.2			
<b>51</b>	1.3	1.3	1.3	1.3	1.3			
<b>53</b>	5.2	5.2	5.2	5.2	5.2			
<b>54</b>	4.1	4.3	4.3	4.3	4.3			
<b>55</b>	1.3	1.3	1.3	1.3	1.3			
<b>57</b>	2.1a	2.2a	2.2a	2.2a	3.3			
<b>58</b>	1.2	1.2	1.2	1.2	1.2			
<b>59</b>	2.1a	2.1a	2.1a	2.1a	2.1a			
<b>60</b>	1.3	1.3	1.3	1.3	1.3			

## Grade 8

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Items	Objectives				
	4.1	4.1	4.1	4.1	4.1
1	4.1	4.1	4.1	4.1	4.1
2	1.1a	2.2c	2.2c	2.2c	2.2c
3	1.1a	1.1a	1.1a	1.1a	1.1a
4	4.1	4.1	4.1	4.1	4.1
5	3.2	3.2	3.2	3.2	3.2
7	3.1	3.1	3.1	3.1	4.3
8	1.2	1.2	1.2	1.2	1.2
9	2.1	2.1	2.1	2.1	2.2b
10	1.1c	1.1c	1.1c	1.1c	1.1c
11	1.1a	1.1a	1.1a	1.1a	1.1a
12	1.1a	1.1a	1.1a	1.1a	1.1a
13	3.1	3.1	3.1	3.1	3.1
14	1.2	1.2	1.2	1.2	1.2
15	1.1c	1.1c	1.1c	1.1c	1.1c
16	4.1	4.2	4.2	4.2	4.2
17	2.2c	2.2c	2.2c	2.2c	2.2c
18	5.1	5.1	5.1	5.1	5.1
21	2.1	2.1	2.2b	2.2b	2.2b
22	4.3	4.3	4.3	4.3	4.3
23	1.1d	1.1d	1.1d	1.1d	2.2c
24	3.1	3.1	3.1	3.1	3.1
25	1.2	1.2	1.2	1.2	1.2
27	2.1	2.1	2.1	2.1	2.2b
28	3.2	3.2	3.2	3.2	3.2
29	2.2a	2.2a	2.2a	2.2a	2.2c
30	1.1b	1.1b	1.1b	1.1b	5.1
31	3.1	3.1	3.1	3.1	3.1
33	1.1d	1.1d	1.1d	4.1	4.3
34	1.1c	5.1	5.1	5.1	5.1
37	5.3	5.3	5.3	5.3	5.3
38	2.2a	2.2a	2.2a	2.2a	2.2a
39	1.1b	1.1b	1.1b	1.1b	5.1
40	3.2	3.2	3.2	3.2	3.2
41	3.1	3.1	3.1	3.1	3.1
42	2.1	2.1	2.1	2.2a	2.2b
43	5.1	5.3	5.3	5.3	5.3
45	1.1b	1.1b	1.1b	1.1b	1.1c
46	4.1	4.1	4.1	4.1	4.1
47	5.3	5.3	5.3	5.3	5.3

**Grade 8 (Table D3 Continued)**

<b>Items</b>	<b>Objectives</b>				
<b>48</b>	2.2c	2.2c	2.2c	2.2c	2.2c
<b>49</b>	2.2a	2.2a	2.2a	2.2a	2.2b
<b>50</b>	1.1c	1.1c	1.1c	1.1c	1.1c
<b>51</b>	4.3	4.3	4.3	4.3	4.3
<b>52</b>	5.3	5.3	5.3	5.3	5.3
<b>53</b>	2.2a	2.2b	2.2b	2.2b	2.2b
<b>55</b>	5.1	5.1	5.1	5.1	5.1
<b>56</b>	1.2	1.2	1.2	1.2	1.2
<b>58</b>	2.2a	3.2	4.2	4.2	4.2
<b>59</b>	3.2	3.2	3.2	3.2	3.2
<b>60</b>	1.1a	1.2	1.2	1.2	1.2

### Grade 3

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
1																									
1.1	4	4	4	4	45	45																			
1.2	1	1	8	8	8	8	14	14	14	14	14	17	17	17	32	38	38	46	52	52	54	54	54	54	54
	58	58	60																						
1.3	8	43	43	43	43	43	53	53	53	53	53	59													
2	13																								
2.1a																									
2.1a.1	2	6	6	6	6	13	15	15	15	15	15	27	27	27	27	27	31	31	31	31					
2.1a.2	33	33	33	33	33	56																			
2.2a	1	1	1	4	13	13	13	17	17	38	38	38	46	46	46	52	52	52	57	57	58	58	58	60	60
	60	60																							
2.2b																									
2.2b.1	8	36	37	37	37	37	37	40	40	59	59	59													
2.2b.2	3	3	29	59																					
2.2b.3																									
2.1b																									
2.1b.1	2	2	2	2	15	15	31	36	36	36															
2.1b.2	25	25	25	25	25	42	42	42	42	42	56	56	56	56											
3	9	41	41																						
3.1	9	9	9	9	41	41	51	51	51	51															
3.2	6	28	28	28	28	28	41	47	47	47	47	47	51												
3.3	7	7	7	7	7	19	19	19	19																
4																									
4.1a	3	3	3	3	3	24	24	24	24	24	40	40	40	40	40										
4.1c	23	23	23	23	23																				
4.2a	48	48	48	48																					
4.2b	12	12	12	12	12	48																			
4.2c																									
4.3	10	10	10	10	10	49	49	49	49	49	57	57													

**Grade 3 (Table D4 Continued)**

Objective	Item Number																									
5																										
5.1b	2	4	18	18	18	18	18	20	20	21	29	29	29	29	31	32	32	32	32	32	32	36	45	45	45	46
	57																									
5.1c	19	20	20	20	29																					
5.2	21	21	21	21	21	30	30	30	30	30	35	35	35	35	35											

## Grade 4

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																												
1																													
1.1	13	13	21	21	21	21	21	24	24	24	24	24																	
1.2	5	9	12	12	12	12	12	20	22	34	37	37	37	37	37	46	58												
1.3	53	53	53	53	53	60	60	60	60	60																			
2																													
2.1a																													
2.1a.1	14	16	16	16	16	16	19	25	25	25	25	25																	
2.1a.2	19	19	19	19	50	55																							
2.1b																													
2.1b.1	10	10	10	10	14	14																							
2.1b.2	27	27	27	27	27	47	47	47																					
2.1b.3	29	29	29	29	29																								
2.2a	9	9	9	9	20	20	20	20	26	26	26	26	26	34	34	34	34	35	35	35	35	49	49	49	49				
	49	58	58	58	58																								
2.2b																													
2.2b.1	5	14	46																										
2.2b.2	5	35																											
2.2b.3	5	5	22	22	22	22	46	46	46	46																			
3																													
3.1	3	3	3	3	3	43	43	43	43	43	44																		
3.2	15	15	15	15	15	38	38	38	38	38																			
3.3	32	32	32	32	32	44	44	44	44	48	48	48	48																
3.4	1	1	1	1	1	7	7	7	7	7	48																		
4																													
4.1a	2	2	2	39	39	39	41	41	41	59	59																		
4.1b	2	47	47	57	57	57	57	57	59	59	59																		
4.1c	2	2	39	39	39	39	41	41	41																				
4.1d																													
4.2a	36	36	36	36	36																								

**Grade 4 (Table D4 Continued)**

<b>Objective</b>	<b>Item Number</b>																							
4.2b	30	30	30	30	30																			
4.3	50	50	50	50	55	55	55	55																
5																								
5.1a	10	13	13	13	14	31	31	31	31	31	42	42												
5.1b	42	42	42																					
5.2	6	6	6	6	6	13	45	45	45	45	45													
5.3	11	11	11	11	11	52	52	52	52	52	54	54	54	54	54									

## Grade 5

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
1																									
1.1	3	3	3	7	7	7	7	7	9	9	9	9	9	10	19	19	19	19	19	29	29	29	29	29	37
	37	42	42	42	44	44	48	48	48	48	48														
1.2	37	37	37	44	44	44																			
1.3	21	21	21	21	21	31	43	43	43	43	43	50	50	50	50	50	57	57	57	57	57				
2																									
2.1a	5	10	10	10	10	18	52	52	52	60	60														
2.1b	5	5	5	5	12	12	12	12	12	18	18	18	18	34	34	34	34	34	45	45	45	45	45	52	52
	60	60	60																						
2.1c																									
2.2a	2	2	2	2	2	24	24	24	24	33	33	33	49	49	49	49	53	53	58	58	58	58	58		
2.2b	30	30	30	30	30	36	36	53																	
2.2c	31	31	31	31	55	55	55	55	55																
3																									
3.1	15	15	15	15	17	17	17	17	23	27	27	27	27	27	32	32	32	32	32	36	54	54	54	54	54
3.2	17	17	23	23	23	23	38	38	38	38	38														
4																									
4.1a	39	39	39	39	39	59																			
4.1b	1	1	1	1	1	3	20	20	20	20	20														
4.1c	24	26	26	26	26	26	49	59	59	59	59														
4.2	33	33	33	53	53	53	53																		
5																									
5.1	3	8	8	8	8	8	13	13	13	13	13	15	15	36	36	40	40	40	40	40	42	42			
5.2a	28	28	28	28	28																				
5.2b	4	4	4	4	4																				
5.3	16	16	16	16	16	46	46	46	46	46															

## Grade 6

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
1																									
1.1	1	1	1	1	1	6	6	6	6	6	10	10	10	10	11	11	11	11	32	32	32	49			
1.2	10	11	15	15	15	15	15	28	32	37	49	49	49	49	49	54	54	54	54	54					
1.3	2	2	2	2	2	3	3	3	3	15	28	28	28	49											
1.4	10	15	20	20	20	20	20	37	37	37	37														
2																									
2.1	14	14	14	14	16	16	16	16	23	23	23	23	23	42	42	42	42	42	45	45	45	45	50		
2.2a	8	8	8	8	19	19	19	19	27	27	27	27	57	57											
2.2b	34	34	34	34	56	56																			
2.2c	12	12	12	12	16	19	27	39	39	39	39	39	41	56	56	56	58	60	60	60	60				
2.2d	3	56																							
2.2e	3	25	25	25	25	25	33	33	33	33	33														
3																									
3.1	43	43	43	43	43	52	52	52	52	52															
3.2	26	26	26	26	53	53	53	53	53																
3.3	18	18	18	18	24	24	24	24	24	26	28	40	40	40	40	40	51	51	51	51	51				
4																									
4.1	21	21	21	21	21	31	31	31	31	31															
4.2	7	7	7	7	7	8	12	27	34	44	44	44	44	44	57	57	57	57	58	58	58	58	59	59	59
	59	59	60																						
5																									
5.1	6	17	17	17	17	17	18	30	32	41	41	41	41	41	45	49	50	50	50	50	50				
5.2	14	36	36	36	36	36	48	48	48	48	48														
5.3	9	9	9	9	9	30	30	30	30	30															

## Grade 7

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
1																									
1.1	6	30	30	30	30	31	31	31	36	36	37	39	39	39	39	39	42	42	42	42					
1.2	6	12	12	12	12	12	21	21	37	37	37	37	43	43	43	43	43	47	47	47	47	47	58	58	58
	58	58																							
1.3	26	26	26	26	26	48	48	48	48	48	51	51	51	51	51	55	55	55	55	55	60	60	60	60	60
2																									
2.1a	8	18	29	29	29	29	57	59	59	59	59	59													
2.1b	10	10	10	20	20	20	27	27	27	27	27														
2.2a	8	8	8	8	18	18	18	18	24	57	57	57													
2.2b	4	4	4	11	11	11	11	11																	
2.2c	6	6	6	6																					
3																									
3.1	1	1	1	1	1	3	3	3	3	3	24	24	24	24											
3.2	2	2	2	2	2	15	15	15	15	15	25	25	25	25	25										
3.3	13	13	13	13	20	20	30	32	32	32	32	32	42	57											
4																									
4.1	7	7	7	7	10	10	10	17	17	17	17	17	19	19	19	19	19	21	35	46	46	46	46	49	54
4.2	35	35	35	35	50	50	50	50	50																
4.3	7	7	10	21	21	46	46	46	46	49	49	49	49	54	54	54	54								
5	36																								
5.1	4	4	13	14	14	14	22	22	22	22	22	29	31	31	36	36	41	41	41	41	41				
5.2	14	14	14	14	53	53	53	53	53																
5.3	34	34	34	34	34	40	40	40	40	40	45	45	45	45	45										

## Grade 8

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																							
1																								
1.1a	2	3	3	3	3	3	11	11	11	11	12	12	12	12	12	60								
1.1b	30	30	30	30	39	39	39	39	45	45	45	45												
1.1c	10	10	10	10	10	15	15	15	15	15	34	45	50	50	50	50								
1.1d	23	23	23	23	33	33	33																	
1.2	8	8	8	8	8	14	14	14	14	14	25	25	25	25	25	56	56	56	56	56	60	60	60	60
2																								
2.1	9	9	9	9	21	21	27	27	27	27	42	42	42											
2.2a	29	29	29	29	38	38	38	38	38	42	49	49	49	49	53	58								
2.2b	9	21	21	21	27	42	49	53	53	53	53													
2.2c	2	2	2	2	17	17	17	17	17	23	29	48	48	48	48	48								
3																								
3.1	7	7	7	7	13	13	13	13	13	24	24	24	24	24	31	31	31	31	31	41	41	41	41	41
3.2	5	5	5	5	5	28	28	28	28	28	40	40	40	40	40	58	59	59	59	59	59			
4																								
4.1	1	1	1	1	1	4	4	4	4	4	16	33	46	46	46	46	46							
4.2	16	16	16	16	58	58	58																	
4.3	7	22	22	22	22	22	33	51	51	51	51	51												
5																								
5.1	18	18	18	18	18	30	34	34	34	34	39	43	55	55	55	55	55							
5.3	37	37	37	37	37	43	43	43	43	47	47	47	47	47	52	52	52	52	52					

### Grade 3

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

	Low				High							
	1-2	3	4	5								
Objective	Item Number: Number of Reviewers											
1												
1.1	4:4	45:2										
1.2	46:1	52:2	54:5	58:2	60:1	1:2	8:4	14:5	17:3	38:2	32:1	
1.3	8:1	59:1	53:5	43:5								
2	13:1											
2.1a												
2.1a.1	13:1	15:5	6:4	2:1	31:4	27:5						
2.1a.2	33:5	56:1										
2.2a	46:3	57:2	52:3	58:3	60:4	38:3	1:3	4:1	13:3	17:2		
2.2b												
2.2b.1	36:1	37:5	59:3	40:2	8:1							
2.2b.2	59:1	3:2	29:1									
2.2b.3												
2.1b												
2.1b.1	36:3	2:4	15:2	31:1								
2.1b.2	25:5	56:4	42:5									
3	41:2	9:1										
3.1	9:4	41:2	51:4									
3.2	51:1	47:5	41:1	6:1	28:5							
3.3	7:5	19:4										
4												
4.1a	3:5	24:5	40:5									
4.1c	23:5											
4.2a	48:4											
4.2b	48:1	12:5										
4.2c												
4.3	10:5	49:5	57:2									
5												
5.1b	57:1	46:1	45:3	20:2	18:5	21:1	29:4	36:1	31:1	32:5	4:1	2:1
5.1c	29:1	20:3	19:1									
5.2	30:5	35:5	21:5									

## Grade 4

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Objective	Low				High			
	1-2	3	4	5	1-2	3	4	5
1								
1.1	13:2	21:5	24:5					
1.2	22:1	34:1	37:5	9:1	12:5	20:1	5:1	46:1
1.3	60:5	53:5						
2								
2.1a								
2.1a.1	16:5	19:1	14:1	25:5				
2.1a.2	19:4	50:1	55:1					
2.1b								
2.1b.1	14:2	10:4						
2.1b.2	27:5	47:3						
2.1b.3	29:5							
2.2a	26:5	34:4	35:4	9:4	20:4	49:5	58:4	
2.2b								
2.2b.1	14:1	5:1	46:1					
2.2b.2	5:1	35:1						
2.2b.3	22:4	5:2	46:4					
3								
3.1	3:5	43:5	44:1					
3.2	38:5	15:5						
3.3	44:4	32:5	48:4					
3.4	48:1	7:5	1:5					
4								
4.1a	2:3	59:2	39:3	41:3				
4.1b	59:3	57:5	47:2	2:1				
4.1c	41:3	2:2	39:4					
4.1d								
4.2a	36:5							
4.2b	30:5							
4.3	50:4	55:4						
5								
5.1a	31:5	42:2	10:1	14:1	13:3			
5.1b	42:3							
5.2	45:5	13:1	6:5					
5.3	11:5	52:5	54:5					

## Grade 5

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low				High
1-2	3	4	5	

Objective	Item Number: Number of Reviewers									
1										
1.1	3:3	9:5	10:1	7:5	19:5	29:5	37:2	42:3	44:2	48:5
1.2	44:3	37:3								
1.3	31:1	21:5	43:5	50:5	57:5					
2										
2.1a	60:2	52:3	18:1	10:4	5:2					
2.1b	12:5	5:4	18:4	52:2	60:3	34:5	45:5			
2.1c										
2.2a	49:4	58:5	53:2	24:4	2:5	33:3				
2.2b	30:5	36:2	53:1							
2.2c	55:5	31:4								
3										
3.1	32:5	27:5	23:1	15:4	54:5	36:1	17:4			
3.2	17:2	23:4	38:5							
4										
4.1a	39:5	59:1								
4.1b	20:5	1:5	3:1							
4.1c	24:1	26:5	59:4	49:1						
4.2	33:3	53:4								
5										
5.1	40:5	3:1	13:5	8:5	36:2	42:2	15:2			
5.2a	28:5									
5.2b	4:5									
5.3	16:5	46:5								

## Grade 6

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low				High
1-2	3	4	5	

Objective	Item Number: Number of Reviewers									
1										
1.1	1:5	6:5	11:4	10:4	32:3	49:1				
1.2	32:1	37:1	28:1	10:1	15:5	11:1	49:5	54:5		
1.3	2:5	28:3	49:1	3:4	15:1					
1.4	37:4	20:5	10:1	15:1						
2										
2.1	16:4	14:4	23:5	42:5	45:4	50:1				
2.2a	19:4	8:4	27:4	57:2						
2.2b	34:4	56:2								
2.2c	56:3	58:1	60:4	39:5	27:1	12:4	19:1	16:1	41:1	
2.2d	3:1	56:1								
2.2e	3:1	25:5	33:5							
3										
3.1	43:5	52:5								
3.2	53:5	26:4								
3.3	26:1	24:5	28:1	40:5	18:4	51:5				
4										
4.1	21:5	31:5								
4.2	27:1	34:1	7:5	12:1	8:1	57:4	60:1	58:4	59:5	44:5
5										
5.1	45:1	50:5	18:1	17:5	32:1	41:5	6:1	49:1	30:1	
5.2	36:5	14:1	48:5							
5.3	9:5	30:5								

## Grade 7

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Objective	Low				High			
	1-2	3	4	5	1-2	3	4	5
1								
1.1	6:1	30:4	31:3	36:2	37:1	39:5	42:4	
1.2	43:5	47:5	58:5	37:4	21:2	6:1	12:5	
1.3	26:5	60:5	51:5	55:5	48:5			
2								
2.1a	57:1	59:5	29:4	18:1	8:1			
2.1b	10:3	20:3	27:5					
2.2a	24:1	18:4	8:4	57:3				
2.2b	4:3	11:5						
2.2c	6:4							
3								
3.1	3:5	1:5	24:4					
3.2	25:5	2:5	15:5					
3.3	13:4	20:2	30:1	32:5	57:1	42:1		
4								
4.1	49:1	54:1	35:1	21:1	19:5	17:5	7:4	10:3
4.2	35:4	50:5						
4.3	49:4	54:4	21:2	10:1	46:4	7:2		
5	36:1							
5.1	36:2	31:2	22:5	29:1	4:2	13:1	41:5	14:3
5.2	53:5	14:4						
5.3	34:5	40:5	45:5					

## Grade 8

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low		High	
1-2	3	4	5

Objective	Item Number: Number of Reviewers					
1						
1.1a	2:1	3:5	11:5	12:5	60:1	
1.1b	45:4	30:4	39:4			
1.1c	34:1	10:5	15:5	45:1	50:5	
1.1d	33:3	23:4				
1.2	25:5	14:5	8:5	60:4	56:5	
2						
2.1	42:3	9:4	27:4	21:2		
2.2a	29:4	38:5	42:1	49:4	58:1	53:1
2.2b	53:4	49:1	42:1	27:1	21:3	9:1
2.2c	2:4	17:5	23:1	29:1	48:5	
3						
3.1	24:5	41:5	31:5	13:5	7:4	
3.2	5:5	40:5	28:5	58:1	59:5	
4						
4.1	46:5	33:1	1:5	4:5	16:1	
4.2	16:4	58:3				
4.3	51:5	7:1	33:1	22:5		
5						
5.1	30:1	34:4	39:1	18:5	43:1	55:5
5.3	43:4	47:5	52:5	37:5		

## **Appendix E**

### **Results of Intra-Class Correlation**

## Results of Intra-Class Correlation

Reliability can be increased by adding more training to reduce the One-Judge Reliability or by adding more judges to reduce the variability of the mean.

**Number of Judges needed to reach Aspiration Level of Reliability**

Aspiration Level	One-Judge Reliability			Number of Judges Needed		
	0.335	0.421	0.399	Mathematics	Reading	Science
0.7	4.6	3.2	3.5	5	4	4
0.8	7.9	5.5	6.0	8	6	7
0.9	17.9	12.4	13.6	18	13	14
0.95	37.7	26.1	28.6	38	27	29

Notes: The minimum number of judges calculation is based on the Spearman Browne Prophecy

formula,  $m = \left\{ \frac{\rho^*}{1 - \rho^*} \middle/ \frac{\rho_L}{1 - \rho_L} \right\} = \frac{\rho^* \langle 1 - \rho_L \rangle}{\rho_L \langle 1 - \rho^* \rangle}$ , where  $\rho^*$  is the reliability aspired to and  $\rho_L$  is the reliability

estimate for a single judge.

The two-way analysis assuming both random items and fixed judges gives a result for the mean correlation identical to Cronbach's Alpha, i.e.,  $\alpha = \frac{\sigma_{Bet}^2 - \sigma_e^2}{\sigma_{Bet}^2}$ . While SPSS allows the user to

select between the random and mixed models, the calculations come out the same with either model. Assuming the judges are fixed would imply these are the only judges that would ever be used so there is no component of variance associated with them. *Random judges* assume the judges used are one of many possible selections of judges; then the variability among judges must be taken into account, which will result in a lower value for the intra-class correlation (or any other measure of reliability.)

For the mixed model (i.e., fixed judges), the intra-class correlation would be calculated identically to Alpha.

$$ICC_{FixedJudges} = \frac{ItemMS - EMS}{ItemMS}$$

For the random model, the correct calculation is:

$$ICC_{RandomJudges} = \frac{ItemMS - EMS}{ItemMS + \frac{\langle JudgeMS - EMS \rangle}{n}}$$

## Calculation Modes

Calculation for two-way model with both questions and judges random:

### Grade 3

	Mathematics	
	DF	MS
questions	49	1.11
judges	4	0.54
error	196	0.27
<b>Intra-Class Correlation</b>		.76
Cronbach's Alpha		.76

### Grade 4

	Mathematics	
	DF	MS
questions	49	0.84
judges	4	2.59
error	196	0.21
<b>Intra-Class Correlation</b>		.71
Cronbach's Alpha		.75

### Grade 5

	Mathematics	
	DF	MS
questions	49	0.81
judges	4	2.68
error	196	0.20
<b>Intra-Class Correlation</b>		.71
Cronbach's Alpha		.75

### Grade 6

	Mathematics	
	DF	MS
questions	49	0.96
judges	4	1.25
error	196	0.24
<b>Intra-Class Correlation</b>		.74
Cronbach's Alpha		.75

## Calculation Modes (Continued)

### Grade 7

	Mathematics	
	DF	MS
questions	49	1.00
judges	4	0.53
error	196	0.23
<b>Intra-Class Correlation</b>		.76
Cronbach's Alpha		.76

### Grade 8

	Mathematics	
	DF	MS
questions	49	0.91
judges	4	0.73
error	196	0.21
<b>Intra-Class Correlation</b>		.76
Cronbach's Alpha		.77

## **Appendix F**

### **Biographies of the National Experts**

## **Linda Bridges, MEd**

Ms. Linda Bridges is currently a secondary Alabama Mathematics, Science, Technology Initiative (AMSTI) Specialist at the University of Alabama in Huntsville, Alabama. In this capacity, Ms. Bridges serves as an AMSTI trainer for grades 6–12 mathematics teachers; develops and presents professional development sessions and workshops to grades 6–12 mathematics teachers; models inquiry-based, hands-on lessons in grades 5–12 AMSTI mathematics classrooms; models and uses appropriate forms of technology in lesson presentations and teacher training; and presents AMSTI overview sessions to pre-service teachers at local universities. Ms. Bridges has also worked as a college algebra adjunct teacher at Northwest Mississippi Community College and the University of Mississippi in Oxford, Mississippi.

In addition to her university teaching experience, Ms. Bridges has over 32 years of teaching experience at the middle and high school levels, including five years teaching geometry, Algebra II, precalculus, trigonometry, foundations of higher mathematics, AP Calculus I and II, AP Statistics, probability and statistics, Integrating Science/Mathematics with Technology and Data Analysis, Theory of Equations, and other individualized courses at the Mississippi School for Mathematics and Science. Ms. Bridges is also a mentor for teachers seeking National Board Certification and a member of the Alabama Council of Teachers of Mathematics, the National Council of Teachers of Mathematics, and the Council of Presidential Awardees in Mathematics. She has been extensively involved in state and national mathematics initiatives throughout her educational career.

Ms. Bridges received a BS in Mathematics from Mississippi University for Women and a MEd in Secondary Mathematics Education from the University of Mississippi. She also holds a Class AA Secondary Mathematics (6–12) teacher certification in the state of Alabama and is a National Board Certified Teacher in Secondary Mathematics.

## **Leo Edwards, Jr., EdD**

Dr. Leo Edwards currently serves as a mathematics education consultant for state departments of education, school districts, and other educational resource groups and agencies. Dr. Edwards has participated as a mathematics national expert for state alignment studies based on Dr. Norman Webb's methodology. His work includes many research and professional practices, and projects awarded and funded by the Eisenhower Fund, NASA, Texas Instruments, the National Science Foundation, and other states, universities, and educational organizations. He is a contributing author for several mathematics textbooks for elementary and secondary levels from publishers that include Silver Burdett & Ginn, and Glencoe/Merrill. Dr. Edwards has conducted numerous mathematics and education-related workshops and has made conference presentations related to mathematics topics at the elementary and secondary levels. In addition to his position on the faculty at Fayetteville State University, Dr. Edwards has held leadership positions that include Director of the Mathematics & Science Education Center, acting Dean of Colleges of Arts and Sciences, and acting Vice Chancellor for Academic Affairs.

Dr. Edwards received a BS degree in Mathematics from Fayetteville State University, Fayetteville, North Carolina; a MEd in Mathematics Education from Temple University, Philadelphia, Pennsylvania; a MA degree in Computer Sciences from Goddard College,

Plainfield, Vermont; and an EdD in Curriculum and Instruction from Utah State University, Logan, Utah.

### **Carsten Wilmes, PhD**

Dr. Carsten Wilmes is the Assistant Director for Assessment for the World-Class Instructional Design and Test Consortium (WIDA). Dr. Wilmes supervises the development and operational implementation for WIDA's tests and is responsible for the planning and implementation of alignment studies for English language learners. In addition, he coordinates the data analysis for and manages the development of each study's final report. Prior to his current position, he served as WIDA's Alignment Coordinator/Researcher, where he was the presenter and facilitator for alignment workshops for the states of Wisconsin and Oklahoma and the University of Wisconsin-Madison. He also conducted alignment research pursuant to the requirements of the *No Child Left Behind Act of 2001*. Dr. Wilmes has served as a national alignment expert for alignment studies in Louisiana, Maryland, and Oklahoma.

In addition to his educational test background, Dr. Wilmes has considerable expertise in foreign language testing, teaching, translation, and interpretation. As an intern for Berlitz International Inc., Testing Division, he developed a telephone-delivered proficiency test and provided language proficiency test consulting services. Dr. Wilmes also served as a coordinator for international relations for the City of Naori, Japan. There he translated official documents, interpreted for official city functions, coordinated official student and government exchanges, taught ESL and German courses, and functioned as a cultural and community outreach liaison. While working as a research assistant for the Foreign Language Test Group (FLAG) at the University of Illinois at Urbana-Champaign, he developed a specification-based revision of the Oral English Placement Test (Oral EPT) for incoming international graduate students.

Dr. Wilmes has reviewed the book *Diagnosing foreign language proficiency: The interface between learning and test*. His review was published in the *Modern Language Journal*. Furthermore, Dr. Wilmes has presented at numerous professional organizations, including the American Educational Research Association (AERA) Annual Meeting and the 14<sup>th</sup> World Congress of Applied Linguistics. He is a member of the AERA, International Language Testing Association (ILTA), and the Modern Language Association (MLA).

He earned a BA degree in Linguistics from the University of Paderborn (Germany). Additionally, he earned a MA degree in Germanic Languages and Literatures with a concentration in Second Language Acquisition, and a PhD degree in Second Language Acquisition with a concentration in Educational Measurement.

**Oklahoma Core Curriculum Tests  
(OCCT)**

**Reading Alignment Study Report**

**Grades 3–8**

**December 1–2, 2011**

The findings in this study are those of the independent reviewing team and do **not** represent the opinion of the State of Oklahoma.

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## Overview

The alignment studies for the *Oklahoma Core Curriculum Tests* (OCCT) in grades 3–8 reading were held on December 1–2, 2011, in Norman, Oklahoma. The purpose of each reading alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) for each grade and the test items found on the corresponding grade-level reading OCCT. The reading alignment study involved a group of five independent third-party reviewers whose primary role was to first judge the depth-of-knowledge level of each PASS standard and objective and then to judge the depth-of-knowledge level of each test item, including identifying the primary and possibly a secondary objective to which each item was aligned.

This report consists of a description of the independent reviewers and the alignment model that was used, including the process and the four criteria used to judge the alignment between the PASS standards and objectives and the test items found on the corresponding OCCT. This report also includes summary tables showing the results from each grade-level study. Overall, the alignment relationships for the reading studies are strong and clearly demonstrate that the OCCT reading tests are well aligned to the respective Oklahoma PASS standards and objectives.

### Alignment Study Participants

Five reviewers participated in the reading alignment studies. Four of the reviewers for each study were Oklahoma educators who had extensive teaching experience and expertise in reading. The fifth reviewer for each alignment study was a national content expert. Each national content expert also had expertise in reading and experience in standards development, curriculum and instruction development, test development, and alignment studies. In addition to serving as the fifth reviewer, each national content expert also served as a group leader. The list of reviewers is on the next page, and a brief summary of each national expert's professional qualifications is provided in Appendix F.

In addition to the alignment study reviewers, a national alignment study expert, Dr. Carsten Wilmes of the World-Class Instructional Design and Assessment (WIDA) Consortium, also participated in the study. Dr. Wilmes is a well-known alignment expert who has broad experience in conducting alignment studies using the Webb model. Over the years he has worked closely with Dr. Norman Webb, who is affiliated with WIDA's host institution: the Wisconsin Center for Education Research (WCER). The national alignment study expert's role was to oversee the entire alignment process, ensuring that the process was followed correctly. The national alignment study expert also provided reviewers with alignment training. The training included information related to understanding Webb's depth-of-knowledge levels. The training also provided information designed to help reviewers understand the alignment process. Dr. Wilmes's professional qualifications are also provided in Appendix F.

## **List of Participants**

### **Trainer/Facilitator**

Carsten Wilmes, PhD

### **State of Oklahoma Reviewers**

#### **Grades 3–5**

Rodeana Bixler

Sheila Harris

Amanda Lotter

Carrie Ware

### **National Expert**

Jacquelyn Graham, PhD

### **State of Oklahoma Reviewers**

#### **Grades 6–8**

Linda Atchley

Erika Cole

Phillip Scarbrough

Kathy Raber

### **National Expert**

Margaret Weldon, EdD

## Alignment Study: Approach and Process

The Oklahoma alignment studies were based on the work of Dr. Norman Webb, Wisconsin Center for Educational Research, University of Wisconsin–Madison. In his work, Webb states that the alignment of the standards or objectives for student learning with tests for measuring students' attainment of these expectations is an essential component for an effective standards-based education system. The Oklahoma alignment studies were designed to model Webb's procedures, including the use of depth-of-knowledge levels, Webb's definition of alignment (Webb, 2002), and the Web Alignment Tool (WAT).

Webb's alignment model is based upon four criteria as follows:

- *Depth-of-knowledge consistency*—an indication of whether the cognitive demands required of the students on the test are consistent with what students are expected to know and do as stated in the standards.
- *Categorical concurrence*—a general indication of how well the test includes items that measure content from each standard.
- *Range-of-knowledge correspondence*—an indication of whether the extent of knowledge expected of students by a strand is the same as the extent of knowledge required of students to answer the test items correctly.
- *Balance of representation*—the degree to which one objective in a standard is given more emphasis on the test than another objective within the same strand. An index (Webb, 2002) is used to judge the distribution of the test items.

The Webb model provides a reliable set of procedures and criteria for conducting alignment analysis studies. The model combines qualitative expert reviewers' judgments and quantified coding and analysis of standards and test items. This final alignment study report includes a set of statistics for each standard and grade on the degree of alignment between the content embedded in the PASS standards and objectives for a given grade and the content in the items on the corresponding reading OCCT.

The Webb model has been used extensively in many alignment studies throughout the country and has been recommended for use by the Chief Council of State School Officers (CCSSO). The alignment criteria in the Webb model also adhere to the guidelines specified in the United States Department of Education's Standards and Tests Peer Review documents and is in compliance with the requirements specified by the *No Child Left Behind* (NCLB) legislation. A brief description of the alignment criteria is provided below, and detailed information can be found in the section of this report titled Alignment Criteria.

## **Overview of the Alignment Study Process**

Reviewers were asked to determine the degree of alignment between the PASS objectives (what students should know and be able to do) for each grade and the test questions found on the corresponding reading OCCT. In order to accomplish this task, the alignment study process involved four major steps:

- Training
- Assigning depth-of-knowledge levels to the reading PASS standards and objectives for each grade
- Taking each test
- Determining what each item measures and identifying the depth-of-knowledge level for each item

A high-level overview of the steps in the process is provided on the next page. The alignment study process also involved the use of the Web Alignment Tool (WAT). Information about the tool and its use in the process is provided below.

### **Use of the Web Alignment Tool (WAT)**

The Web Alignment Tool (WAT), developed by the Wisconsin Center for Education, University of Wisconsin–Madison, was used in the alignment studies. The tool was designed specifically to facilitate the gathering of independent reviewers' judgments. For the Oklahoma reading alignment studies, the Web-based application automated the process of aligning the PASS content standards and objectives for a given grade and the test items on the corresponding OCCT. The tool and its reports made it possible to gauge in a timely manner the alignment between the standards and the test on the basis of the criteria. In addition, the tool also provided opportunities for reviewers to provide additional information regarding items, including providing comments related to source of challenge. The item-by-objective codings by reviewers were then aggregated and analyzed automatically through the use of the WAT.

The national alignment expert, Dr. Carsten Wilmes, provided training on the overall alignment process and the depth-of-knowledge levels and served as the lead facilitator. Dr. Wilmes has extensive experience training third-party independent review committee members in the use of the WAT (2005). The training provided information on understanding not only the depth-of-knowledge levels but also on how to use the WAT when assigning a depth-of-knowledge level to each objective and item.

## **Steps in the Alignment Process**

### **Step 1: Receiving training**

Reviewers received training on Webb’s depth-of-knowledge levels, the alignment process, and the use of the WAT. The training was provided by the national alignment expert, Dr. Carsten Wilmes.

### **Step 2: Dividing into grade-level groups**

Reviewers were divided into groups according to grade level (grades 3–5 and grades 6–8). Reviewers received additional training on the use of the WAT and the depth-of-knowledge levels.

### **Step 3: Determining the depth-of-knowledge level of each PASS standard and objective**

Using the WAT, reviewers individually determined the depth of knowledge of each of the PASS standards and objectives. A group discussion followed, and reviewers reached consensus. (See Appendix B.)

### **Step 4: Taking a test**

Reviewers took the OCCT and recorded their answers in the answer booklet. Reviewers noted any source-of-challenge comments or notes about the test items directly in the test booklet.

### **Step 5: Determining what each item measured and the depth-of-knowledge level of each item**

Using the WAT, reviewers independently determined what each item measured. Reviewers also entered the depth-of-knowledge level for each item. (Note: If reviewers determined that a given item aligned to more than one objective, the WAT provided them with the opportunity to align each test item with a primary objective and a secondary objective. However, the WAT did not allow reviewers to determine more than one depth-of-knowledge level for a given item.)

Throughout the alignment process, reviewers also independently noted any source of challenge for each test item and provided written comments, as necessary.

### **Step 6: Answering debriefing questions**

Using the WAT, reviewers independently responded to debriefing questions.

### **Step 7: Participating in a group discussion**

A final group discussion took place. Reviewers shared feedback about the process and/or any other information they wished to share with the group, the alignment experts, or the Oklahoma State Department of Education.

## Alignment Criteria

Reviewers assessed specific criteria related to the content agreement between the Oklahoma content standards, objectives, and test questions. The four criteria receiving major attention were depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation. For each alignment criterion, an acceptable level was defined by what would be required to ensure that a student had met the standards.

### Depth-of-Knowledge Consistency

For the purpose of this study, Webb's definition of depth-of-knowledge consistency was used. According to Webb (2002), depth-of-knowledge consistency between content standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and do as stated in the content standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the objective or one level above the depth-of-knowledge level of the objective. According to the Webb model, as a measure of consistency, at least 50% of the items corresponding to an objective should be at or above the depth-of-knowledge level of the objective. For depth-of-knowledge consistency, this criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. (See Appendix C.)

The Oklahoma definitions for the depth-of-knowledge levels, which are based on the Webb definitions, were used for this alignment study. The levels are as follows: **Level 1** (Recall and Reproduction), **Level 2** (Skills and Concepts), and **Level 3** (Strategic and Extended Thinking). Additional information concerning the levels can be found in Appendix A.

### Categorical Concurrence

According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a general indication of alignment if the standards and the test incorporate the same content. For these alignment studies, this criterion was judged by first allowing reviewers to make a determination as to whether the test as a whole included questions measuring content from each of the standards. The reviewers used their professional opinions, as well as the Webb guiding principle, to determine that at least six questions measuring content from each standard is a good indicator of categorical concurrence between the standard and the test (Webb, 2002, p. 7).

Using Webb's model, the number of questions used to determine categorical concurrence, six for this study, is based on estimating the number of questions that could produce a reasonably reliable subscale for estimating students' mastery of content on that subscale. Of course, many factors have to be considered in determining a reasonable number, including the reliability of the subscale, the mean score, and the cutoff score for determining mastery. Using a procedure developed by Subkoviak (1988) and assuming that the cutoff score is the mean and that the reliability of one item is 0.1, it was estimated that six questions would produce an agreement coefficient of at least 0.63. This indicates that about 63% of the group would be consistently

classified as either masters or non-masters if two equivalent test administrations were employed. The agreement coefficient would increase if the cutoff score was increased to one standard deviation from the mean to 0.77 and, with a cutoff score of 1.5 standard deviations from the mean, to 0.88.

For the Oklahoma alignment studies, the criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. Six questions were assumed as a minimum for a test measuring content knowledge related to a standard and as a basis for making some decisions about students' knowledge of that standard. If the mean for six questions is three and one standard deviation is one question, then a cutoff score set at four would produce an agreement coefficient of 0.77. Any fewer questions with a mean of one-half of the questions would require a cutoff that would allow a student to miss only one question. This would be a very stringent requirement considering a reasonable standard error of measurement on the subscale. (See Appendix C.)

### **Range-of-Knowledge Correspondence**

For standards and the test questions to be aligned, the breadth of knowledge required on both must be comparable. The range-of-knowledge criterion is used to judge whether the span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the test questions associated with that standard. For an acceptable range of knowledge, at least 50% of the objectives for a standard must have at least one related test question. The range-of-knowledge correspondence criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. (See Appendix C.)

### **Balance of Representation**

The balance of representation is met if the emphasis of content and performance supplied by the questions (primary, secondary, or both) corresponds to the standards for the test as a whole. Reviewers determined whether the test questions were distributed among the objectives that were assessed. (See Appendix C.)

The balance-of-representation criterion is used to indicate the degree to which one objective is given more emphasis on the test than another. An index is used to judge the distribution of the test questions. This index only considers the objective for a standard that has at least one related assessment item. The index in this study was computed by considering the difference in the proportion of objectives and the proportion of hits (questions corresponding to eligible content) assigned to the objectives. An index value of one signifies perfect balance and is obtained if the hits are equally distributed among the content standards. Index values that approach zero signify that a large proportion of the hits are on only one or two of all of the content standards. Depending on the number of content standards and the number of hits, a unimodal distribution has an index value of less than 0.5. A bimodal distribution has an index value of around 0.55 or 0.6. Index values of 0.7 or higher indicate that questions are distributed among all of the content standards, at least to some degree. Index values between 0.6 and 0.7 indicate the balance-of-representation criterion has only been "moderately" met. The balance-of-representation criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards.

A summary of Webb’s alignment criteria can be found in Table 1.

**Table 1: Alignment Levels for the Four Criteria**

<b>Alignment Level</b>	<b>Depth-of-Knowledge Consistency</b>	<b>Categorical Concurrence</b>	<b>Range-of-Knowledge Correspondence</b>	<b>Balance of Representation</b>
Yes	50%	mean is 6 or more	50%	.70
Yes*	40%–49%	mean is 5 to 5.9	40%–49%	.60–.69
Weaker	less than 40%	mean is less than 5	less than 40%	less than .60

\*Indicates acceptable alignment; however, the alignment is not as strong as Yes.

The results for each of the four criteria discussed in this section were calculated using Webb’s methodology, reviewers’ averaged ratings, and reviewers’ comments. The results for depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation are found in Appendix C.

### **Source of Challenge**

The purpose of each reading alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) objectives for each grade and the test items found on the corresponding grade-level reading OCCT. In addition, the WAT provides opportunities for reviewers to offer comments and/or feedback on how the test questions were written. Reviewers were also encouraged to note whether there was a source-of-challenge issue with a particular test question or questions. A source-of-challenge issue might include a reviewer’s opinion that a particular question contained misleading information or that a particular question might require prior knowledge. All comments about the items and/or source-of-challenge issues were provided to the Oklahoma State Department of Education (SDE) for review and subsequent action, if required.

The source-of-challenge comments are not provided in this report. The final results of this alignment study reflect only the agreement between the PASS standards and objectives and the corresponding reading OCCT. In other words, the purpose of the alignment study was not to provide an opinion or to verify the general quality of the Oklahoma standards and objectives or the test. Rather, the purpose of the study was to determine the degree of alignment.

## Depth-of-Knowledge Alignment Analysis

### Depth-of-Knowledge Consensus of the PASS Standards and Objectives

After training, the first major step in the alignment process involved reviewers' determination of the depth-of-knowledge levels of the PASS standards and objectives. Table 2 summarizes the five reviewers' consensus on the depth-of-knowledge levels of the PASS objectives by grade for reading. Appendix B provides the depth-of-knowledge consensus values for each objective and the value for the overall standard as determined by the reviewers.

**Table 2: Depth-of-Knowledge Consensus of the PASS Reading Objectives**

Grade	Number of PASS Objectives per Grade	Depth-of-Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			Number	Percentage
<b>3</b>	24	1	9	38%
		2	11	46%
		3	4	17%
<b>4</b>	29	1	8	28%
		2	17	59%
		3	4	14%
<b>5</b>	46	1	12	26%
		2	29	63%
		3	5	11%
<b>6</b>	40	1	12	30%
		2	20	50%
		3	8	20%
<b>7</b>	41	1	8	20%
		2	27	66%
		3	6	15%
<b>8</b>	34	1	4	12%
		2	28	82%
		3	2	6%

## **Alignment Results**

Using the WAT, reviewers independently determined what each item measured. They also entered the depth-of-knowledge level for each item. The WAT provided the statistical data to determine whether each reading test as a whole at a given grade level included items measuring content from each of the standards. The tool also provided the statistical data to determine depth-of-knowledge consistency, range-of-knowledge correspondence, and balance of representation.

A high-level summary alignment analysis for depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation is provided in Table 3. The results of the alignment relationship between the PASS standards for reading as articulated in the standards for reading and the corresponding reading OCCT for grades 3 through 8 is very strong, as noted in the interpretation of Table 3. Detailed information can be found in Appendix C and Appendix D.

**Table 3: Summary of Alignment**

<b>Grade</b>	<b>Standard</b>	<b>Depth-of-Knowledge Consistency</b>	<b>Categorical Concurrence</b>	<b>Range-of-Knowledge Correspondence</b>	<b>Balance of Representation</b>
<b>3</b>	2	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	WEAKER	YES	YES
	6	YES	YES	YES	YES
<b>4</b>	1	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES*	YES*	YES*
<b>5</b>	1	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES*	WEAKER	YES
<b>6</b>	1	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES*	YES*	YES
<b>7</b>	1	YES	YES	YES	YES
	3	YES	YES	YES*	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES
<b>8</b>	1	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES

\*Indicates acceptable alignment; however, the alignment is not as strong as Yes.

### **Interpretation of Alignment Results**

Depth-of-Knowledge Consistency: As stated earlier in this report, depth-of-knowledge consistency between standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and do as stated in the standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the standard or one level above the depth-of-knowledge level of the standard. According to the Webb model, as a measure of consistency, at least 50% of the items must be at or above the depth-of-knowledge level of the corresponding objective.

The acceptable depth-of-knowledge consistency of 0.5 was met for all standards across all grades.

Categorical Concurrence: The OCCT for reading grades 3–8 included items assessing content in four standards: Vocabulary, Comprehension/Critical Literacy, Literature, and Research and Information. According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a general indication of alignment if the standards and the test incorporate the same content.

The results summarized in Table 3 indicate that the acceptable level for categorical concurrence, six items, was met for all standards across all grades with the exception of standard 5 (Research and Information) at grades 4–6 and standard 5 (Literature) at grade 3. In grades 4–6, standard 5 (Research and Information), the categorical concurrence was not as strong as the categorical concurrence of the other standards. At grade 3, the categorical concurrence for standard 5 (Literature) may need improvement. The introduction of items that link more clearly to the associated objectives for this standard could improve the alignment.

Range-of-Knowledge Correspondence: According to Webb’s model, for standards and the items on a given test to be aligned, the breadth of knowledge required on both should be comparable. This is called range-of-knowledge correspondence. The range-of-knowledge criterion is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the items on the test. For an acceptable range-of-knowledge correspondence, according to Webb’s model, at least 50% of the items coded to a given standard should have at least one item aligned to them.

The results summarized in Table 3 indicate that the range-of-knowledge criterion was met for most standards and grades. The range of knowledge for grades 4 and 6, standard 5 (Research and Information), and for grade 7, standard 3 (Comprehension/Critical Literacy), was not as strong as the range of knowledge of the other standards. At grade 5 the range of knowledge for standard 5 may need improvement. This may suggest that there is a slight inconsistency in the span of knowledge expected in the standards and those found on the assessment.

Balance of Representation: As stated earlier in this report, balance of representation is the degree to which one objective in a standard is given more emphasis on the test than another objective within the same standard. An index is used to judge the distribution of the test items.

The results summarized in Table 3 indicate that the balance of representation was sufficient, except for standard 5 (Research and Information) at grade 4. An examination to determine whether assessment items are evenly distributed across objectives measuring this standard could be conducted in order to improve the alignment.

## Reliability among Reviewers

The intra-class correlation is based on the mean squares from the analysis of variance of a two-way random effects model, reviewers crossed with items (Shrout and Fleiss, 1979) as described in Appendix E. The overall intra-class correlation among the reading reviewers' assignment of depth-of-knowledge levels to items was reasonably high for the reviewers. If there is a low variance among the reviewers' coding in assigning depth-of-knowledge levels to items, the intra-class correlation has greater error. Table 4 provides a summary of the intra-class correlation and the percentage of items coded as the same depth-of-knowledge by all reviewers.

**Table 4: Summary of Reliability**

<b>Grade</b>	<b>Intra-Class Correlation</b>	<b>Percentage of Items Coded the Same Depth of Knowledge</b>
<b>3</b>	.88	26%
<b>4</b>	.82	28%
<b>5</b>	.77	18%
<b>6</b>	.72	16%
<b>7</b>	.74	14%
<b>8</b>	.67	30%

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## **Appendix A**

### **Reading Depth-of-Knowledge Levels**

# Reading Depth-of-Knowledge Levels

## Grades 3 through 8

**Level 1** (Recall and Reproduction) requires students to receive or recite facts or to use simple skills or abilities. Oral reading that does not include analysis of the text as well as basic comprehension of a text is included. Items require only a shallow understanding of a single word or phrase.

Some examples that represent but do not constitute all Level 1 performances are:

- Support ideas by reference to details in the text.
- Use a dictionary to find the meaning of words.
- Identify figurative language in a reading passage.

**Level 2** (Skills and Concepts) includes the engagement of some mental processing beyond recalling or reproducing a response; it requires both comprehension and subsequent processing of text or portions of text. Inter-sentence analysis or inference is required. Some important concepts are covered but not in a complex way. Standards and items at this level may include words such as summarize, interpret, infer, classify, organize, collect, display, compare, and determine whether fact or opinion. Literal main ideas are stressed. A Level 2-assessment item may require students to apply some of the skills and concepts that are covered in Level 1.

Some examples that represent but do not constitute all Level 2 performances are:

- Use context cues to identify the meaning of unfamiliar words.
- Predict a logical outcome based on information in a reading selection.
- Identify and summarize the major events in a narrative.

**Level 3** (Strategic and Extended Thinking) encourages students to go beyond the text; however, they are still required to show understanding of the ideas in the text. Students may be encouraged to explain, generalize, or connect ideas. Standards and items at Level 3 involve reasoning and planning and will probably be an extended activity, with extended time provided. The extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. Students take information from at least one passage and are asked to apply this information to a new task. They may also be asked to develop hypotheses and perform complex analyses of the connections among texts, or describe and illustrate how common themes are found across texts from different cultures. Students must be able to support their thinking. Items may involve abstract theme identification, inference across an entire passage, or students' application of prior knowledge.

### **Grades 3 through 8 Reading DOK Levels (Continued)**

Items may also involve more superficial connections between texts. Some examples that represent, but do not constitute, all Level 3 performances are:

- Analyze and synthesize information from multiple sources.
- Examine and explain alternative perspectives across a variety of sources.
- Describe and illustrate how common themes are found across texts from different cultures.
- Determine the author's purpose and describe how it affects the interpretation of a reading selection.
- Summarize information from multiple sources to address a specific topic.
- Analyze and describe the characteristics of various types of literature.

(Oklahoma Core Curriculum Tests Test and Item Specifications: Reading, 2010)

## **Appendix B**

### **Depth-of-Knowledge Consensus Values**

### Grade 3 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
2	Vocabulary - The student will develop and expand knowledge of words and word meanings to increase vocabulary.	2
2.1	Words in Context - Use context clues (the meaning of the text around the word) to determine the meaning of grade-level appropriate words.	2
2.2	Affixes - Use prefixes (for example: un-, pre-, bi-, mis-, dis-, en-, in-, im-, ir-), suffixes (for example: -er, -est, -ful, -ness, -ing, -ish, -less), and roots to determine the meaning of words.	1
2.3	Synonyms, Antonyms, and Homonyms/Homophones - Determine the meanings of words using knowledge of synonyms, antonyms, homonyms/homophones, and multiple meaning words.	2
2.4	Using Resource Materials - Use word reference materials (glossary, dictionary, thesaurus) to determine the meaning and pronunciation of unknown words.	1
4	Comprehension/Critical Literacy - The student will interact with the words and concepts in a text to construct an appropriate meaning.	2
4.1	Literal Understanding	-
4.1.a	Read and comprehend poetry, fiction, and nonfiction that is appropriately designed for third grade.	1
4.1.b	Use prereading strategies independently to preview, activate prior knowledge, predict content of text, and establish a purpose for reading.	2
4.1.c	Recall major points in a text and revise predictions about what is read.	1
4.1.d	Show understanding by asking questions and supporting answers with literal information from the text.	1
4.2	Inferences and Interpretation	-
4.2.a	Make inferences by connecting prior knowledge and experience with information from the text.	2
4.2.b	Interpret text, including lessons or morals depicted in fairytales, fables, etc., and draw conclusions from evidence presented in the text.	3
4.3	Summary and Generalization	-
4.3.a	Summarize by recognizing main ideas, key concepts, key actions, and supporting details in fiction and nonfiction.	2
4.3.b	Make generalizations about a text (e.g., theme of a story or main idea of an informational text).	3
4.3.c	Produce summaries of fiction and nonfiction text, highlighting major points.	2
4.4	Analysis and Evaluation	-
4.4.a	Analyze characters including their traits, relationships, feelings, and changes in text.	2
4.4.b	Distinguish between fact and opinion in nonfiction text.	2
4.4.c	Analyze the causes, motivations, sequences, and results of events from a text.	2
5	Literature - The student will read to construct meaning and respond to a wide variety of literary forms.	3
5.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and how they affect the development of a literary work.	-
5.2.a	Compare and contrast plots, settings, or characters presented by different authors and the same author of multiple texts.	3

### Grade 3 Depth-of-Knowledge Consensus (Continued)

Standards and Objectives	Description	Consensus
5.2.b	Recognize themes that occur across literary works. Example: Read <i>Yoko</i> by Rosemary Wells and <i>You Are Special</i> by Max Lucado. Discuss the theme of "everyone is unique" that occurs in both stories.	3
5.3	Figurative Language and Sound Devices - The student will identify figurative language and sound devices in writing and how they affect the development of a literary work. Example: Identify and discuss how certain words and rhythmic patterns can be used in a selection to imitate sounds (e.g., rhythm, rhyme, alliteration).	2
6	Research and Information - The student will conduct research and organize information.	1
6.1	Accessing Information - The student will select the best source for a given purpose.	-
6.1.a	Alphabetize to the third letter.	1
6.1.b	Use guide words to locate words in dictionaries and topics in encyclopedias.	1
6.1.c	Access information from charts, maps, graph, schedules, directions, and diagrams.	1
6.1.d	Use the title page, table of contents, glossary, chapter headings, and index to locate information.	1
6.1.e	Use text formats as an aid in constructing meaning from nonfiction (expository) text (e.g., heading, subheading, bold print, and italics).	2

#### Grade 4 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Vocabulary - The student will develop and expand knowledge of words and word meanings to increase vocabulary.	2
1.1	Words in Context - Use context clues (the meaning of the text around a word) to distinguish and interpret the meaning of multiple meaning words as well as other unfamiliar words.	2
1.2	Affixes, Roots, and Derivatives	-
1.2.a	Interpret new words by analyzing the meaning of prefixes and suffixes.	1
1.2.b	Use knowledge of root words (e.g., snow, snowbound, snowdrift) and word parts (therm = heat) derived from Greek and Latin to analyze the meaning of complex words (thermometer).	1
1.3	Synonyms, Antonyms, and Homonyms/Homophones - Apply knowledge of fourth grade level synonyms, antonyms, homonyms/homophones, multiple meaning words, and idioms to determine the meanings of words and phrases.	2
3	Comprehension/Critical Literacy - The student will interact with the words and concepts in a text to construct an appropriate meaning.	2
3.1	Literal Understanding	-
3.1.a	Use prereading strategies independently to preview, activate prior knowledge, predict content of text, formulate questions that might be answered in the text, establish and adjust purposes for reading (e.g., to find out, to understand, to enjoy, to solve problems).	2
3.1.b	Read and comprehend poetry, fiction, and nonfiction that is appropriately designed for fourth grade.	1
3.1.c	Identify and explain the differences in fiction and nonfiction text.	2
3.2	Inferences and Interpretation	-
3.2.a	Use prior knowledge and experience to make inferences and support them with information presented in text.	2
3.2.b	Make interpretations and draw conclusions from fiction and nonfiction text beyond personal experience.	2
3.2.c	Make inferences and draw conclusions about characters' qualities and actions (i.e., based on knowledge of plot, setting, characters' motives, characters' appearances, and other characters' responses to a character).	2
3.3	Summary and Generalization	-
3.3.a	Paraphrase by recognizing main ideas, key concepts, key actions, and supporting details in fiction and nonfiction to recall, inform, or organize ideas.	2
3.3.b	Support ideas, arguments, and generalizations by reference to evidence in the text.	2
3.3.c	Represent text information in different ways such as in outline, timeline, or graphic organizer.	2
3.4	Analysis and Evaluation	-
3.4.a	Evaluate new information and hypotheses by testing them against known information and ideas.	3
3.4.b	Compare and contrast information on the same topic after reading several passages or articles.	3
3.4.c	Identify fact/opinion and cause and effect in various texts.	2

#### Grade 4 Depth-of-Knowledge Consensus (Continued)

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
3.4.d	Analyze and explain the causes, motivations, sequences, and results of events from a text.	2
4	Literature - The student will read to construct meaning and respond to a wide variety of literary forms.	2
4.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and how they affect the development of a literary work.	-
4.2.a	Identify the main events of the plot, including their causes and effects of each event on future actions, and the major theme from the story.	3
4.2.b	Identify the purposes of different types of texts (e.g., to inform, to explain, to entertain).	2
4.2.c	Identify themes that occur across literary works.	3
4.2.d	Use knowledge of the situation, setting, a character's traits, motivations, and feelings to determine the causes for that character's actions.	2
4.3	Figurative Language and Sound Devices - The student will identify figurative language and sound devices in writing and how they affect the development of a literary work.	-
4.3.a	Interpret poetry and recognize poetic styles (e.g., rhymed, free verse, and patterned [cinquain, diamante]).	2
4.3.b	Define figurative language, such as similes, metaphors, hyperboles, or personification, and identify its use in literary works. • Simile: a comparison that uses like or as • Metaphor: an implied comparison • Hyperbole: an exaggeration for effect • Personification: a description that represents a thing as a person	1
5	Research and Information - The student will conduct research and organize information.	1
5.1	Accessing Information - Select the best source for a given purpose.	-
5.1.a	Understand the organization of and access information from a variety of sources including dictionaries, encyclopedias, atlases, almanacs, tables of contents, glossaries, and indexes.	1
5.1.b	Identify key words to be used in searching for resources and information.	1
5.1.c	Cite information sources appropriately.	1
5.1.d	Use text formats and organization as an aid in constructing meaning from nonfiction (expository) text (e.g., heading, subheading, bold print, and italics).	2
5.1.e	Locate information in reference texts by using organizational features, such as prefaces and appendixes.	1
5.1.f	Continue to use test-taking strategies by answering different levels of questions, such as open-ended, literal, and interpretive, as well as multiple choice, true/false, and short answer.	2

## Grade 5 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Vocabulary - The student will develop and expand knowledge of words and word meanings to increase their vocabulary.	2
1.1	Words in Context	-
1.1.a	Use knowledge of word parts and word relationships, as well as context clues (the meaning of the text around a word), to determine the meaning of specialized vocabulary and to understand the precise meaning of grade-level-appropriate words.	2
1.1.b	Use prior experience and context to understand and explain the figurative use of words such as similes (comparisons that use <i>like</i> or <i>as</i> : <i>His feet were as big as boats</i> ), and metaphors (implied comparisons: <i>The giants steps were thunderous</i> ).	2
1.2	Affixes, Roots, and Stems	-
1.2.a	Interpret new words by analyzing the meaning of prefixes and suffixes.	1
1.2.b	Apply knowledge of root words to determine the meaning of unknown words within a passage.	1
1.2.c	Use word origins, including knowledge of less common roots ( <i>graph</i> = <i>writing</i> , <i>terras</i> = <i>earth</i> ) and word parts ( <i>hemi</i> = <i>half</i> , <i>bio</i> = <i>life</i> ) from Greek and Latin to analyze the meaning of complex words ( <i>terrain</i> , <i>hemisphere</i> , <i>biography</i> ).	1
1.3	Synonyms, Antonyms, and Homonyms/Homophones - Apply knowledge of fifth grade level synonyms, antonyms, homonym/homophones, and multiple meaning words to determine the meaning of words and phrases.	2
3	Comprehension/Critical Literacy - The student will interact with the words and concepts in the text to construct an appropriate meaning.	2
3.1	Literal Understanding	-
3.1.a	Use prereading strategies independently (to preview, activate prior knowledge, predict content of text, formulate questions that might be answered by the text, and establish purpose for reading).	2
3.1.b	Read and comprehend both fiction and nonfiction that is appropriately designed for fifth grade.	1
3.1.c	Recognize main ideas presented in a particular segment of text; identify evidence that supports those ideas.	2
3.1.d	Use the text's structure or progression of ideas such as cause and effect or chronology to organize or recall information.	2
3.2	Inferences and Interpretation	-
3.2.a	Apply prior knowledge and experience to make inferences and respond to new information presented in text.	2
3.2.b	Draw inferences and conclusions about text and support them with textual evidence and prior knowledge.	2
3.2.c	Describe elements of character development in written works (e.g., differences between main and minor characters; changes that characters undergo; the importance of a character's actions, motives, stereotypes, and appearance to plot and theme).	2
3.2.d	Make inferences or draw conclusions about characters' qualities and actions (e.g., based on knowledge of plot, setting, characters' motives, characters' appearances, stereotypes and other characters' responses to a character).	2

### Grade 5 Depth-of-Knowledge Consensus (Continued)

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
3.3	Summary and Generalization	-
3.3.a	Summarize and paraphrase information from entire reading selection including the main idea and significant supporting details.	2
3.3.b	Make generalizations with information gleaned from text.	2
3.3.c	Support ideas and arguments by reference to relevant aspects of text and issues across texts.	2
3.3.d	Organize text information in different ways (e.g., timeline, outline, graphic organizer) to support and explain ideas.	2
3.4	Analysis and Evaluation	-
3.4.a	Identify and analyze the characteristics of poetry, drama, fiction, and nonfiction and explain the appropriateness of the literary form chosen by an author for a specific purpose.	2
3.4.b	Identify the main problem or conflict of the plot and explain how it is resolved.	2
3.4.c	Contrast the actions, motives, and appearances of characters in a work of fiction and discuss the importance of the contrasts to the plot or theme.	3
3.4.d	Make observations and connections, react, speculate, interpret, and raise questions in analysis of texts.	2
3.4.e	Recognize structural patterns found in information text (e.g., cause and effect, problem/solution, sequential order).	2
3.4.f	Distinguish among facts/inferences supported by evidence and opinions in text.	2
4	Literature - The student will read to contrast meaning and respond to a wide variety of literary forms.	2
4.1	Literary Genres - Demonstrate knowledge of and appreciation for various forms (genres) of literature.	-
4.1.a	Recognize characteristics of literary genres and forms (e.g., contemporary realistic fiction, historical fiction, nonfiction, modern fantasy, poetry, drama, and traditional stories such as fairy tales, fables, myths, and legends).	1
4.1.b	Read and construct meaning from a variety of genres.	2
4.1.c	Demonstrate an understanding of similarities and differences within and among literary works of various genre and cultures (e.g., in terms of settings, character types, events, and role of natural phenomena).	3
4.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and how they affect the development of a literary work.	-
4.2.a	Develop a knowledge of the literary elements of fiction (plot, problems, attempts to resolve conflicts, resolution, etc.) and the text structure of nonfiction (compare/contrast, cause/effect, sequence, main idea, and details).	2
4.2.b	Compare/contrast genres, themes, ideas, and story elements across texts read, listened to, or viewed.	3
4.2.c	Identify the author's purpose (persuade, inform, or entertain).	2
4.2.d	Recognize and identify the writer's perspective or point of view in a literary selection (e.g., first person, second person) and how it affects the text.	2
4.3	Figurative Language and Sound Devices - Identify figurative language and sound devices in writing and how they affect the development of a literary work.	-

### Grade 5 Depth-of-Knowledge Consensus (Continued)

Standards and Objectives	Description	Consensus
4.3.a	Identify and discuss certain words and rhythmic patterns that can be used in a selection to imitate sounds (e.g., rhythm, rhyme, alliteration).	1
4.3.b	Evaluate and identify figurative language, such as simile, metaphors, hyperbole, personification, and idioms. Example: Simile - a comparison that uses like or as Example: Metaphor - an implied comparison Example: Hyperbole – an exaggeration for effect Example: Personification – a description that represents a thing as a person Example: Idioms – an expression that does not mean what it literally says	2
4.3.c	Identify the function and effect of common literary devices, such as imagery, metaphor, and symbolism. Symbolism: the use of an object to represent something else; for example, a dove might symbolize peace. Imagery: the use of language to create vivid pictures in the reader's mind. Metaphor: an implied comparison in which a word or phrase is used in place of another, such as <i>He was drowning in money</i> .	2
4.3.d	Interpret poetry and recognize poetic styles (e.g., rhymed, free verse, and patterned [cinquain, diamante]).	2
5	Research and Information: The student will conduct research and organize information.	2
5.1	Accessing Information - Select the best source for a given purpose.	-
5.1.a	Determine and use appropriate sources for accessing information including, dictionaries, thesaurus, library catalogs and databases, magazines, newspapers, technology/Internet, encyclopedias, atlases, almanacs, tables of contents, glossaries, and indexes.	1
5.1.b	Identify and credit the sources used to gain information.	1
5.1.c	Use text features to access information (e.g., format, italics, heading, subheadings, graphics, sequence, diagrams, illustrations, charts, and maps).	1
5.1.d	Use reference features of printed text, such as citations, endnotes, and bibliographies to locate relevant information about a topic.	1
5.1.e	Use the features of informational texts, such as formats, graphics, diagrams, illustrations, charts, maps, and organization, to find information and support understanding. Example: Locate specific information in a social studies textbook by using its organization, sections on different world regions, and textual features, such as headers, maps, and charts.	1
5.1.f	Recognize and apply test-taking strategies by answering different levels of questions, such as literal, as well as multiple choice, true/false, short answer, inferential, evaluative, or open-ended.	2
5.2	Interpreting Information - Analyze and evaluate information from a variety of sources.	-
5.2.a	Follow multistep directions to accomplish a task (e.g., video games, computer programs, recipes).	2
5.2.b	Select a topic, formulate questions, and synthesize information from a variety of print, nonprint and technological resources (e.g., dictionaries, reference books, atlases, magazines, informational texts, thesaurus, and technology/Internet).	3
5.2.c	Develop notes that include important information on a selected topic.	2
5.2.d	Summarize information from multiple sources into a written report or summary.	3
5.2.e	Create simple documents using a computer and employing organizational features, such as passwords, entry and pull-down menus, word searches, the thesaurus, and spell checks.	1

## Grade 6 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Vocabulary - The student will develop and expand knowledge of words and word meanings to increase vocabulary.	2
1.1	Words in Context	-
1.1.a	Use knowledge of word parts and word relationships, as well as context clues (the meaning of the text around a word), to determine the meaning of technical and specialized vocabulary and to understand the precise meaning of grade-level-appropriate words in fiction and nonfiction texts.	2
1.1.b	Use prior experience and context to analyze and explain the figurative use of words, similes (comparisons that use <i>like</i> or <i>as</i> : <i>The Snowplow Reared Up Like a Stallion</i> ), metaphors (implied comparisons: <i>Peace is a Sunrise</i> ), and multiple meaning words.	2
1.2	Word Origins	-
1.2.a	Recognize the origins and meanings of foreign words frequently used in English. Example: Understand foreign words that are often used in English such as spaghetti (Italian) and rodeo (Spanish).	1
1.2.b	Apply knowledge of root words to determine the meaning of unknown words within a passage.	1
1.2.c	Use word origins, including knowledge of less common roots ( <i>graph</i> = <i>writing</i> , <i>logos</i> = <i>the study of</i> ) and word parts ( <i>auto</i> = <i>self</i> , <i>bio</i> = <i>life</i> ) from Greek and Latin to analyze the meaning of complex words ( <i>autograph</i> , <i>autobiography</i> , <i>biology</i> ).	1
3	Comprehension/Critical Literacy - The student will interact with the words and concepts in the text to construct an appropriate meaning.	2
3.1	Literal Understanding	2
3.1.a	Use prereading strategies independently (to preview, activate prior knowledge, predict content of text, formulate questions that might be answered by the text, establish purpose for reading).	2
3.1.b	Read and comprehend both fiction and nonfiction that is appropriately designed for sixth grade.	2
3.1.c	Recognize main ideas presented in a particular segment of text; identify and assess evidence that supports those ideas. Example: Use a graphic organizer to compare an advertisement to the actual product label.	2
3.1.d	Use the text's structure or progression of ideas, such as cause and effect or chronology to locate or recall information.	2
3.2	Inferences and Interpretation	-
3.2.a	Draw inferences and conclusions about text and support them with textual evidence and prior knowledge.	2
3.2.b	Make inferences or draw conclusions about characters' qualities and actions (i.e., based on knowledge of plot, setting, characters' motives, characters' appearances, other characters' responses to a character).	2
3.3	Summary and Generalization	-
3.3.a	Summarize and paraphrase information including the main idea and significant supporting details of a reading selection.	2
3.3.b	Make generalizations based on information gleaned from text.	3

### Grade 6 Depth-of-Knowledge Consensus (Continued)

Standards and Objectives	Description	Consensus
3.3.c	Support reasonable statements and conclusions by reference to relevant aspects of text and examples.	2
3.3.d	Clarify understanding of text information in different ways (e.g., timelines, outlines, graphic organizer) to support and explain ideas.	2
3.4	Analysis and Evaluation	-
3.4.a	Evaluate the believability of a character and the impact they have on the plot.	3
3.4.b	Analyze the main problem or conflict of the plot; the effect of the qualities of the characters and explain how the conflict is resolved.	2
3.4.c	Contrast the actions, motives, and appearances of characters in a work of fiction and discuss the importance of the contrasts to the plot or theme.	3
3.4.d	Make observations, connections, and react, speculate, interpret, and raise questions in analysis of texts.	3
3.4.e	Recognize and evaluate structural patterns found in a literary work (e.g., cause/effect, problem/solution, sequential order).	2
3.4.f	Distinguish among stated facts, inferences supported by evidence, and opinions in text.	2
4	Literature - The student will read, construct meaning, and respond to a wide variety of literary forms.	2
4.1	Literary Genres - The student will demonstrate a knowledge of and an appreciation for various forms of literature.	-
4.1.a	Analyze the characteristics of genres, including short story, novel, drama, poetry, and nonfiction.	1
4.1.b	Analyze characteristics of subgenres, including autobiography, biography, fable, folk tale, mystery, and myth.	1
4.2	Literary Elements - The student will demonstrate knowledge of literary elements and techniques and how they affect the development of a literary work.	-
4.2.a	Identify and explain elements of fiction, including plot, conflict, character, setting, and theme.	1
4.2.b	Identify and explain internal and external conflict in the development of a story.	2
4.2.c	Determine the author's purpose (persuade, inform, entertain) and point of view, whether explicitly or implicitly stated and how it affects the text.	3
4.2.d	Connect, compare, and contrast ideas, themes, and issues across texts.	3
4.3	Figurative Language and Sound Devices - The student will identify figurative language and sound devices and will analyze how they affect the development of a literary work.	-
4.3.a	Identify and explain figurative language, including symbolism, imagery, metaphor, personification, simile, and idioms.	1
4.3.b	Identify and explain sound devices, including alliteration, onomatopoeia, and rhyme.	1
4.3.c	Interpret poetry and recognize poetic styles (e.g., rhymed, free verse, and patterned [cinquain, diamante]).	1
4.3.d	Identify and describe the function and effect of common literary devices, such as imagery and symbolism. • Imagery: the use of language to create vivid pictures in the reader's mind. • Symbolism: the use of an object to represent something else; for example, a dove might symbolize peace.	2

### Grade 6 Depth-of-Knowledge Consensus (Continued)

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
5	Research and Information - The student will conduct research and organize information.	2
5.1	Accessing Information - The student will select the best source for a given purpose.	-
5.1.a	Use library catalogs and computer databases to locate sources for research topics.	1
5.1.b	Access information from a variety of primary and secondary sources to gather information for research topics	2
5.1.c	Use organizational strategies as an aid to comprehend increasingly difficult content material.	2
5.1.d	Note instances of persuasion, propaganda, faulty reasoning, or misleading information in text.	2
5.1.e	Use reference features of printed text, such as citations, endnotes, and bibliographies, to locate relevant information about a topic.	1
5.2	Interpreting Information - The student will analyze and evaluate information from a variety of sources.	-
5.2.a	Record, organize, and display relevant information from multiple sources in systemic ways (e.g., outlines, graphic organizers, or note cards).	3
5.2.b	Identify and credit the reference sources used to gain information.	1
5.2.c	Determine the appropriateness of an information source for a research topic.	2
5.2.d	Summarize information from multiple sources into a research paper.	3

## Grade 7 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Vocabulary - The student will expand vocabulary through word study, literature, and class discussion.	2
1.1	Words in Context - Verify the meaning of a word in its context, even when its meaning is not directly stated, through the use of definitions, restatement, example, comparison, or contrast.	2
1.2	Word Origins	-
1.2.a	Identify the origins and meanings of foreign words frequently used in English and use these words accurately in speaking and writing. Example: Understand and use in speaking and writing foreign words that are often used in English such as lasagna (Italian), sauerkraut (French).	1
1.2.b	Use knowledge of Greek and Latin word parts and roots to determine the meaning of subject area vocabulary. Example: Analyze the roots, prefixes, and suffixes of subject-area words such as telescope, geography, and quadrant.	1
1.3	Idioms and Comparisons - Identify and explain idioms and comparisons, such as analogies, metaphors, and similes, to infer the literal and figurative meanings of phrases.	-
1.3.a	Idioms: expressions that cannot be understood just by knowing the meanings of the words in the expression, such as <i>the apple of his eye</i> or <i>beat around the bush</i> .	2
1.3.b	Analogies: comparisons of the similar aspects of two different things	2
1.3.c	Metaphors: implies comparisons, such as, <i>The street light was my security guard</i> .	2
1.3.d	Similes: comparisons that use like or as, such as <i>A gentle summer breeze feels like a soft cotton sheet</i> .	2
3	Comprehension - The student will interact with the words and concepts in a text to construct an appropriate meaning.	2
3.1	Literal Understanding	-
3.1.a	Apply prereading strategies when reading both fiction and nonfiction that is appropriately designed for grade level. Determine the purpose for reading such as to be informed, entertained, or persuaded. Preview the material and use prior knowledge to make connections between text and personal experience.	2
3.1.b	Recognize transition words to guide understanding of the text (e.g., as a result, first of all, furthermore).	1
3.1.c	Show understanding by asking questions and supporting answers with literal information from text.	2
3.2	Inference and Interpretation	-
3.2.a	Make inferences and draw conclusions with evidence drawn from the text and/or student experiences.	2
3.2.b	Make inferences supported by a character's thoughts, words, and actions or the narrator's description.	2
3.3	Summary and Generalization	-
3.3.a	Summarize the main idea and how it is supported with specific details.	2
3.3.b	Recall major points in the text and make and revise predictions.	3
3.3.c	Recognize the importance and relevance of details on the development of the plot.	2
3.3.d	Support reasonable statements by reference to relevant aspects of text and examples.	2
3.4	Analysis and Evaluation	-

## Grade 7 Depth-of-Knowledge Consensus (Continued)

Standards and Objectives	Description	Consensus
3.4.a	Compare and contrast points of view, such as first person, third person, limited and omniscient, and explain their effect on the overall theme of a literary work.	3
3.4.b	Evaluate events that advance the plot of a literary work and how those events relate to past, present, or future actions.	2
3.4.c	Analyze character traits, conflicts, motivations, points of view, and changes that occur within the story and discuss the importance to the plot or theme.	3
3.4.d	Evaluate the accuracy or appropriateness of the evidence used by the author to support claims and assertions.	3
3.4.e	Distinguish between stated fact, reasoned judgment, and opinion in text.	2
4	Literature - The student will read, construct meaning, and respond to a wide variety of literary forms.	2
4.1	Literary Genres - Demonstrate a knowledge of and an appreciation for various forms of literature.	-
4.1.a	Analyze the characteristics of genres, including short story, novel, drama, poetry, and nonfiction.	1
4.1.b	Analyze characteristics of subgenres, including autobiography, biography, fable, folk tale, mystery, and myth.	1
4.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and how they affect the development of a literary work.	-
4.2.a	Analyze and explain elements of fiction, including plot, conflict, resolution, character, setting, theme, and point of view.	2
4.2.b	Identify and explain techniques of direct and indirect characterization in fiction.	2
4.2.c	Describe how the author's perspective, argument, or point of view affects the text.	2
4.2.d	Analyze inferred and recurring themes in literary works (e.g., bravery, loyalty, historical).	3
4.3	Figurative Language and Sound Devices: The student will identify figurative language and sound devices and will analyze how they affect the development of a literary work.	-
4.3.a	Identify and explain the use of figurative language in literary works to convey mood, images, and meaning, including metaphor, personification, and simile.	2
4.3.b	Identify and explain the use of sound devices in literary works to convey mood, images, and meaning, including alliteration, onomatopoeia, and rhyme.	2
4.3.c	Analyze poetry and evaluate poetic styles (e.g., rhymed, free verse, and patterned [cinquain, diamante]).	1
5	Research and Information - The student will conduct research and organize information.	2
5.1	Accessing Information - Select the best source for a given purpose.	-
5.1.a	Use library catalogs and computer databases to locate sources for research topics.	1
5.1.b	Access a variety of primary and secondary sources to locate information relevant to research questions.	2
5.1.c	Gather data for research purposes through interviews (e.g., prepare and organize relevant questions, make notes of responses, and compile the information).	2
5.1.d	Use organizational strategies as an aid to comprehend increasingly difficult content material.	2
5.1.e	Note instances of persuasion, propaganda, and faulty reasoning in text.	2

**Grade 7 Depth-of-Knowledge Consensus (Continued)**

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
5.1.f	Use reference features of printed text, such as citations, endnotes, and bibliographies to locate relevant information about a topic.	1
5.2	Interpreting Information - The student will analyze and evaluate information from a variety of sources.	-
5.2.a	Record, organize, and display relevant information from multiple sources in systematic ways (e.g., outlines, graphic organizers, or note cards).	2
5.2.b	Interpret and use graphic sources of information such as graphs, maps, timelines, or tables, to address research questions.	2
5.2.c	Analyze and paraphrase or summarize information gathered from a variety of sources into a research paper.	3
5.2.d	Determine the appropriateness of an information source for a research topic.	2
5.2.e	Identify and credit the sources used to gain information for both quoted and paraphrased information in a bibliography using a consistent format.	2

## Grade 8 Depth-of-Knowledge Consensus

Standards and Objectives	Description	Consensus
1	Vocabulary - The student will expand vocabulary through word study, literature, and class discussion.	2
1.1	Words in Context - Verify the meaning of a word in its context, even when its meaning is not directly stated, through the use of definitions, restatement, example, comparison, or contrast.	2
1.2	Word Origins - Recognize and analyze the influence of historical events on English word meaning and vocabulary expansion. Example: Identify how the early influences of Spanish explorers in North America impacted American English vocabulary by adding words such as <i>lasso</i> , <i>tortilla</i> , and <i>patio</i> and investigate why these particular words were adopted from the Spanish.	2
1.3	Idioms and Comparisons - Analyze idioms and comparisons, such as analogies, metaphors, and similes, to infer the literal and figurative meanings of phrases.	-
1.3.a	Idioms: expressions that cannot be understood just by knowing the meanings of the words in the expression, such as <i>Rush hour traffic moves at a snail's pace</i> or <i>as plain as day</i> .	2
1.3.b	Analogies: comparisons of the similar aspects of two different things.	2
1.3.c	Metaphors: implies comparisons, such as, <i>The cup of hot tea was the best medicine for my cold</i> .	2
1.3.d	Similes: comparisons that use like or as, such as, <i>The ice was smooth as glass before the skaters entered the rink</i> .	2
3	Comprehension - The student will interact with the words and concepts in the text to construct an appropriate meaning.	2
3.1	Literal Understanding	-
3.1.a	Apply prereading strategies when reading both fiction and nonfiction that is appropriately designed for grade level. Determine the purpose for reading such as to be informed, entertained, persuaded, or to understand. Preview the text and use prior knowledge and experience to make connections to text.	2
3.1.b	Show understanding by asking questions and supporting answers with literal information from text.	2
3.2	Inferences and Interpreting	-
3.2.a	Make inferences and draw conclusions supported by text evidence and student experiences.	2
3.2.b	Connect, compare, and contrast ideas, themes, and issues across texts. Example: Use graphic organizer to show comparisons.	3
3.3	Summary and Generalization	-
3.3.a	Determine the main (or major) idea and how those ideas are supported with specific details.	2
3.3.b	Paraphrase and summarize text to recall, inform, or organize ideas.	2
3.4	Analysis and Evaluation	-
3.4.a	Distinguish between stated fact, reasoned judgment, and opinion in various texts.	2
3.4.b	Use text's structure or progression of ideas, such as cause and effect or chronology (sequential order).	2
3.4.c	Compare/contrast to determine similarities and differences in treatment, scope, or organization.	2
3.4.d	Problem/solution - offer observations, make connections, react, speculate, interpret, and raise questions in response to text.	2
3.4.e	Analyze character traits, conflicts, motivations, points of view, and changes that occur within the story.	2

### Grade 8 Depth-of-Knowledge Consensus (Continued)

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
3.4.f	Analyze the structural elements of the plot, subplot, and climax and explain the way in which conflicts are or are not resolved.	2
4	Literature: The student will read, construct meaning, and respond to a wide variety of literary forms.	2
4.1	Literary Genres - The student will demonstrate a knowledge of and an appreciation for various forms of literature.	-
4.1.a	Analyze the characteristics of genres, including short story, novel, drama, lyric poetry, nonfiction, historical fiction, and informational texts.	1
4.1.b	Identify and distinguish characteristics of subgenres, including autobiography, biography, fable, folk tale, mystery, myth, limericks, tall tales, and plays.	1
4.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and how they affect the development of a literary work.	-
4.2.a	Analyze and explain elements of fiction including plot, conflict, character, mood, setting, theme, point of view, and author's purpose.	2
4.2.b	Identify and explain various points of view and how they affect a story's interpretation.	2
4.3	Figurative Language and Sound Devices - Identify figurative language and sound devices and analyze how they affect the development of a literary work.	-
4.3.a	Identify and explain the use of figurative language, in literary works to convey mood, images, and meaning, including metaphor, personification, and simile.	2
4.3.b	Identify and explain the use of sound devices in literary works to convey mood, images, and meaning, including alliteration, onomatopoeia, and rhyme.	2
4.3.c	Identify and interpret literary devices such as flashback, foreshadowing, symbolism, and imagery.	2
5	Research and Information: The student will conduct research and organize information.	2
5.1	Accessing Information - Select the best source for a given purpose, locate information relevant to research questioning.	-
5.1.a	Access information from a variety of primary and secondary sources, including electronic text, experts, and prime resources, to locate information relevant to research questioning.	1
5.1.b	Use text organizers, including headings, graphic features (e.g., boldface, italic type), and tables of contents, to locate and organize information.	2
5.1.c	Use organizational strategies to learn and recall important ideas from texts, such as preview, questions, reread, and record, as an aid to comprehend increasingly difficult content material.	2
5.1.d	Note instances of persuasion, propaganda, and faulty reasoning in text.	2
5.2	Interpreting Information - Analyze and evaluate information from a variety of sources.	-
5.2.a	Record, organize, and display relevant information from multiple sources in systematic ways (e.g., outlines, timelines, graphic organizers, or note cards).	2
5.2.b	Analyze and paraphrase or summarize information from a variety of sources into a research paper.	3
5.2.c	Identify and credit the sources used to gain information (e.g., bibliographies, footnotes, appendix).	1

**Grade 8 Depth-of-Knowledge Consensus (Continued)**

<b>Standards and Objectives</b>	<b>Description</b>	<b>Consensus</b>
5.2.d	Identify and apply test-taking strategies by answering different types and levels of questions, such as open-ended, literal, and interpretive as well as test-like questions, such as multiple choice, true/false, and short answer.	2
5.2.e	Interpret and use graphic sources of information such as maps, graphs, timelines, or tables to address research questions.	2

# **Appendix C**

## **Summary Tables**

### Grade 3

**Table C1: Depth-of-Knowledge Consistency between Standards and Assessment**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>2 Vocabulary</b>	4	13.2	1.64	28.19	28	70.48	30	1.33	3	YES
<b>4 Comprehension/ Critical Literacy</b>	12	30	4.58	9.78	9	83.92	9	6.3	4	YES
<b>5 Literature</b>	3	4.6	1.95	10	22	53.33	38	36.67	25	YES
<b>6 Research and Information</b>	5	6.4	1.52	14.83	9	72.17	23	13	16	YES
<b>Total</b>	24	54.2	5.17	15.87	12.4	75.28	14.9	8.86	3	

**Table C2: Categorical Concurrence between Standards and Assessment**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>2 Vocabulary</b>	4	1 2	2 2	50 50	13.2	1.64	YES
<b>4 Comprehension/ Critical Literacy</b>	12	1 2 3	3 7 2	25 58.33 16.67	30	4.58	YES
<b>5 Literature</b>	3	2 3	1 2	33.33 66.67	4.6	1.95	WEAKER
<b>6 Research and Information</b>	5	1 2	4 1	80 20	6.4	1.52	YES
<b>Total</b>	24	1 2 3	9 11 4	38 46 17	54.2	5.17	

**Grade 3 (Continued)**

**Table C3: Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
2 Vocabulary	4	13.2	1.64	4	0	100	0	YES	25	4	0.73	0.12	YES
4 Comprehension/ Critical Literacy	12	30	4.58	9	1.22	75	10.21	YES	55	4	0.74	0.06	YES
5 Literature	3	4.6	1.95	2.6	0.89	80	18.26	YES	8	4	0.9	0.09	YES
6 Research and Information	5	6.4	1.52	4.4	0.55	82	11.93	YES	12	3	0.88	0.07	YES
Total	24	54.2	5.17	5	2.78	84.25	11		25	21	0.81	0.09	

## Grade 4

**Table C1: Depth-of-Knowledge Consistency between Standards and Assessment**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Vocabulary</b>	4	11.8	0.84	0	0	37.52	6	62.48	6	YES
<b>3 Comprehension/ Critical Literacy</b>	13	22.4	3.58	30.1	22	66.14	23	3.76	2	YES
<b>4 Literature</b>	6	11	2.74	21.9	13	69.37	5	8.73	12	YES
<b>5 Research and Information</b>	6	5.6	0.55	3.33	7	82.67	20	14	22	YES
<b>Total</b>	29	50.8	1.3	18.5	10	61.81	9.4	19.69	2.5	

**Table C2: Categorical Concurrence between Standards and Assessment**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Vocabulary</b>	4	1 2	2 2	50 50	11.8	0.84	YES
<b>3 Comprehension/ Critical Literacy</b>	13	1 2 3	1 10 2	7.69 76.92 15.38	22.4	3.58	YES
<b>4 Literature</b>	6	1 2 3	1 3 2	16.67 50 33.33	11	2.74	YES
<b>5 Research and Information</b>	6	1 2	4 2	66.67 33.33	5.6	0.55	YES*
<b>Total</b>	29	1 2 3	8 17 4	28 59 14	50.8	1.3	

**Grade 4 (Continued)**

**Table C3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Vocabulary	4	11.8	0.84	4	0	100	0	YES	23	1	0.8	0.05	YES
3 Comprehension/ Critical Literacy	13	22.4	3.58	10	1.58	76.92	12.16	YES	44	7	0.75	0.04	YES
4 Literature	6.2	11	2.74	5.4	0.89	87.14	13.84	YES	22	6	0.77	0.07	YES
5 Research and Information	6.4	5.6	0.55	2.8	0.45	44.17	8.12	YES*	11	1	0.69	0.03	YES*
Total	29.6	50.8	1.3	5.6	3.15	77.06	24		25	14	0.75	0.05	

**Grade 5**

**Table C1: Depth-of-Knowledge Consistency between Standards and Assessment**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Vocabulary</b>	6	11.6	0.55	10.3	14	42.88	19	46.82	18	YES
<b>3 Comprehension/ Critical Literacy</b>	18	25	0.71	15.21	4	72.75	18	12.04	16	YES
<b>4 Literature</b>	11	8.2	0.84	17.02	14	68.73	19	14.25	9	YES
<b>5 Research and Information</b>	11	5.4	1.14	2.86	6	61.86	34	35.29	30	YES
<b>Total</b>	46	50.2	0.45	13.15	4.6	63.75	13.9	23.11	9.4	

**Table C2: Categorical Concurrence between Standards and Assessment**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Vocabulary</b>	6	1	3	50	11.6	0.55	YES
		2	3	50			
<b>3 Comprehension/ Critical Literacy</b>	18	1	1	5.56	25	0.71	YES
		2	16	88.89			
		3	1	5.56			
<b>4 Literature</b>	11	1	2	18.18	8.2	0.84	YES
		2	7	63.64			
		3	2	18.18			
<b>5 Research and Information</b>	11	1	6	54.55	5.4	1.14	YES*
		2	3	27.27			
		3	2	18.18			
<b>Total</b>	46	1	12	26	50.2	0.45	
		2	29	63			
		3	5	11			

**Grade 5 (Continued)**

**Table C3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Assessments**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Vocabulary	6	11.6	0.55	5	0.71	83.33	11.79	YES	23	1	0.8	0.07	YES
3 Comprehension/ Critical Literacy	18	25	0.71	11.2	0.84	62.22	4.65	YES	50	1	0.77	0.04	YES
4 Literature	11	8.2	0.84	6	0.71	54.55	6.43	YES	16	2	0.83	0.05	YES
5 Research and Information	11	5.4	1.14	3.2	1.3	29.09	11.85	WEAKER	11	2	0.81	0.14	YES
Total	46	50.2	0.45	6.4	3.43	57.3	22		25	17	0.8	0.03	

## Grade 6

**Table C1: Depth-of-Knowledge Consistency between Standards and Assessments**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Vocabulary</b>	5	9.6	0.89	21.19	18	68.55	8	10.26	11	YES
<b>3 Comprehension/ Critical Literacy</b>	16	23.2	2.17	13.37	7	78.9	14	7.72	8	YES
<b>4 Literature</b>	10.2	12.4	1.34	7.75	5	41.55	19	50.7	16	YES
<b>5 Research and Information</b>	9	5.2	0.84	7.33	10	73	28	19.67	19	YES
<b>Total</b>	40.2	50.4	0.89	13.1	5.4	66.67	12.2	20.24	9.9	

**Table C2: Categorical Concurrence between Standards and Assessments**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Vocabulary</b>	5	1 2	3 2	60 40	9.6	0.89	YES
<b>3 Comprehension/ Critical Literacy</b>	16	2 3	12 4	75 25	23.2	2.17	YES
<b>4 Literature</b>	10.2	1 2 3	6 2 2	60 20 20	12.4	1.34	YES
<b>5 Research and Information</b>	9	1 2 3	3 4 2	33.33 44.44 22.22	5.2	0.84	YES*
<b>Total</b>	40.2	1 2 3	12 20 8	30 50 20	50.4	0.89	

**Grade 6 (Continued)**

**Table C3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Vocabulary	5	9.6	0.89	3.2	0.84	64	16.73	YES	19	2	0.79	0.06	YES
3 Comprehension/ Critical Literacy	16	23.2	2.17	10.2	1.92	63.75	12.02	YES	46	4	0.73	0.09	YES
4 Literature	10.2	12.4	1.34	7.2	1.1	70.55	10.07	YES	25	3	0.78	0.03	YES
5 Research and Information	9	5.2	0.84	4.4	0.55	48.89	6.09	YES*	10	2	0.91	0.08	YES
Total	40.2	50.4	0.89	6.2	3.12	61.8	9		25	15	0.8	0.08	

**Grade 7**

**Table C1: Depth-of-Knowledge Consistency between Standards and Assessment**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Vocabulary</b>	7	12.2	2.28	8.79	11	42.87	12	48.34	6	YES
<b>3 Comprehension/ Critical Literacy</b>	14	21	3.16	18.15	11	72.98	18	8.87	10	YES
<b>4 Literature</b>	9	10	1.41	2	4	84	17	14	17	YES
<b>5 Research and Information</b>	11	8.2	1.48	4.44	10	90.56	9	5	7	YES
<b>Total</b>	41	51.4	1.95	10.89	7.5	70.04	9.4	19.07	7.7	

**Table C2: Categorical Concurrence between Standards and Assessment**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Vocabulary</b>	7	1 2	2 5	28.57 71.43	12.2	2.28	YES
<b>3 Comprehension/ Critical Literacy</b>	14	1 2 3	1 9 4	7.14 64.29 28.57	21	3.16	YES
<b>4 Literature</b>	9	1 2 3	3 5 1	33.33 55.56 11.11	10	1.41	YES
<b>5 Research and Information</b>	11	1 2 3	2 8 1	18.18 72.73 9.09	8.2	1.48	YES
<b>Total</b>	41	1 2 3	8 27 6	20 66 15	51.4	1.95	

**Grade 7 (Continued)**

**Table C3: Range-of-Knowledge Correspondence and Balance of Representation between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Vocabulary	7	12.2	2.28	5.4	0.55	77.14	7.82	YES	24	5	0.74	0.08	YES
3 Comprehension/ Critical Literacy	14	21	3.16	6.8	0.84	48.57	5.98	YES*	41	5	0.82	0.06	YES
4 Literature	9	10	1.41	5.2	1.3	57.78	14.49	YES	19	3	0.8	0.09	YES
5 Research and Information	11	8.2	1.48	6	1.22	54.55	11.13	YES	16	3	0.83	0.07	YES
Total	41	51.4	1.95	5.8	0.72	59.51	12		25	11	0.8	0.04	

## Grade 8

**Table C1: Depth-of-Knowledge Consistency between Standards and Assessments**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Vocabulary</b>	6	6.2	0.45	0	0	32.38	2	67.62	2	YES
<b>3 Comprehension/ Critical Literacy</b>	12	23.4	2.19	10.59	12	84.03	14	5.38	6	YES
<b>4 Literature</b>	7	16.4	2.19	5.51	6	82.54	11	11.95	7	YES
<b>5 Research and Information</b>	9	6.6	1.52	8.21	8	70	22	21.79	21	YES
<b>Total</b>	34	52.6	3.36	7.6	7.5	75.29	8.4	17.11	4.8	

**Table C2: Categorical Concurrence Between Standards and Assessment**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Vocabulary</b>	6	2	6	100	6.2	0.45	YES
<b>3 Comprehension/ Critical Literacy</b>	12	2	11	91.67	23.4	2.19	YES
		3	1	8.33			
<b>4 Literature</b>	7	1	2	28.57	16.4	2.19	YES
		2	5	71.43			
<b>5 Research and Information</b>	9	1	2	22.22	6.6	1.52	YES
		2	6	66.67			
		3	1	11.11			
<b>Total</b>	34	1	4	12	52.6	3.36	
		2	28	82			
		3	2	6			

Grade 8 (Continued)

**Table C3: Range-of-Knowledge Correspondence between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Vocabulary	6	6.2	0.45	4	0	66.67	0	YES	12	1	0.81	0.04	YES
3 Comprehension/ Critical Literacy	12	23.4	2.19	8.4	0.55	70	4.56	YES	45	3	0.7	0.06	YES
4 Literature	7	16.4	2.19	5.8	1.1	82.86	15.65	YES	31	3	0.73	0.06	YES
5 Research and Information	9	6.6	1.52	5	1.22	55.56	13.61	YES	13	3	0.84	0.04	YES
Total	34	52.6	3.36	5.8	1.88	68.77	11		25	16	0.77	0.07	

## **Appendix D**

### **Depth-of-Knowledge Levels by Item and Reviewers**

## Grade 3

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	1	1	1	1
2	1	1	2	1	1
3	1	2	1	1	2
4	1	2	1	1	2
5	2	1	2	2	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	2	1
9	1	1	1	1	1
10	2	2	2	2	2
11	1	2	1	1	1
12	1	1	1	1	1
13	1	1	1	1	1
14	2	2	2	2	2
15	1	2	2	2	2
16	2	1	1	1	1
17	1	2	1	2	2
18	2	2	3	2	2
19	2	2	2	2	3
25	1	1	2	1	2
26	1	1	1	1	1
27	2	2	2	2	2
28	3	3	3	3	3
29	1	1	2	1	1
30	1	1	1	1	1
31	1	1	1	1	1
32	2	2	1	2	2
33	1	1	1	3	3
34	3	3	1	3	3
35	3	3	2	3	3
36	3	3	2	3	3
37	1	1	1	1	1
38	1	2	1	2	2
39	1	1	1	1	1
40	1	2	1	1	2
41	2	2	2	2	1
42	2	2	3	2	2
43	2	2	2	2	2
49	3	3	2	2	2
50	2	2	1	2	2
51	2	1	1	2	1
52	3	1	1	2	2
53	3	2	2	2	2
54	2	2	2	2	2
55	1	1	1	1	2
56	2	1	1	2	2
57	1	1	1	1	1
58	1	1	1	1	1
59	3	2	2	2	2
60	1	1	2	1	1

## Grade 4

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	1	1	1	2
2	1	2	1	1	1
3	1	1	1	1	1
4	2	2	2	1	2
5	2	2	2	2	2
6	1	1	1	1	2
12	2	2	2	2	3
13	2	2	1	1	2
14	1	2	1	1	2
15	1	1	1	1	1
16	1	1	1	2	1
17	3	3	2	3	3
18	3	3	3	3	3
19	2	3	1	1	2
20	1	1	1	1	1
21	1	1	1	1	1
22	2	2	1	1	2
23	3	3	1	3	3
24	2	2	1	1	2
25	2	2	1	1	2
26	1	1	1	1	1
27	1	1	1	2	1
28	2	2	2	2	2
29	1	1	2	1	1
30	1	2	1	1	2
31	1	1	1	2	1
32	1	1	1	1	2
33	2	2	2	1	2
34	1	2	1	1	1
35	2	2	1	2	2
36	2	2	1	2	1
37	2	2	1	2	2
38	1	1	1	1	2
44	2	1	1	1	2
45	2	2	1	1	2
46	1	1	1	1	1
47	1	2	1	1	2
48	2	2	1	1	2
49	3	2	2	2	2
50	1	2	2	1	2
51	1	1	1	1	1
52	1	1	1	1	1
53	3	2	2	2	2
54	3	2	2	2	2
55	1	1	1	1	2
56	2	2	2	1	2
57	1	1	2	1	2
58	2	2	1	1	2
59	1	2	3	2	2
60	3	2	2	1	2

## Grade 5

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	2	2	1	2
2	3	2	2	2	2
3	1	1	1	2	2
4	2	1	2	1	2
5	1	1	1	1	1
6	2	2	2	1	2
12	1	2	2	2	2
13	1	1	1	1	1
14	2	2	1	2	2
15	2	2	2	2	2
16	2	2	2	1	2
17	3	2	2	2	2
18	3	2	2	2	2
19	2	2	2	2	2
20	1	1	2	2	1
21	1	1	2	1	1
22	2	2	1	2	1
23	3	2	2	2	2
24	3	2	3	2	2
25	2	1	1	1	2
26	1	1	1	2	1
27	1	1	2	2	1
28	1	2	1	1	1
29	2	2	2	2	2
30	3	2	2	2	2
31	2	2	2	1	2
32	2	2	2	1	2
33	2	1	1	2	2
34	1	2	2	2	1
35	3	2	2	2	2
35	2	1	3	2	2
42	1	1	1	2	2
43	2	2	1	1	2
44	3	2	2	2	2
45	3	2	2	2	2
46	2	1	2	1	2
47	1	1	1	2	2
48	1	1	2	2	2
49	2	2	2	2	2
50	1	1	2	2	1
51	1	2	1	2	2
52	2	2	2	2	3
53	3	2	2	3	3
54	1	2	2	1	2
55	1	1	2	1	2
56	3	2	2	2	2
57	1	1	2	1	1
58	1	1	2	1	2
59	3	3	2	3	3
60	3	2	3	3	3

## Grade 6

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	2	2	2	2
2	2	2	2	2	2
3	1	2	2	2	2
4	2	2	2	2	2
5	1	1	1	1	1
6	2	2	2	2	2
7	2	2	1	2	2
13	2	2	2	2	2
14	1	2	1	2	1
15	2	2	2	2	2
16	2	3	2	2	2
17	2	2	3	3	2
18	2	3	3	3	3
19	3	3	3	3	3
20	2	1	1	1	1
21	1	1	2	2	2
22	1	1	2	2	2
23	2	2	2	2	2
24	3	2	2	2	2
25	1	2	2	1	1
26	2	1	2	2	2
27	1	1	2	2	2
28	1	1	2	2	2
29	2	1	1	1	2
30	2	1	2	2	2
31	2	3	2	2	2
32	2	2	2	2	2
33	1	2	2	2	2
34	1	3	2	2	2
35	2	1	2	2	2
36	2	2	2	1	3
37	1	1	1	2	2
38	2	2	2	2	2
39	2	2	2	2	3
40	2	2	2	2	2
41	1	1	1	2	2
42	1	2	2	2	2
43	2	3	2	2	3
44	2	1	2	2	2
45	1	2	1	1	2
46	2	2	2	2	2
47	1	2	2	2	2
48	3	2	2	2	2
49	2	2	2	1	2
55	1	2	2	2	2
56	2	2	2	2	2
57	2	3	2	2	2
58	2	2	1	3	2
59	1	1	2	2	1
60	2	2	1	2	1

## Grade 7

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	2	2	2	2
2	1	1	2	2	2
3	1	2	2	2	2
4	2	1	2	2	2
5	2	2	2	2	2
6	2	2	2	2	2
7	2	3	2	2	2
13	1	1	1	1	2
14	2	2	2	2	1
15	2	1	2	1	1
16	2	3	2	2	2
17	2	3	2	2	2
18	2	2	2	2	2
19	1	1	1	2	1
20	2	2	2	2	2
21	2	2	2	2	2
22	2	3	2	2	2
23	2	2	2	2	2
24	3	2	2	2	2
25	2	2	2	2	2
26	2	2	3	3	2
27	2	2	2	3	2
28	2	1	2	1	1
29	2	2	2	2	2
30	2	2	2	2	2
31	1	1	2	1	1
32	1	2	2	2	1
33	2	2	2	2	2
34	2	2	2	1	2
35	1	3	2	2	2
36	2	3	2	1	2
37	2	2	3	2	2
38	2	3	3	3	3
39	2	2	2	2	2
40	2	2	2	2	2
41	3	3	2	2	2
42	1	2	1	1	2
43	2	2	2	2	2
44	2	2	2	2	2
50	2	2	2	1	2
51	2	3	2	2	2
52	1	2	2	2	2
53	2	3	3	2	2
54	1	2	1	1	1
55	2	1	1	2	1
56	2	2	2	2	1
57	2	2	2	2	2
58	2	2	2	2	2
59	3	3	2	2	3
60	1	2	2	1	1

## Grade 8

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	2	2	2	2
2	2	2	2	2	2
3	2	2	2	2	2
4	1	2	2	2	2
5	1	1	2	2	2
11	2	2	2	1	2
12	2	2	2	2	2
13	2	3	2	2	2
14	2	2	2	2	2
15	1	2	2	2	2
16	2	2	2	2	2
17	2	1	2	2	2
18	2	2	2	2	2
19	1	2	2	2	2
20	1	2	1	1	2
21	2	3	3	3	2
22	2	1	2	2	2
23	2	2	2	2	2
24	2	2	2	2	2
25	2	2	3	2	2
26	2	2	2	2	2
27	1	1	1	1	2
28	1	1	2	2	2
29	2	1	2	2	1
30	2	1	2	2	1
31	1	1	2	2	2
32	2	2	2	3	2
33	2	1	2	2	3
34	1	1	1	2	1
35	2	1	3	2	2
36	2	2	2	1	2
37	2	2	2	2	2
38	2	1	2	1	2
39	2	2	2	2	2
45	2	1		1	2
46	2	2	2	2	2
47	2	2	2	1	2
48	2	1	2	1	1
49	2	2	2	1	2
50	2	3	2	2	2
51	2	2	2	2	2
52	2	2	2	2	2
53	1	1	1	1	1
54	1	1	2	2	1
55	2	2	3	2	2
56	2	2	2	2	2
57	2	2	3	2	2
58	2	2	2	2	3
59	2	2	2	2	2
60	2	2	2	3	2

## Grade 3

**Table D2**  
**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

		Low		High		
Item	Objective: Number of Reviewers					
1	4.1.a:4	4.1.c:5				
2	2.1:2	2.2:5				
3	2.1:3	2.3:2				
4	4.1.a:2	4.2.a:2	5.3:1			
5	4.1.a:1	4.1.c:1	4.2.a:2	4.3.b:1		
6	4.1.a:2	4.1.c:2	4.3.c:1	4.4.c:1		
7	4.1.a:1	4.1.c:3	4.1.d:2			
8	2.1:1	2.4:3	6.1.d:1			
9	4.1.c:1	4.1.d:1	4.2.a:1	6.1.c:1	6.1.d:1	6.1.e:1
10	4.2.a:5					
11	4.1.a:3	4.1.c:2	4.1.d:1	4.2.a:1		
12	2.3:1	5.3:4				
13	4.1.d:1	6.1.e:4				
14	4.3.a:5	4.3.b:1				
15	2.1:1	2.3:4				
16	4.1.a:3	4.1.b:1	4.1.c:2	4.1.d:1		
17	2.1:5					
18	4.1.b:1	4.1.c:1	4.2.a:2	4.2.b:1	4.4.a:1	
19	4.3.a:3	4.3.b:3				
25	4.1.a:1	4.1.c:1	4.1.d:2	4.2.a:1	4.4.c:1	
26	4.1.a:1	4.1.c:5				
27	4.3.a:5					
28	4.2.b:3	4.3.b:2				
29	6.1.a:2	6.1.b:4				
30	6.1.d:5					
31	2.3:1	5.3:4				
32	2.1:4	2.3:1				
33	4.1.b:1	4.1.c:1	5.2:1	5.2.a:2		
34	4.2.a:1	4.4.a:2	5.2.a:2			
35	4.4.a:1	5.2.a:4				
36	5.2.a:2	5.2.b:3				
37	6.1.a:5					
38	2.1:5					
39	2.4:3	6.1:1	6.1.b:1			
40	2.3:5					
41	4.1.c:1	4.2.a:3	4.4.c:1			
42	4.4.a:5					
43	4.3.a:3	4.3.c:2				
49	4.3.a:2	4.3.b:3				
50	2.1:5	2.3:1				
51	2.1:2	2.4:3				
52	4.1.a:1	4.1.c:3	4.4.a:1	4.4.c:1		
53	4.2.b:3	4.4.a:2				
54	4.2.a:4	4.3.b:1				

**Grade 3 (Table D2 Continued)**

Item	Objective: Number of Reviewers					
55	2.3:1	2.4:2	6.1:2			
56	2.1:4	2.2:1				
57	4.1.a:1	4.1.c:4				
58	4.1.c:4	4.1.d:1				
59	4.2.a:3	4.2.b:1	4.3.a:1			
60	2.4:1	6.1.b:4				

## Grade 4

**Table D2**  
**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low			High			
Item	Objective: Number of Reviewers					
1	3.1.b:2	3.3.a:1	3.3.b:1	3.3.c:1		
2	3.1.a:1	3.1.b:1	3.3.a:1	3.3.b:1	4.2.d:1	
3	1.2.b:5					
4	1.1:1	1.3:1	3.1.a:2	3.2.a:1		
5	3.2.a:4	3.2.c:1				
6	5.1:1	5.1.a:4				
12	3.2.b:3	3.2.c:1	4.2.d:1			
13	4.2:1	4.3.a:1	4.3.b:3			
14	1.3:4	4.3.b:1				
15	4.3.b:5					
16	5.1:1	5.1.b:4				
17	3.4.b:4	4.3.a:1				
18	4.2.c:5					
19	4.2.b:5					
20	3.1.b:1	3.3.a:1	3.3.b:2	4.2.a:1		
21	1.2.a:5					
22	1.1:5					
23	4.2.a:4	4.2.c:1				
24	1.3:5					
25	3.1.b:1	3.1.c:4				
26	4.3.b:5					
27	3.1.b:1	3.2.a:1	3.3.b:1	3.4.d:1	4.2.a:1	
28	3.1.a:1	3.2.a:2	3.2.b:1	3.3.b:1		
29	1.1:1	1.2.b:4				
30	1.1:2	1.3:4				
31	3.1.b:1	3.2.a:2	3.3.a:1	3.3.b:1		
32	3.1.b:1	3.3.a:1	3.3.c:3			
33	3.4.c:5					
34	1.2.a:1	1.2.b:4				
35	3.2.b:1	3.3.c:1	5.1.d:3			
36	3.1.b:1	3.2.b:1	3.3.a:1	3.3.b:1	3.4.a:1	3.4.d:1
37	3.2.a:1	3.3.a:3	4.2.a:1			
38	5.1:1	5.1.a:4				
44	3.1.a:1	3.1.b:2	3.2.a:1	3.2.b:1		
45	3.1.a:1	3.2.a:2	3.2.b:1	4.2.d:1		
46	1.1:2	1.2.b:4				
47	1.1:1	1.3:5				
48	3.4.c:5					
49	3.2.c:4	4.2.a:1				
50	1.1:5					
51	5:1	5.1.a:3	5.1.e:1			
52	4.3.a:1	4.3.b:4				
53	3.2.c:1	4.2.d:4				
54	3.2.b:1	3.3.a:1	4.2.a:3			

**Grade 4 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>					
<b>55</b>	5.1.1	5.1.a:4				
<b>56</b>	3.1.a:5					
<b>57</b>	3.1.a:1	3.1.b:1	3.3.a:2	3.3.c:1		
<b>58</b>	3.4.c:5					
<b>59</b>	3.1.b:1	3.2.b:1	3.3.a:1	3.3.b:2		
<b>60</b>	3.1.a:1	4.2.b:4				

## Grade 5

**Table D2**  
**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

	Low		High	
Item	Objective: Number of Reviewers			
1	1.3:5			
2	3.4.b:4	5.1.f:1		
3	1.1.a:4	1.2.a:1		
4	3.1.d:2	3.3.d:2	3.4.e:1	
5	3.1.a:1	3.1.b:2	3.1.d:1	3.2.b:1
6	3.2.b:1	3.2.c:1	3.2.d:3	
12	1.1.a:3	1.2.b:1	3.1.a:1	
13	3.1.b:4	3.1.d:1		
14	1.1.a:1	1.3:4		
15	3.1.c:4	3.3.a:1		
16	3.4.f:5			
17	3.2.b:1	3.2.d:3	3.3.b:1	
18	3.1.c:1	3.2.b:2	3.3.a:1	3.4.d:1
19	3.3.b:1	4.1.c:1	4.2.d:3	
20	1.2.c:5			
21	1.2.a:5			
22	3.1.d:5			
23	3.1.c:3	3.3.a:2		
24	3.2.a:1	3.2.b:4		
25	3.2.b:1	5.1.a:4		
26	3.1.b:2	3.1.d:3		
27	1.1.a:1	1.1.b:1	1.2.c:3	
28	1.1.b:1	4.3.b:4		
29	3.2.a:1	3.2.d:1	4.3.c:3	
30	3.2.c:3	3.2.d:1	3.3.b:1	3.4.e:1
31	1.3:5			
32	1.3:5			
33	3.2.b:1	5.1.c:2	5.1.e:2	
34	3.1.d:2	3.2.a:1	3.4.e:1	5.2.a:1
35	3.2.a:3	3.2.b:1	3.2.d:1	
36	3.4.a:1	4.1.a:2	4.2.b:1	4.3.c:1
42	1.1.a:2	1.2.b:1	5.1.a:2	
43	3.4.f:5			
44	3.2.a:1	3.2.b:3	3.3.b:1	
45	3.3.b:1	3.3.d:1	3.4.d:1	5.1.c:2
46	3.4.a:1	4.1.a:3	4.2.c:1	
47	5.1.a:5			

**Grade 5 (Table D2 Continued)**

<b>Item</b>	<b>Objective: Number of Reviewers</b>			
<b>48</b>	1.1.a:3	1.2.a:2		
<b>49</b>	3.1.d:1	3.4.e:1	5.2.a:1	5.2.c:2
<b>50</b>	1.2.a:1	1.2.b:3	1.2.c:1	
<b>51</b>	3.1.a:1	3.1.c:1	3.2.a:1	3.2.b:2
<b>52</b>	3.1.b:1	3.2.a:1	3.2.d:2	3.3.b:1
<b>53</b>	3.2.a:1	3.2.d:1	3.3.b:2	3.4.c:1
<b>54</b>	3.4.a:2	4.1.a:3		
<b>55</b>	5.1.a:4	5.1.b:1		
<b>56</b>	3.2.d:3	3.3.b:1	4.2.d:1	
<b>57</b>	4.3.a:4	4.3.b:1		
<b>58</b>	4.1.a:3	4.3.d:2		
<b>59</b>	4.1.c:1	4.2.b:4		
<b>60</b>	3.2.d:2	4.1.c:1	4.2.b:2	

## Grade 6

**Table D2**  
**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**



Item	Objective: Number of Reviewers				
1	1.1.a:4	1.2.c:1			
2	3.1.b:1	3.1.c:4			
3	1.1.b:1	4.3.a:4			
4	3.1.d:1	4.2.a:3	4.3.d:1		
5	1.1.a:2	1.2.a:1	1.2.b:1	1.2.c:1	
6	3.1.d:1	3.2.b:3	3.4.c:1		
7	5.1.a:3	5.1.b:2			
13	1.1.b:1	4.3.a:4			
14	4.3.b:1	4.3.c:4			
15	3.1.c:5				
16	3.3.b:1	4.3.a:4			
17	3.2.a:2	3.4.d:1	4.2.d:2		
18	3.2.a:2	3.4.d:1	4.2.d:2		
19	3.2.a:1	4.1.a:1	4.2.a:1	4.2.d:3	
20	5.1.b:1	5.1.e:1	5.2.b:3		
21	1.1.a:5				
22	1.1.a:5				
23	3.2.a:2	3.2.b:1	3.3.b:2		
24	3.2.b:3	3.3.b:1	3.3.c:1		
25	3.1.b:1	4.1.a:4			
26	5.1.a:1	5.1.b:2	5.2.c:2		
27	1.1.a:5				
28	1.2.b:3	1.2.c:2			
29	3.1.d:3	3.2.a:1	3.4.e:1		
30	3.1.c:4	3.3.a:1			
31	3.2.a:3	3.3.a:1	3.4.f:1		
32	3.2.b:4	3.3.c:1			
33	1.1.a:3	1.1.b:2			
34	1.1.b:3	3.2.a:1	4.3:1		
35	3.1.b:1	3.2.b:1	3.3.c:1	3.4.b:2	
36	3.1.b:1	3.2.a:1	3.2.b:1	3.4.b:1	3.4.c:1
37	1.2.b:1	1.2.c:4			
38	3.1.c:4	3.1.d:1			
39	3.1.d:2	3.3.d:1	3.4.e:1	5.2.a:1	
40	3.1.c:3	3.3.a:2			
41	4.1.b:5				

**Grade 6 (Table D2 Continued)**

Item	Objective: Number of Reviewers				
42	5.1.b:3	5.1.e:1	5.2.c:1		
43	3.1.d:1	3.3.c:1	3.4.e:3		
44	3.1.b:4	3.2.a:1			
45	1.1.a:2	1.2.b:1	3.1.b:2		
46	3.1.c:1	3.3.d:4			
47	3.1.b:2	3.1.c:1	3.2.a:1	5.1.d:1	
48	4.2.c:5				
49	4.1.a:5				
55	4.3.a:4	4.3.d:1			
56	3.4.b:3	3.4.e:1	4.2.a:1	4.2.b:1	
57	3.1.d:2	3.3.d:3			
58	3.2.a:4	3.4.e:1			
59	4.1.b:5				
60	3.4.f:1	5.1.e:4			

## Grade 7

**Table D2**  
**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

	Low		High		
Item	Objective: Number of Reviewers				
1	1.1:1	1.3.a:1	1.3.c:3		
2	1.1:5				
3	1.1:1	1.3.a:3	4.3.a:1		
4	3.2.a:1	3.4.e:4			
5	3.1.a:3	3.3.a:2			
6	3.3.d:1	5.1.b:1	5.2.b:3		
7	3.2.a:4	5.2.a:1			
13	1.2.a:1	1.2.b:4			
14	1.3.a:1	1.3.c:3	4.3.a:1		
15	1.3.d:1	3.1.a:1	3.1.c:2	3.2.a:1	
16	3.2.a:1	3.2.b:4			
17	3.1.a:1	3.2.b:1	3.4.a:1	3.4.c:1	4.2.c:1
18	5.1.b:2	5.2.d:2	5.2.e:1		
19	1.2.a:1	1.2.b:4			
20	1.1:3	3.4.e:1	4.3.a:1		
21	3.2.a:1	3.4.c:1	3.4.e:3		
22	3.2.a:1	3.3.a:1	3.4.c:2	5.1.e:1	
23	3.3.a:4	4.2.a:1			
24	3.2.a:1	3.4.d:1	4.2.c:3	5.1.e:1	
25	5.1.b:4	5.1.c:1			
26	3.2.a:2	3.4.c:3	3.4.d:1		
27	1.3.b:1	3.2.a:3	3.2.b:1		
28	1.3.d:5				
29	1.1:1	3.2.b:1	3.4.c:1	4.2.a:2	
30	3.2.b:5				
31	4.1.a:5				
32	5.1.b:2	5.1.f:3			
33	1.1:5				
34	3.1.c:2	3.2.a:1	3.4.c:1	4.2.b:1	
35	3.2.a:2	3.2.b:2	4.3.c:1		
36	1.1:4	1.2.a:2			
37	3.2.b:2	3.4.a:1	3.4.c:1	4.3.a:1	
38	3.2.b:2	3.3.a:1	3.4.a:1	4.2.a:1	
39	1.1:5				
40	3.1.a:1	3.4.e:4			
41	3.2.a:1	3.3.a:3	4.2.d:1		
42	3.1.c:2	3.2.a:1	3.3.a:1	4.1.a:1	
43	3.3.d:1	5.1.c:1	5.1.d:2	5.2.a:1	

**Grade 7 (Table D2 Continued)**

Item	Objective: Number of Reviewers				
44	5.1.b:1	5.2.d:4			
50	3.1.a:3	3.2.b:1	3.3.b:1		
51	4.3.a:4	4.3.b:1			
52	3.2.b:1	3.3.a:3	3.4.c:1	4.3.c:1	
53	3.2.b:1	4.2.a:2	4.2.d:2	4.3.b:1	
54	4.1.a:4	4.3.c:1			
55	5.1.f:3	5.2.e:3			
56	1.3.a:4	4.3.a:1			
57	1.3.a:1	4.3.a:4			
58	1.1:1	5.2.a:4			
59	3.4.c:3	4.2.a:3			
60	4.1.a:5				

## Grade 8

**Table D2**  
**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

		Low		High		
Item	Objective: Number of Reviewers					
1	1.1:1	3.2.a:4				
2	1.1:5					
3	3.4.b:5	5.2.e:1				
4	4.1.b:1	4.3.a:4				
5	3.1.a:3	3.4.d:1	4.1.a:1	4.3.a:1		
11	3.1.a:2	3.1.b:2	3.2.a:1	3.3.a:1		
12	3.1.b:1	3.3.a:4				
13	1.3.b:4	4.3.a:1				
14	3.4.d:1	5.1.e:1	5.2.a:3			
15	5.1.a:4	5.2.a:1				
16	1.3.b:1	3.1.b:1	3.2.a:1	3.4.b:1	3.4.d:1	4.3.a:1
17	1.1:1	1.2:4				
18	3.4.f:2	4.2.a:4				
19	3.3.a:4	4.1.a:1	4.2.a:1			
20	4.1.a:5					
21	3.2.b:4	4.1.a:1				
22	1.1:5					
23	3.1.a:1	3.1.b:2	3.2.a:2	3.4.d:1		
24	5.1.b:3	5.1.c:1	5.2.a:1			
25	3.3.a:1	3.4.b:4				
26	3.3.a:1	3.3.b:4				
27	4.1.a:4	4.1.b:1				
28	5.1.a:5					
29	1.2:5					
30	4.3.b:5					
31	3.3.a:3	4.1.a:1	4.2.a:1			
32	3.4.e:2	4.2.a:1	4.2.b:2			
33	4.2.a:5					
34	4.1.a:5					
35	3.2.a:1	3.3.a:4				
36	3.1.b:3	3.3.b:1	3.4.b:1			
37	3.2.a:1	3.4.a:1	5.1.d:4			
38	3.1.b:4	3.2.a:1	3.4.e:1			
39	1.3.a:5	4.3.a:1				
45	3.1.a:1	3.1.b:2	3.2.a:1			
46	3.2.a:4	3.4.b:1				
47	3.1.b:3	3.2.a:2				
48	3.2.a:1	3.4.b:1	5.1.b:4			

**Grade 8 (Table D2 Continued)**

Item	Objective: Number of Reviewers					
49	3.3.a:1	4.2.a:4				
50	3.2.a:5	3.3.a:1				
51	4.3.a:2	4.3.c:3				
52	3.4.e:2	4.2.a:3				
53	4.1.a:5					
54	5.2.c:5					
55	4.3.b:5					
56	4.3.c:5					
57	3.2.a:4	3.4.e:1				
58	3.4.e:1	3.4.f:1	4.2.a:3			
59	3.4.d:1	3.4.e:1	3.4.f:1	4.2.a:2		
60	3.2.a:2	3.2.b:1	3.3.a:1	4.2.a:3		

## Grade 3

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives								
1	4.1.a	4.1.a	4.1.a	4.1.a	4.1.c	4.1.c	4.1.c	4.1.c	4.1.c
2	2.1	2.1	2.2	2.2	2.2	2.2	2.2		
3	2.1	2.1	2.1	2.3	2.3				
4	4.1.a	4.1.a	4.2.a	4.2.a	5.3				
5	4.1.a	4.1.c	4.2.a	4.2.a	4.3.b				
6	4.1.a	4.1.a	4.1.c	4.1.c	4.3.c	4.4.c			
7	4.1.a	4.1.c	4.1.c	4.1.c	4.1.d	4.1.d			
8	2.1	2.4	2.4	2.4	6.1.d				
9	4.1.c	4.1.d	4.2.a	6.1.c	6.1.d	6.1.e			
10	4.2.a	4.2.a	4.2.a	4.2.a	4.2.a				
11	4.1.a	4.1.a	4.1.a	4.1.c	4.1.c	4.1.d	4.2.a		
12	2.3	5.3	5.3	5.3	5.3				
13	4.1.d	6.1.e	6.1.e	6.1.e	6.1.e				
14	4.3.a	4.3.a	4.3.a	4.3.a	4.3.a	4.3.b			
15	2.1	2.3	2.3	2.3	2.3				
16	4.1.a	4.1.a	4.1.a	4.1.b	4.1.c	4.1.c	4.1.d		
17	2.1	2.1	2.1	2.1	2.1				
18	4.1.b	4.1.c	4.2.a	4.2.a	4.2.b	4.4.a			
19	4.3.a	4.3.a	4.3.a	4.3.b	4.3.b	4.3.b			
25	4.1.a	4.1.c	4.1.d	4.1.d	4.2.a	4.4.c			
26	4.1.a	4.1.c	4.1.c	4.1.c	4.1.c	4.1.c			
27	4.3.a	4.3.a	4.3.a	4.3.a	4.3.a				
28	4.2.b	4.2.b	4.2.b	4.3.b	4.3.b				
29	6.1.a	6.1.a	6.1.b	6.1.b	6.1.b	6.1.b			
30	6.1.d	6.1.d	6.1.d	6.1.d	6.1.d				
31	2.3	5.3	5.3	5.3	5.3				
32	2.1	2.1	2.1	2.1	2.3				
33	4.1.b	4.1.c	5.2	5.2.a	5.2.a				
34	4.2.a	4.4.a	4.4.a	5.2.a	5.2.a				
35	4.4.a	5.2.a	5.2.a	5.2.a	5.2.a				
36	5.2.a	5.2.a	5.2.b	5.2.b	5.2.b				
37	6.1.a	6.1.a	6.1.a	6.1.a	6.1.a				
38	2.1	2.1	2.1	2.1	2.1				
39	2.4	2.4	2.4	6.1	6.1.b				
40	2.3	2.3	2.3	2.3	2.3				
41	4.1.c	4.2.a	4.2.a	4.2.a	4.4.c				
42	4.4.a	4.4.a	4.4.a	4.4.a	4.4.a				
43	4.3.a	4.3.a	4.3.a	4.3.c	4.3.c				
49	4.3.a	4.3.a	4.3.b	4.3.b	4.3.b				
50	2.1	2.1	2.1	2.1	2.1	2.3			

**Grade 3 (Table D3 Continued)**

Item	Objectives								
	2.1	2.1	2.4	2.4	2.4				
<b>51</b>	2.1	2.1	2.4	2.4	2.4				
<b>52</b>	4.1.a	4.1.c	4.1.c	4.1.c	4.4.a	4.4.c			
<b>53</b>	4.2.b	4.2.b	4.2.b	4.4.a	4.4.a				
<b>54</b>	4.2.a	4.2.a	4.2.a	4.2.a	4.3.b				
<b>55</b>	2.3	2.4	2.4	6.1	6.1				
<b>56</b>	2.1	2.1	2.1	2.1	2.2				
<b>57</b>	4.1.a	4.1.c	4.1.c	4.1.c	4.1.c				
<b>58</b>	4.1.c	4.1.c	4.1.c	4.1.c	4.1.d				
<b>59</b>	4.2.a	4.2.a	4.2.a	4.2.b	4.3.a				
<b>60</b>	2.4	6.1.b	6.1.b	6.1.b	6.1.b				

## Grade 4

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives					
1	3.1.b	3.1.b	3.3.a	3.3.b	3.3.c	
2	3.1.a	3.1.b	3.3.a	3.3.b	4.2.d	
3	1.2.b	1.2.b	1.2.b	1.2.b	1.2.b	
4	1.1	1.3	3.1.a	3.1.a	3.2.a	
5	3.2.a	3.2.a	3.2.a	3.2.a	3.2.c	
6	5.1	5.1.a	5.1.a	5.1.a	5.1.a	
12	3.2.b	3.2.b	3.2.b	3.2.c	4.2.d	
13	4.2	4.3.a	4.3.b	4.3.b	4.3.b	
14	1.3	1.3	1.3	1.3	4.3.b	
15	4.3.b	4.3.b	4.3.b	4.3.b	4.3.b	
16	5.1	5.1.b	5.1.b	5.1.b	5.1.b	
17	3.4.b	3.4.b	3.4.b	3.4.b	4.3.a	
18	4.2.c	4.2.c	4.2.c	4.2.c	4.2.c	
19	4.2.b	4.2.b	4.2.b	4.2.b	4.2.b	
20	3.1.b	3.3.a	3.3.b	3.3.b	4.2.a	
21	1.2.a	1.2.a	1.2.a	1.2.a	1.2.a	
22	1.1	1.1	1.1	1.1	1.1	
23	4.2.a	4.2.a	4.2.a	4.2.a	4.2.c	
24	1.3	1.3	1.3	1.3	1.3	
25	3.1.b	3.1.c	3.1.c	3.1.c	3.1.c	
26	4.3.b	4.3.b	4.3.b	4.3.b	4.3.b	
27	3.1.b	3.2.a	3.3.b	3.4.d	4.2.a	
28	3.1.a	3.2.a	3.2.a	3.2.b	3.3.b	
29	1.1	1.2.b	1.2.b	1.2.b	1.2.b	
30	1.1	1.1	1.3	1.3	1.3	1.3
31	3.1.b	3.2.a	3.2.a	3.3.a	3.3.b	
32	3.1.b	3.3.a	3.3.c	3.3.c	3.3.c	
33	3.4.c	3.4.c	3.4.c	3.4.c	3.4.c	
34	1.2.a	1.2.b	1.2.b	1.2.b	1.2.b	
35	3.2.b	3.3.c	5.1.d	5.1.d	5.1.d	
36	3.1.b	3.2.b	3.3.a	3.3.b	3.4.a	3.4.d
37	3.2.a	3.3.a	3.3.a	3.3.a	4.2.a	
38	5.1	5.1.a	5.1.a	5.1.a	5.1.a	
44	3.1.a	3.1.b	3.1.b	3.2.a	3.2.b	
45	3.1.a	3.2.a	3.2.a	3.2.b	4.2.d	
46	1.1	1.1	1.2.b	1.2.b	1.2.b	1.2.b
47	1.1	1.3	1.3	1.3	1.3	1.3
48	3.4.c	3.4.c	3.4.c	3.4.c	3.4.c	
49	3.2.c	3.2.c	3.2.c	3.2.c	4.2.a	

**Grade 4 (Table D3 Continued)**

<b>Item</b>	<b>Objectives</b>					
<b>50</b>	1.1	1.1	1.1	1.1	1.1	
<b>51</b>	5	5.1.a	5.1.a	5.1.a	5.1.e	
<b>52</b>	4.3.a	4.3.b	4.3.b	4.3.b	4.3.b	
<b>53</b>	3.2.c	4.2.d	4.2.d	4.2.d	4.2.d	
<b>54</b>	3.2.b	3.3.a	4.2.a	4.2.a	4.2.a	
<b>55</b>	5.1	5.1.a	5.1.a	5.1.a	5.1.a	
<b>56</b>	3.1.a	3.1.a	3.1.a	3.1.a	3.1.a	
<b>57</b>	3.1.a	3.1.b	3.3.a	3.3.a	3.3.c	
<b>58</b>	3.4.c	3.4.c	3.4.c	3.4.c	3.4.c	
<b>59</b>	3.1.b	3.2.b	3.3.a	3.3.b	3.3.b	
<b>60</b>	3.1.a	4.2.b	4.2.b	4.2.b	4.2.b	

## Grade 5

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives					
1	1.3	1.3	1.3	1.3	1.3	
2	3.4.b	3.4.b	3.4.b	3.4.b	5.1.f	
3	1.1.a	1.1.a	1.1.a	1.1.a	1.2.a	
4	3.1.d	3.1.d	3.3.d	3.3.d	3.4.e	
5	3.1.a	3.1.b	3.1.b	3.1.d	3.2.b	
6	3.2.b	3.2.c	3.2.d	3.2.d	3.2.d	
12	1.1.a	1.1.a	1.1.a	1.2.b	3.1.a	
13	3.1.b	3.1.b	3.1.b	3.1.b	3.1.d	
14	1.1.a	1.3	1.3	1.3	1.3	
15	3.1.c	3.1.c	3.1.c	3.1.c	3.3.a	
16	3.4.f	3.4.f	3.4.f	3.4.f	3.4.f	
17	3.2.b	3.2.d	3.2.d	3.2.d	3.3.b	
18	3.1.c	3.2.b	3.2.b	3.3.a	3.4.d	
19	3.3.b	4.1.c	4.2.d	4.2.d	4.2.d	
20	1.2.c	1.2.c	1.2.c	1.2.c	1.2.c	
21	1.2.a	1.2.a	1.2.a	1.2.a	1.2.a	
22	3.1.d	3.1.d	3.1.d	3.1.d	3.1.d	
23	3.1.c	3.1.c	3.1.c	3.3.a	3.3.a	
24	3.2.a	3.2.b	3.2.b	3.2.b	3.2.b	
25	3.2.b	5.1.a	5.1.a	5.1.a	5.1.a	
26	3.1.b	3.1.b	3.1.d	3.1.d	3.1.d	
27	1.1.a	1.1.b	1.2.c	1.2.c	1.2.c	
28	1.1.b	4.3.b	4.3.b	4.3.b	4.3.b	
29	3.2.a	3.2.d	4.3.c	4.3.c	4.3.c	
30	3.2.c	3.2.c	3.2.c	3.2.d	3.3.b	3.4.e
31	1.3	1.3	1.3	1.3	1.3	
32	1.3	1.3	1.3	1.3	1.3	
33	3.2.b	5.1.c	5.1.c	5.1.e	5.1.e	
34	3.1.d	3.1.d	3.2.a	3.4.e	5.2.a	
35	3.2.a	3.2.a	3.2.a	3.2.b	3.2.d	
36	3.4.a	4.1.a	4.1.a	4.2.b	4.3.c	
42	1.1.a	1.1.a	1.2.b	5.1.a	5.1.a	
43	3.4.f	3.4.f	3.4.f	3.4.f	3.4.f	
44	3.2.a	3.2.b	3.2.b	3.2.b	3.3.b	
45	3.3.b	3.3.d	3.4.d	5.1.c	5.1.c	
46	3.4.a	4.1.a	4.1.a	4.1.a	4.2.c	
47	5.1.a	5.1.a	5.1.a	5.1.a	5.1.a	
48	1.1.a	1.1.a	1.1.a	1.2.a	1.2.a	
49	3.1.d	3.4.e	5.2.a	5.2.c	5.2.c	
50	1.2.a	1.2.b	1.2.b	1.2.b	1.2.c	

**Grade 5 (Table D3 Continued)**

<b>Item</b>	<b>Objectives</b>					
<b>51</b>	3.1.a	3.1.c	3.2.a	3.2.b	3.2.b	
<b>52</b>	3.1.b	3.2.a	3.2.d	3.2.d	3.3.b	
<b>53</b>	3.2.a	3.2.d	3.3.b	3.3.b	3.4.c	
<b>54</b>	3.4.a	3.4.a	4.1.a	4.1.a	4.1.a	
<b>55</b>	5.1.a	5.1.a	5.1.a	5.1.a	5.1.b	
<b>56</b>	3.2.d	3.2.d	3.2.d	3.3.b	4.2.d	
<b>57</b>	4.3.a	4.3.a	4.3.a	4.3.a	4.3.b	
<b>58</b>	4.1.a	4.1.a	4.1.a	4.3.d	4.3.d	
<b>59</b>	4.1.c	4.2.b	4.2.b	4.2.b	4.2.b	
<b>60</b>	3.2.d	3.2.d	4.1.c	4.2.b	4.2.b	

## Grade 6

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives					
1	1.1.a	1.1.a	1.1.a	1.1.a	1.2.c	
2	3.1.b	3.1.c	3.1.c	3.1.c	3.1.c	
3	1.1.b	4.3.a	4.3.a	4.3.a	4.3.a	
4	3.1.d	4.2.a	4.2.a	4.2.a	4.3.d	
5	1.1.a	1.1.a	1.2.a	1.2.b	1.2.c	
6	3.1.d	3.2.b	3.2.b	3.2.b	3.4.c	
7	5.1.a	5.1.a	5.1.a	5.1.b	5.1.b	
13	1.1.b	4.3.a	4.3.a	4.3.a	4.3.a	
14	4.3.b	4.3.c	4.3.c	4.3.c	4.3.c	
15	3.1.c	3.1.c	3.1.c	3.1.c	3.1.c	
16	3.3.b	4.3.a	4.3.a	4.3.a	4.3.a	
17	3.2.a	3.2.a	3.4.d	4.2.d	4.2.d	
18	3.2.a	3.2.a	3.4.d	4.2.d	4.2.d	
19	3.2.a	4.1.a	4.2.a	4.2.d	4.2.d	4.2.d
20	5.1.b	5.1.e	5.2.b	5.2.b	5.2.b	
21	1.1.a	1.1.a	1.1.a	1.1.a	1.1.a	
22	1.1.a	1.1.a	1.1.a	1.1.a	1.1.a	
23	3.2.a	3.2.a	3.2.b	3.3.b	3.3.b	
24	3.2.b	3.2.b	3.2.b	3.3.b	3.3.c	
25	3.1.b	4.1.a	4.1.a	4.1.a	4.1.a	
26	5.1.a	5.1.b	5.1.b	5.2.c	5.2.c	
27	1.1.a	1.1.a	1.1.a	1.1.a	1.1.a	
28	1.2.b	1.2.b	1.2.b	1.2.c	1.2.c	
29	3.1.d	3.1.d	3.1.d	3.2.a	3.4.e	
30	3.1.c	3.1.c	3.1.c	3.1.c	3.3.a	
31	3.2.a	3.2.a	3.2.a	3.3.a	3.4.f	
32	3.2.b	3.2.b	3.2.b	3.2.b	3.3.c	
33	1.1.a	1.1.a	1.1.a	1.1.b	1.1.b	
34	1.1.b	1.1.b	1.1.b	3.2.a	4.3	
35	3.1.b	3.2.b	3.3.c	3.4.b	3.4.b	
36	3.1.b	3.2.a	3.2.b	3.4.b	3.4.c	
37	1.2.b	1.2.c	1.2.c	1.2.c	1.2.c	
38	3.1.c	3.1.c	3.1.c	3.1.c	3.1.d	
39	3.1.d	3.1.d	3.3.d	3.4.e	5.2.a	
40	3.1.c	3.1.c	3.1.c	3.3.a	3.3.a	
41	4.1.b	4.1.b	4.1.b	4.1.b	4.1.b	
42	5.1.b	5.1.b	5.1.b	5.1.e	5.2.c	
43	3.1.d	3.3.c	3.4.e	3.4.e	3.4.e	
44	3.1.b	3.1.b	3.1.b	3.1.b	3.2.a	
45	1.1.a	1.1.a	1.2.b	3.1.b	3.1.b	

**Grade 6 (Table D3 Continued)**

<b>Item</b>	<b>Objectives</b>					
<b>46</b>	3.1.c	3.3.d	3.3.d	3.3.d	3.3.d	
<b>47</b>	3.1.b	3.1.b	3.1.c	3.2.a	5.1.d	
<b>48</b>	4.2.c	4.2.c	4.2.c	4.2.c	4.2.c	
<b>49</b>	4.1.a	4.1.a	4.1.a	4.1.a	4.1.a	
<b>55</b>	4.3.a	4.3.a	4.3.a	4.3.a	4.3.d	
<b>56</b>	3.4.b	3.4.b	3.4.b	3.4.e	4.2.a	4.2.b
<b>57</b>	3.1.d	3.1.d	3.3.d	3.3.d	3.3.d	
<b>58</b>	3.2.a	3.2.a	3.2.a	3.2.a	3.4.e	
<b>59</b>	4.1.b	4.1.b	4.1.b	4.1.b	4.1.b	
<b>60</b>	3.4.f	5.1.e	5.1.e	5.1.e	5.1.e	

## Grade 7

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives					
1	1.1	1.3.a	1.3.c	1.3.c	1.3.c	
2	1.1	1.1	1.1	1.1	1.1	
3	1.1	1.3.a	1.3.a	1.3.a	4.3.a	
4	3.2.a	3.4.e	3.4.e	3.4.e	3.4.e	
5	3.1.a	3.1.a	3.1.a	3.3.a	3.3.a	
6	3.3.d	5.1.b	5.2.b	5.2.b	5.2.b	
7	3.2.a	3.2.a	3.2.a	3.2.a	5.2.a	
13	1.2.a	1.2.b	1.2.b	1.2.b	1.2.b	
14	1.3.a	1.3.c	1.3.c	1.3.c	4.3.a	
15	1.3.d	3.1.a	3.1.c	3.1.c	3.2.a	
16	3.2.a	3.2.b	3.2.b	3.2.b	3.2.b	
17	3.1.a	3.2.b	3.4.a	3.4.c	4.2.c	
18	5.1.b	5.1.b	5.2.d	5.2.d	5.2.e	
19	1.2.a	1.2.b	1.2.b	1.2.b	1.2.b	
20	1.1	1.1	1.1	3.4.e	4.3.a	
21	3.2.a	3.4.c	3.4.e	3.4.e	3.4.e	
22	3.2.a	3.3.a	3.4.c	3.4.c	5.1.e	
23	3.3.a	3.3.a	3.3.a	3.3.a	4.2.a	
24	3.2.a	3.4.d	4.2.c	4.2.c	4.2.c	5.1.e
25	5.1.b	5.1.b	5.1.b	5.1.b	5.1.c	
26	3.2.a	3.2.a	3.4.c	3.4.c	3.4.c	3.4.d
27	1.3.b	3.2.a	3.2.a	3.2.a	3.2.b	
28	1.3.d	1.3.d	1.3.d	1.3.d	1.3.d	
29	1.1	3.2.b	3.4.c	4.2.a	4.2.a	
30	3.2.b	3.2.b	3.2.b	3.2.b	3.2.b	
31	4.1.a	4.1.a	4.1.a	4.1.a	4.1.a	
32	5.1.b	5.1.b	5.1.f	5.1.f	5.1.f	
33	1.1	1.1	1.1	1.1	1.1	
34	3.1.c	3.1.c	3.2.a	3.4.c	4.2.b	
35	3.2.a	3.2.a	3.2.b	3.2.b	4.3.c	
36	1.1	1.1	1.1	1.1	1.2.a	1.2.a
37	3.2.b	3.2.b	3.4.a	3.4.c	4.3.a	
38	3.2.b	3.2.b	3.3.a	3.4.a	4.2.a	
39	1.1	1.1	1.1	1.1	1.1	
40	3.1.a	3.4.e	3.4.e	3.4.e	3.4.e	
41	3.2.a	3.3.a	3.3.a	3.3.a	4.2.d	
42	3.1.c	3.1.c	3.2.a	3.3.a	4.1.a	
43	3.3.d	5.1.c	5.1.d	5.1.d	5.2.a	
44	5.1.b	5.2.d	5.2.d	5.2.d	5.2.d	
50	3.1.a	3.1.a	3.1.a	3.2.b	3.3.b	

**Grade 7 (Table D3 Continued)**

<b>Item</b>	<b>Objectives</b>					
<b>51</b>	4.3.a	4.3.a	4.3.a	4.3.a	4.3.b	
<b>52</b>	3.2.b	3.3.a	3.3.a	3.3.a	3.4.c	4.3.c
<b>53</b>	3.2.b	4.2.a	4.2.a	4.2.d	4.2.d	4.3.b
<b>54</b>	4.1.a	4.1.a	4.1.a	4.1.a	4.3.c	
<b>55</b>	5.1.f	5.1.f	5.1.f	5.2.e	5.2.e	5.2.e
<b>56</b>	1.3.a	1.3.a	1.3.a	1.3.a	4.3.a	
<b>57</b>	1.3.a	4.3.a	4.3.a	4.3.a	4.3.a	
<b>58</b>	1.1	5.2.a	5.2.a	5.2.a	5.2.a	
<b>59</b>	3.4.c	3.4.c	3.4.c	4.2.a	4.2.a	4.2.a
<b>60</b>	4.1.a	4.1.a	4.1.a	4.1.a	4.1.a	

## Grade 8

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives						
1	1.1	3.2.a	3.2.a	3.2.a	3.2.a		
2	1.1	1.1	1.1	1.1	1.1		
3	3.4.b	3.4.b	3.4.b	3.4.b	3.4.b	5.2.e	
4	4.1.b	4.3.a	4.3.a	4.3.a	4.3.a		
5	3.1.a	3.1.a	3.1.a	3.4.d	4.1.a	4.3.a	
11	3.1.a	3.1.a	3.1.b	3.1.b	3.2.a	3.3.a	
12	3.1.b	3.3.a	3.3.a	3.3.a	3.3.a		
13	1.3.b	1.3.b	1.3.b	1.3.b	4.3.a		
14	3.4.d	5.1.c	5.2.a	5.2.a	5.2.a		
15	5.1.a	5.1.a	5.1.a	5.1.a	5.2.a		
16	1.3.b	3.1.b	3.2.a	3.4.b	3.4.d	4.3.a	
17	1.1	1.2	1.2	1.2	1.2		
18	3.4.f	3.4.f	4.2.a	4.2.a	4.2.a	4.2.a	
19	3.3.a	3.3.a	3.3.a	3.3.a	4.1.a	4.2.a	
20	4.1.a	4.1.a	4.1.a	4.1.a	4.1.a		
21	3.2.b	3.2.b	3.2.b	3.2.b	4.1.a		
22	1.1	1.1	1.1	1.1	1.1		
23	3.1.a	3.1.b	3.1.b	3.2.a	3.2.a	3.4.d	
24	5.1.b	5.1.b	5.1.b	5.1.c	5.2.a		
25	3.3.a	3.4.b	3.4.b	3.4.b	3.4.b		
26	3.3.a	3.3.b	3.3.b	3.3.b	3.3.b		
27	4.1.a	4.1.a	4.1.a	4.1.a	4.1.b		
28	5.1.a	5.1.a	5.1.a	5.1.a	5.1.a		
29	1.2	1.2	1.2	1.2	1.2		
30	4.3.b	4.3.b	4.3.b	4.3.b	4.3.b		
31	3.3.a	3.3.a	3.3.a	4.1.a	4.2.a		
32	3.4.e	3.4.e	4.2.a	4.2.b	4.2.b		
33	4.2.a	4.2.a	4.2.a	4.2.a	4.2.a		
34	4.1.a	4.1.a	4.1.a	4.1.a	4.1.a		
35	3.2.a	3.3.a	3.3.a	3.3.a	3.3.a		
36	3.1.b	3.1.b	3.1.b	3.3.b	3.4.b		
37	3.2.a	3.4.a	5.1.d	5.1.d	5.1.d	5.1.d	
38	3.1.b	3.1.b	3.1.b	3.1.b	3.2.a	3.4.e	
39	1.3.a	1.3.a	1.3.a	1.3.a	1.3.a	4.3.a	
45	3.1.a	3.1.b	3.1.b	3.2.a			
46	3.2.a	3.2.a	3.2.a	3.2.a	3.4.b		
47	3.1.b	3.1.b	3.1.b	3.2.a	3.2.a		
48	3.2.a	3.4.b	5.1.b	5.1.b	5.1.b	5.1.b	
49	3.3.a	4.2.a	4.2.a	4.2.a	4.2.a		
50	3.2.a	3.2.a	3.2.a	3.2.a	3.2.a	3.3.a	

**Grade 8 (Table D3 Continued)**

Item	Objectives						
<b>51</b>	4.3.a	4.3.a	4.3.c	4.3.c	4.3.c		
<b>52</b>	3.4.e	3.4.e	4.2.a	4.2.a	4.2.a		
<b>53</b>	4.1.a	4.1.a	4.1.a	4.1.a	4.1.a		
<b>54</b>	5.2.c	5.2.c	5.2.c	5.2.c	5.2.c		
<b>55</b>	4.3.b	4.3.b	4.3.b	4.3.b	4.3.b		
<b>56</b>	4.3.c	4.3.c	4.3.c	4.3.c	4.3.c		
<b>57</b>	3.2.a	3.2.a	3.2.a	3.2.a	3.4.e		
<b>58</b>	3.4.e	3.4.f	4.2.a	4.2.a	4.2.a		
<b>59</b>	3.4.d	3.4.e	3.4.f	4.2.a	4.2.a		
<b>60</b>	3.2.a	3.2.a	3.2.b	3.3.a	4.2.a	4.2.a	4.2.a

# Grade 3

**Table D4**

**Items Coded by Reviewers to Each Objective**

Objective	Item Number																									
2																										
2.1	2	2	3	3	3	8	15	17	17	17	17	17	32	32	32	32	38	38	38	38	38	50	50	50	50	
	50	51	51	56	56	56	56																			
2.2	2	2	2	2	2	56																				
2.3	3	3	12	15	15	15	15	31	32	40	40	40	40	40	50	55										
2.4	8	8	8	39	39	39	51	51	51	55	55	60														
4																										
4.1																										
4.1.a	1	1	1	1	4	4	5	6	6	7	11	11	11	16	16	16	25	26	52	57						
4.1.b	16	18	33																							
4.1.c	1	1	1	1	1	5	6	6	7	7	7	9	11	11	16	16	18	25	26	26	26	26	26	33	41	
	52	52	52	57	57	57	57	58	58	58	58															
4.1.d	7	7	9	11	13	16	25	25	58																	
4.2																										
4.2.a	4	4	5	5	9	10	10	10	10	10	11	18	18	25	34	41	41	41	54	54	54	54	59	59	59	
4.2.b	18	28	28	28	53	53	53	59																		
4.3																										
4.3.a	14	14	14	14	14	19	19	19	27	27	27	27	27	43	43	43	49	49	59							
4.3.b	5	14	19	19	19	28	28	49	49	49	54															
4.3.c	6	43	43																							
4.4																										
4.4.a	18	34	34	35	42	42	42	42	42	52	53	53														
4.4.b																										
4.4.c	6	25	41	52																						
5																										
5.2	33																									
5.2.a	33	33	34	34	35	35	35	35	36	36																
5.2.b	36	36	36																							
5.3	4	12	12	12	12	31	31	31	31																	

**Grade 3 (Table D4 Continued)**

Objective	Item Number																							
<b>6</b>																								
<b>6.1</b>	39	55	55																					
<b>6.1.a</b>	29	29	37	37	37	37	37																	
<b>6.1.b</b>	29	29	29	29	39	60	60	60	60															
<b>6.1.c</b>	9																							
<b>6.1.d</b>	8	9	30	30	30	30	30																	
<b>6.1.e</b>	9	13	13	13	13																			

## Grade 4

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																		
<b>1</b>																			
<b>1.1</b>	4	22	22	22	22	22	29	30	30	46	46	47	50	50	50	50	50		
<b>1.2</b>																			
<b>1.2.a</b>	21	21	21	21	21	34													
<b>1.2.b</b>	3	3	3	3	3	29	29	29	29	34	34	34	34	46	46	46	46		
<b>1.3</b>	4	14	14	14	14	24	24	24	24	24	30	30	30	30	47	47	47	47	47
<b>3</b>																			
<b>3.1</b>																			
<b>3.1.a</b>	2	4	4	28	44	45	56	56	56	56	56	57	60						
<b>3.1.b</b>	1	1	2	20	25	27	31	32	36	44	44	57	59						
<b>3.1.c</b>	25	25	25	25															
<b>3.2</b>																			
<b>3.2.a</b>	4	5	5	5	5	27	28	28	31	31	37	44	45	45					
<b>3.2.b</b>	12	12	12	28	35	36	44	45	54	59									
<b>3.2.c</b>	5	12	49	49	49	49	53												
<b>3.3</b>																			
<b>3.3.a</b>	1	2	20	31	32	36	37	37	37	54	57	57	59						
<b>3.3.b</b>	1	2	20	20	27	28	31	36	59	59									
<b>3.3.c</b>	1	32	32	32	35	57													
<b>3.4</b>																			
<b>3.4.a</b>	36																		
<b>3.4.b</b>	17	17	17	17															
<b>3.4.c</b>	33	33	33	33	33	48	48	48	48	48	58	58	58	58	58				
<b>3.4.d</b>	27	36																	
<b>4</b>																			
<b>4.2</b>	13																		
<b>4.2.a</b>	20	23	23	23	23	27	37	49	54	54	54								
<b>4.2.b</b>	19	19	19	19	19	60	60	60	60										
<b>4.2.c</b>	18	18	18	18	18	23													
<b>4.2.d</b>	2	12	45	53	53	53	53												
<b>4.3</b>																			
<b>4.3.a</b>	13	17	52																
<b>4.3.b</b>	13	13	13	14	15	15	15	15	15	26	26	26	26	26	52	52	52	52	
<b>5</b>	51																		
<b>5.1</b>	6	16	38	55															

**Grade 4 (Table D4 Continued)**

Objective	Item Number															
	6	6	6	6	38	38	38	38	51	51	51	55	55	55	55	
<b>5.1.a</b>	6	6	6	6	38	38	38	38	51	51	51	55	55	55	55	
<b>5.1.b</b>	16	16	16	16												
<b>5.1.c</b>																
<b>5.1.d</b>	35	35	35													
<b>5.1.e</b>	51															
<b>5.1.f</b>																

## Grade 5

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																		
<b>1</b>																			
<b>1.1</b>																			
<b>1.1.a</b>	3	3	3	3	12	12	12	14	27	42	42	48	48	48					
<b>1.1.b</b>	27	28																	
<b>1.2</b>																			
<b>1.2.a</b>	3	21	21	21	21	21	48	48	50										
<b>1.2.b</b>	12	42	50	50	50														
<b>1.2.c</b>	20	20	20	20	20	27	27	27	50										
<b>1.3</b>	1	1	1	1	1	14	14	14	14	31	31	31	31	31	32	32	32	32	32
<b>3</b>																			
<b>3.1</b>																			
<b>3.1.a</b>	5	12	51																
<b>3.1.b</b>	5	5	13	13	13	13	26	26	52										
<b>3.1.c</b>	15	15	15	15	18	23	23	23	51										
<b>3.1.d</b>	4	4	5	13	22	22	22	22	22	26	26	26	34	34	49				
<b>3.2</b>																			
<b>3.2.a</b>	24	29	34	35	35	35	44	51	52	53									
<b>3.2.b</b>	5	6	17	18	18	24	24	24	24	25	33	35	44	44	44	51	51		
<b>3.2.c</b>	6	30	30	30															
<b>3.2.d</b>	6	6	6	17	17	17	29	30	35	52	52	53	56	56	56	60	60		
<b>3.3</b>																			
<b>3.3.a</b>	15	18	23	23															
<b>3.3.b</b>	17	19	30	44	45	52	53	53	56										
<b>3.3.c</b>																			
<b>3.3.d</b>	4	4	45																
<b>3.4</b>																			
<b>3.4.a</b>	36	46	54	54															
<b>3.4.b</b>	2	2	2	2															
<b>3.4.c</b>	53																		

**Grade 5 (Table D4 Continued)**

<b>Objective</b>	<b>Item Number</b>																		
<b>3.4.d</b>	18	45																	
<b>3.4.e</b>	4	30	34	49															
<b>3.4.f</b>	16	16	16	16	16	43	43	43	43	43									
<b>4</b>																			
<b>4.1</b>																			
<b>4.1.a</b>	36	36	46	46	46	54	54	54	58	58	58								
<b>4.1.b</b>																			
<b>4.1.c</b>	19	59	60																
<b>4.2</b>																			
<b>4.2.a</b>																			
<b>4.2.b</b>	36	59	59	59	59	60	60												
<b>4.2.c</b>	46																		
<b>4.2.d</b>	19	19	19	56															
<b>4.3</b>																			
<b>4.3.a</b>	57	57	57	57															
<b>4.3.b</b>	28	28	28	28	57														
<b>4.3.c</b>	29	29	29	36															
<b>4.3.d</b>	58	58																	
<b>5</b>																			
<b>5.1</b>																			
<b>5.1.a</b>	25	25	25	25	42	42	47	47	47	47	47	55	55	55	55				
<b>5.1.b</b>	55																		
<b>5.1.c</b>	33	33	45	45															
<b>5.1.d</b>																			
<b>5.1.e</b>	33	33																	
<b>5.1.f</b>	2																		
<b>5.2</b>																			
<b>5.2.a</b>	34	49																	
<b>5.2.b</b>																			
<b>5.2.c</b>	49	49																	
<b>5.2.d</b>																			
<b>5.2.e</b>																			

## Grade 6

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																											
1																												
1.1																												
1.1.a	1	1	1	1	5	5	21	21	21	21	21	22	22	22	22	22	27	27	27	27	27	33	33	33	45			
	45																											
1.1.b	3	13	33	33	34	34	34																					
1.2																												
1.2.a	5																											
1.2.b	5	28	28	28	37	45																						
1.2.c	1	5	28	28	37	37	37	37																				
3																												
3.1																												
3.1.a																												
3.1.b	2	25	35	36	44	44	44	44	45	45	47	47																
3.1.c	2	2	2	2	15	15	15	15	15	30	30	30	30	38	38	38	38	40	40	40	46	47						
3.1.d	4	6	29	29	29	38	39	39	43	57	57																	
3.2																												
3.2.a	17	17	18	18	19	23	23	29	31	31	31	34	36	44	47	58	58	58	58									
3.2.b	6	6	6	23	24	24	24	32	32	32	32	35	36															
3.3																												
3.3.a	30	31	40	40																								
3.3.b	16	23	23	24																								
3.3.c	24	32	35	43																								
3.3.d	39	46	46	46	46	57	57	57																				
3.4																												
3.4.a																												
3.4.b	35	35	36	56	56	56																						
3.4.c	6	36																										
3.4.d	17	18																										
3.4.e	29	39	43	43	43	56	58																					

**Grade 6 (Table D4 Continued)**

Objective	Item Number																							
<b>3.4.f</b>	31	60																						
<b>4</b>																								
<b>4.1</b>																								
<b>4.1.a</b>	19	25	25	25	25	49	49	49	49	49														
<b>4.1.b</b>	41	41	41	41	41	59	59	59	59	59														
<b>4.2</b>																								
<b>4.2.a</b>	4	4	4	19	56																			
<b>4.2.b</b>	56																							
<b>4.2.c</b>	48	48	48	48	48																			
<b>4.2.d</b>	17	17	18	18	19	19	19																	
<b>4.3</b>	34																							
<b>4.3.a</b>	3	3	3	3	13	13	13	13	16	16	16	16	55	55	55	55								
<b>4.3.b</b>	14																							
<b>4.3.c</b>	14	14	14	14																				
<b>4.3.d</b>	4	55																						
<b>5</b>																								
<b>5.1</b>																								
<b>5.1.a</b>	7	7	7	26																				
<b>5.1.b</b>	7	7	20	26	26	42	42	42																
<b>5.1.c</b>																								
<b>5.1.d</b>	47																							
<b>5.1.e</b>	20	42	60	60	60	60																		
<b>5.2</b>																								
<b>5.2.a</b>	39																							
<b>5.2.b</b>	20	20	20																					
<b>5.2.c</b>	26	26	42																					
<b>5.2.d</b>																								

## Grade 7

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
<b>1</b>																									
<b>1.1</b>	1	2	2	2	2	2	3	20	20	20	29	33	33	33	33	33	36	36	36	36	39	39	39	39	39
	58																								
<b>1.2</b>																									
<b>1.2.a</b>	13	19	36	36																					
<b>1.2.b</b>	13	13	13	13	19	19	19	19																	
<b>1.3</b>																									
<b>1.3.a</b>	1	3	3	3	14	56	56	56	56	57															
<b>1.3.b</b>	27																								
<b>1.3.c</b>	1	1	1	14	14	14																			
<b>1.3.d</b>	15	28	28	28	28	28																			
<b>3</b>																									
<b>3.1</b>																									
<b>3.1.a</b>	5	5	5	15	17	40	50	50	50																
<b>3.1.b</b>																									
<b>3.1.c</b>	15	15	34	34	42	42																			
<b>3.2</b>																									
<b>3.2.a</b>	4	7	7	7	7	15	16	21	22	24	26	26	27	27	27	34	35	35	41	42					
<b>3.2.b</b>	16	16	16	16	17	27	29	30	30	30	30	30	35	35	37	37	38	38	50	52	53				
<b>3.3</b>																									
<b>3.3.a</b>	5	5	22	23	23	23	23	38	41	41	41	42	52	52	52										
<b>3.3.b</b>	50																								
<b>3.3.c</b>																									
<b>3.3.d</b>	6	43																							
<b>3.4</b>																									
<b>3.4.a</b>	17	37	38																						
<b>3.4.b</b>																									
<b>3.4.c</b>	17	21	22	22	26	26	26	29	34	37	52	59	59	59											
<b>3.4.d</b>	24	26																							
<b>3.4.e</b>	4	4	4	4	20	21	21	21	40	40	40	40													
<b>4</b>																									

**Grade 7 (Table D4 Continued)**

Objective	Item Number																											
<b>4.1</b>																												
<b>4.1.a</b>	31	31	31	31	31	42	54	54	54	54	60	60	60	60	60													
<b>4.1.b</b>																												
<b>4.2</b>																												
<b>4.2.a</b>	23	29	29	38	53	53	59	59	59																			
<b>4.2.b</b>	34																											
<b>4.2.c</b>	17	24	24	24																								
<b>4.2.d</b>	41	53	53																									
<b>4.3</b>																												
<b>4.3.a</b>	3	14	20	37	51	51	51	51	56	57	57	57	57															
<b>4.3.b</b>	51	53																										
<b>4.3.c</b>	35	52	54																									
<b>5</b>																												
<b>5.1</b>																												
<b>5.1.a</b>																												
<b>5.1.b</b>	6	18	18	25	25	25	25	32	32	44																		
<b>5.1.c</b>	25	43																										
<b>5.1.d</b>	43	43																										
<b>5.1.e</b>	22	24																										
<b>5.1.f</b>	32	32	32	55	55	55																						
<b>5.2</b>																												
<b>5.2.a</b>	7	43	58	58	58	58																						
<b>5.2.b</b>	6	6	6																									
<b>5.2.c</b>																												
<b>5.2.d</b>	18	18	44	44	44	44																						
<b>5.2.e</b>	18	55	55	55																								

## Grade 8

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																											
1																												
1.1	1	2	2	2	2	2	17	22	22	22	22	22																
1.2	17	17	17	17	29	29	29	29	29																			
1.3																												
1.3.a	39	39	39	39	39																							
1.3.b	13	13	13	13	16																							
1.3.c																												
1.3.d																												
3																												
3.1																												
3.1.a	5	5	5	11	11	23	45																					
3.1.b	11	11	12	16	23	23	36	36	36	38	38	38	38	45	45	47	47	47										
3.2																												
3.2.a	1	1	1	1	11	16	23	23	35	37	38	45	46	46	46	46	47	47	48	50	50	50	50	50	50	50	57	
	57	57	57	60	60																							
3.2.b	21	21	21	21	60																							
3.3																												
3.3.a	11	12	12	12	12	19	19	19	19	25	26	31	31	31	35	35	35	35	49	50	60							
3.3.b	26	26	26	26	36																							
3.4																												
3.4.a	37																											
3.4.b	3	3	3	3	3	16	25	25	25	25	36	46	48															
3.4.c																												
3.4.d	5	14	16	23	59																							
3.4.e	32	32	38	52	52	57	58	59																				
3.4.f	18	18	58	59																								
4																												
4.1																												

Grade 8 (Table D4 Continued)

Objective	Item Number																									
4.1.a	5	19	20	20	20	20	20	21	27	27	27	27	31	34	34	34	34	34	53	53	53	53	53			
4.1.b	4	27																								
4.2																										
4.2.a	18	18	18	18	19	31	32	33	33	33	33	33	49	49	49	49	52	52	52	58	58	58	59	59	60	
	60	60																								
4.2.b	32	32																								
4.3																										
4.3.a	4	4	4	4	5	13	16	39	51	51																
4.3.b	30	30	30	30	30	55	55	55	55	55																
4.3.c	51	51	51	56	56	56	56	56																		
5																										
5.1																										
5.1.a	15	15	15	15	28	28	28	28	28																	
5.1.b	24	24	24	48	48	48	48																			
5.1.c	14	24																								
5.1.d	37	37	37	37																						
5.2																										
5.2.a	14	14	14	15	24																					
5.2.b																										
5.2.c	54	54	54	54	54																					
5.2.d																										
5.2.e	3																									

## Grade 3

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**



Objective	Item Number: Number of Reviewers															
2																
2.1	3:3	8:1	15:1	17:5	32:4	38:5	50:5	51:2	56:4	2:2						
2.2	56:1	2:5														
2.3	3:2	15:4	12:1	32:1	31:1	55:1	40:5	50:1								
2.4	51:3	55:2	60:1	39:3	8:3											
4																
4.1																
4.1.a	5:1	4:2	57:1	25:1	26:1	1:4	52:1	7:1	16:3	6:2	11:3					
4.1.b	16:1	33:1	18:1													
4.1.c	33:1	18:1	25:1	26:5	16:2	1:5	6:2	5:1	7:3	57:4	58:4	52:3	41:1	9:1	11:2	
4.1.d	58:1	7:2	11:1	9:1	16:1	13:1	25:2									
4.2																
4.2.a	25:1	18:2	34:1	9:1	10:5	11:1	5:2	4:2	59:3	54:4	41:3					
4.2.b	53:3	59:1	18:1	28:3												
4.3																
4.3.a	27:5	14:5	59:1	49:2	43:3	19:3										
4.3.b	49:3	54:1	5:1	19:3	28:2	14:1										
4.3.c	6:1	43:2														
4.4																
4.4.a	42:5	53:2	52:1	18:1	34:2	35:1										
4.4.b																
4.4.c	25:1	6:1	52:1	41:1												
5																
5.2	33:1															
5.2.a	33:2	34:2	35:4	36:2												
5.2.b	36:3															
5.3	31:4	4:1	12:4													
6																
6.1	39:1	55:2														
6.1.a	37:5	29:2														
6.1.b	39:1	60:4	29:4													
6.1.c	9:1															
6.1.d	9:1	8:1	30:5													
6.1.e	9:1	13:4														

## Grade 4

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Objective	Item Number: Number of Reviewers											
	Low				High							
1												
1.1	4:1	22:5	29:1	50:5	46:2	47:1	30:2					
1.2												
1.2.a	34:1	21:5										
1.2.b	3:5	34:4	29:4	46:4								
1.3	47:5	30:4	24:5	14:4	4:1							
3												
3.1												
3.1.a	4:2	2:1	28:1	44:1	45:1	56:5	57:1	60:1				
3.1.b	57:1	59:1	44:2	36:1	27:1	25:1	31:1	32:1	2:1	1:2	20:1	
3.1.c	25:4											
3.2												
3.2.a	27:1	28:2	31:2	44:1	45:2	37:1	4:1	5:4				
3.2.b	12:3	45:1	44:1	36:1	35:1	28:1	59:1	54:1				
3.2.c	49:4	53:1	12:1	5:1								
3.3												
3.3.a	1:1	2:1	20:1	31:1	32:1	36:1	37:3	59:1	57:2	54:1		
3.3.b	59:2	31:1	28:1	27:1	20:2	2:1	1:1	36:1				
3.3.c	1:1	32:3	35:1	57:1								
3.4												
3.4.a	36:1											
3.4.b	17:4											
3.4.c	33:5	58:5	48:5									
3.4.d	27:1	36:1										
4												
4.2	13:1											
4.2.a	20:1	23:4	37:1	27:1	54:3	49:1						
4.2.b	60:4	19:5										
4.2.c	18:5	23:1										
4.2.d	2:1	12:1	45:1	53:4								
4.3												
4.3.a	52:1	13:1	17:1									
4.3.b	13:3	14:1	15:5	26:5	52:4							
5	51:1											
5.1	55:1	38:1	16:1	6:1								
5.1.a	6:4	38:4	55:4	51:3								
5.1.b	16:4											
5.1.c												
5.1.d	35:3											
5.1.e	51:1											
5.1.f												

## Grade 5

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

	Low				High						
Objective	Item Number: Number of Reviewers										
1											
1.1											
1.1.a	3:4	12:3	14:1	27:1	42:2	48:3					
1.1.b	27:1	28:1									
1.2											
1.2.a	21:5	3:1	48:2	50:1							
1.2.b	50:3	12:1	42:1								
1.2.c	27:3	20:5	50:1								
1.3	14:4	1:5	31:5	32:5							
3											
3.1											
3.1.a	12:1	5:1	51:1								
3.1.b	52:1	5:2	13:4	26:2							
3.1.c	23:3	15:4	18:1	51:1							
3.1.d	49:1	22:5	13:1	5:1	4:2	26:3	34:2				
3.2											
3.2.a	34:1	44:1	35:3	24:1	29:1	51:1	52:1	53:1			
3.2.b	51:2	24:4	25:1	35:1	33:1	44:3	5:1	6:1	18:2	17:1	
3.2.c	6:1	30:3									
3.2.d	29:1	35:1	6:3	17:3	52:2	53:1	60:2	56:3	30:1		
3.3											
3.3.a	18:1	15:1	23:2								
3.3.b	30:1	44:1	45:1	17:1	19:1	56:1	53:2	52:1			
3.3.c											
3.3.d	4:2	45:1									
3.4											
3.4.a	36:1	46:1	54:2								
3.4.b	2:4										
3.4.c	53:1										
3.4.d	18:1	45:1									
3.4.e	34:1	30:1	4:1	49:1							
3.4.f	43:5	16:5									
4											
4.1											
4.1.a	36:2	46:3	58:3	54:3							
4.1.b											
4.1.c	60:1	59:1	19:1								
4.2											
4.2.a											
4.2.b	36:1	59:4	60:2								
4.2.c	46:1										
4.2.d	56:1	19:3									
4.3											
4.3.a	57:4										

Grade 5 (Table D5 Continued)

Objective	Item Number: Number of Reviewers									
4.3.b	57:1	28:4								
4.3.c	29:3	36:1								
4.3.d	58:2									
5										
5.1										
5.1.a	55:4	47:5	42:2	25:4						
5.1.b	55:1									
5.1.c	45:2	33:2								
5.1.d										
5.1.e	33:2									
5.1.f	2:1									
5.2										
5.2.a	34:1	49:1								
5.2.b										
5.2.c	49:2									
5.2.d										
5.2.e										

## Grade 6

**Table D5**  
**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Objective	Item Number: Number of Reviewers											
1												
1.1												
1.1.a	1:4	5:2	21:5	22:5	27:5	33:3	45:2					
1.1.b	33:2	34:3	13:1	3:1								
1.2												
1.2.a	5:1											
1.2.b	5:1	37:1	28:3	45:1								
1.2.c	28:2	37:4	5:1	1:1								
3												
3.1												
3.1.a												
3.1.b	2:1	35:1	36:1	25:1	45:2	44:4	47:2					
3.1.c	47:1	46:1	30:4	38:4	40:3	2:4	15:5					
3.1.d	4:1	6:1	38:1	39:2	29:3	43:1	57:2					
3.2												
3.2.a	58:4	44:1	47:1	29:1	31:3	36:1	34:1	17:2	18:2	23:2	19:1	
3.2.b	23:1	6:3	36:1	35:1	32:4	24:3						
3.3												
3.3.a	30:1	31:1	40:2									
3.3.b	24:1	23:2	16:1									
3.3.c	24:1	32:1	35:1	43:1								
3.3.d	46:4	57:3	39:1									
3.4												
3.4.a												
3.4.b	35:2	36:1	56:3									
3.4.c	36:1	6:1										
3.4.d	18:1	17:1										
3.4.e	39:1	29:1	56:1	58:1	43:3							
3.4.f	60:1	31:1										
4												
4.1												
4.1.a	25:4	19:1	49:5									
4.1.b	59:5	41:5										
4.2												
4.2.a	19:1	4:3	56:1									
4.2.b	56:1											
4.2.c	48:5											

Grade 6 (Table D5 Continued)

Objective	Item Number: Number of Reviewers										
4.2.d	17:2	18:2	19:3								
4.3	34:1										
4.3.a	16:4	3:4	13:4	55:4							
4.3.b	14:1										
4.3.c	14:4										
4.3.d	4:1	55:1									
5											
5.1											
5.1.a	7:3	26:1									
5.1.b	26:2	42:3	7:2	20:1							
5.1.c											
5.1.d	47:1										
5.1.e	60:4	20:1	42:1								
5.2											
5.2.a	39:1										
5.2.b	20:3										
5.2.c	42:1	26:2									
5.2.d											

## Grade 7

**Table D5**  
**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**



Objective	Item Number: Number of Reviewers												
1													
1.1	2:5	3:1	1:1	20:3	29:1	33:5	39:5	58:1	36:4				
1.2													
1.2.a	36:2	19:1	13:1										
1.2.b	13:4	19:4											
1.3													
1.3.a	14:1	1:1	3:3	56:4	57:1								
1.3.b	27:1												
1.3.c	1:3	14:3											
1.3.d	15:1	28:5											
3													
3.1													
3.1.a	15:1	17:1	5:3	40:1	50:3								
3.1.b													
3.1.c	42:2	15:2	34:2										
3.2													
3.2.a	34:1	35:2	27:3	22:1	15:1	16:1	7:4	21:1	4:1	42:1	41:1	24:1	26:2
3.2.b	50:1	52:1	53:1	16:4	17:1	27:1	29:1	35:2	38:2	37:2	30:5		
3.3													
3.3.a	38:1	22:1	23:4	5:2	52:3	41:3	42:1						
3.3.b	50:1												
3.3.c													
3.3.d	43:1	6:1											
3.4													
3.4.a	17:1	38:1	37:1										
3.4.b													
3.4.c	37:1	34:1	22:2	29:1	26:3	17:1	21:1	59:3	52:1				
3.4.d	26:1	24:1											
3.4.e	21:3	20:1	4:4	40:4									
4													
4.1													
4.1.a	42:1	54:4	60:5	31:5									
4.1.b													
4.2													
4.2.a	38:1	23:1	29:2	53:2	59:3								
4.2.b	34:1												
4.2.c	24:3	17:1											
4.2.d	41:1	53:2											
4.3													

**Grade 7 (Table D5 Continued)**

Objective	Item Number: Number of Reviewers												
4.3.a	51:4	57:4	56:1	20:1	3:1	14:1	37:1						
4.3.b	53:1	51:1											
4.3.c	52:1	54:1	35:1										
5													
5.1													
5.1.a													
5.1.b	32:2	25:4	6:1	18:2	44:1								
5.1.c	43:1	25:1											
5.1.d	43:2												
5.1.e	24:1	22:1											
5.1.f	32:3	55:3											
5.2													
5.2.a	58:4	43:1	7:1										
5.2.b	6:3												
5.2.c													
5.2.d	18:2	44:4											
5.2.e	18:1	55:3											

## Grade 8

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**



Objective	Item Number: Number of Reviewers													
1														
1.1	2:5	1:1	17:1	22:5										
1.2	17:4	29:5												
1.3														
1.3.a	39:5													
1.3.b	13:4	16:1												
1.3.c														
1.3.d														
3														
3.1														
3.1.a	11:2	23:1	45:1	5:3										
3.1.b	45:2	38:4	36:3	23:2	16:1	11:2	12:1	47:3						
3.2														
3.2.a	47:2	48:1	57:4	11:1	1:4	16:1	23:2	35:1	38:1	37:1	45:1	46:4	60:2	50:5
3.2.b	21:4	60:1												
3.3														
3.3.a	25:1	26:1	31:3	35:4	12:4	60:1	50:1	49:1	11:1	19:4				
3.3.b	36:1	26:4												
3.4														
3.4.a	37:1													
3.4.b	25:4	36:1	46:1	3:5	16:1	48:1								
3.4.c														
3.4.d	59:1	16:1	5:1	14:1	23:1									
3.4.e	32:2	59:1	57:1	58:1	52:2	38:1								
3.4.f	58:1	59:1	18:2											
4														
4.1														
4.1.a	19:1	20:5	5:1	31:1	21:1	27:4	34:5	53:5						
4.1.b	27:1	4:1												
4.2														
4.2.a	19:1	18:4	31:1	32:1	33:5	52:3	49:4	59:2	60:3	58:3				
4.2.b	32:2													
4.3														
4.3.a	16:1	4:4	5:1	13:1	51:2	39:1								
4.3.b	55:5	30:5												
4.3.c	56:5	51:3												
5														
5.1														
5.1.a	28:5	15:4												

**Grade 8 (Table D5 Continued)**

Objective	Item Number: Number of Reviewers													
5.1.b	24:3	48:4												
5.1.c	24:1	14:1												
5.1.d	37:4													
5.2														
5.2.a	14:3	24:1	15:1											
5.2.b														
5.2.c	54:5													
5.2.d														
5.2.e	3:1													

## **Appendix E**

### **Results of Intra-Class Correlation**

## Results of Intra-Class Correlation

Reliability can be increased by adding more training to reduce the One-Judge Reliability or by adding more judges to reduce the variability of the mean.

### Number of Judges needed to reach Aspiration Level of Reliability

Aspiration Level	One-Judge Reliability			Number of Judges Needed		
	0.335	0.421	0.399	Mathematics	Reading	Science
0.7	4.6	3.2	3.5	5	4	4
0.8	7.9	5.5	6.0	8	6	7
0.9	17.9	12.4	13.6	18	13	14
0.95	37.7	26.1	28.6	38	27	29

Notes: The minimum number of judges calculation is based on the Spearman Browne

Prophecy formula,  $m = \left\{ \frac{\frac{\rho^*}{1-\rho^*}}{\frac{\rho_L}{1-\rho_L}} \right\} = \frac{\rho^* \langle 1-\rho_L \rangle}{\rho_L \langle 1-\rho^* \rangle}$ , where  $\rho^*$  is the reliability aspired to and  $\rho_L$

is the reliability estimate for a single judge.

The two-way analysis assuming both random items and fixed judges gives a result for the mean correlation identical to Cronbach's Alpha, i.e.,  $\alpha = \frac{\sigma_{Bet}^2 - \sigma_e^2}{\sigma_{Bet}^2}$ . While SPSS allows

the user to select between the random and mixed models, the calculations come out the same with either model. Assuming the judges are fixed would imply these are the only judges that would ever be used so there is no component of variance associated with them. *Random judges* assume the judges used are one of many possible selections of judges; then the variability among judges must be taken into account, which will result in a lower value for the intra-class correlation (or any other measure of reliability.)

For the mixed model (i.e., fixed judges), the intra-class correlation would be calculated identically to Alpha.

$$ICC_{FixedJudges} = \frac{ItemMS - EMS}{ItemMS}$$

For the random model, the correct calculation is:

$$ICC_{RandomJudges} = \frac{ItemMS - EMS}{ItemMS + \frac{\langle JudgeMS - EMS \rangle}{n}}$$

## Calculation Modes

Calculation for two-way model with both questions and judges random:

### Grade 3

	Reading	
	DF	MS
questions	49	1.56
judges	4	0.28
error	196	0.18
<b>Intra-Class Correlation</b>		.88
Cronbach's Alpha		.88

### Grade 4

	Reading	
	DF	MS
questions	49	1.18
judges	4	1.83
error	196	0.19
<b>Intra-Class Correlation</b>		.82
Cronbach's Alpha		.84

### Grade 5

	Reading	
	DF	MS
questions	49	0.95
judges	4	0.50
error	196	0.22
<b>Intra-Class Correlation</b>		.77
Cronbach's Alpha		.77

### Grade 6

	Reading	
	DF	MS
questions	49	0.69
judges	4	0.58
error	196	0.19
<b>Intra-Class Correlation</b>		.72
Cronbach's Alpha		.73

## Calculation Modes (Continued)

### Grade 7

	<b>Reading</b>	
	DF	MS
questions	49	0.65
judges	4	0.54
error	196	0.16
<b>Intra-Class Correlation</b>		.74
Cronbach's Alpha		.75

### Grade 8

	<b>Reading</b>	
	DF	MS
questions	49	0.48
judges	4	0.59
error	196	0.15
<b>Intra-Class Correlation</b>		.67
Cronbach's Alpha		.68

## **Appendix F**

### **Biographies of the National Experts**

### **Jacquelyn Graham, PhD**

Dr. Jacquelyn Graham has extensive experience in the field of English language arts education, including reading. Currently, she is a professional development coach consultant with the Association for Supervision and Curriculum Development (Virginia) and an adjunct professor of elementary education at St. Petersburg College (Florida). As a consultant, she helps administrators and teacher leaders build expertise in faculty members to improve teaching quality. As an adjunct professor, Dr. Graham teaches core education online courses for teacher education program candidates in both the undergraduate and alternative certification programs. Her English language arts experience includes 10 years a classroom teacher at the elementary, middle school, and college levels. She has coordinated the reading/English language arts program in elementary education, assisted students with reading difficulties via small group instruction, taught a developmental writing course, and diagnosed students' reading difficulties at grades seven and eight. Dr. Graham's related professional work experience includes curriculum development and test development. As a curriculum developer, she helped to develop a plan for the implementation of reading portfolios for use in county middle schools. In addition, Dr. Graham has test development experience from the Maryland Department of Education, Measurement Incorporated, and Data Recognition Corporation. Among the states she has worked with closely in test development are Alaska, North Carolina, Louisiana, Minnesota, and Pennsylvania. In addition, she served as a consultant on a development team at the Maryland State Department of Education to create an integrated writing, language usage, and reading task for the Maryland School Performance Assessment Program (MSPAP) test.

Furthermore, she has served as a research analyst for the American Institutes of Research. Her responsibilities included directing research and policy analyses over a range of education, assessment, and evaluation programs for all aspects of research, including project management, research design, survey instrument development, statistical analysis, reports, and briefings.

Dr. Graham received a BS in elementary education and a MEd in reading education from Indiana University in Pennsylvania, and a PhD in English education with a specialty in composition from the University of Maryland.

### **Margaret E. Weldon, EdD**

Dr. Margaret Weldon is an educational consultant. She has served as an English language arts national expert for alignment studies based on the methodology of Dr. Norman Webb for the states of Alaska, Nebraska, Idaho, Maryland, and Oklahoma as a facilitator and reviewer. Dr. Weldon was an assessment specialist for the Alabama Department of Education where she managed the writing assessment program development and administration for grades 5, 7, and 11. She led the development of the reading assessment (grades 3–8) for the Alabama Reading and Mathematics Test and the reading comprehension and language subject-area tests of the Alabama High School Graduation Exam (3rd ed.), as well as collaborating on the development of the Alabama Early Learning Assessment—K, 1, and 2 reading tests. Dr. Weldon has conducted statewide writing programs for teachers and administrators on composition, instructional strategies,

holistic scoring, and reading instruction. She has participated in NAEP item reviews for reading and writing and in standard setting using Bookmark and Modified-Angoff methodologies.

Dr. Weldon was a classroom teacher and administrator for 19 years in the Montgomery public schools, as a central office administrator where she directed the implementation of the state assessment program for a school system of 35,000 students. She was English department chairman when she taught secondary English. Also, Dr. Weldon was a Title 1 reading specialist.

She received a BS degree in secondary English education, a MEd degree in secondary reading education, and an EdD degree in educational leadership, foundations, and technology from Auburn University, Auburn, Alabama

### **Carsten Wilmes, PhD**

Dr. Carsten Wilmes is the Assistant Director for Assessment for the World-Class Instructional Design and Test Consortium (WIDA). Dr. Wilmes supervises the development and operational implementation for WIDA's tests and is responsible for the planning and implementation of alignment studies for English language learners. In addition, he coordinates the data analysis for and manages the development of each study's final report. Prior to his current position, he served as WIDA's Alignment Coordinator/Researcher, where he was the presenter and facilitator for alignment workshops for the states of Wisconsin and Oklahoma and the University of Wisconsin-Madison. He also conducted alignment research pursuant to the requirements of the *No Child Left Behind Act of 2001*. Dr. Wilmes has served as a national alignment expert for alignment studies in Louisiana, Maryland, and Oklahoma.

In addition to his educational test background, Dr. Wilmes has considerable expertise in foreign language testing, teaching, translation, and interpretation. As an intern for Berlitz International Inc., Testing Division, he developed a telephone-delivered proficiency test and provided language proficiency test consulting services. Dr. Wilmes also served as a coordinator for international relations for the City of Naori, Japan. There he translated official documents, interpreted for official city functions, coordinated official student and government exchanges, taught ESL and German courses, and functioned as a cultural and community outreach liaison. While working as a research assistant for the Foreign Language Test Group (FLAG) at the University of Illinois at Urbana-Champaign, he developed a specification-based revision of the Oral English Placement Test (Oral EPT) for incoming international graduate students.

Dr. Wilmes has reviewed the book *Diagnosing foreign language proficiency: The interface between learning and test*. His review was published in the *Modern Language Journal*. Furthermore, Dr. Wilmes has presented at numerous professional organizations, including the American Educational Research Association (AERA) Annual Meeting and the 14<sup>th</sup> World Congress of Applied Linguistics. He is a member of the AERA, International Language Testing Association (ILTA), and the Modern Language Association (MLA).

He earned a BA degree in Linguistics from the University of Paderborn (Germany). Additionally, he earned a MA degree in Germanic Languages and Literatures with a concentration in Second Language Acquisition, and a PhD degree in Second Language Acquisition with a concentration in Educational Measurement.

**Oklahoma Core Curriculum Tests  
(OCCT)**

**Science Alignment Study Report**

**Grades 5 and 8**

**December 1–2, 2011**

The findings in this study are those of the independent reviewing team and do **not** represent the opinion of the State of Oklahoma.

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## Overview

The alignment studies for the *Oklahoma Core Curriculum Tests* (OCCT) in grades 5 and 8 science were held on December 1–2, 2011, in Norman, Oklahoma. The purpose of each science alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) for each grade and the test items found on the corresponding grade-level science OCCT. The science alignment study involved a group of five independent third-party reviewers whose primary role was to first judge the depth-of-knowledge level of each PASS standard and objective and then to judge the depth-of-knowledge level of each test item, including identifying the primary and possibly a secondary objective to which each item was aligned. During the study, both sets of standards had to be considered; reviewers were instructed to go through the alignment process first for the process standards and then go back through the entire process for the content standards. This dual review allowed separate statistics to be derived for each set of standards so that the alignment of the items to the process and content standards could be considered separately. All items were aligned to both the process standards and the content standards except for safety items which were designed to be aligned only to process standards.

This report consists of a description of the independent reviewers and the alignment model that was used, including the process and the four criteria used to judge the alignment between the PASS standards and objectives and the test items found on the corresponding OCCT. This report also includes summary tables showing the results from each grade-level study. Overall, the alignment relationships for the science studies are strong and clearly demonstrate that the OCCT science tests are well aligned to the respective Oklahoma PASS standards and objectives.

### Alignment Study Participants

Five reviewers participated in the science alignment studies. Four of the reviewers for each study were Oklahoma educators who had teaching experience and expertise in science. The fifth reviewer for each alignment study was a national content expert. Each national content expert also had extensive expertise in science and experience in standards development, curriculum and instruction development, test development, and alignment studies. In addition to serving as the fifth reviewer, each national content expert also served as a group leader. The list of reviewers is on the next page, and a brief summary of each national expert's professional qualifications is provided in Appendix F.

In addition to the alignment study reviewers, a national alignment study expert, Dr. Carsten Wilmes of the World-Class Instructional Design and Assessment (WIDA) Consortium, also participated in the study. Dr. Wilmes is a well-known alignment expert who has broad experience in conducting alignment studies using the Webb model. Over the years he has worked closely with Dr. Norman Webb, who is affiliated with WIDA's host institution: the Wisconsin Center for Education Research (WCER). The national alignment study expert's role was to oversee the entire alignment process, ensuring that the process was followed correctly. The national alignment study expert also provided reviewers with alignment training. The training included information related to understanding Webb's depth-of-knowledge levels. The training also provided information designed to help reviewers understand the alignment process. Dr. Wilmes's professional qualifications are also provided in Appendix F.

## **List of Participants**

### **Trainer/Facilitator**

Carsten Wilmes, PhD

### **State of Oklahoma Reviewers**

#### **Grade 5**

Melba Sue Bartlett

Darlene Black

Annette Huett

Travis Hurst

#### **National Expert**

Charles Judson Hill, MA

### **State of Oklahoma Reviewers**

#### **Grade 8**

Adrienne Elder

Brenda Grant

Bob Melton

Wendy Wolfe

#### **National Expert**

Sandra Enger

## Alignment Study: Approach and Process

The Oklahoma alignment studies were based on the work of Dr. Norman Webb, Wisconsin Center for Educational Research, University of Wisconsin–Madison. In his work, Webb states that the alignment of the standards or objectives for student learning with tests for measuring students’ attainment of these expectations is an essential component for an effective standards-based education system. The Oklahoma alignment studies were designed to model Webb’s procedures, including the use of depth-of-knowledge levels, Webb’s definition of alignment (Webb, 2002), and the Web Alignment Tool (WAT).

Webb’s alignment model is based upon four criteria as follows:

- *Depth-of-knowledge consistency*—an indication of whether the cognitive demands required of the students on the test are consistent with what students are expected to know and do as stated in the standards.
- *Categorical concurrence*—a general indication of how well the test includes items that measure content from each standard.
- *Range-of-knowledge correspondence*—an indication of whether the extent of knowledge expected of students by a strand is the same as the extent of knowledge required of students to answer the test items correctly.
- *Balance of representation*—the degree to which one objective in a standard is given more emphasis on the test than another objective within the same strand. An index (Webb, 2002) is used to judge the distribution of the test items.

The Webb model provides a reliable set of procedures and criteria for conducting alignment analysis studies. The model combines qualitative expert reviewers’ judgments and quantified coding and analysis of standards and test items. This final alignment study report includes a set of statistics for each standard and grade on the degree of alignment between the content embedded in the PASS standards and objectives for a given grade and the content in the items on the corresponding science OCCT.

The Webb model has been used extensively in many alignment studies throughout the country and has been recommended for use by the Chief Council of State School Officers (CCSSO). The alignment criteria in the Webb model also adhere to the guidelines specified in the United States Department of Education’s Standards and Tests Peer Review documents and is in compliance with the requirements specified by the *No Child Left Behind* (NCLB) legislation. A brief description of the alignment criteria is provided below, and detailed information can be found in the section of this report titled Alignment Criteria.

## **Overview of the Alignment Study Process**

Reviewers were asked to determine the degree of alignment between the PASS objectives (what students should know and be able to do) for each grade and the test questions found on the corresponding science OCCT. In order to accomplish this task, the alignment study process involved four major steps:

- Training
- Assigning depth-of-knowledge levels to the science PASS standards and objectives for each grade
- Taking each test
- Determining what each item measures and identifying the depth-of-knowledge level for each item

A high-level overview of the steps in the process is provided on the next page. The alignment study process also involved the use of the Web Alignment Tool (WAT). Information about the tool and its use in the process is provided below.

### **Use of the Web Alignment Tool (WAT)**

The Web Alignment Tool (WAT), developed by the Wisconsin Center for Education, University of Wisconsin–Madison, was used in the alignment studies. The tool was designed specifically to facilitate the gathering of independent reviewers' judgments. For the Oklahoma science alignment studies, the Web-based application automated the process of aligning the PASS content standards and objectives for a given grade and the test items on the corresponding OCCT. The tool and its reports made it possible to gauge in a timely manner the alignment between the standards and the test on the basis of the criteria. In addition, the tool also provided opportunities for reviewers to provide additional information regarding items, including providing comments related to source of challenge. The item-by-objective codings by reviewers were then aggregated and analyzed automatically through the use of the WAT.

The national alignment expert, Dr. Carsten Wilmes, provided training on the overall alignment process and the depth-of-knowledge levels and served as the lead facilitator. Dr. Wilmes has extensive experience training third-party independent review committee members in the use of the WAT (2005). The training provided information not only on understanding the depth-of-knowledge levels but also on how to use the WAT when assigning a depth-of-knowledge level to each objective and item.

## **Steps in the Alignment Process**

### **Step 1: Receiving training**

Reviewers received training on Webb's depth-of-knowledge levels, the alignment process, and the use of the WAT. The training was provided by the national alignment expert, Dr. Carsten Wilmes.

### **Step 2: Dividing into grade-level groups**

Reviewers were divided into groups according to grade level (grades 5 and 8). Reviewers received additional training on the use of the WAT and the depth-of-knowledge levels.

### **Step 3: Determining the depth-of-knowledge level of each PASS process standard and objective**

Using the WAT, reviewers individually determined the depth of knowledge of each of the PASS standards and objectives. A group discussion followed, and reviewers reached consensus. (See Appendix B.)

### **Step 4: Taking a test**

Reviewers took the OCCT and recorded their answers in the answer booklet. Reviewers noted any source-of-challenge comments or notes about the test items directly in the test booklet.

### **Step 5: Determining what each item measured for the process standards and the depth-of-knowledge level of each item**

Using the WAT, reviewers independently determined what each item measured. Reviewers also entered the depth-of-knowledge level for each item. (Note: If reviewers determined that a given item aligned to more than one objective, the WAT provided them with the opportunity to align each test item with a primary objective and a secondary objective. However, the WAT did not allow reviewers to determine more than one depth-of-knowledge level for a given item.)

Throughout the alignment process, reviewers also independently noted any source of challenge for each test item and provided written comments, as necessary.

### **Step 6: Answering debriefing questions**

Using the WAT, reviewers independently responded to debriefing questions.

### **Step 7: Determining the depth-of-knowledge level of each PASS content standard and objective**

Using the WAT, reviewers individually determined the depth of knowledge of each of the PASS standards and objectives. A group discussion followed, and reviewers reached consensus. (See Appendix B.)

### **Steps in the Alignment Process (Continued)**

#### **Step 8: Determining what each item measured for the content standards and the depth-of-knowledge level of each item**

Using the WAT, reviewers independently determined what each item measured. Reviewers also entered the depth-of-knowledge level for each item. (Note: If reviewers determined that a given item aligned to more than one objective, the WAT provided them with the opportunity to align each test item with a primary objective and a secondary objective. However, the WAT did not allow reviewers to determine more than one depth-of-knowledge level for a given item.)

#### **Step 9: Answering debriefing questions**

Using the WAT, reviewers independently responded to debriefing questions.

#### **Step 10: Participating in a group discussion**

A final group discussion took place. Reviewers shared feedback about the process and/or any other information they wished to share with the group, the alignment experts, or the Oklahoma State Department of Education.

## Alignment Criteria

Reviewers assessed specific criteria related to the content agreement between the Oklahoma content standards, objectives, and test questions. The four criteria receiving major attention were depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation. For each alignment criterion, an acceptable level was defined by what would be required to ensure that a student had met the standards.

### Depth-of-Knowledge Consistency

For the purpose of this study, Webb's definition of depth-of-knowledge consistency was used. According to Webb (2002), depth-of-knowledge consistency between content standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and do as stated in the content standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the objective or one level above the depth-of-knowledge level of the objective. According to the Webb model, as a measure of consistency, at least 50% of the items corresponding to an objective should be at or above the depth-of-knowledge level of the objective. For depth-of-knowledge consistency, this criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. (See Appendix C.)

The Oklahoma definitions for the depth-of-knowledge levels, which are based on the Webb definitions, were used for this alignment study. The levels are as follows: **Level 1** (Recall and Reproduction), **Level 2** (Skills and Concepts), and **Level 3** (Strategic and Extended Thinking). Additional information concerning the levels can be found in Appendix A.

### Categorical Concurrence

According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a very general indication of alignment if the standards and the test incorporate the same content. For these alignment studies, this criterion was judged by first allowing reviewers to make a determination as to whether the test as a whole included questions measuring content from each of the standards. The reviewers used their professional opinions, as well as the Webb guiding principle, to determine that at least six questions measuring content from each standard is a good indicator of categorical concurrence between the standard and the test (Webb, 2002, p. 7).

Using Webb's model, the number of questions used to determine categorical concurrence, six for this study, is based on estimating the number of questions that could produce a reasonably reliable subscale for estimating students' mastery of content on that subscale. Of course, many factors have to be considered in determining a reasonable number, including the reliability of the subscale, the mean score, and the cutoff score for determining mastery. Using a procedure developed by Subkoviak (1988) and assuming that the cutoff score is the mean and that the reliability of one item is 0.1, it was estimated that six questions would produce an agreement coefficient of at least 0.63. This indicates that about 63% of the group would be consistently

classified as either masters or non-masters if two equivalent test administrations were employed. The agreement coefficient would increase if the cutoff score was increased to one standard deviation from the mean to 0.77 and, with a cutoff score of 1.5 standard deviations from the mean, to 0.88.

For the Oklahoma alignment studies, the criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. Six questions were assumed as a minimum for a test measuring content knowledge related to a standard and as a basis for making some decisions about students' knowledge of that standard. If the mean for six questions is three and one standard deviation is one question, then a cutoff score set at four would produce an agreement coefficient of 0.77. Any fewer questions with a mean of one-half of the questions would require a cutoff that would allow a student to miss only one question. This would be a very stringent requirement considering a reasonable standard error of measurement on the subscale. (See Appendix C.)

### **Range-of-Knowledge Correspondence**

For standards and the test questions to be aligned, the breadth of knowledge required on both must be comparable. The range-of-knowledge criterion is used to judge whether the span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the test questions associated with that standard. For an acceptable range of knowledge, at least 50% of the objectives for a standard must have at least one related test question. The range-of-knowledge correspondence criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards. (See Appendix C.)

### **Balance of Representation**

The balance of representation is met if the emphasis of content and performance supplied by the questions (primary, secondary, or both) corresponds to the standards for the test as a whole. Reviewers determined whether the test questions were distributed among the objectives that were assessed. (See Appendix C.)

The balance-of-representation criterion is used to indicate the degree to which one objective is given more emphasis on the test than another. An index is used to judge the distribution of the test questions. This index only considers the objective for a standard that has at least one related assessment item. The index in this study was computed by considering the difference in the proportion of objectives and the proportion of hits (questions corresponding to eligible content) assigned to the objectives. An index value of one signifies perfect balance and is obtained if the hits are equally distributed among the content standards. Index values that approach zero signify that a large proportion of the hits are on only one or two of all of the content standards. Depending on the number of content standards and the number of hits, a unimodal distribution has an index value of less than 0.5. A bimodal distribution has an index value of around 0.55 or 0.6. Index values of 0.7 or higher indicate that questions are distributed among all of the content standards, at least to some degree. Index values between 0.6 and 0.7 indicate the balance-of-representation criterion has only been "moderately" met. The balance-of-representation criterion was judged by first allowing reviewers to align the items to the PASS objectives that measure the standards.

A summary of Webb’s alignment criteria can be found in Table 1.

**Table 1: Alignment Levels for the Four Criteria**

<b>Alignment Level</b>	<b>Depth-of-Knowledge Consistency</b>	<b>Categorical Concurrence</b>	<b>Range-of-Knowledge Correspondence</b>	<b>Balance of Representation</b>
Yes	50%	mean is 6 or more	50%	.70
Yes*	40%–49%	mean is 5 to 5.9	40%–49%	.60–.69
Weaker	less than 40%	mean is less than 5	less than 40%	less than .60

\*Indicates acceptable alignment; however, the alignment is not as strong as Yes.

The results for each of the four criteria discussed in this section were calculated using Webb’s methodology, reviewers’ averaged ratings, and reviewers’ comments. The results for depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation are found in Appendix C.

### **Source of Challenge**

The purpose of each science alignment study was to determine the degree of alignment among the content standards and objectives in the *Priority Academic Student Skills* (PASS) objectives for each grade and the test items found on the corresponding grade-level science OCCT. In addition, the WAT provides opportunities for reviewers to offer comments and/or feedback on how the test questions were written. Reviewers were also encouraged to note whether there was a source-of-challenge issue with a particular test question or questions. A source-of-challenge issue might include a reviewer’s opinion that a particular question contained misleading information or that a particular question might require prior knowledge. All comments about the items and/or source-of-challenge issues were provided to the Oklahoma State Department of Education (SDE) for review and subsequent action, if required.

The source-of-challenge comments are not provided in this report. The final results of this alignment study reflect only the agreement between the PASS standards and objectives and the corresponding science OCCT. In other words, the purpose of the alignment study was not to provide an opinion or to verify the general quality of the Oklahoma standards and objectives or the test. Rather, the purpose of the study was to determine the degree of alignment.

## Depth-of-Knowledge Alignment Analysis

### Depth-of-Knowledge Consensus of the PASS Standards and Objectives

After training, the first major step in the alignment process involved reviewers' determination of the depth-of-knowledge levels of the PASS standards and objectives. Table 2 summarizes the five reviewers' consensus of the depth-of-knowledge levels of the PASS objectives by grade for science. Appendix B provides the depth-of-knowledge consensus values for each objective and the value for the overall standard as determined by the reviewers.

**Table 2: Depth-of-Knowledge Consensus of the PASS Science Objectives by Grade**

Grade	Number of PASS Objectives per Grade	Depth-of-Knowledge Level	Number of PASS Objectives by Depth-of-Knowledge Level and Percentage	
			Number	Percentage
Grade 5 Process	9	1	1	11%
		2	5	56%
		3	3	33%
Grade 5 Content	7	1	2	29%
		2	5	71%
		3	0	0%
Grade 8 Process	11	1	3	27%
		2	4	36%
		3	4	36%
Grade 8 Content	10	1	0	0%
		2	10	100%
		3	0	0%

## Alignment Results

Using the WAT, reviewers independently determined what each item measured. They also entered the depth-of-knowledge level for each item. The WAT provided the statistical data to determine whether each science test as a whole at a given grade level included items measuring content from each of the standards. The tool also provided the statistical data to determine depth-of-knowledge consistency, range-of-knowledge correspondence, and balance of representation.

A high-level summary alignment analysis for depth-of-knowledge consistency, categorical concurrence, range-of-knowledge correspondence, and balance of representation is provided in Tables 3 and 4. The results of the alignment relationship between the PASS standards for science as articulated in the standards for science and the corresponding science OCCT for grades 5 and 8 is very strong as noted in the interpretation of Tables 3 and 4. Detailed information can be found in Appendix C and Appendix D.

**Table 3: Process Standards Summary of Alignment**

Grade	Standard	Depth-of-Knowledge Consistency	Categorical Concurrence	Range-of-Knowledge Correspondence	Balance of Representation
5	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
8	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	WEAKER	YES	YES	YES
	4	YES	YES	YES	YES

**Table 4: Content Standards Summary of Alignment**

Grade	Standard	Depth-of-Knowledge Consistency	Categorical Concurrence	Range-of-Knowledge Correspondence	Balance of Representation
5	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
8	1	YES	YES	YES	YES
	2	YES	YES	YES	YES
	3	YES	YES	YES	YES
	4	YES	YES	YES	YES
	5	YES	YES	YES	YES

## **Interpretation of Alignment Results**

Depth-of-Knowledge Consistency: As stated earlier in this report, depth-of-knowledge consistency between standards and test items indicates alignment if what is elicited from students on the test is as demanding cognitively as what students are expected to know and do as stated in the standards. Therefore, for consistency to exist between the test items and the standards, each item should be coded the same depth-of-knowledge level as the standard or one level above the depth-of-knowledge level of the standard. According to the Webb model, as a measure of consistency, at least 50% of the items must be at or above the depth-of-knowledge level of the corresponding objective.

The results summarized in Table 3 indicate that acceptable depth-of-knowledge consistency of 0.5 was met for all process standards for grade 5 and grade 8, except for standard 3 (Experiment) at grade 8, which may need improvement. This could likely be remedied by slightly increasing the depth-of-knowledge levels of items measuring this process standard. The results summarized in Table 4 indicate that the acceptable depth-of-knowledge consistency of 0.5 was met for all content standards for grade 5 and grade 8.

Categorical Concurrence: The items for grade 5 and grade 8 measure process in four standards: Observe and Measure, Classify, Experiment, and Interpret and Communicate. The assessments for science grade 5 and grade 8 also included items assessing content in three standards for grade 5: Properties of Matter and Energy, Organisms and Environments, and Structure of Earth and the Solar System; and five content standards for grade 8: Properties and Chemical Changes in Matter, Motion and Forces, Diversity and Adaptations of Organisms, Structure and Forces of Earth and the Solar System; and Earth's History. According to Webb (2002), an important aspect of alignment between each standard and the test is whether both address the same content categories. The categorical concurrence criterion provides a general indication of alignment if the standards and the test incorporate the same content.

The results summarized in Tables 3 and 4 indicate that the acceptable level for categorical concurrence, six items, was met for all process standards and all content standards across both grades 5 and 8.

Range-of-Knowledge Correspondence: According to Webb's model, for standards and the items on a given test to be aligned, the breadth of knowledge required on both should be comparable. This is called range-of-knowledge correspondence. The range-of-knowledge criterion is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the items on the test. For an acceptable range-of-knowledge correspondence, according to Webb's model, at least 50% of the items coded to a given standard should have at least one item aligned to them.

The results summarized in Tables 3 and 4 indicate that the range-of-knowledge criterion was met for all process standards and all content standards for grade 5 and grade 8.

Balance of Representation: As stated earlier in this report, balance of representation is the degree to which one objective in a standard is given more emphasis on the test than another objective within the same standard. An index is used to judge the distribution of the test items.

The results summarized in Tables 3 and 4 indicate that balance of representation was met for all grades across all standards.

## Reliability among Reviewers

The intra-class correlation is based on the mean squares from the analysis of variance of a two-way random effects model, reviewers crossed with items (Shrout and Fleiss, 1979) as described in Appendix E. The overall intra-class correlation among the science reviewers' assignment of depth-of-knowledge levels to items was reasonably high for the reviewers. If there is a low variance among the reviewers' coding in assigning depth-of-knowledge levels to items, the intra-class correlation has greater error. Table 4 provides a summary of the intra-class correlation and the percentage of items coded as the same depth-of-knowledge by all reviewers.

**Table 5: Summary of Reliability**

<b>Grade</b>	<b>Intra-Class Correlation</b>	<b>Percentage of Items Coded the Same Depth of Knowledge</b>
<b>Grade 5 Process</b>	.73	33%
<b>Grade 5 Content</b>	.77	49%
<b>Grade 8 Process</b>	.86	24%
<b>Grade 8 Content</b>	.87	38%

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## **Appendix A**

### **Science Depth-of-Knowledge Levels**

# Science Depth-of-Knowledge Levels

## Grades 5 and 8

**Level 1** (Recall and Reproduction) is the recall of information such as a fact, definition, term, or a simple procedure, as well as performing a simple science process or procedure. Level 1 requires students to demonstrate a rote response, use a well-known formula, follow a set procedure (like a recipe), or perform a clearly defined series of steps. A “simple” procedure is well defined and typically involves only one step. Verbs such as “identify,” “recall,” “recognize,” “use,” “calculate,” and “measure” generally represent cognitive work at the recall and reproduction level. Simple word problems that can be directly translated into and solved by a formula are considered Level 1. Verbs such as “describe” and “explain” could be classified at different DOK levels, depending on the complexity of what is to be described and explained.

A student answering a Level 1 item either knows the answer or does not; that is, the answer does not need to be “figured out” or “solved.” In other words, if the knowledge necessary to answer an item automatically provides the answer to the item, the item is at Level 1. If the knowledge necessary to answer the items does not automatically provide the answer, the item is at least at Level 2.

Some examples that represent, but do not constitute all Level 1 performances are:

- Recall or recognize a fact, term, or property
- Represent in words or diagrams a scientific concept or relationship
- Provide or recognize a standard, scientific representation for simple phenomena
- Perform a routine procedure, such as measuring length

**Level 2** (Skills and Concepts) includes the engagement of some mental processing beyond recalling or reproducing a response. The content knowledge or process involved is more complex than in Level 1. Items require students to make some decisions as to how to approach the question or problem. Keywords that generally distinguish a Level 2 item include “classify,” “organize,” “estimate,” “make observations,” “collect and display data,” and “compare data.” These actions imply more than one step. For example, to compare data requires first identifying characteristics of the objects or phenomenon, and then grouping or ordering the objects. Level 2 activities include: making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.

Some action verbs, such as “explain,” “describe,” or interpret” could be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, which requires reading information from the graph, is a Level 2. An item that requires interpretation from a complex graph, such as making decisions regarding features of the graph that need to be considered and how information from the graph can be aggregated, is at a Level 3.

## **Grades 5 and 8 DOK Levels (Continued)**

Some examples that represent, but do not constitute all Level 2 performances are:

- Specify and explain the relationship between facts, terms, properties, or variables
- Describe and explain examples and non-examples of science concepts
- Select a procedure according to specified criteria and perform it
- Formulate a routine problem given data and conditions
- Organize, represent, and interpret data

**Level 3** (Strategic and Extended Thinking) requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands of Level 3 are complex and abstract. The complexity does not result only from the fact that there could be multiple answers, a possibility for both Levels 1 and 2, but because the multi-step task requires more demanding reasoning. In most instances, requiring students to explain their thinking is at Level 3; requiring a very simple explanation or a word or two should be at Level 2. An activity that has more than one possible answer and requires students to justify the response they give would most likely be Level 3. Experimental designs in Level 3 typically involve more than one dependent variable. Other Level 3 activities include: drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems.

Some examples that represent, but do not constitute all Level 3 performances are:

- Identify research questions and design investigations for a scientific problem
- Solve non-routine problems
- Develop a scientific model for a complex situation
- Form conclusions from experimental data

(Oklahoma Core Curriculum Tests Test and Item Specifications: Science, 2010)

## **Appendix B**

### **Depth-of-Knowledge Consensus Values**

## Grade 5 (Process Standards)

Standards and Objectives	Description	Consensus
1	Observe and Measure—Observing is the first action taken by the learner to acquire new information about an object, organism, or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.	2
1.1	Observe and measure objects, organisms, and/or events (e.g., mass, length, time, volume, temperature) using Systems International (SI) units (i.e., grams, milligrams, meters, millimeters, centimeters, kilometers, liters, milliliters, and degrees Celsius).	2
1.2	Compare and/or contrast similar and/or different characteristics (e.g., color, shape, size, texture, sound, position, change) in a given set of objects, organisms, or events.	2
2	Classify—Classifying establishes order. Objects, organisms, and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.	2
2.1	Classify a set of objects, organisms, and/or events using two or more observable properties (e.g., simple dichotomous keys).	2
2.2	Arrange objects, organisms, and/or events in serial order (e.g., least to greatest, fastest to slowest).	2
3	Experiment—Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.	2
3.2	Evaluate the design of a scientific investigation.	3
3.4	Recognize potential hazards and practice safety procedures in all science investigations.	1
4	Interpret and Communicate—Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.	3
4.2	Interpret data tables, line, bar, trend, and/or simple circle graphs.	2
4.3	Make predictions based on patterns in experimental data.	3
4.4	Communicate the results of investigations and/or give explanations based on data.	3

## Grade 5 (Content Standards)

Standards and Objectives	Description	Consensus
1	Properties of Matter and Energy—Describe characteristics of objects based on physical qualities such as size, shape, color, mass, temperature, and texture. Energy can produce changes in properties of objects such as changes in temperature. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
1.1	Matter has physical properties that can be used for identification (e.g., color, texture, shape).	1
1.2	Physical properties of objects can be observed, described, and measured using tools such as simple microscopes, gram spring scales, metric rulers, metric balances, and Celsius thermometers.	2
1.3	Energy can be transferred in many ways (e.g., energy from the Sun to air, water, and metal).	2
2	Organisms and Environments—Organisms within a community are dependent on one another and the environment. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
2.1	Organisms in a community, interacting populations in a common location, depend on each other for food, shelter, and reproduction.	2
2.2	Changes in environmental conditions due to human interactions or natural phenomena can affect the survival of individual organisms and/or entire species.	2
3	Structure of Earth and the Solar System—Interaction between air, water, rocks/ soil, and all living things. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
3.2	Weather exhibits daily and seasonal patterns (i.e., air temperature, cloud type, wind direction, wind speed, and precipitation).	2
3.3	Earth is the third planet from the Sun in a system that includes the moon, the Sun, and eight other planets.	1

## Grade 8 (Process Standards)

Standards and Objectives	Description	Consensus
1	Observe and Measure—Observing is the first action taken by the learner to acquire new information about an object, organism, or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.	1
1.1	Identify qualitative and/or quantitative changes given conditions (e.g., temperature, mass, volume, time, position, length) before, during, and after an event.	2
1.2	Use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) when measuring objects, organisms, and/or events.	1
1.3	Use appropriate System International (SI) units (i.e., grams, meters, liters, degrees Celsius, and seconds); and SI prefixes (i.e., micro-, milli-, centi-, and kilo-) when measuring objects, organisms, and/or events.	1
2	Classify—Classifying establishes order. Objects, organisms, and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.	2
2.1	Using observable properties, place an object, organism, and/or event into a classification system (e.g., dichotomous keys).	2
2.2	Identify properties by which a set of objects, organisms, and/or events could be ordered.	2
3	Experiment—Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.	3
3.1	Ask questions about the world and design investigations that lead to scientific inquiry.	3
3.2	Evaluate the design of a scientific investigation.	3
3.3	Identify variables and/or controls in an experimental setup: independent (tested/experimental) variable and dependent (measured) variable.	3
3.6	Recognize potential hazards and practice safety procedures in all science activities.	1
4	Interpret and Communicate—Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.	3
4.2	Interpret data tables, line, bar, trend and/or circle graphs.	2
4.3	Evaluate data to develop reasonable explanations, and/or predictions.	3

## Grade 8 (Content Standards)

Standards and Objectives	Description	Consensus
1	Properties and Chemical Changes in Matter—Physical characteristics of objects can be described using shape, size, and mass. The materials from which objects are made can be described using color, texture, and hardness. These properties can be used to distinguish and separate one substance from another. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
1.1	Substances react chemically with other substances to form new substances with different characteristics (e.g., rusting, burning, reaction between baking soda and vinegar).	2
1.2	Matter has physical properties that can be measured (i.e., mass, volume, temperature, color, texture, density, and hardness). In chemical reactions and physical changes, matter is conserved (e.g., compare and contrast physical and chemical changes).	2
2	Motions and Forces—The motion of an object can be described by its position, direction of motion, and speed. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
2.1	The motion of an object can be measured. The position of an object, its speed and direction can be represented on a graph.	2
2.2	An object that is not being subjected to a net force will continue to move at a constant velocity (in a straight line and at a constant speed).	2
3	Diversity and Adaptations of Organisms—Millions of species of animals, plants, and microorganisms are alive today. Although different species might look dissimilar, the unity among organisms becomes apparent from an analysis of internal and external structures. Adaptation involves the selection of naturally occurring variations in populations. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
3.1	By classifying organisms, biologists consider details of internal and external structure.	2
3.2	Organisms have a great variety of internal and external structures that enable them to survive in a specific habitat such as echolocation of bats and seed dispersal methods.	2
4	Structures and Forces of the Earth and Solar System—The earth is mostly rock, three-fourths of its surface is covered by a relatively thin layer of water, and the entire planet is surrounded by a relatively thin blanket of air, and is able to support life. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
4.1	Landforms result from constructive forces such as crustal deformation, volcanic eruption, and deposition of sediment and destructive forces such as weathering and erosion.	2
4.2	The formation, weathering, sedimentation, and reformation of rock constitute a continuing “rock cycle” in which the total amount of material stays the same as its form changes.	2
5	Earth’s History—The Earth’s history involves periodic changes in the structures of the earth over time. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
5.1	Earth’s history has been punctuated by occasional catastrophic events, such as the impact of asteroids or comets, enormous volcanic eruptions, periods of continental glaciation, and the rise and fall of sea level.	2
5.2	Fossils provide important evidence of how life and environmental conditions have changed.	2

# **Appendix C**

## **Summary Tables**

## Grade 5 Science Process Standards

**Table S1: Depth-of-Knowledge Consistency between Standards and Assessments**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Observe and Measure</b>	2	11.8	8.01	43.7	15	45.3	5	11	12	YES
<b>2 Classify</b>	2	10.6	2.07	26.16	17	53.8	19	20.05	18	YES
<b>3 Experiment</b>	2	9.4	2.7	45.24	14	54.76	14	0	0	YES
<b>4 Interpret and Communicate</b>	3	23.8	4.38	37.98	13	50.86	11	11.16	4	YES
<b>Total</b>	9	55.6	8.93	38.49	10.8	51.44	7.3	10.07	5.1	

**Table S2: Categorical Concurrence between Standards and Assessments**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Observe and Measure</b>	2	2	2	100	11.8	8.01	YES
<b>2 Classify</b>	2	2	2	100	10.6	2.07	YES
<b>3 Experiment</b>	2	1	1	50	9.4	2.7	YES
		3	1	50			
<b>4 Interpret and Communicate</b>	3	2	1	33.33	23.8	4.38	YES
		3	2	66.67			
<b>Total</b>	9	1	1	11	55.6	8.93	
		2	5	56			
		3	3	33			

## Grade 5 Science Process Standards (Continued)

**Table S3: Range-of-Knowledge Correspondence and Balance of Representation Between Standards as Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Observe and Measure	2	11.8	8.01	2.2	0.45	100	0	YES	20	10	0.81	0.12	YES
2 Classify	2	10.6	2.07	2.2	0.45	100	0	YES	19	5	0.86	0.06	YES
3 Experiment	2	9.4	2.7	2	0	100	0	YES	17	4	0.85	0.11	YES
4 Interpret and Communicate	3	23.8	4.38	3	0	100	0	YES	43	8	0.75	0.04	YES
Total	9	55.6	8.93	2.4	0.44	100	0		25	12	0.82	0.05	

## Grade 5 Science Content Standards

**Table S1: Depth-of-Knowledge Consistency between Standards and Assessments**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Properties of Matter and Energy</b>	3	18.2	6.3	21.97	15	46.03	12	32.01	24	YES
<b>2 Organisms and Environments</b>	2	15.4	2.7	19.52	12	51.11	22	29.37	21	YES
<b>3 Structure of Earth and the Solar System</b>	2	13.4	0.55	14.62	12	50.77	8	34.62	17	YES
<b>Total</b>	7	47	6.52	19.57	9.1	48.94	8.6	31.49	15.5	

**Table S2: Categorical Concurrence between Standards and Assessments**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Properties of Matter and Energy</b>	3	1 2	1 2	33.33 66.67	18.2	6.3	YES
<b>2 Organisms and Environments</b>	2	2	2	100	15.4	2.7	YES
<b>3 Structure of Earth and the Solar System</b>	2	1 2	1 1	50 50	13.4	0.55	YES
<b>Total</b>	7	1 2	2 5	29 71	47	6.52	

## Grade 5 Science Content Standards (Continued)

**Table S3: Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Properties of Matter and Energy	3	18.2	6.3	3	0	100	0	YES	38	8	0.77	0.13	YES
2 Organisms and Environments	2	15.4	2.7	2.2	0.45	100	0	YES	33	6	0.87	0.09	YES
3 Structure of Earth and the Solar System	2	13.4	0.55	2	0	100	0	YES	29	3	0.92	0.03	YES
Total	7	47	6.52	2.4	0.53	100	0		33	5	0.85	0.09	

## Grade 8 Science Process Standards

**Table S1: Depth-of-Knowledge Consistency between Standards and Assessments**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Observe and Measure</b>	3	8.2	2.17	8.79	13	60.87	27	30.34	22	YES
<b>2 Classify</b>	2	13.4	4.45	8.67	14	69.83	25	21.5	17	YES
<b>3 Experiment</b>	4	17	5.66	60.64	7	36.03	4	3.33	5	WEAKER
<b>4 Interpret and Communicate</b>	2	14.8	2.28	30.59	11	52.7	13	16.71	14	YES
<b>Total</b>	11	53.4	9.34	31.84	5.4	51.31	14.3	16.85	11.5	

**Table S2: Categorical Concurrence between Standards and Assessments**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Observe and Measure</b>	3	1 2	2 1	66.67 33.33	8.2	2.17	YES
<b>2 Classify</b>	2	2	2	100	13.4	4.45	YES
<b>3 Experiment</b>	4	1 3	1 3	25 75	17	5.66	YES
<b>4 Interpret and Communicate</b>	2	2 3	1 1	50 50	14.8	2.28	YES
<b>Total</b>	11	1 2 3	3 4 4	27 36 36	53.4	9.34	

## Grade 8 Science Process Standards (Continued)

**Table S3: Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Observe and Measure	3	8.2	2.17	2.4	0.55	80	18.26	YES	15	4	0.76	0.06	YES
2 Classify	2	13.4	4.45	2	0	100	0	YES	25	7	0.81	0.07	YES
3 Experiment	4	17	5.66	3.8	0.45	95	11.18	YES	31	6	0.87	0.09	YES
4 Interpret and Communicate	2	14.8	2.28	2	0	100	0	YES	28	4	0.91	0.08	YES
Total	11	53.4	9.34	2.6	0.85	93.75	9		25	7	0.84	0.07	

## Grade 8 Science Content Standards

**Table S1: Depth-of-Knowledge Consistency between Standards and Assessments**

Standards		Hits		Depth-of-Knowledge Levels						DOK Consistency
	Objectives	Mean	Standard Deviation	% Under	Standard Deviation	% At	Standard Deviation	% Above	Standard Deviation	
<b>1 Properties and Chemical Changes in Matter</b>	2	12.8	1.3	17.88	15	80.69	16	1.43	3	YES
<b>2 Motions and Forces</b>	2	8.4	0.89	12	9	71.5	10	16.5	6	YES
<b>3 Diversity and Adaptations of Organisms</b>	2	10.6	1.95	11.12	11	64.56	21	24.32	15	YES
<b>4 Structures and Forces of Earth and the Solar System</b>	2	7.6	3.58	7.52	11	64.33	27	28.15	19	YES
<b>5 Earth's History</b>	2	8.6	1.14	10.79	19	53.8	25	35.4	9	YES
<b>Total</b>	10	48	6.04	12.92	10.4	66.67	16.3	20.42	8.1	

**Table S2: Categorical Concurrence between Standards and Assessments**

Standards		Level by Objective			Hits		Categorical Concurrence
	Objectives	Level	Objectives by Level	Percent by Level	Mean	Standard Deviation	
<b>1 Properties and Chemical Changes in Matter</b>	2	2	2	100	12.8	1.3	YES
<b>2 Motions and Forces</b>	2	2	2	100	8.4	0.89	YES
<b>3 Diversity and Adaptations of Organisms</b>	2	2	2	100	10.6	1.95	YES
<b>4 Structures and Forces of Earth and the Solar System</b>	2	2	2	100	7.6	3.58	YES
<b>5 Earth's History</b>	2	2	2	100	8.6	1.14	YES
<b>Total</b>	10	2	10	100	48	6.04	

## Grade 8 Science Content Standards (Continued)

**Table S3: Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment**

Standards		Hits		Range of Objectives				Range of Knowledge	Balance Index				Balance of Representation
				Number of Objectives Hit		% of Total			Percent of Total Hits		Index		
									Mean	Standard Deviation	Mean	Standard Deviation	
	Objectives	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		Mean	Standard Deviation	Mean	Standard Deviation	
1 Properties and Chemical Changes in Matter	2	12.8	1.3	2	0	100	0	YES	27	1	0.89	0.04	YES
2 Motions and Forces	2	8.4	0.89	2	0	100	0	YES	18	2	0.83	0.12	YES
3 Diversity and Adaptations of Organisms	2	10.6	1.95	2	0	100	0	YES	22	2	0.95	0.05	YES
4 Structures and Forces of Earth and the Solar System	2	7.6	3.58	2	0	100	0	YES	15	6	0.86	0.11	YES
5 Earth's History	2	8.6	1.14	2	0	100	0	YES	18	3	0.92	0.12	YES
Total	10	48	6.04	2	0	100	0		20	4	0.89	0.05	

## **Appendix D**

### **Depth-of-Knowledge Levels by Item and Reviewers**

## Grade 5 Science Process Standards

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	1	1	1	1
2	1	1	1	1	1
4	2	3	3	3	2
5	2	3	2	3	3
7	2	2	3	2	2
8	2	2	3	3	1
9	2	3	2	2	1
10	3	2	3	3	1
11	3	2	2	2	1
12	1	3	2	2	2
14	2	3	2	3	2
15	1	1	3	2	2
16	2	2	1	2	1
17	1	3	2	1	2
18	2	1	1	2	1
19	2	2	1	1	1
20	2	3	2	2	2
21	2	2	2	2	1
24	2	3	3	3	2
25	2	3	2	2	3
26	1	1	1	1	1
27	3	3	3	2	2
28	2	2	2	2	2
29	2	2	2	1	2
31	2	3	2	2	2
32	2	1	1	1	1
33	2	2	2	2	1
34	1	1	1	1	1
37	2	1	2	2	1
38	1	2	1	1	1
39	2	2	2	2	1
40	3	3	3	3	3
41	2	2	3	2	2
42	1	3	1	2	1
43	2	1	2	1	2
44	3	2	2	2	1
45	1	1	1	1	1
46	1	3	2	3	1
48	2	2	2	1	1
49	2	3	2	1	1
50	1	2	1	1	2
51	2	1	2	2	2
52	2	2	2	1	1
54	2	1	3	1	2
55	2	3	1	1	2

## Grade 5 Science Content Standards

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	1	1	1	1	1
2	1	1	1	1	1
4	2	3	2	3	2
5	2	3	2	3	2
7	2	2	3	2	2
8	2	3	3	3	1
9	2	3	2	2	2
10	3	2	3	3	2
11	3	2	2	2	1
12	1	3	1	2	2
14	2	2	3	3	2
15	1	3	3	2	2
16	2	2	1	2	1
17	1	3	2	1	2
18	2	1	1	2	1
19	2	2	1	1	1
20	2	3	2	2	2
21	2	2	2	2	1
24	2	3	3	3	2
25	2	3	2	2	3
26	1	1	1	1	1
27	3	3	3	2	2
28	2	2	2	2	2
29	2	2	2	1	2
31	2	3	2	2	2
32	2	1	1	1	1
33	2	2	2	2	1
34	1	1	1	1	-
37	2	1	2	2	1
38	1	2	1	1	1
39	2	2	2	2	1
40	3	3	3	3	3
41	2	2	3	2	2
42	1	2	1	2	1
43	2	2	2	1	2
44	3	2	2	2	1
45	1	1	1	1	-
46	1	3	2	3	1
48	2	2	2	1	1
49	2	2	2	1	1
50	1	2	1	1	2
51	2	2	2	2	2
52	2	2	2	1	1
54	2	1	3	1	2
55	2	3	1	1	2

## Grade 8 Science Process Standards

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	3	2	2	2
2	1	1	1	1	1
3	2	2	1	2	2
5	2	2	2	2	2
6	2	2	2	2	2
7	2	2	1	1	2
9	1	1	1	1	1
10	2	2	2	3	2
11	2	1	2	2	2
12	2	2	2	2	2
13	2	2	2	2	2
15	2	2	2	1	2
16	2	2	2	2	2
17	2	1	2	-	2
19	3	3	3	3	3
20	2	1	2	1	2
22	2	1	1	1	1
24	2	2	2	2	2
25	1	1	2	1	1
26	2	2	2	2	1
27	2	2	2	1	2
28	2	2	3	2	3
29	2	3	3	3	3
30	2	2	3	2	2
31	3	2	3	3	2
33	2	2	3	2	2
34	2	2	2	2	2
35	2	3	2	2	2
36	1	2	2	1	1
37	2	2	2	1	1
39	2	3	3	3	2
40	3	3	3	3	3
41	3	2	3	3	2
42	2	3	2	2	2
43	2	3	2	3	2
45	2	2	2	2	2
46	2	2	1	2	2
47	3	3	3	3	2
48	2	1	1	1	2
49	2	3	2	2	2
50	2	3	3	3	3
51	2	2	3	2	2
53	2	1	2	1	2
54	2	2	2	1	2
55	2	3	3	2	2

## Grade 8 Science Content Standards

**Table D1**  
**DOK Levels by Item and Reviewers**

Item	R1	R2	R3	R4	R5
1	2	2	2	2	2
2	2	1	1	1	1
3	2	2	1	2	2
5	2	2	2	2	2
6	2	2	2	2	2
7	2	2	1	1	2
9	1	1	1	1	1
10	2	3	2	2	2
11	2	2	2	2	2
12	2	2	2	2	2
13	2	2	2	1	2
15	2	2	2	1	2
16	2	2	2	2	2
17	2	2	1	1	2
19	3	3	3	3	3
20	2	2	1	1	2
22	2	1	1	1	1
24	2	2	2	2	2
25	1	1	2	1	1
26	2	2	2	2	2
27	2	2	2	2	2
28	2	2	3	2	2
29	3	3	3	3	3
30	2	2	2	2	2
31	2	2	3	2	2
33	2	2	2	2	2
34	2	2	3	2	2
35	2	2	3	1	2
36	1	2	2	1	1
37	2	2	2	1	2
39	2	3	3	3	3
40	3	3	3	3	3
41	2	2	3	2	2
42	2	3	2	2	3
43	2	2	2	3	2
45	2	3	2	2	2
46	2	2	1	2	2
47	3	3	3	3	2
48	2	1	1	1	2
49	2	2	2	2	2
50	2	3	3	3	3
51	2	2	3	2	2
53	2	2	2	2	1
54	2	2	2	1	2
55	2	2	3	2	2

## Grade 5 Science Process Standards

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

		Low		High			
		1-2	3	4	5		
Item	Objective: Number of Reviewers						
1	3.4:5						
2	3.4:5						
4	1.1:1	1.2:1	2.1:1	4.2:1	4.3:2	4.4:1	
5	4.2:2	4.3:4					
7	1.2:1	4.2:3	4.4:2				
8	1.1:2	1.2:1	2.1:4	4.2:2			
9	1.2:1	2.1:4					
10	1.1:1	1.2:1	2.1:5				
11	1.1:1	1.2:1	4.2:3	4.3:1			
12	1.2:3	4.3:2					
14	2.2:1	3.2:2	4.2:2	4.4:1			
15	1.0:1	1.2:1	3.2:1	4.3:3	4.4:1		
16	1.2:2	2.1:2	2.2:1	4.3:1			
17	1.1:1	3.2:4					
18	1.2:1	2.1:3	4.2:1				
19	1.1:5	3.2:2					
20	2.2:1	3.2:5					
21	4.2:5						
24	4.2:2	4.3:5	4.4:1				
25	3.2:5	4.4:1					
26	1.1:4	3.2:1					
27	1.1:2	1.2:1	2.2:1	3.2:1	4.2:2		
28	1.1:2	1.2:1	3.2:1	4.4:2			
29	2.1:1	2.2:1	4.2:4	4.4:1			
31	1.1:1	2.2:1	3.2:1	4.2:3	4.3:2		
32	1.1:1	1.2:1	2.2:4				
33	1.1:1	2.2:4	4.2:1	4.4:1			
34	3.4:4						
37	1.1:3	1.2:1	3.2:1				
38	1.1:1	2.0:1	2.1:1	2.2:1	4.4:1		
39	1.1:2	2.2:3	4.2:4				
40	3.2:2	4.2:1	4.3:2	4.4:3			
41	1.2:1	2.0:1	2.1:1	2.2:1	4.2:2		
42	1.2:2	4.3:3	4.4:1				
43	3.2:1	4.2:4					
44	2.2:3	3.2:1	4.2:3				
45	3.4:4						
46	2.2:2	4.2:4	4.3:2				
48	1.1:1	4.2:5					
49	1.2:1	4.2:4	4.3:2				
50	1.1:1	1.2:1	2.0:1	4.4:2			
51	1.2:1	4.2:1	4.3:3	4.4:3			
52	2.1:4	4.2:1					
54	4.2:5						
55	1.1:5	3.2:1	4.4:1				

## Grade 5 Science Content Standards

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

	Low		High	
	1-2	3	4	5
Item	Objective: Number of Reviewers			
1				
2				
4	2.2:1	3.2:4		
5	2.1:3	2.2:3		
7	1.2:3	1.3:1	2.2:1	3.2:2
8	1.2:1	3.2:5		
9	1.1:2	1.2:1	2.1:2	
10	1.1:1	1.2:1	2.1:3	2.2:1
11	1.2:4	1.3:3		
12	2.1:2	2.2:5		
14	1.2:1	2.1:5		
15	2.1:4	2.2:2		
16	1.1:2	1.2:1	2.1:2	
17	1.2:4	1.3:1		
18	1.1:3	1.2:1	2.1:1	
19	1.2:5			
20	1.1:1	1.2:4	1.3:1	
21	1.2:1	1.3:1	3.2:3	
24	2.1:4	2.2:3		
25	3.3:5			
26	1.1:1	1.2:4	3.3:3	
27	1.1:1	1.2:4		
28	1.2:1	2.0:1	2.1:2	2.2:1
29	2.1:5			
31	1.1:1	1.2:4	1.3:3	
32	1.1:4	1.2:1		
33	1.1:1	1.2:1	3.3:5	
34				
37	1.1:1	3.2:5		
38	2.1:5			
39	3.3:5			
40	1.1:1	2.2:4		
41	2.1:4	2.2:1		
42	3.2:5			
43	3.2:5			
44	1.1:1	1.2:1	1.3:3	2.1:1
45				
46	1.3:2	3.3:5		
48	3.2:5			
49	1.1:4	2.2:1		

## Grade 5 Science Content Standards

**Table D2 (Continued)**

Item	Objective: Number of Reviewers			
50	2.1:3	2.2:2		
51	3.2:5			
52	3.3:5			
54	2.2:5			
55	1.1:1	1.2:4	1.3:4	

## Grade 8 Science Process Standards

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low			High			
1-2		3	4	5		
Item	Objective: Number of Reviewers					
1	1.1:2	4.2:3				
2	3.6:4					
3	1.1:1	2.1:1	4.2:2			
5	3.2:5					
6	3.2:1	3.3:5				
7	2.1:1	3.1:1	4.3:3			
9	3.6:5					
10	2.1:2	2.2:4	4.2:1	4.3:2		
11	2.1:3	2.2:3	4.3:1			
12	2.1:4	2.2:2	4.3:1			
13	1.3:1	3.3:4				
15	3.3:5					
16	1.1:1	1.3:1	4.2:4	4.3:1		
17	2.1:2	2.2:1	4.2:1			
19	3.2:1	4.2:2	4.3:4			
20	2.1:1	2.2:2	3.1:1			
22	1.3:5					
24	3.2:4	3.3:1				
25	3.6:5					
26	2.2:2	4.2:3	4.3:2			
27	1.1:2	4.3:3				
28	1.1:2	3.1:2	3.2:1	4.3:1		
29	2.1:5	4.3:2				
30	3.1:1	3.2:2	4.2:1	4.3:3		
31	3.2:5					
33	1.1:4	3.1:1	3.2:1			
34	3.1:1	3.2:2	3.3:5			
35	3.1:3	4.3:2				
36	3.6:5					
37	1.1:5					
39	2.1:4	2.2:2	4.2:2			
40	3.3:4	4.2:2	4.3:1			
41	1.1:3	1.2:1	1.3:1	3.1:1	3.2:2	4.2:2
42	2.1:5					
43	4.2:5					
45	1.1:1	2.2:1	3.1:1	4.2:1	4.3:2	
46	2.1:1	2.2:4				
47	1.2:1	1.3:1	2.1:2	4.2:1	4.3:3	
48	2.1:3	2.2:1				
49	1.1:1	1.3:1	4.2:3			
50	2.2:1	4.2:1	4.3:5			
51	1.2:1	1.3:2	2.1:2	2.2:1	4.3:2	
53	1.1:4	4.3:2				
54	2.2:1	3.1:3	3.2:2	3.3:1		
55	2.1:5	2.2:1				

## Grade 8 Science Content Standards

**Table D2**

**Number of Reviewers Coding Objective by Item (Objective: Number of Reviewers)**

Low			High
1-2	3	4	5

Item	Objective: Number of Reviewers		
1	1.1:1	1.2:4	
2	1.1:4	1.2:2	
3	1.2:5		
5	1.1:4	1.2:2	
6	2.1:5	2.2:1	
7	4.1:3	5.1:4	
9			
10	3.1:2	3.2:4	
11	3.2:5		
12	3.1:4	3.2:3	
13	1.1:4	1.2:1	
15	1.2:3	4.2:2	
16	2.1:5		
17	3.2:5		
19	4.1:2	5.1:5	
20	4.2:5		
22	2.1:5		
24	1.1:5		
25	1.2:3		
26	5.1:1	5.2:5	
27	2.2:5		
28	4.2:5		
29	3.1:3	5.2:4	
30	1.1:1	1.2:4	
31	2.1:3	2.2:2	
33	1.1:1	1.2:5	
34	1.2:2	4.1:3	4.2:1
35	5.1:5		
36			
37	1.1:5	1.2:2	
39	3.1:5		
40	2.1:4	2.2:2	
41	1.1:1	1.2:4	
42	3.1:5	3.2:1	
43	4.1:2	5.1:4	
45	4.1:4	5.1:3	
46	3.1:5		
47	1.2:1	4.1:3	4.2:3
48	3.2:5		
49	2.1:4	2.2:1	
50	5.1:1	5.2:5	
51	3.1:4	3.2:1	5.1:1
53	2.2:5		
54	4.2:1	5.2:5	
55	3.1:1	4.2:4	

## Grade 5 Science Process Standards

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives									
1	3.4	3.4	3.4	3.4	3.4					
2	3.4	3.4	3.4	3.4	3.4					
4	1.1	1.2	2.1	4.2	4.3	4.3	4.4			
5	4.2	4.2	4.3	4.3	4.3	4.3				
7	1.2	4.2	4.2	4.2	4.4	4.4				
8	1.1	1.1	1.2	2.1	2.1	2.1	2.1	4.2	4.2	
9	1.2	2.1	2.1	2.1	2.1					
10	1.1	1.2	2.1	2.1	2.1	2.1	2.1			
11	1.1	1.2	4.2	4.2	4.2	4.3				
12	1.2	1.2	1.2	4.3	4.3					
14	2.2	3.2	3.2	4.2	4.2	4.4				
15	1	1.2	3.2	4.3	4.3	4.3	4.4			
16	1.2	1.2	2.1	2.1	2.2	4.3				
17	1.1	3.2	3.2	3.2	3.2					
18	1.2	2.1	2.1	2.1	4.2					
19	1.1	1.1	1.1	1.1	1.1	3.2	3.2			
20	2.2	3.2	3.2	3.2	3.2	3.2				
21	4.2	4.2	4.2	4.2	4.2					
24	4.2	4.2	4.3	4.3	4.3	4.3	4.3	4.4		
25	3.2	3.2	3.2	3.2	3.2	4.4				
26	1.1	1.1	1.1	1.1	3.2					
27	1.1	1.1	1.2	2.2	3.2	4.2	4.2			
28	1.1	1.1	1.2	3.2	4.4	4.4				
29	2.1	2.2	4.2	4.2	4.2	4.2	4.4			
31	1.1	2.2	3.2	4.2	4.2	4.2	4.3	4.3		
32	1.1	1.2	2.2	2.2	2.2	2.2				
33	1.1	2.2	2.2	2.2	2.2	4.2	4.4			
34	3.4	3.4	3.4	3.4						
37	1.1	1.1	1.1	1.2	3.2					
38	1.1	2	2.1	2.2	4.4					
39	1.1	1.1	2.2	2.2	2.2	4.2	4.2	4.2	4.2	
40	3.2	3.2	4.2	4.3	4.3	4.4	4.4	4.4		
41	1.2	2	2.1	2.2	4.2	4.2				
42	1.2	1.2	4.3	4.3	4.3	4.4				
43	3.2	4.2	4.2	4.2	4.2					
44	2.2	2.2	2.2	3.2	4.2	4.2	4.2			
45	3.4	3.4	3.4	3.4						
46	2.2	2.2	4.2	4.2	4.2	4.2	4.3	4.3		
48	1.1	4.2	4.2	4.2	4.2	4.2				
49	1.2	4.2	4.2	4.2	4.2	4.3	4.3			
50	1.1	1.2	2	4.4	4.4					
51	1.2	4.2	4.3	4.3	4.3	4.4	4.4	4.4		
52	2.1	2.1	2.1	2.1	4.2					
54	4.2	4.2	4.2	4.2	4.2					
55	1.1	1.1	1.1	1.1	1.1	3.2	4.4			

## Grade 5 Science Content Standards

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives									
1										
2										
4	2.2	3.2	3.2	3.2	3.2					
5	2.1	2.1	2.1	2.2	2.2	2.2				
7	1.2	1.2	1.2	1.3	2.2	3.2	3.2			
8	1.2	3.2	3.2	3.2	3.2	3.2				
9	1.1	1.1	1.2	2.1	2.1					
10	1.1	1.2	2.1	2.1	2.1	2.2				
11	1.2	1.2	1.2	1.2	1.3	1.3	1.3			
12	2.1	2.1	2.2	2.2	2.2	2.2	2.2			
14	1.2	2.1	2.1	2.1	2.1	2.1				
15	2.1	2.1	2.1	2.1	2.2	2.2				
16	1.1	1.1	1.2	2.1	2.1					
17	1.2	1.2	1.2	1.2	1.3					
18	1.1	1.1	1.1	1.2	2.1					
19	1.2	1.2	1.2	1.2	1.2					
20	1.1	1.2	1.2	1.2	1.2	1.3				
21	1.2	1.3	3.2	3.2	3.2					
24	2.1	2.1	2.1	2.1	2.2	2.2	2.2			
25	3.3	3.3	3.3	3.3	3.3					
26	1.1	1.2	1.2	1.2	1.2	3.3	3.3	3.3		
27	1.1	1.2	1.2	1.2	1.2					
28	1.2	2	2.1	2.1	2.2					
29	2.1	2.1	2.1	2.1	2.1					
31	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.3		
32	1.1	1.1	1.1	1.1	1.2					
33	1.1	1.2	3.3	3.3	3.3	3.3	3.3			
34										
37	1.1	3.2	3.2	3.2	3.2	3.2				
38	2.1	2.1	2.1	2.1	2.1					
39	3.3	3.3	3.3	3.3	3.3					
40	1.1	2.2	2.2	2.2	2.2					
41	2.1	2.1	2.1	2.1	2.2					
42	3.2	3.2	3.2	3.2	3.2					
43	3.2	3.2	3.2	3.2	3.2					
44	1.1	1.2	1.3	1.3	1.3	2.1				
45										
46	1.3	1.3	3.3	3.3	3.3	3.3	3.3			
48	3.2	3.2	3.2	3.2	3.2					
49	1.1	1.1	1.1	1.1	2.2					
50	2.1	2.1	2.1	2.2	2.2					
51	3.2	3.2	3.2	3.2	3.2					
52	3.3	3.3	3.3	3.3	3.3					
54	2.2	2.2	2.2	2.2	2.2					
55	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	

## Grade 8 Science Process Standards

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives										
1	1.1	1.1	4.2	4.2	4.2						
2	3.6	3.6	3.6	3.6							
3	1.1	2.1	4.2	4.2							
5	3.2	3.2	3.2	3.2	3.2						
6	3.2	3.3	3.3	3.3	3.3	3.3					
7	2.1	3.1	4.3	4.3	4.3						
9	3.6	3.6	3.6	3.6	3.6						
10	2.1	2.1	2.2	2.2	2.2	2.2	4.2	4.3	4.3		
11	2.1	2.1	2.1	2.2	2.2	2.2	4.3				
12	2.1	2.1	2.1	2.1	2.2	2.2	4.3				
13	1.3	3.3	3.3	3.3	3.3						
15	3.3	3.3	3.3	3.3	3.3						
16	1.1	1.3	4.2	4.2	4.2	4.2	4.3				
17	2.1	2.1	2.2	4.2							
19	3.2	4.2	4.2	4.3	4.3	4.3	4.3				
20	2.1	2.2	2.2	3.1							
22	1.3	1.3	1.3	1.3	1.3						
24	3.2	3.2	3.2	3.2	3.3						
25	3.6	3.6	3.6	3.6	3.6						
26	2.2	2.2	4.2	4.2	4.2	4.3	4.3				
27	1.1	1.1	4.3	4.3	4.3						
28	1.1	1.1	3.1	3.1	3.2	4.3					
29	2.1	2.1	2.1	2.1	2.1	4.3	4.3				
30	3.1	3.2	3.2	4.2	4.3	4.3	4.3				
31	3.2	3.2	3.2	3.2	3.2						
33	1.1	1.1	1.1	1.1	3.1	3.2					
34	3.1	3.2	3.2	3.3	3.3	3.3	3.3	3.3			
35	3.1	3.1	3.1	4.3	4.3						
36	3.6	3.6	3.6	3.6	3.6						
37	1.1	1.1	1.1	1.1	1.1						
39	2.1	2.1	2.1	2.1	2.2	2.2	4.2	4.2			
40	3.3	3.3	3.3	3.3	4.2	4.2	4.3				
41	1.1	1.1	1.1	1.2	1.3	3.1	3.2	3.2	4.2	4.2	
42	2.1	2.1	2.1	2.1	2.1						
43	4.2	4.2	4.2	4.2	4.2						
45	1.1	2.2	3.1	4.2	4.3	4.3					
46	2.1	2.2	2.2	2.2	2.2						
47	1.2	1.3	2.1	2.1	4.2	4.3	4.3	4.3			
48	2.1	2.1	2.1	2.2							
49	1.1	1.3	4.2	4.2	4.2						
50	2.2	4.2	4.3	4.3	4.3	4.3	4.3				
51	1.2	1.3	1.3	2.1	2.1	2.2	4.3	4.3			
53	1.1	1.1	1.1	1.1	4.3	4.3					
54	2.2	3.1	3.1	3.1	3.2	3.2	3.3				
55	2.1	2.1	2.1	2.1	2.1	2.2					

## Grade 8 Science Content Standards

**Table D3**  
**Objectives Coded to Each Item by Reviewers**

Item	Objectives						
1	1.1	1.2	1.2	1.2	1.2		
2	1.1	1.1	1.1	1.1	1.2	1.2	
3	1.2	1.2	1.2	1.2	1.2		
5	1.1	1.1	1.1	1.1	1.2	1.2	
6	2.1	2.1	2.1	2.1	2.1	2.2	
7	4.1	4.1	4.1	5.1	5.1	5.1	5.1
9							
10	3.1	3.1	3.2	3.2	3.2	3.2	
11	3.2	3.2	3.2	3.2	3.2		
12	3.1	3.1	3.1	3.1	3.2	3.2	3.2
13	1.1	1.1	1.1	1.1	1.2		
15	1.2	1.2	1.2	4.2	4.2		
16	2.1	2.1	2.1	2.1	2.1		
17	3.2	3.2	3.2	3.2	3.2		
19	4.1	4.1	5.1	5.1	5.1	5.1	5.1
20	4.2	4.2	4.2	4.2	4.2		
22	2.1	2.1	2.1	2.1	2.1		
24	1.1	1.1	1.1	1.1	1.1		
25	1.2	1.2	1.2				
26	5.1	5.2	5.2	5.2	5.2	5.2	
27	2.2	2.2	2.2	2.2	2.2		
28	4.2	4.2	4.2	4.2	4.2		
29	3.1	3.1	3.1	5.2	5.2	5.2	5.2
30	1.1	1.2	1.2	1.2	1.2		
31	2.1	2.1	2.1	2.2	2.2		
33	1.1	1.2	1.2	1.2	1.2	1.2	
34	1.2	1.2	4.1	4.1	4.1	4.2	
35	5.1	5.1	5.1	5.1	5.1		
36							
37	1.1	1.1	1.1	1.1	1.1	1.2	1.2
39	3.1	3.1	3.1	3.1	3.1		
40	2.1	2.1	2.1	2.1	2.2	2.2	
41	1.1	1.2	1.2	1.2	1.2		
42	3.1	3.1	3.1	3.1	3.1	3.2	
43	4.1	4.1	5.1	5.1	5.1	5.1	
45	4.1	4.1	4.1	4.1	5.1	5.1	5.1
46	3.1	3.1	3.1	3.1	3.1		
47	1.2	4.1	4.1	4.1	4.2	4.2	4.2
48	3.2	3.2	3.2	3.2	3.2		
49	2.1	2.1	2.1	2.1	2.2		
50	5.1	5.2	5.2	5.2	5.2	5.2	
51	3.1	3.1	3.1	3.1	3.2	5.1	
53	2.2	2.2	2.2	2.2	2.2		
54	4.2	5.2	5.2	5.2	5.2	5.2	
55	3.1	4.2	4.2	4.2	4.2		

## Grade 5 Science Process Standards

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
<b>1</b>																									
<b>1.1</b>	1	1	3	16	27	27	28	28	33	33	33	33	37	37	37	37	37	41	41	41	45	49	53	53	53
	53																								
<b>1.2</b>	41	47	51																						
<b>1.3</b>	13	16	22	22	22	22	22	41	47	49	51	51													
<b>2</b>																									
<b>2.1</b>	3	7	10	10	11	11	11	12	12	12	12	17	17	20	29	29	29	29	29	39	39	39	39	42	42
	42	42	42	46	47	47	48	48	48	51	51	55	55	55	55	55									
<b>2.2</b>	10	10	10	10	11	11	11	12	12	17	20	20	26	26	39	39	45	46	46	46	46	48	50	51	54
	55																								
<b>3</b>																									
<b>3.1</b>	7	20	28	28	30	33	34	35	35	35	41	45	54	54	54										
<b>3.2</b>	5	5	5	5	5	6	19	24	24	24	24	28	30	30	31	31	31	31	31	33	34	34	41	41	54
	54																								
<b>3.3</b>	6	6	6	6	6	13	13	13	13	15	15	15	15	15	24	34	34	34	34	34	40	40	40	40	54
<b>3.6</b>	2	2	2	2	9	9	9	9	9	25	25	25	25	25	36	36	36	36	36						
<b>4</b>																									
<b>4.2</b>	1	1	1	3	3	10	16	16	16	16	17	19	19	26	26	26	30	39	39	40	40	41	41	43	43
	43	43	43	45	47	49	49	49	50																
<b>4.3</b>	7	7	7	10	10	11	12	16	19	19	19	19	26	26	27	27	27	28	29	29	30	30	30	35	35
	40	45	45	47	47	47	50	50	50	50	50	51	51	53	53										

## Grade 5 Science Content Standards

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																								
<b>1</b>																									
<b>1.1</b>	9	9	10	16	16	18	18	18	20	26	27	31	32	32	32	32	33	37	40	44	49	49	49	49	55
<b>1.2</b>	7	7	7	8	9	10	11	11	11	11	14	16	17	17	17	17	18	19	19	19	19	19	20	20	20
	20	21	26	26	26	26	27	27	27	27	28	31	31	31	31	32	33	44	55	55	55	55			
<b>1.3</b>	7	11	11	11	17	20	21	31	31	31	44	44	44	46	46	55	55	55	55						
<b>2</b>	28																								
<b>2.1</b>	5	5	5	9	9	10	10	10	12	12	14	14	14	14	14	15	15	15	15	16	16	18	24	24	24
	24	28	28	29	29	29	29	29	38	38	38	38	38	41	41	41	41	44	50	50	50				
<b>2.2</b>	4	5	5	5	7	10	12	12	12	12	12	15	15	24	24	24	28	40	40	40	40	41	49	50	50
	54	54	54	54	54																				
<b>3</b>																									
<b>3.2</b>	4	4	4	4	7	7	8	8	8	8	8	21	21	21	37	37	37	37	37	42	42	42	42	42	43
	43	43	43	43	48	48	48	48	48	51	51	51	51	51											
<b>3.3</b>	25	25	25	25	25	26	26	26	33	33	33	33	33	39	39	39	39	39	46	46	46	46	46	52	52
	52	52	52																						

## Grade 8 Science Process Standards

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																									
1																										
1.1	1	1	3	16	27	27	28	28	33	33	33	33	37	37	37	37	37	41	41	41	45	49	53	53	53	53
	53																									
1.2	41	47	51																							
1.3	13	16	22	22	22	22	22	41	47	49	51	51														
2																										
2.1	3	7	10	10	11	11	11	12	12	12	12	17	17	20	29	29	29	29	29	39	39	39	39	42	42	42
	42	42	42	46	47	47	48	48	48	51	51	55	55	55	55	55										
2.2	10	10	10	10	11	11	11	12	12	17	20	20	26	26	39	39	45	46	46	46	46	46	48	50	51	54
	55																									
3																										
3.1	7	20	28	28	30	33	34	35	35	35	41	45	54	54	54											
3.2	5	5	5	5	5	6	19	24	24	24	24	28	30	30	31	31	31	31	31	33	34	34	41	41	54	54
	54																									
3.3	6	6	6	6	6	13	13	13	13	15	15	15	15	15	24	34	34	34	34	34	34	40	40	40	40	54
3.6	2	2	2	2	9	9	9	9	9	25	25	25	25	25	36	36	36	36	36							
4																										
4.2	1	1	1	3	3	10	16	16	16	16	17	19	19	26	26	26	30	39	39	40	40	41	41	43	43	43
	43	43	43	45	47	49	49	49	50																	
4.3	7	7	7	10	10	11	12	16	19	19	19	19	26	26	27	27	27	28	29	29	30	30	30	35	35	35
	40	45	45	47	47	47	50	50	50	50	50	51	51	53	53											

## Grade 8 Science Content Standards

**Table D4**  
**Items Coded by Reviewers to Each Objective**

Objective	Item Number																							
<b>1</b>																								
<b>1.1</b>	1	2	2	2	2	5	5	5	5	13	13	13	13	24	24	24	24	24	30	33	37	37	37	37
	41																							
<b>1.2</b>	1	1	1	1	2	2	3	3	3	3	3	5	5	13	15	15	15	25	25	25	30	30	30	33
	33	33	33	33	34	34	37	37	41	41	41	41	47											
<b>2</b>																								
<b>2.1</b>	6	6	6	6	6	16	16	16	16	16	22	22	22	22	22	31	31	31	40	40	40	40	49	49
	49																							
<b>2.2</b>	6	27	27	27	27	27	31	31	40	40	49	53	53	53	53	53								
<b>3</b>																								
<b>3.1</b>	10	10	12	12	12	12	29	29	29	39	39	39	39	39	42	42	42	42	42	46	46	46	46	51
	51	51	51	55																				
<b>3.2</b>	10	10	10	10	11	11	11	11	11	12	12	12	17	17	17	17	17	42	48	48	48	48	48	51
<b>4</b>																								
<b>4.1</b>	7	7	7	19	19	34	34	34	43	43	45	45	45	45	47	47	47							
<b>4.2</b>	15	15	20	20	20	20	20	28	28	28	28	28	34	47	47	47	54	55	55	55	55			
<b>5</b>																								
<b>5.1</b>	7	7	7	7	19	19	19	19	19	26	35	35	35	35	35	43	43	43	43	45	45	45	50	51
<b>5.2</b>	26	26	26	26	26	29	29	29	29	50	50	50	50	50	54	54	54	54	54					

## Grade 5 Science Process Standards

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low			High
1-2	3	4	5

Objective	Item Number: Number of Reviewers																			
1	15:1																			
1.1	17:1	26:4	27:2	28:2	31:1	37:3	38:1	50:1	55:5	10:1	8:2	4:1	11:1	32:1	33:1	19:5	48:1	39:2		
1.2	50:1	51:1	41:1	42:2	37:1	32:1	28:1	16:2	18:1	9:1	4:1	11:1	12:3	27:1	10:1	49:1	8:1	7:1	15:1	
2	38:1	41:1	50:1																	
2.1	52:4	41:1	38:1	18:3	29:1	4:1	9:4	10:5	8:4	16:2										
2.2	16:1	38:1	32:4	33:4	41:1	27:1	31:1	14:1	20:1	46:2	44:3	39:3	29:1							
3																				
3.2	44:1	43:1	31:1	37:1	17:4	25:5	27:1	26:1	15:1	14:2	20:5	19:2	28:1	55:1	40:2					
3.4	1:5	2:5	34:4	45:4																
4																				
4.2	48:5	49:4	43:4	52:1	54:5	51:1	33:1	27:2	18:1	4:1	5:2	7:3	21:5	24:2	14:2	11:3	8:2	41:2	29:4	
	39:4	44:3	31:3	46:4	40:1															
4.3	11:1	12:2	15:3	4:2	16:1	31:2	42:3	46:2	49:2	5:4	24:5	51:3	40:2							
4.4	50:2	40:3	38:1	29:1	28:2	7:2	14:1	55:1	51:3	33:1	25:1	15:1	24:1	4:1	42:1					

## Grade 5 Science Content Standards

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low			High
1-2	3	4	5

Objective	Item Number: Number of Reviewers																			
<b>1</b>																				
<b>1.1</b>	9:2	16:2	18:3	20:1	26:1	32:4	31:1	40:1	49:4	44:1	10:1	27:1	37:1	55:1	33:1					
<b>1.2</b>	44:1	32:1	27:4	28:1	21:1	18:1	19:5	16:1	17:4	9:1	10:1	14:1	8:1	7:3	11:4	20:4	31:4	55:4	26:4	33:1
<b>1.3</b>	7:1	11:3	17:1	21:1	20:1	44:3	55:4	46:2	31:3											
<b>2</b>	28:1																			
<b>2.1</b>	28:2	29:5	38:5	44:1	41:4	18:1	16:2	14:5	10:3	9:2	50:3	5:3	12:2	15:4	24:4					
<b>2.2</b>	50:2	40:4	49:1	54:5	5:3	4:1	7:1	10:1	12:5	15:2	41:1	24:3	28:1							
<b>3</b>																				
<b>3.2</b>	42:5	43:5	37:5	21:3	7:2	8:5	4:4	48:5	51:5											
<b>3.3</b>	52:5	39:5	46:5	25:5	26:3	33:5														

## Grade 8 Science Process Standards

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low			High
1-2	3	4	5

Objective	Item Number: Number of Reviewers																	
1																		
1.1	3:1	16:1	27:2	28:2	33:4	37:5	45:1	49:1	1:2	53:4	41:3							
1.2	51:1	47:1	41:1															
1.3	47:1	49:1	22:5	13:1	51:2	16:1	41:1											
2																		
2.1	12:4	20:1	17:2	3:1	10:2	29:5	39:4	55:5	48:3	46:1	42:5	11:3	47:2	7:1	51:2			
2.2	46:4	48:1	51:1	17:1	20:2	11:3	12:2	10:4	55:1	54:1	45:1	26:2	39:2	50:1				
3																		
3.1	20:1	7:1	30:1	28:2	41:1	33:1	35:3	54:3	45:1	34:1								
3.2	31:5	24:4	5:5	33:1	28:1	41:2	54:2	6:1	34:2	30:2	19:1							
3.3	6:5	13:4	15:5	24:1	40:4	54:1	34:5											
3.6	36:5	25:5	2:4	9:5														
4																		
4.2	10:1	3:2	1:3	16:4	17:1	19:2	26:3	30:1	41:2	45:1	43:5	49:3	50:1	39:2	47:1	40:2		
4.3	45:2	51:2	53:2	40:1	35:2	28:1	27:3	11:1	7:3	12:1	29:2	30:3	16:1	19:4	26:2	50:5	10:2	47:3

## Grade 8 Science Content Standards

**Table D5**

**Number of Reviewers Coding Item by Objective (Item Number: Number of Reviewers)**

Low			High
1-2	3	4	5

Objective	Item Number: Number of Reviewers												
1													
1.1	2:4	5:4	1:1	13:4	24:5	30:1	41:1	37:5	33:1				
1.2	41:4	37:2	33:5	34:2	30:4	25:3	13:1	15:3	1:4	3:5	2:2	5:2	47:1
2													
2.1	6:5	16:5	22:5	31:3	40:4	49:4							
2.2	49:1	53:5	31:2	27:5	6:1	40:2							
3													
3.1	39:5	29:3	42:5	46:5	55:1	51:4	10:2	12:4					
3.2	51:1	10:4	11:5	17:5	48:5	42:1	12:3						
4													
4.1	47:3	34:3	45:4	43:2	19:2	7:3							
4.2	15:2	20:5	28:5	55:4	54:1	47:3	34:1						
5													
5.1	51:1	43:4	35:5	7:4	45:3	19:5	26:1	50:1					
5.2	26:5	50:5	29:4	54:5									

## **Appendix E**

### **Results of Intra-Class Correlation**

## Results of Intra-Class Correlation

Reliability can be increased by adding more training to reduce the One-Judge Reliability or by adding more judges to reduce the variability of the mean.

### Number of Judges needed to reach Aspiration Level of Reliability

Aspiration Level	One-Judge Reliability			Number of Judges Needed		
	0.335	0.421	0.399	Mathematics	Reading	Science
0.7	4.6	3.2	3.5	5	4	4
0.8	7.9	5.5	6.0	8	6	7
0.9	17.9	12.4	13.6	18	13	14
0.95	37.7	26.1	28.6	38	27	29

Notes: The minimum number of judges calculation is based on the Spearman Browne Prophecy

formula,  $m = \left\{ \frac{\frac{\rho^*}{1-\rho^*}}{\frac{\rho_L}{1-\rho_L}} \right\} = \frac{\rho^* \langle 1-\rho_L \rangle}{\rho_L \langle 1-\rho^* \rangle}$ , where  $\rho^*$  is the reliability aspired to and  $\rho_L$  is the reliability estimate for a single judge.

The two-way analysis assuming both random items and fixed judges gives a result for the mean correlation identical to Cronbach's Alpha, i.e.,  $\alpha = \frac{\sigma_{Bet}^2 - \sigma_e^2}{\sigma_{Bet}^2}$ . While SPSS allows the user to

select between the random and mixed models, the calculations come out the same with either model. Assuming the judges are fixed would imply these are the only judges that would ever be used so there is no component of variance associated with them. *Random judges* assume the judges used are one of many possible selections of judges; then the variability among judges must be taken into account, which will result in a lower value for the intra-class correlation (or any other measure of reliability.)

For the mixed model (i.e., fixed judges), the intra-class correlation would be calculated identically to Alpha.

$$ICC_{FixedJudges} = \frac{ItemMS - EMS}{ItemMS}$$

For the random model, the correct calculation is:

$$ICC_{RandomJudges} = \frac{ItemMS - EMS}{ItemMS + \frac{\langle JudgeMS - EMS \rangle}{n}}$$

## Calculation Modes

Calculation for two-way model with both questions and judges random:

### Grade 5 (Process Standards)

	Science	
	DF	MS
questions	44	1.21
judges	4	1.87
error	176	0.30
<b>Intra-Class Correlation</b>		.73
Cronbach's Alpha		.75

### Grade 5 (Content Standards)

	Science	
	DF	MS
questions	44	1.25
judges	4	1.95
error	176	0.26
<b>Intra-Class Correlation</b>		.77
Cronbach's Alpha		.79

### Grade 8 (Process Standards)

	Science	
	DF	MS
questions	44	1.22
judges	4	0.30
error	176	0.17
<b>Intra-Class Correlation</b>		.86
Cronbach's Alpha		.86

### Grade 8 (Content Standards)

	Science	
	DF	MS
questions	44	1.12
judges	4	0.45
error	176	0.14
<b>Intra-Class Correlation</b>		.87
Cronbach's Alpha		.87

## **Appendix F**

### **Biographies of the National Experts**

### **Sandra Enger, ABD**

Ms. Enger is an Associate Professor of Education at the University of Alabama. She has served as Head Biology Teaching Assistant at the University of Iowa, Biology Teaching Assistant at the University of Mississippi, and National Scientific Officer for the Republic of Trinidad and Tobago. She has taught science courses at the junior high school level in Wisconsin, high school level in Arkansas, and internationally in Greece. She also served as a Director of Assessment and Research for the Iowa Scope, Sequence, and Coordination Project at the University of Iowa. In addition, she has been a national expert for alignment studies based on Dr. Norman Webb's methodology for the states of Maryland, Nebraska, Oklahoma, and West Virginia.

Ms. Enger has earned an ABD in botany from the University of Iowa with additional education from universities in Arkansas, California, Illinois, Michigan, Mississippi, New Jersey, and Tennessee. Ms. Enger is a member of the Alabama Science Teachers Association (ASTA), American Educational Research Association (AERA), National Association of Biology Teachers (NABT), Phi Delta Kappa (PDK), and other professional organizations.

### **Charles Judson Hill, MA**

Mr. Hill has extensive experience in science education. His experience includes teaching courses in astronomy, biology, chemistry, physical science, and physics in Boston public schools; mentoring four Harvard University Graduate School of Education students; being an evaluator for the Presidential Awards for Excellence in Math and Science Teaching; and being a reviewer for the Louisiana Comprehensive Curriculum: K–12 Science Curriculum. Aside from his education career, Mr. Hill has worked at Polaroid Corporation as a junior process engineer. Currently, he is a senior research associate at the Center for Science Education at the Education Development Center, Inc., in Newton, Massachusetts. His responsibilities include writing, managing a WebBoard, and serving as field-test coordinator for teachers nationwide using the NSF-sponsored Foundation Science: Earth Space Curriculum.

Mr. Hill has presented the topic “The Power of Story” at the National Science Teacher Association (NSTA) conference in Anaheim, California, which focused on developing high school physics and chemistry curricula. He has also copresented to teachers in the Springfield, Massachusetts, public schools on “Analyzing Grade 9 Physical Science Investigations.” In addition, Mr. Hill has participated as an external national expert in alignment studies for the states of Alabama, Maryland, and West Virginia.

Mr. Hill completed a BA degree in Biology and received an MA degree in secondary science education from Boston University. He holds a certificate of advanced study in teaching, curriculum, and learning environments from Harvard University.

## **Carsten Wilmes, PhD**

Dr. Carsten Wilmes is the Assistant Director for Assessment for the World-Class Instructional Design and Test Consortium (WIDA). Dr. Wilmes supervises the development and operational implementation for WIDA's tests and is responsible for the planning and implementation of alignment studies for English language learners. In addition, he coordinates the data analysis for and manages the development of each study's final report. Prior to his current position, he served as WIDA's Alignment Coordinator/Researcher, where he was the presenter and facilitator for alignment workshops for the states of Wisconsin and Oklahoma and the University of Wisconsin-Madison. He also conducted alignment research pursuant to the requirements of the *No Child Left Behind Act of 2001*. Dr. Wilmes has served as a national alignment expert for alignment studies in Louisiana, Maryland, and Oklahoma.

In addition to his educational test background, Dr. Wilmes has considerable expertise in foreign language testing, teaching, translation, and interpretation. As an intern for Berlitz International Inc., Testing Division, he developed a telephone-delivered proficiency test and provided language proficiency test consulting services. Dr. Wilmes also served as a coordinator for international relations for the City of Naori, Japan. There he translated official documents, interpreted for official city functions, coordinated official student and government exchanges, taught ESL and German courses, and functioned as a cultural and community outreach liaison. While working as a research assistant for the Foreign Language Test Group (FLAG) at the University of Illinois at Urbana-Champaign, he developed a specification-based revision of the Oral English Placement Test (Oral EPT) for incoming international graduate students.

Dr. Wilmes has reviewed the book *Diagnosing foreign language proficiency: The interface between learning and test*. His review was published in the *Modern Language Journal*. Furthermore, Dr. Wilmes has presented at numerous professional organizations, including the American Educational Research Association (AERA) Annual Meeting and the 14<sup>th</sup> World Congress of Applied Linguistics. He is a member of the AERA, International Language Testing Association (ILTA), and the Modern Language Association (MLA).

He earned a BA degree in Linguistics from the University of Paderborn (Germany). Additionally, he earned a MA degree in Germanic Languages and Literatures with a concentration in Second Language Acquisition, and a PhD degree in Second Language Acquisition with a concentration in Educational Measurement.

# Oklahoma Core Curriculum Tests (OCCT)

End-of-Instruction  
Alignment Institute

**Norman, Oklahoma**

**March 18-19, 2010**



**OKLAHOMA**

State Department of Education

WestEd 

# WestEd Mission

**WestEd, a research, development, and service agency,  
works with education and other communities to . . .**

***promote excellence,  
achieve equity, and  
improve learning  
for children, youth, and adults.***

# What are the OCCT?

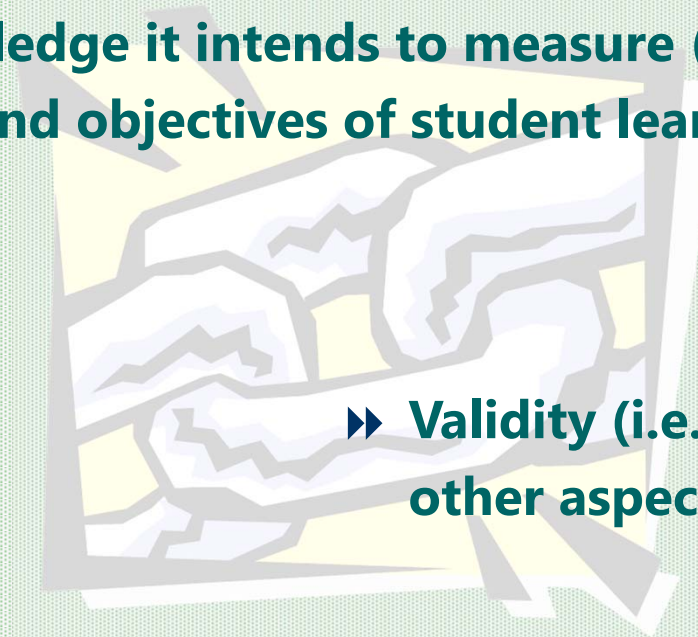
- ▶▶ **The General Assessments, also known as the Oklahoma Core Curriculum Tests (Criterion Referenced Tests)**
- ▶▶ **For Grades 3-8 and at the "End-of-Instruction" (EOI) secondary level**
- ▶▶ **Aligned to the state-mandated curriculum, the *Priority Academic Student Skills (PASS)***

—from the Oklahoma SDE Web site

# What is Alignment?

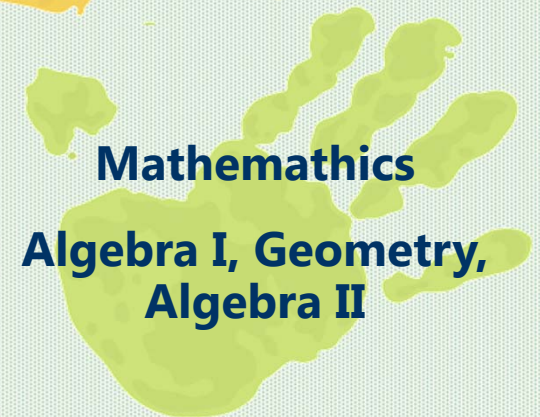
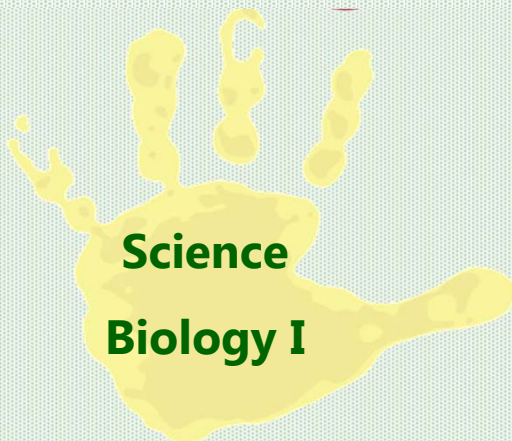
►► Degree of match between the test and the skills/knowledge it intends to measure (i.e., standards and objectives of student learning)

►► Validity (i.e., content and other aspects)



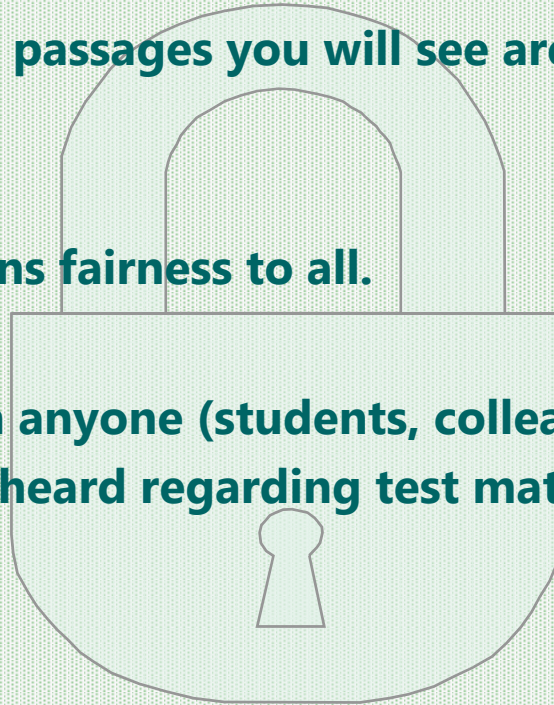
# What is Being Aligned?

- ▶▶ **OCCT EOI test items**
- ▶▶ ***Priority Academic Student Skills (PASS)***



# Secure Materials

- ▶▶ **Certain items and passages you will see are SECURE and CONFIDENTIAL.**
- ▶▶ **Test security means fairness to all.**
- ▶▶ **Do not share with anyone (students, colleagues, etc.) what you have seen or heard regarding test materials.**



# Why is Alignment Important?

- ▶▶ **To ensure the appropriate breadth and depth of content is being assessed as intended by the State (*PASS* and OCCT EOI blueprints)**
- ▶▶ **To help ensure equity and fairness**
- ▶▶ **Valid assessments lead to valid results.**
- ▶▶ **Valid results lead to appropriate instruction.**

# Overview of the Alignment Process

1. Review the *PASS*.
2. Rate the depth of knowledge (DOK) level of each objective.
3. Rate the DOK level of each assessment item.
4. Determine the correspondence between items and objectives—a primary and up to two secondary objectives may be coded.
5. Determine whether there is a source-of-challenge issue for each item.

# Alignment Criteria

- ▶▶ **Standard, Objective**
- ▶▶ **Strength of Alignment**
  - ▶ *Primary, Secondary*
- ▶▶ **Depth of Knowledge**
  - ▶ *Recall*
  - ▶ *Basic Application*
  - ▶ *Strategic Thinking*
  - ▶ *Extended Thinking*

# Alignment Ratings

**The correspondence of test item to the standard/objective:**

- ▶▶ **Primary (One Only):** Item assesses a fundamental skill or concept as explicitly stated in the objective. The skills or concepts in the objective are *necessary* to correctly respond to the item. If the selected primary objective is *necessary* and *sufficient*, no secondary objective ratings are warranted.
- ▶▶ **Secondary (Two Maximum):** Objectives expressing additional skills/concepts necessary to correctly respond to the item
- ▶▶ **None:** Item does not address the skill/content of any standard.

# Depth of Knowledge Ratings

The level of cognitive complexity or demand reflected by the knowledge/skill required by an item:

- » **Recall:** Item requires student to recall a fact, information, or procedure.
- » **Basic Application:** Item requires student to use a skill or concept (e.g., information, conceptual knowledge, procedures).
- » **Strategic Thinking:** Item requires student to reason or develop a plan or sequence of steps.
- » **Extended Thinking:** Item requires student to conduct an investigation or process multiple conditions/elements of a problem or task.

# Example: Language Arts

## English II



***Standard 3: Literature— The student will read, construct meaning, and respond to a wide variety of literary forms.***

**1.2 Literary Elements: Demonstrate knowledge of literary elements and techniques and show how they affect the development of a literary work.**

**The tone the author uses when describing Old Abe's contributions to the United States is one of**

- A. awe.**
- B. hope.**
- C. respect.**
- D. sympathy.**

# Example: Mathematics



## Algebra I

### *Standard 1: Number Sense and Algebraic Operations*

**1.1.d Solve two-step and three-step problems using concepts such as rules of exponents, rate, distance, ratio and proportion, and percent.**

**A drink dispenser fills cups at a rate of 2 ounces per second. Adrian has a 64-ounce cup that already contains 18 ounces of water. How long will it take the dispenser to fill the rest of Adrian's cup with water?**

- A. 9 seconds**
- B. 23 seconds**
- C. 92 seconds**
- D. 128 seconds**

# Example: Science



## Biology I

**Process Objective 1.2: Use appropriate tools when measuring cells, organisms, populations, and ecosystems.**

**Content Objective 1.2: Cells are composed of a variety of structures, such as the nucleus, cell membrane, cell wall, cytoplasm, ribosomes, mitochondria, and chloroplasts.**

**Which method should a scientist use to view the site of photosynthesis in a plant cell?**

- A. use a magnifying glass to view the chloroplasts**
- B. use a magnifying glass to view the mitochondria**
- C. use a microscope to view the chloroplasts**
- D. use a microscope to view the mitochondria**

# Example: U.S. History



## U.S. History

***Standard 5: The student will analyze the changing role of the United States in world affairs at the turn of the twentieth century.***

**5.2 Identify the role of the Spanish-American War in the development of the United States as a world power.**

**Which statement explains an immediate effect of the Spanish-American War on the United States?**

- A. The United States gained Texas, California, and the New Mexico territory from Mexico.**
- B. The United States developed a policy of containment to stop the spread of communism.**
- C. The United States was given control over territories in the Pacific Ocean and the Caribbean Sea.**
- D. The United States experienced a deep economic depression as war-time production of goods slowed.**

# Roles and Responsibilities

## Reviewers

- ▶▶ **Internal:** Oklahoma educators with content area expertise, knowledge of the *PASS* objectives, and knowledge of your students
- ▶▶ **External:** Educators from states other than Oklahoma
- ▶▶ **Reviewers' role:**
  - ▶ *Independently match each test item to objectives and provide explanations as appropriate.*
  - ▶ *Contribute to group discussions about alignment evaluations.*
  - ▶ *Keep the materials and information related to the materials (i.e., test items and passages) secure and confidential.*

# Roles and Responsibilities

## Group Leaders

- ▶▶ Answer questions about the alignment process and criteria.
- ▶▶ Make sure the reviewers have appropriate materials for the alignment task.
- ▶▶ Facilitate group discussion of independent alignments.
- ▶▶ Collect all alignment materials from reviewers.

# Next Steps

- ▶▶ **Break into assigned groups.**
- ▶▶ **WestEd Group Leaders will provide more in-depth discussion/training using sample items.**
- ▶▶ **Begin rating/alignment process.**

# Alignment Groups



O

» Math and Science:  
**Room O**

P

» English and Social Studies:  
**Room P**

# WestEd Contacts

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**Alignment Analysis of Oklahoma Core  
Curriculum Tests (OCCT) End-of-Instruction  
(EOI) Items and *Priority Academic Student  
Skills (PASS)* Objectives**

WestEd

*Assessment and Standards Development Services*

**For**

Oklahoma State Department of Education

**June 30, 2010**





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## **Executive Summary**

The Oklahoma State Department of Education (SDE) contracted the Assessment and Standards Development Services Program (ASDS) at WestEd to conduct alignment studies of the Oklahoma School Testing Program's assessments. The first year focused on the Oklahoma Modified Alternate Assessment Program (OMAAP) alternate assessments based on modified achievement standards for grades 3 through 8 reading and mathematics, grades 5 and 8 science, and end-of-instruction (EOI) English II, Algebra I, and Biology I. The second year focused on the Oklahoma Core Curriculum Tests (OCCT) EOI assessments based on the general education standards for Algebra I, Geometry, Algebra II, English II, English III, U.S. History, and Biology I. This report describes the alignment study and results for the OCCT EOI assessments.

This study used methods and tools developed by Norman L. Webb and his colleagues (see Webb, 2005), specifically the Web Alignment Tool (WAT). As called for in this method, WestEd convened an alignment institute where reviewers used the WAT to code OCCT EOI assessments and *PASS* objectives for analysis. The OCCT EOI Alignment Institute took place March 18–19, 2010, in Norman, Oklahoma. Reviewers formed groups in the following subjects and courses: mathematics (Algebra I, Geometry, and Algebra II); English (English II and English III); social studies (U.S. History); and science (Biology I). Each group consisted of two external experts (assessment and curriculum experts from outside Oklahoma), one of whom served as the group leader, and three internal experts (educators from Oklahoma): two teachers with expertise in the course(s) and one cross-grade specialist. SDE staff were in attendance observing and were available to answer questions from internal reviewers regarding questions specific to the *PASS* objectives and the OCCT EOI assessments and curriculum.

After participating in large-group and small-group training on the alignment processes, reviewers registered with the WAT on individual computers, and the groups completed consensus coding of the *PASS* objectives, followed by individual coding of the OCCT EOI items. The results computed by the WAT were analyzed for the five Webb criteria: Categorical Concurrence, Depth-of-Knowledge Consistency, Range-of-Knowledge Correspondence, Balance of Representation, and Source of Challenge.

A summary of the overall results for each content area follows.

### **Mathematics**

The Algebra I and Algebra II tests met all criteria for all standards.

The Geometry test met all criteria for all standards except in Depth-of-Knowledge Consistency, which was not met for Standard 1.

## English

The English II test met all criteria for all standards except in Categorical Concurrence, which was not met for Standard 10.4, in Depth-of-Knowledge Consistency, which was weakly met for Standard 10.3, and in Balance of Representation, which was weakly met for Standard 10.2.

The English III test met all criteria for all standards except in Range of Knowledge, which was not met for Standards 11.1 and 11.4.

## Social Studies

The U.S. History test met all criteria for all standards except in Categorical Concurrence, which was not met for Standards 5, 6, and 8, and in Depth-of-Knowledge Consistency, which was weakly met for Standards 2, 4, 5, and 10, and not met for Standard 9.

## Science

The Biology I test met all criteria for all content standards except in Depth-of-Knowledge Consistency, which was weakly met for Standards B.2, B.3, and B.4.

The Biology I test met all criteria for all process standards except in Depth-of-Knowledge Consistency, which was weakly met for Standard PS.4, and not met for Standard PS.5.

WestEd recommends that the SDE carefully consider the results of this alignment study, taking into consideration the following elements of the Oklahoma educational and assessment context:

- The Oklahoma student population;
- The 2008–2009 Test Blueprint for each course;
- The Test and Item Specifications for each course;
- The *PASS* objectives, goals, and standards statements and organization; and
- The curriculum for each course.

Taking into consideration this overall context, SDE should consider whether ratings of *YES*, *WEAK*, or *NO* for each of the criteria for each test form are results of *intentional* decisions or policies, and if not, whether changes need to be made to the assessment forms and items, the blueprints and specifications, the *PASS* standards, or the curriculum (or any combination of these).

# **I. Introduction**

The Oklahoma State Department of Education (SDE) contracted the Assessment and Standards Development Services Program (ASDS) at WestEd to conduct alignment studies of the Oklahoma School Testing Program's assessments. The first year focused on the Oklahoma Modified Alternate Assessment Program (OMAAP) alternate assessments based on modified achievement standards for grades 3 through 8 reading and mathematics, grades 5 and 8 science, and end-of-instruction (EOI) English II, Algebra I, and Biology I. The second year focused on the Oklahoma Core Curriculum Tests (OCCT) EOI assessments based on the general education standards for Algebra I, Geometry, Algebra II, English II, English III, U.S. History, and Biology I. This report describes the alignment study and results for the OCCT EOI assessments.

The SDE describes the OCCT and EOI tests as follows.

The General Assessments, also known as the Oklahoma Core Curriculum Tests (Criterion Reference Tests), for Grades 3-8 and at the "End-of-Instruction" (EOI) secondary level tests are aligned to the state-mandated curriculum, the *Priority Academic Student Skills (PASS)* which has been adopted by the State Board of Education and is the curriculum foundation for all public schools.<sup>1</sup>

The standards-based criterion-referenced EOI tests are administered four times a year. The completion of these tests is a requirement for high school graduation for students who began high school prior to the 2008-2009 school year. Beginning with the freshman class of 2008-2009, the students are required to pass ACE English II, ACE Algebra I, and any two of the other five tests for graduation.<sup>2</sup>

## **A. Overview of the Study**

This study used methods and tools developed by Norman L. Webb and his colleagues (see Webb, 2005), specifically the Web Alignment Tool (WAT).<sup>3</sup> As called for in this method, WestEd convened an alignment institute where reviewers used the WAT to code OCCT EOI assessments and *PASS* objectives for analysis. The test forms provided by the SDE and used in the analysis are listed below.

- ACE Algebra I, Spring 2009, Form 1, 55 operational items

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<sup>1</sup> Retrieved April 16, 2010, from <http://sde.state.ok.us/AcctAssess/core.html>

<sup>2</sup> Oklahoma School Testing Program Brochure, June 2009, available at <http://sde.state.ok.us/AcctAssess/pdf/OSTPBrochure.pdf>

<sup>3</sup> See WAT: Web Alignment Tool at <http://wat.wceruw.org>

- ACE Geometry, Spring 2009, Form 1, 55 operational items
- ACE Algebra II, Spring 2009, Form 1, 55 operational items
- English II, Spring 2009, Form 1, 60 operational items
- ACE English III, Spring 2009, Form 1, 62 operational items
- U.S. History, Spring 2009, Form 1, 60 operational items
- Biology I, Spring 2009, Form 1, 60 operational items

The OCCT EOI Alignment Institute took place March 18–19, 2010, in Norman, Oklahoma. Reviewers formed groups by subject: mathematics (Algebra I, Geometry, and Algebra II); English (English II and English III); social studies (U.S. History); and science (Biology I). Each group consisted of two external experts (assessment and curriculum experts from outside Oklahoma), one of whom served as the group leader, and three internal experts (educators from Oklahoma): two teachers with expertise in the course(s) and one cross-grade specialist. SDE staff were in attendance observing and were available to answer questions from internal reviewers regarding questions specific to the *PASS* objectives and the OCCT EOI assessments and curriculum.

The WestEd project director has over nine years of experience with research and development in standards and assessments for K–12 and adult general education and special populations, including standards development, evaluation, and alignment studies as well as assessment development for several states across the nation. The external experts, including the WestEd group leaders, have experience in assessment development, alignment, and curriculum development and teaching in their respective subject areas. The Oklahoma educators have experience teaching in the relevant subject area and course(s), and many also have experience with special populations as well as with standards or assessment review; the cross-grade specialists have additional experience teaching across grades or courses in the content area, as well as curriculum development and/or standards and assessment development or review experience. In addition, Norman L. Webb consulted with WestEd on use of the WAT.

On the first day of the alignment institute, the project director provided an introduction to the alignment methodology, alignment criteria, depth-of-knowledge (DOK) ratings, and the role of Oklahoma educators and external experts in a whole-group session PowerPoint presentation. The introduction included determining DOK ratings for sample items for mathematics, English, U.S. History, and biology, followed by discussion. After the introductory session, the reviewers broke out into their smaller groups by content area. Each group leader then provided the reviewers with further training in the alignment protocol, including additional application and discussion of DOK levels, using sample items taken from the OCCT Test and Item Specifications

documents for each course. The learning goals of the training were for the reviewers to 1) understand the purpose of the studies and their roles within them; 2) consistently and accurately apply the alignment criteria to the test items; and 3) participate in productive discussions that would help the groups arrive at consensus DOK ratings for the *PASS* objectives. Group leaders guided reviewers in further examination of the standards, assessments, and DOK definitions and then facilitated the small-group practice component of the training and provided feedback to the reviewers.

When the training was completed, reviewers registered with the WAT on their individual computers, and the groups transitioned to consensus coding of the *PASS* objectives, followed by individual coding of the OCCT EOI items. After reviewers completed coding a set of items for one course, they responded to a debriefing questionnaire; if time permitted, the group leader also led a discussion of the process based on the questionnaire. After completing coding of all assessments for their content areas, reviewers completed an evaluation form giving their feedback on the training process and use of the WAT.

## **B. Overview of Alignment**

The WAT Training Manual (Webb, 2005, pp. 2–3) provides the following definition of standards-to-assessment alignment and its importance in education:

The term *alignment* refers to the degree to which expectation and assessments are in agreement and serve in conjunction with one another to guide the system toward students learning what they are expected to know and do. Defined in this way, alignment is the quality of the relationship between expectations and assessments, not an attribute of any one of these two system components. It describes the match between expectations and assessment that can be legitimately improved by changing either student expectations or the assessments. As a relationship between two or more system components, alignment is determined on the basis of multiple criteria described in detail in a National Institute of Science Education (NISE) research monograph, *Criteria for Alignment of Expectations and Assessments in Mathematics and Science Education* (Webb, 1997). Five general guidelines for alignment are found in the monograph:

1. The alignment process must focus on the content or subject area and its attributes. Science alignment could look very different from alignment for language arts.
2. Alignment should be articulated across grades and ages—that is, alignment occurs not only within a grade, but also between grades. For example, the growth in knowledge over grades expressed by the mathematics standards should be similar to the progression of knowledge measured by assessments over the grades.

3. Alignment must address issues of equity and fairness. This can pertain to special education or culturally relevant content.
4. The alignment process should address pedagogical implications that might arise.
5. Alignment should be reasonable with respect to the resources needed to attain such alignment.

The alignment of expectations for student learning with assessments for measuring students' attainment of these expectations is an essential attribute for an effective standards-based education system. Without adequate alignment between standards and assessments, teachers and students become confused about educational expectations. Among other things, this can result in learning expectations being lowered for some students while being raised for others, creating potential inequities. For these reasons, alignment between curriculum standards and assessments is now required under the provisions of several federal education statutes.

Alignment has some other implications for educators and administrators. Participating in an alignment analysis leads to increasing awareness of the type of knowledge and depth of knowledge that can be displayed or demanded in various content areas, standards, and assessment items. Furthermore, the results of an alignment analysis will not only help determine the quality of the alignment, but also provide direction for how the district and state education personnel can refine standards and/or identify more appropriate assessment items.

As described earlier, this study and report are intended to provide the SDE with information to help ensure appropriate alignment of the OCCT EOI tests and *PASS* standards and improve alignment where necessary.

### **C. Overview of the Report**

This report is organized into the following sections.

- The introduction in section I provides background on the OCCT EOI alignment study, the OCCT EOI alignment institute, and the purpose of alignment in general.
- Definitions of the five alignment criteria for which the WAT provides results are detailed in section II.
- A findings section for each content area (mathematics, English, social studies, and science—sections III, IV, V, and VI respectively) provides a summary of the results of the ratings for each OCCT EOI test analyzed in the study, including the results for each of the five alignment criteria, as well as summaries of reviewers' notes on items and the overall alignment, and inter-rater reliability values.

- Recommendations pertaining to all four content areas are provided in section VII.
- An appendix is provided for each test, containing the full set of coding results for the *PASS* objectives, each of the alignment criteria, inter-rater reliability, and reviewer notes for each OCCT EOI test coded for the study.

## II. Alignment Criteria Used for This Analysis

This analysis used the Web Alignment Tool (WAT) and Webb alignment criteria (described below) to determine the degree of alignment between the Oklahoma (*PASS*) objectives and the OCCT EOI 2009 test items for Algebra I, Geometry, Algebra II, English II, English III, U.S. History, and Biology I. Descriptions of each of the five alignment criteria (from Webb, 2005) follow.

### A. Categorical Concurrence

An important aspect of alignment between standards and assessments is whether both address the same content categories. The categorical-concurrence criterion provides a general indication of alignment, if both documents incorporate the same content. *The criterion of categorical concurrence between standards and assessment is met if the same or consistent categories of content appear in both documents.* This criterion was judged by determining whether the assessment included items measuring content from each standard. The analysis assumed that the assessment had to have at least six items measuring content from a standard in order for an acceptable level of categorical concurrence to exist between the standard and the assessment. The number of items, six, is based on estimating the number of items that could produce a reasonably reliable subscale for estimating students' mastery of content on that subscale (Webb, 2005, p. 110).

### B. Depth-of-Knowledge Consistency

Standards and assessments can be aligned not only on the category of content covered by each, but also on the basis of the complexity of knowledge required by each. *Depth-of-knowledge consistency between standards and assessment indicates alignment if what is elicited from students on the assessment is as demanding cognitively as what students are expected to know and do as stated in the standards.* For consistency to exist between the assessment and the standard, as judged in this analysis, at least 50% of targeted objectives are met by items of the appropriate complexity. Fifty percent, a conservative cutoff point, is based on the assumption that a minimal passing score for any one standard of 50% or higher would require the student to successfully answer at least some items at or above the depth-of-knowledge level of the corresponding objectives. For example, assume an assessment included six items related to one standard and students were required to answer correctly four of those items to be judged proficient—i.e., 67% of the items. If three (50%) of the six items were at or above the depth-of-knowledge level of the corresponding objectives, then to achieve a proficient score, the student would be required to correctly answer at least one item at or above the depth-of-knowledge level of one objective. If a standard had between 40% and 50% of items at or above the depth-of-knowledge levels of the objectives, then it was reported that the criterion was “weakly” met (Webb, 2005, p. 111).

### **C. Range-of-Knowledge Correspondence**

For standards and assessments to be aligned, the breadth of knowledge required on both should be comparable. *The range-of-knowledge correspondence criterion is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the assessment items/activities.* The criterion for correspondence between span of knowledge for a standard and an assessment considers the number of objectives within the standard with one related assessment item/activity. Fifty percent of the objectives for a standard had to have at least one related assessment item for the alignment on this criterion to be judged acceptable. This level is based on the assumption that students' knowledge should be tested on content from over half of the domain of knowledge for a standard. This assumes that each objective for a standard should be given equal weight. If 50% or more of the objectives for a standard had a corresponding assessment item, then the range-of-knowledge correspondence criterion was met. If between 40% and 50% of the objectives for a standard had a corresponding assessment item, the criterion was "weakly" met (Webb, 2005, p. 112).

### **D. Balance of Representation**

Aligned standards and assessments should also require that knowledge be distributed equally in both. The range-of-knowledge correspondence criterion only considers the number of objectives within a standard hit (a standard with a corresponding item); it does not take into consideration how the hits (or assessment items/activities) are distributed among these objectives. *The balance-of-representation criterion is used to indicate the degree to which one objective is given more emphasis on the assessment than another.* An index is used to judge the distribution of assessment items. This index only considers the objectives for a standard that have at least one hit—i.e., one related assessment item per objective. The index is computed by considering the difference in the proportion of objectives and the proportion of hits assigned to the objective. An index value of 1 signifies perfect balance and is obtained if the hits (corresponding items) related to a standard are equally distributed among the objectives for the given standard. Index values that approach 0 signify that a large proportion of the hits are on only one or two of all of the objectives. Index values of .7 or higher indicate that items/activities are distributed among all of the objectives at least to some degree (e.g., every objective has at least two items) and is used as the acceptable level on this criterion. Index values between .6 and .7 indicate the balance-of-representation criterion has only been "weakly" met (Webb, 2005, pp. 112-113).

### **E. Source of Challenge**

The source-of-challenge criterion is only used to identify items on which the major cognitive demand is inadvertently placed and is other than the targeted subject area skill, concept, or

application. Cultural bias or specialized knowledge could be reasons for an item to have a source-of-challenge problem. Such item characteristics may result in some students a) not answering an assessment item; b) answering an assessment item incorrectly, or at a lower level, even though they possess the understanding and skills being assessed; or c) answering an assessment item correctly even though they do not possess the understanding and skills that the assessment administrators believe the item to be assessing (Webb, 2005, p. 114).

### III. Findings for Mathematics

This study analyzed alignment between the *PASS* standards and OCCT End-of-Instruction test items for Algebra I, Geometry, and Algebra II. Standards marked in the *PASS* documents as “must be assessed by the local school district” were not included in the study. Terminology matching the three WAT levels for standards to the *PASS* levels was defined as follows:

- WAT standard—*PASS* numbered standards
- WAT goal—*PASS* numbered statements under a standard with lettered statements below the goal
- WAT objective—*PASS* lettered statements
- WAT objective—*PASS* numbered statements under a standard with no lettered statements below

The 2009–2010 Test Blueprint (equivalent to the 2008–2009 blueprint) was also considered in the discussion of the alignment results.

The review group consisted of two external reviewers, two Oklahoma classroom teachers with experience teaching the courses, and a cross-grade specialist (curriculum resource instructor), for a total of five reviewers.<sup>4</sup>

Results of the alignment studies as calculated by the WAT are provided in Appendices A, B, and C. The tables in these appendices were downloaded directly from the WAT and have not been modified. The following sections provide summaries and discussion of the results.

#### A. Content Standards

This section presents and discusses findings on the distribution of DOK levels for the EOI mathematics standards and objectives.

Table 1 below shows the number of objectives coded for each course’s standards, the number of objectives coded at each DOK level, and the percent of objectives coded at each DOK level. (See Table 9-12.14 in Appendices A, B, and C for a full set of coded objectives for each course.)

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<sup>4</sup> Two more Oklahoma teachers had been invited to participate and confirmed attendance, but needed to cancel right before the beginning of the institute. Of the remaining two teachers, one had expertise in all three courses, and the other had expertise in Algebra I and II.

**Table 1. Percent of Objectives by Depth-of-Knowledge (DOK) Levels for OCCT EOI Alignment Analysis for Mathematics**

Course	No. of Objectives	DOK Level	No. of Objectives by Level	% Across Standards by Level
Algebra I	23	1	8	35
		2	14	61
		3	1	4
Geometry	26	1	3	12
		2	22	85
		3	1	4
Algebra II	32	1	3	10
		2	23	74
		3	5	16

*Note: Percentages may not sum to 100 due to rounding.*

For these three mathematics courses, the percentages of objectives at each DOK level are highest for DOK 2 (from 61% to 85%), relatively low for DOK 1 (from 10% to 35%), with the fewest objectives at DOK 3 (from 4% to 16%). For Algebra I, of the 23 objectives, 35% (8) were coded DOK 1, 61% (14) were coded DOK 2, and 4% (1) were coded DOK 3. Of the 26 objectives in Geometry, 12% (3) were coded DOK 1, 85% (22) were coded DOK 2, and 4% (1) were coded DOK 3. For Algebra II, of the 31 objectives, 10% (3) were coded DOK 1, 74% (23) were coded DOK 2, and 16% (5) were coded DOK 3.

## **B. Alignment of Content Standards and the OCCT EOI Mathematics Assessments**

This section presents findings on the five alignment criteria for this study: 1) Categorical Concurrence, 2) Depth-of-Knowledge Consistency, 3) Range of Knowledge, 4) Balance of Representation, and 5) Source of Challenge. For each of the first four alignment criteria, an acceptable level was defined by the Webb methodology as described in Section II; the results are summarized and discussed in subsections for each course. Two further subsections provide information across courses on exceptional coding of items and on items identified as having source-of-challenge or other issues.

### **ALGEBRA I**

The Algebra I Test Book contains 75 test items. Of the 55 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below in Table 2.

**Table 2. Summary of Attainment of Acceptable Alignment Level, OCCT EOI Algebra I**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of- Knowledge Consistency	Range of Knowledge	Balance of Representation
<b>1. Number Sense and Algebraic Operations</b>	YES	YES	YES	YES
<b>2. Relations and Functions</b>	YES	YES	YES	YES
<b>3. Data Analysis, Probability and Statistics</b>	YES	YES	YES	YES

As indicated in Table 2 above, for EOI Algebra I, all WAT criteria are met for all three standards (see Tables 9-12.1, 9-12.2, and 9-12.3 in Appendix A). According to the EOI Algebra I Test Blueprint for operational items, an ideal of 27% of the items should address Standard 1, 56% of the items should address Standard 2, and 16% of the items should address Standard 3. In this study, of the 58 “mean hits”<sup>5</sup> to the 55 coded items in the test (see Table 9-12.1 in Appendix A), an average of 29% (17) were coded to Standard 1, an average of 53% (30.6) were coded to Standard 2, and an average of 18% (10.4) were coded to Standard 3.

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<sup>5</sup> The mean is the number of items coded to an objective within a standard, averaged across reviewers. When a reviewer codes an item to more than one objective, that item corresponds to more than one hit for that reviewer. Thus, the total number of hits is usually higher than the number of items on the assessment.

## GEOMETRY

The Geometry Test Book contains 75 test items. Of the 55 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below in Table 3.

**Table 3. Summary of Attainment of Acceptable Alignment Level, OCCT EOI Geometry**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
1. Logical Reasoning	YES	NO	YES	YES
2. Properties of 2-Dimensional Figures	YES	YES	YES	YES
3. Triangles and Trigonometric Ratios	YES	YES	YES	YES
4. Properties of 3-Dimensional Figures	YES	YES	YES	YES
5. Coordinate Geometry	YES	YES	YES	YES

As indicated in Table 3, for EOI Geometry, all WAT criteria are met for four of the five standards, and all but Depth-of-Knowledge Consistency is met for Standard 1 (see Tables 9-12.1, 9-12.2, and 9-12.3 in Appendix B). According to the EOI Geometry Test Blueprint for operational items, an ideal of 11% of the items should address Standard 1, 36% of the items should address Standard 2, 22% of the items should address Standard 3, 18% of the items should address Standard 4, and 13% of the items should address Standard 5. In this study, of the 58.2 “mean hits” to the 55 coded items in the test (see Table 9-12.1 in Appendix B), an average of 11% (6.2) were coded to Standard 1, an average of 39% (22.8) were coded to Standard 2, an average of 21% (12.2) were coded to Standard 3, an average of 17% (10) were coded to Standard 4, and an average of 12% (7) were coded to Standard 5.

As shown in Table 3 above, the Depth-of-Knowledge Consistency criterion was not attained for Standard 1. Depth-of-Knowledge Consistency is met for a given standard if 50% of the assessment items are at or above the DOK level for the objectives they target. For Standard 1, an average of 38% of the items were coded at the DOK level of the targeted objectives and none were coded above the DOK level (see Table 9-12.2 in Appendix B).

## ALGEBRA II

The Algebra II Test Book contains 75 test items. Of the 55 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below in Table 4.

**Table 4. Summary of Attainment of Acceptable Alignment Level, OCCT EOI Algebra II**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
<b>1. Number Sense and Algebraic Operations</b>	YES	YES	YES	YES
<b>2. Relations and Functions</b>	YES	YES	YES	YES
<b>3. Data Analysis, Probability and Statistics</b>	YES	YES	YES	YES

As indicated in Table 4 above, for EOI Algebra II, all WAT criteria are met for all three standards (see Tables 9-12.1, 9-12.2, and 9-12.3 in Appendix C). According to the EOI Algebra II Test Blueprint for operational items (page 11), an ideal of 27% of the items should address Standard 1, 56% of the items should address Standard 2, and 16% of the items should address Standard 3. In this study, of the 55.4 “mean hits” to the 55 coded items in the test (see Table 9-12.1 in Appendix C), an average of 27% (15.2) were coded to Standard 1, an average of 58% (32.2) were coded to Standard 2, and an average of 14% (8) were coded to Standard 3.

#### ***EXCEPTIONAL CODING OF ITEMS***

In some instances, reviewers did not code an item to an objective. These instances are summarized below.

Assessment items coded by more than one reviewer as corresponding to the standard or one of the goals, and not to a specific objective, are listed below:

- Algebra I, item 75 was coded to goal 2.2 Linear Equations and Graphs by two reviewers because no objective dealt with the y-intercept as specified in the item.
- Algebra II, one item—27—was coded to goal 2.1 Functions and Function Notation by three reviewers because no objective specifically dealt with inverse functions other than exponential and logarithmic functions.

No mathematics assessment items were considered uncodeable (that is, not matching the content of any standards, goals, or objectives) for the Algebra I, Geometry, or Algebra II tests.

## **SOURCE OF CHALLENGE**

The Source of Challenge criterion is met if students' success on the assessment appears to rely on their knowledge of the relevant content rather than on other factors. There is no statistical analysis for Source of Challenge; instead, the criterion is evaluated based on the number and type of source-of-challenge issues noted by reviewers during coding. This section provides a summary of notes on items for each course for which more than one reviewer found source-of-challenge issues. (For the full set of notes for each course, see Table 9-12.5 in Appendices A and B; there were no source-of-challenge notes for Algebra II.)

For the three mathematics courses, no items were identified as having source-of-challenge issues by more than one reviewer, although there were two items for which one reviewer made a source of challenge note, and another reviewer made a similar note in the general notes field.

- Algebra I, item 24 was considered to be more appropriate as a geometry item, due to its reliance on the student knowing and appropriately applying the Pythagorean theorem or knowledge of special right triangles.
- Geometry, item 59 was considered to need tangent points shown in the diagram, to better identify the lengths of intended line segments.

## **C. General Notes on Items**

While coding items, reviewers could also add general notes about the items. For the three mathematics tests, most notes comment on issues previously described in the sections on Exceptional Coding of Items and Source of Challenge. Some notes comment on extraneous information being provided, in that a student might be able to answer the item while ignoring information that the developer apparently intended the student to use in determining the response. Other notes deal with ways an item might be better introduced, both for accuracy and to focus the student's attention. At least one commented on the possible need for a graphing calculator if trigonometry tables were not provided with the item. (For the full set of notes, see Table 9-12.7 in Appendices A, B, and C.)

## **D. General Comments on Overall Alignment**

This section summarizes general comments reviewers made at the end of coding sessions for each test about the overall alignment of the test items and objectives. In mathematics, reviewers were asked to enter their comments to specific questions electronically, using the WAT; due to time constraints the reviewers did not have the opportunity to discuss their thoughts with one another in person. (For the full set of collected notes, see Table 9-12.15 in Appendices A, B, and C.)

## ***ALGEBRA I***

Reviewers indicated that the overall coverage of the objectives is sufficient, as the items cover the most important aspects of each objective/standard. One reviewer noted that some objectives are more heavily represented in the test, in particular scatter plots and systems of equations. Most reviewers felt that a majority of the items were at DOK level 2, and at least one felt there should be more items on the test coded to DOK 3. One reviewer noted two objectives that seemed very broad and could have been further articulated. Four of the five reviewers felt the alignment was acceptable, and one indicated it needs slight improvement to be sure the goals within standards were represented as intended.

## ***GEOMETRY***

Reviewers indicated that the items generally covered the most important parts of the standards, and that the DOK coverage was good; one reviewer commented that an item assessing one standard could have been written at a higher DOK level. As with Algebra I, four of the five reviewers felt the alignment was acceptable, and one indicated it needs slight improvement to be sure the goals within standards were represented as intended.

## ***ALGEBRA II***

As with the other two courses, reviewers indicated that the most important parts of the standards were generally the ones covered. One note questioned where or how inverse functions are addressed in the standards. As to DOK, it was mentioned that several standards are about modeling situations with various types of functions (e.g., 2.2a, 2.3c, 2.5c, 2.6d, and 2.7d) and describe DOK 3–level cognitive processes. However, the test items for this content reflected lower cognitive complexity, due to the constraints of multiple-choice items. In addition, coverage of goal 3.1 at higher DOK levels seemed weak to one reviewer, with all or most items addressing this goal being DOK 1. It was also suggested that objective 3.1a, as stated, was weak. As with Algebra I and Geometry, four of the five reviewers felt the alignment was acceptable, and one indicated it needs slight improvement.

## **E. Reliability Among Reviewers**

This section lists the intraclass correlation decimal values for each test, based on the intraclass correlation reports of DOK levels by item and reviewers (see Table 9-12.6 in Appendices A, B, and C). These values give an indication of how much agreement there was between reviewers in coding DOK levels. Values larger than 0.7 usually indicate good reliability. For each of the mathematics course tests, the intraclass correlation is greater than 0.7.

### ***ALGEBRA I***

- The intraclass correlation is 0.8108.

***GEOMETRY***

- The intraclass correlation is 0.735.

***ALGEBRA II***

- The intraclass correlation is 0.7837.

## IV. Findings for English

This study analyzed alignment between the *PASS* standards and OCCT End-of-Instruction test items for English II and English III. Standards marked in the *PASS* documents as “must be assessed by the local school district” were not included in the study. Terminology matching the three WAT levels for standards to the *PASS* levels was defined as follows:

- WAT standard—*PASS* numbered standards
- WAT goal—*PASS* numbered statements under a standard with lettered statements below the goal
- WAT objective—*PASS* lettered statements
- WAT objective—*PASS* numbered statements under a standard with no lettered statements below

The 2009–2010 Test Blueprint (equivalent to the 2008–2009 blueprint) was also considered in the discussion of the alignment results.

The review group consisted of two external reviewers, two Oklahoma classroom teachers with experience teaching the courses, and a cross-grade specialist (district test coordinator), for a total of five reviewers.

Results of the alignment studies as calculated by the WAT are provided in Appendices D and E. The tables in these appendices were downloaded directly from the WAT and have not been modified. The following sections provide summaries and discussion of the results.

### A. Content Standards

This section presents and discusses findings on the distribution of DOK levels for the English II and English III standards and objectives.

Table 5 below shows the number of objectives coded for each test’s standards, the number of objectives coded at each DOK level, and the percent of objectives coded at each DOK level. (See Table 10.1 in Appendix D and Table 11.1 in Appendix E for a full set of coded objectives for each course.)

**Table 5. Percent of Objectives by Depth-of-Knowledge (DOK) Levels for OCCT EOI Alignment Analysis for English**

Course	No. of Objectives	DOK Level	No. of Objectives by Level	% Across Standards by Level
English II	49	1	12	24
		2	22	45
		3	15	31
English III	57	1	11	19
		2	25	44
		3	21	37

For English II, of the 49 objectives, 12 (24%) were coded to DOK 1, 22 (45%) were coded to DOK 2, and 15 (31%) were coded to DOK 3.

For English III, of the 57 objectives, 11 (19%) were coded to DOK 1, 25 (44%) were coded to DOK 2, and 21 (37%) were coded to DOK 3.

## **B. Alignment of Content Standards and the OCCT EOI English Assessments**

This section presents findings on the five alignment criteria for this study: 1) Categorical Concurrence, 2) Depth-of-Knowledge Consistency, 3) Range of Knowledge, 4) Balance of Representation, and 5) Source of Challenge. For each of the first four alignment criteria, an acceptable level was defined by the Webb methodology as described in Section II; the results are summarized and discussed in subsections for each course. Two further subsections provide information across courses on exceptional coding of items and on items identified as having source-of-challenge or other issues.

## ENGLISH II

The EOI English II Test Book contains 80 test items. Of the 60 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below in Table 6.

**Table 6. Summary of Attainment of Acceptable Alignment Level, OCCT EOI English II**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
10.1. Vocabulary	YES	YES	YES	YES
10.2. Comprehension	YES	YES	YES	WEAK
10.3. Literature	YES	WEAK	YES	YES
10.4. Research and Information	NO	YES	YES	YES
3. Grammar/Usage and Mechanics	YES	YES	YES	YES

As indicated in Table 6 above, for EOI English II, all WAT criteria are met for standards 10.1 and 3 (see Tables 10.1, 10.2, and 10.3 in Appendix D). For standard 10.2, all WAT criteria were met except for Balance of Representation, which was weakly met; for standard 10.3, all WAT criteria were met except for Depth-of-Knowledge Consistency, which was weakly met; for standard 10.4, all WAT criteria were met except for Categorical Concurrence, which was not met. According to the EOI English II Test Blueprint for operational items, an ideal of approximately 11% of items should address Standard 10.1, an ideal of 27% of items should address Standard 10.2, an ideal of 28% of items should address Standard 10.3, an ideal of 9% of items should address Standard 10.4, and an ideal of 18% of items should address Standard 3.<sup>6</sup> In this study, of the 61.2 “mean hits”<sup>7</sup> to the 60 coded items in the test, an average of 7.2 (12%) were coded to Standard 10.1, an average of 20.6 (34%) were coded to Standard 10.2, an average of 16 (26%) were coded to standard 10.3, an average of 5.4 (9%) were coded to standard 10.4, and an average of 12 (20%) were coded to Standard 3 (see Table 10.1 in Appendix D).

<sup>6</sup> An additional item, a writing prompt (Standards 1.0 and 2.0), would account for the remaining 9% of the test; the writing prompt was not included in this study.

<sup>7</sup> The mean is the number of items coded to an objective within a standard, averaged across reviewers. When a reviewer codes an item to more than one objective, that item corresponds to more than one hit for that reviewer. Thus, the total number of hits is usually higher than the number of items on the assessment.

Categorical Concurrence is met for a given standard if there are at least six assessment items targeting objectives falling under the standard. However, an average of 5.4 items were coded to objectives for Standard 10.4 (see Table 10.1 in Appendix D).

Depth-of-Knowledge Consistency is met for a given standard if 50% of the assessment items are at or above the DOK level for the objectives they target. For Standard 10.3, an average of 43% of the items were coded at or above the DOK level of the targeted objectives (see Table 10.2 in Appendix D).

Balance of Representation is met if the items are evenly distributed among objectives. For Standard 10.2, a high percentage of items was coded as corresponding to one objective, 10.2.2.b (see Table 10.10 in Appendix D).

### **ENGLISH III**

The English III Test Book contains 82 test items. Of the 62 operational items, all were coded by five reviewers. Analyses of the alignment results are summarized below in Table 7.

**Table 7. Summary of Attainment of Acceptable Alignment Level, OCCT EOI English III**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
<b>11.1. Vocabulary</b>	YES	YES	NO	YES
<b>11.2. Comprehension</b>	YES	YES	YES	YES
<b>11.3. Literature</b>	YES	YES	YES	YES
<b>11.4. Research and Information</b>	YES	YES	NO	YES
<b>3. Grammar/Usage and Mechanics</b>	YES	YES	YES	YES

As indicated in Table 7 above, for EOI English III, all WAT criteria are met for standards 11.2, 11.3, and 3 (see Tables 11.1, 11.2, and 11.3 in Appendix E). For standards 11.1 and 11.4 all WAT criteria are met except for Range of Knowledge, which is not met.

Range of Knowledge is met if 50% or more of the objectives that fall under a standard are targeted by assessment items. For EOI English III, Standards 11.1 and 11.4, an average of 36%

and 32% (respectively) of the objectives had at least one coded objective (see Table 11.3 in Appendix E).

### ***EXCEPTIONAL CODING OF ITEMS***

There was no exceptional coding of items for English II and English III. All items were coded to an objective, and no items were deemed uncodeable (that is, not matching the content of any standards, goals, or objectives at the grade level).

### ***SOURCE OF CHALLENGE***

The Source of Challenge criterion is met if students' success on the assessment appears to rely on their knowledge of the relevant content rather than on other factors. There is no statistical analysis for Source of Challenge; instead, the criterion is evaluated based on the number and type of source-of-challenge issues noted by reviewers during coding. This section provides a summary of notes on items at each grade level for which more than one reviewer found source-of-challenge issues. (For the full set of notes for each course, see Tables 10.5 and 11.5 in Appendices D and E, respectively.)

- English II, item 46: one reviewer commented that the item could be answered without reading the passage, and a second reviewer commented that the item was cued by item 50.
- English III, Item 75: one reviewer commented that the item cues item 76 and another that it is cued by item 77.
- English III, Item 76: two reviewers commented that the item has two possible correct answers.
- English III, Item 77: reviewers commented that the item cues or clangs with other items in the set.
- English III, Item 78: two reviewers commented on the item's "giggle factor," and that students could possibly get the correct answer for the wrong reasons.

## **C. General Notes on Items**

While coding items, reviewers could also add general notes about the items. For English II, reviewers cited several items with options that were "not the best" or "confusing." Reviewers felt some of the Grammar/Usage and Mechanics items tested skills that "should be automatic at this grade," with the implication that they should not be tested at this level. For English III, reviewers again noted that some of the tested skills in Grammar/Usage and Mechanics "should

be an automatic skill at this grade.” (For the full set of notes for each course, see Tables 10.7 and 11.7 in Appendices D and E, respectively.)

#### **D. General Comments on Overall Alignment**

This section summarizes general comments reviewers made at the end of coding sessions for each test about the overall alignment of the test items and objectives. For both the English II and English III tests, most reviewers considered the alignment of the test items and objectives acceptable, while one reviewer considered the alignment perfect. (For the full summary of notes, see Tables 10.15 and 11.15 in Appendices D and E, respectively.)

#### **E. Reliability Among Reviewers**

This section lists the intraclass correlation decimal values for each test, based on the intraclass correlation reports of DOK levels by item and reviewers (see Tables 10.6 and 11.6 in Appendices D and E, respectively). These values give an indication of how much agreement there was between reviewers in coding DOK levels. Values larger than 0.7 usually indicate good reliability. For each of the tests, the intraclass correlation is close to 0.9.

##### ***ENGLISH II***

- The intraclass correlation is 0.8846.

##### ***ENGLISH III***

- The intraclass correlation is 0.895.

## V. Findings for Social Studies

This study analyzed alignment between the *PASS* standards and OCCT End-of-Instruction test items for U.S. History. Standards marked in the *PASS* documents as “must be assessed by the local school district” were not included in the study. Terminology matching two WAT levels for standards to the *PASS* levels was defined as follows:

- WAT standard—*PASS* numbered standards
- WAT objective—*PASS* numbered statements under a standard

The 2008–2009 Test Blueprint was also considered in the discussion of the alignment results.

The review group consisted of two external reviewers, two Oklahoma classroom teachers with experience teaching the courses, and a cross-grade specialist (curriculum center coordinator), for a total of five reviewers.

Results of the alignment studies as calculated by the WAT are provided in Appendix F. The tables in this appendix were downloaded directly from the WAT and have not been modified. The following sections provide summaries and discussion of the results.

### A. Content Standards

This section presents and discusses findings on the distribution of DOK levels for the U.S. History standards and objectives.

Table 8 below shows the number of objectives coded for the test’s standards, the number of objectives coded at each DOK level, and the percent of objectives coded at each DOK level. (See Table 12.1 in Appendix F for a full set of coded objectives).

**Table 8. Percent of Objectives by Depth-of-Knowledge (DOK) Levels for OCCT EOI Alignment Analysis for U.S. History**

Course	No. of Objectives	DOK Level	No. of Objectives by Level	% Across Standards by Level
U.S. History	51	1	6	13
		2	28	58
		3	14	29

Six of the 48 objectives (13%) were coded to DOK 1, 28 (58%) were coded to DOK 2, and 14 (29%) were coded to DOK 3.

## B. Alignment of Content Standards and the OCCT EOI U.S. History Assessment

This section presents findings on the five alignment criteria for this study: 1) Categorical Concurrence, 2) Depth-of-Knowledge Consistency, 3) Range of Knowledge, 4) Balance of Representation, and 5) Source of Challenge. For each of the first four alignment criteria, an acceptable level was defined by the Webb methodology as described in Section II; the results are summarized and discussed in the first section below. Two further subsections provide information on exceptional coding of items and on items identified as having source-of-challenge or other issues.

### ***U.S. HISTORY***

The EOI U.S. History Test Book contains 80 test items. Of the 60 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below.

**Table 9. Summary of Attainment of Acceptable Alignment Level, OCCT EOI U.S. History**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
1. Social Studies Process Skills	YES	YES	YES	YES
2. Civil War/ Reconstruction Era	YES	WEAK	YES	YES
3. Immigration/ Westward Movement	YES	YES	YES	YES
4. Industrial Revolution	YES	WEAK	YES	YES
5. Imperialism/ Isolationism	NO	WEAK	YES	YES
6. Twenties Culture/Change	NO	YES	YES	YES
7. Great Depression	YES	YES	YES	YES
8. World War II	NO	YES	YES	YES
9. Post-War Foreign Policy	YES	NO	YES	YES
10. Post-War Domestic Policy	YES	WEAK	YES	YES

As indicated in Table 9, for EOI U.S. History, all WAT criteria are met for Standards 1, 3, and 7. Categorical Concurrence is not met for Standards 5, 6, and 8. Depth-of-Knowledge Consistency is weakly met for Standards 2, 4, 5 and 10, and not met for Standard 9. According to the EOI U.S. History Test Blueprint for operational items, an ideal of 10% of items should address each *PASS* standard. In this study, of the 62 “mean hits”<sup>8</sup> to the 60 coded items in the test, an average of 6 (10%) were coded to Standard 1, 7.2 (12%) were coded to Standard 2, 6 (10%) were coded to Standard 3, 6.6 (11%) were coded to Standard 4, 5.8 (9%) were coded to Standard 5, 4.6 (7%) were coded to Standard 6, 6.8 (11%) were coded to Standard 7, 5 (8%) were coded to Standard 8, 7 (11%) were coded to Standard 9, and 7 (11%) were coded to Standard 10 (see Table 12.1 in Appendix F).

Categorical Concurrence is met for a given standard if there are at least six assessment items targeting objectives falling under the standard. However, an average of 5.8 items were coded to objectives for Standard 5, an average of 4.6 for Standard 6, and an average of 5 for Standard 8 (see Table 12.1 in Appendix F).

Depth-of-Knowledge Consistency is met for a given standard if 50% of the assessment items are at or above the DOK level for the objectives they target. However, an average of fewer than 50% of the items were coded at or above the DOK level of the targeted objectives for Standards 2 (41%), 4 (47%), 5 (48%), 9 (30%), and 10 (40%). (See Table 12.2 in Appendix F.)

### ***EXCEPTIONAL CODING OF ITEMS***

In some instances, reviewers did not code an item to an objective. These instances are summarized below.

Assessment items coded by more than one reviewer as corresponding to the standard, and not to a specific objective, are listed below:

- Item 3 was coded to standard 3 by 4 reviewers because the item does not address any objective, but it does address the standard.
- Item 19 was coded to standard 8 by 4 reviewers because the item does not address any objective, but it does address the standard.
- Item 39 was coded to standard 3 by 4 reviewers because the date "1920s" precludes it from addressing any objective; however, it does address the standard.

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<sup>8</sup> The mean is the number of items coded to an objective within a standard, averaged across reviewers. When a reviewer codes an item to more than one objective, that item corresponds to more than one hit for that reviewer. Thus, the total number of hits is usually higher than the number of items on the assessment.

- Item 56 was coded to standard 7 by 4 reviewers because the date "1932" precludes it from addressing any objective; however, it does address the standard.

No U.S. History assessment items were considered uncodeable (that is, not matching the content of any standards or objectives).

### ***SOURCE OF CHALLENGE***

The Source of Challenge criterion is met if students' success on the assessment appears to rely on their knowledge of the relevant content rather than on other factors. There is no statistical analysis for Source of Challenge; instead, the criterion is evaluated based on the number and type of source-of-challenge issues noted by reviewers during coding. This section provides a summary of notes on items for which more than one reviewer found source-of-challenge issues. (For the full set of notes, see Table 12.5 in Appendix F.)

- Item 16 has multiple correct answers.
- Item 22 has multiple correct answers.
- Item 47 has multiple correct answers.
- Item 63 has multiple correct answers.
- Item 69 has multiple correct answers.
- Item 78 has no correct answer.

### **C. General Notes on Items**

While coding items, reviewers could also add general notes about the items. Many of the notes addressed the issue of a match to a standard rather than an objective as mentioned above, while several other notes addressed the issue of multiple correct answers or no correct answer, as mentioned above. A number of reviewers commented on the "reading comprehension" or specific wording of the items; a couple of comments noted that the stimulus was not necessary or helpful. A couple of comments praised the quality of the item. (For the full set of notes, see Table 12.7 in Appendix F.)

### **D. General Comments on Overall Alignment**

This section summarizes general comments reviewers made at the end of coding sessions for each test about the overall alignment of the test items and objectives. Most of the reviewers felt that more topics should have been covered by the test, and that more items could have been written at DOK level 3. The majority of reviewers thought the standards were generally

appropriate for the grade level. Two of the reviewers felt the alignment was acceptable, and three thought it needs slight improvement. (For the full set of notes, see Table 12.15 in Appendix F.)

## **E. Reliability Among Reviewers**

This section reports the intraclass correlation decimal value for the test, based on the Intraclass Correlation reports of DOK levels by item and reviewers (see Table 12.6 in Appendix F). This value gives an indication of how much agreement there was between reviewers in coding DOK levels. Values larger than 0.7 usually indicate good reliability. The intraclass correlation for the U.S. History test is 0.9114.

## VI. Findings for Science

This study analyzed alignment between the *PASS* standards and OCCT End-of-Instruction test items for Biology I. Standards marked in the *PASS* documents as “must be assessed by the local school district” were not included in the study. Terminology matching the two WAT levels for standards to the *PASS* levels were defined as follows:

- WAT standard—*PASS* numbered standards
- WAT objective—*PASS* numbered objectives under a standard

The 2009–2010 Test Blueprint (equivalent to the 2008–2009 blueprint) was also considered in the discussion of the alignment results.

The review group consisted of two external reviewers, two Oklahoma classroom teachers with experience teaching the course, and a cross-grade specialist (curriculum coordinator), for a total of five reviewers.

The Biology I test was coded twice, once for the Content standards, and once for the Process standards. Results of the alignment studies as calculated by the WAT are provided in Appendices G and H for Content and Process standards, respectively. The tables in these appendices were downloaded directly from the WAT and have not been modified. The following sections provide summaries and discussion of the results.

### A. Content Standards

This section presents and discusses findings on the distribution of DOK levels for the Biology I Content and Process standards and objectives.

Table 10 below shows the number of objectives coded for the Content and Process standards, the number of objectives coded at each DOK level, and the percent of objectives coded at each DOK level. (See Table 9-12.1 in Appendices G and H for a full set of coded Content and Process objectives.)

**Table 10. Percent of Objectives by Depth-of-Knowledge (DOK) Levels for OCCT EOI Alignment Analysis for Biology I**

Course	No. of Objectives	DOK Level	No. of Objectives by Level	% Across Standards by Level
Biology I (Content)	13	1	1	7
		2	6	46
		3	6	46
Biology I (Process)	17	1	1	6
		2	8	47
		3	8	47

As indicated in Table 10 above, for the EOI Biology I Content Standards, of the 13 objectives, 1 (7%) was coded to DOK 1, 6 (46%) were coded to DOK 2, and 6 (46%) were coded to DOK 3. The DOK distribution for the EOI Biology I Process Standards was very similar to the Content Standards. Of the 17 Process objectives, 1 (6%) was coded to DOK 1, 8 (47%) were coded to DOK 2, and 8 (47%) were coded to DOK 3.

## **B. Alignment of Content Standards and the OCCT EOI Biology I Assessment**

This section presents findings on the five alignment criteria for this study: 1) Categorical Concurrence, 2) Depth-of-Knowledge Consistency, 3) Range of Knowledge, 4) Balance of Representation, and 5) Source of Challenge. For each of the first four alignment criteria, an acceptable level was defined by the Webb methodology as described in Section II; the results are summarized and discussed in subsections for Content and Process. Two further subsections provide information on exceptional coding of items and on items identified as having source-of-challenge or other issues.

### ***BIOLOGY I CONTENT***

The EOI Biology I Test Book contains 80 test items. Of the 60 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below in Table 11.

**Table 11. Summary of Attainment of Acceptable Alignment Level, OCCT EOI Biology I Content**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrency	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
<b>B.1. The Cell</b>	YES	YES	YES	YES
<b>B.2. The Molecular Basis of Heredity</b>	YES	WEAK	YES	YES
<b>B.3. Biological Diversity</b>	YES	WEAK	YES	YES
<b>B.4. The Interdependence of Organisms</b>	YES	WEAK	YES	YES
<b>B.5. Matter, Energy, and Organization in Living Systems</b>	YES	YES	YES	YES
<b>B.6. The Behavior of Organisms</b>	YES	YES	YES	YES

As indicated in Table 11 above, for EOI Biology I Content, all WAT criteria are met for Standards B.1, B.5, and B.6. For Standards B.2, B.3, and B.4 all WAT criteria are met except Depth-of-Knowledge Consistency, which is weakly met (see Tables 9-12.1, 9-12.2, and 9-12.3 in Appendix G). According to the EOI Biology I Test Blueprint for operational items, an ideal of 16% of the items in the test should address Content Standard B.1, 16% should address Standard B.2, 16% should address Standard B.3, 22% should address Standard B.4, 16% should address Standard B.5, and 14% should address Standard B.6. In this study, of the 55.4 “mean hits”<sup>9</sup> to the 60 coded items in the test, an average of 10 (18%) were coded to Standard B.1, 9.2 (17%) to Standard B.2, 6.6 (12%) to Standard B.3, 11.2 (20%) to Standard B.4, 11.2 (20%) to Standard B.5, and 7.2 (13%) to Standard B.6 (see Table 9-12.1 in Appendix G).

Depth-of-Knowledge Consistency is met for a given standard if 50% of the assessment items are at or above the DOK level for the objectives they target. For Standard B.2, an average of 41% of the items were coded at or above the DOK level of the targeted objectives; for Standard B.3, an average of 40%; and for Standard B.4, an average of 48% (see Table 9-12.2 in Appendix G).

<sup>9</sup> The mean is the number of items coded to an objective within a standard, averaged across reviewers. When a reviewer codes an item to more than one objective, that item corresponds to more than one hit for that reviewer. Thus, the total number of hits may be higher than the number of items on the assessment. In the case of Biology I, the total number for the content standards is lower than the number of items since an average of 6.4 (8%) of the Biology I items were not coded to any content standard.

## **BIOLOGY I PROCESS**

The EOI Biology I Test Book contains 80 test items. Of the 60 operational items, all were coded by the five reviewers. Analyses of the alignment results are summarized below.

**Table 12. Summary of Attainment of Acceptable Alignment Level, OCCT EOI Biology I Process**

STANDARDS	ALIGNMENT CRITERIA			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
PS.1. Observe and Measure	YES	YES	YES	YES
PS.2. Classify	YES	YES	YES	YES
PS.3. Experiment	YES	YES	YES	YES
PS.4. Interpret and Communicate	YES	WEAK	YES	YES
PS.5. Model	YES	NO	YES	YES

As indicated in Table 12 above, for EOI Biology I Process, all WAT criteria are met for Standards PS.1, PS.2, and PS.3. For Standards PS.4 and PS.5, all WAT criteria are met except Depth-of-Knowledge Consistency, which is weakly met for PS.4, and not met for PS.5 (see Tables 9-12.1, 9-12.2, and 9-12.3 in Appendix H). According to the EOI Biology I Test Blueprint for operational items, an ideal of 13% of the items in the test should address Process Standard PS.1, 13% should address Standard PS.2, 27% should address Standard PS.3, 34% should address Standard PS.4, and 13% should address Standard PS.5. In this study, of the 68.6 mean hits to the 60 coded items in the test, an average of 7.8 (12%) were coded to Standard PS.1, 6.8 (10%) to Standard PS.2, 17.2 (25%) to Standard PS.3, 26.4 (38%) to Standard PS.4, and 10.4 (15%) to Standard PS.5 (see Table 9-12.1 in Appendix H).

Depth-of-Knowledge Consistency is met for a given standard if 50% of the assessment items are at or above the DOK level for the objectives they target. For Standard PS.4, an average of 41% of the items were coded at or above the DOK level of the targeted objectives. For Standard PS.5, an average of only 30% of the items were coded at or above the DOK level of the targeted objectives (see Table 9-12.2 in Appendix H).

### **EXCEPTIONAL CODING OF ITEMS**

In some instances, reviewers did not code an item to an objective. The following items were rated by more than one reviewer as being uncodeable to the Biology I Content Standards (that is, not matching the content of any content standards or objectives). This circumstance only occurred for the ratings of items to the Content Standards (as opposed to the Process Standards).

Per the Biology I Content Standards Test Blueprint, the following six items were coded to the safety Process Standard and Objective PS.3.5 and are not intended to test a corresponding Content Standard.

- Item 1 - Safety
- Item 15 - Safety
- Item 19 - Safety
- Item 20 - Safety
- Item 24 - Safety
- Item 48 - Safety

The following 12 items were determined by more than one reviewer to be process items that did not require or utilize any content knowledge to correctly answer the item.

- Item 3 was rated uncodeable by 2 reviewers as process only.
- Item 10 was rated uncodeable by 2 reviewers as process only.
- Item 16 was rated uncodeable by 4 reviewers as process only.
- Item 26 was rated uncodeable by 2 reviewers as process only.
- Item 27 was rated uncodeable by 2 reviewers as process only.
- Item 38 was rated uncodeable by 2 reviewers as process only.
- Item 43 was rated uncodeable by 3 reviewers as process only.
- Item 62 was rated uncodeable by 2 reviewers as process only.
- Item 63 was rated uncodeable by 4 reviewers as process only.

- Item 68 was rated uncodeable by 4 reviewers as process only.
- Item 77 was rated uncodeable by 2 reviewers as process only.
- Item 80 was rated uncodeable by 4 reviewers as process only.

### ***SOURCE OF CHALLENGE***

The Source of Challenge criterion is met if students' success on the assessment appears to rely on their knowledge of the relevant content rather than on other factors. There is no statistical analysis for Source of Challenge; instead, the criterion is evaluated based on the number and type of source-of-challenge issues noted by reviewers during coding. This section provides a summary of notes on the Biology I items for which more than one reviewer found source-of-challenge issues. (For the full set of notes, see Table 9-12.5 in Appendices G and H.)

- Item 14: The entire introductory paragraph is superfluous to the item.
- Item 26: The entire introductory paragraph and stimuli are superfluous to the item. In addition, the scenario presented does not describe a valid experiment with a control group.
- Item 41: The scenario presented does not describe a valid experiment with a control group.

### **C. General Notes on Items**

While coding items, reviewers could also add general notes about the items. The majority of the notes either identify individual items as safety items (where there are no associated content standards) or as process items that are uncodeable to the content standards. These individual items are identified above. (For the full set of notes, see Table 9-12.7 in Appendices G and H.)

### **D. General Comments on Overall Alignment**

This section summarizes general comments reviewers made at the end of each of the two coding sessions about the overall alignment of the test items and objectives. (For the full set of collected notes, see Table 9-12.15 in Appendices G and H.)

### ***BIOLOGY I CONTENT***

In general, the reviewers thought that the test items covered most of the important topics expected by the standards. However, Standard B.3, Biological Diversity, seemed underrepresented, particularly for Objective B.3.2, Natural Selection and Biological

Adaptations. Standard B.6, The Behavior of Organisms, also seemed somewhat underrepresented.

In general, the reviewers thought that the items covered the most important DOK levels expected by the standards.

In general, the reviewers thought that most of the standards were written at an appropriate level of specificity and were directed toward appropriate expectations for high school EOI Biology I. However, the expectations for Standard B.1, The Cell, seemed to be below the typical high school Biology I level because cellular and organelle functions were not addressed in the objectives.

Four of the five reviewers thought that there was acceptable alignment between the test items and the EOI Biology I Content standards. One reviewer thought that major improvement was needed between the test items and the standards, particularly because of the number of items that were rated as process only, and were not coded to any content standards or objectives.

### ***BIOLOGY I PROCESS***

In general, the reviewers thought that the test items covered most of the important topics expected by the standards. However, Standard PS.2, Classify, seemed somewhat underrepresented. In addition, some of the items that used the term “classify” primarily required content knowledge rather than use of the process of classifying (see items 29, 75, 78, and 79). For Standard PS.3, Experiment, some of the items that used the term “experiment” did not model valid processes for scientific experimentation (see items 11, 26, and 41). In these items, the situation described was more representative of a loosely structured investigation rather than a scientific experiment.

In general, the reviewers thought that the items covered the most important DOK levels expected by the standards.

In general, the reviewers thought that most of the standards were written at an appropriate level of specificity and were directed toward appropriate expectations for high school EOI Biology I.

Four of the five reviewers thought that there was acceptable alignment between the test items and the EOI Biology I Process standards. One reviewer thought that slight improvement was needed between the test items and the standards.

## **E. Reliability Among Reviewers**

This section lists the intraclass correlation decimal values for each test, based on the Intraclass Correlation reports of DOK levels by item and reviewers (see Table 9-12.6 in Appendices G and

H). These values give an indication of how much agreement there was between reviewers in coding DOK levels. Values larger than 0.7 usually indicate good reliability.

***BIOLOGY I CONTENT***

- 0.7709

***BIOLOGY I PROCESS***

- 0.7773

## **VII. Conclusions and Recommendations**

This section summarizes the overall results for each content area, followed by a set of recommendations that applies across content areas.

### **Mathematics**

The Algebra I and Algebra II tests met all criteria for all standards.

The Geometry test met all criteria for all standards except in Depth-of-Knowledge Consistency, which was not met for Standard 1.

### **English**

The English II test met all criteria for all standards except in Categorical Concurrence, which was not met for Standard 10.4, in Depth-of-Knowledge Consistency, which was weakly met for Standard 10.3, and in Balance of Representation, which was weakly met for Standard 10.2.

The English III test met all criteria for all standards except in Range of Knowledge, which was not met for Standards 11.1 and 11.4.

### **Social Studies**

The U.S. History test met all criteria for all standards except in Categorical Concurrence, which was not met for Standards 5, 6, and 8, and in Depth-of-Knowledge Consistency, which was weakly met for Standards 2, 4, 5, and 10, and not met for Standard 9.

### **Science**

The Biology I test met all criteria for all content standards except in Depth-of-Knowledge Consistency, which was weakly met for Standards B.2, B.3, and B.4.

The Biology I test met all criteria for all process standards except in Depth-of-Knowledge Consistency, which was weakly met for Standard PS.4, and not met for Standard PS.5.

WestEd recommends that the SDE carefully consider the results of this alignment study, taking into consideration the following elements of the Oklahoma educational and assessment context:

- The Oklahoma student population;
- The 2008–2009 Test Blueprint for each course;
- The Test and Item Specifications for each course;
- The *PASS* objectives, goals, and standards statements and organization; and
- The curriculum for each course.

Taking into consideration this overall context, SDE should consider whether ratings of *YES*, *WEAK*, or *NO* for each of the criteria for each test form are results of *intentional* decisions or policies, and if not, whether changes need to be made to the assessment forms and items, the blueprints and specifications, the *PASS* standards, or the curriculum (or any combination of these). Specific considerations for each criterion, based on the Webb analysis methodology, are provided below.

### **A. Categorical Concurrence**

Based on the test blueprints, consider which and how many items need to be developed, revised, or removed so that items address the standards intended for each form of the assessment. Alternatively, consider revising the test blueprints to reflect the appropriate emphases on standards relevant for the state assessment.

### **B. Depth-of-Knowledge Consistency**

Based on the *PASS* standards and the grade-level curriculum, consider which and how many items assessing each objective need to be at higher DOK levels. Based on the DOK of the objectives, existing items may need to be revised to address higher DOK skills; any new items added to target un- or under-targeted objectives need to be written at an appropriate DOK level.

### **C. Range-of-Knowledge Correspondence**

Similarly to Categorical Concurrence, based on the test blueprints, consider which and how many items need to be developed, revised, or removed so that items address a range of objectives for each of the standards intended for each form of the assessment.

### **D. Balance of Representation**

Consider revising or replacing items addressing overly targeted objectives so that they target other objectives, especially underrepresented ones. Additionally, consider reviewing those *PASS* objectives to which too many or too few items were aligned. This review would help

determine if the over- or underrepresentation is due to the objectives being too broad (resulting in numerous items targeting the objective) or too narrow (resulting in few or no items targeting the objective).

### **E. Source of Challenge**

Consider revising or replacing items that pose source-of-challenge issues.

## VIII. References

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## **Appendix A: Alignment Analysis Tables—Algebra I**



Table 9-12.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

OCCT Algebra I Alignment Study

Number of Assessment Items - 55

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
1 - Number Sense and Algebraic Operations - The studen ...	2	7	1 2	3 4	42 57	17	1.79	YES
2 - Relations and Functions - The student will use rel ...	4	12.4	1 2	5 7	41 58	30.6	1.36	YES
3 - Data Analysis, Probability and Statistics - The st ...	2	4	2 3	3 1	75 25	10.4	1.36	YES
Total	8	23.4	1 2 3	8 14 1	34 60 4	58	1.90	

Table 9-12.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

OCCT Algebra I Alignment Study

Number of Assessment Items - 55

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
1 - Number Sense and Algebraic Operations - The studen ...	2	7	17	1.79	8	16	77	28	15	25	YES
2 - Relations and Functions - The student will use rel ...	4	12.4	30.6	1.36	35	41	56	41	9	24	YES
3 - Data Analysis, Probability and Statistics - The st ...	2	4	10.4	1.36	48	41	51	42	1	4	YES
Total	8	23.4	58	1.90	29	38	62	39	10	23	

Table 9-12.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers  
 OCCT Algebra I Alignment Study  
 Number of Assessment Items - 55

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
1 - Number Sense and Algebraic Operations - The studen ...	2	7	17	1.79	6.6	0.8	94	11	YES	29	2	0.84	0.03	YES
2 - Relations and Functions - The student will use rel ...	4	12.4	30.6	1.36	12.2	0.4	98	3	YES	53	4	0.77	0.02	YES
3 - Data Analysis, Probability and Statistics - The st ...	2	4	10.4	1.36	3.2	0.75	80	19	YES	18	2	0.84	0.06	YES
Total	8	23.4	58	1.90	7.33	3.77	91	15		33	15	0.82	0.05	

Table 9-12.4

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

OCCT Algebra I Alignment Study

Number of Assessment Items - 55

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
1 - Number Sense and Algebraic Operations - The studen ...	YES	YES	YES	YES
2 - Relations and Functions - The student will use rel ...	YES	YES	YES	YES
3 - Data Analysis, Probability and Statistics - The st ...	YES	YES	YES	YES

*Table 9-12.5*

Source-of-Challenge Issues by Reviewer

OCCT Algebra I Alignment Study

Item Number	Comments by Reviewer
24	Much of the challenge in this item is in the geometry skills rather than the algebra skills of using the formula. The student has to deduce the length of the missing portion of the longer base, add $9 + 11 + 9$ to get the longer base, then use the Pythagorean theorem to find the height. Only then is the student ready to use the formula.

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT Algebra I Alignment Study

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	1	1	1	2	1
2	2	2	2	2	1
3	1	1	1	1	1
4					
5					
6	2	2	2	2	2
7	1	1	1	1	1
8	2	2	2	2	2
9	1	2	1	2	1
10	1	2	1	2	1
11	2	1	2	2	1
12					
13					
14	2	2	2	1	2
15	1	1	1	1	1
16	2	2	2	2	2
17	1	1	1	1	1
18	1	1	1	1	1
19	2	2	2	2	1
20					
21					
22					
23	1	1	1	1	2
24	2	3	2	2	2
25	2	2	2	3	2
26	1	1	1	2	2
27	2	2	2	2	1
28	2	2	1	1	1
29	1	1	1	2	1
30	2	2	2	2	2
31					
32	2	1	2	3	2
33					
34					
35	1	1	1	1	1
36	1	2	2	1	1
37	2	2	2	1	1
38	2	1	1	1	1
39	1	2	1	1	1
40	1	1	1	2	2
41	1	1	1	1	1
42	1	1	1	1	1
43					
44					
45	2	2	2	2	2
46	2	2	3	3	2
47	1	1	1	2	1
48	2	2	2	2	2

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT Algebra I Alignment Study

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	1	1	1	1	1
50	1	1	1	1	1
51	1	2	1	1	1
52					
53	2	2	1	1	1
54					
55					
56					
57	2	2	2	1	1
58	2	2	2	3	2
59	2	2	2	2	1
60	1	2	1	1	1
61					
62	2	2	2	2	2
63	1	1	1	1	1
64	2	2	1	1	1
65	2	2	2	1	2
66					
67					
68	2	2	1	1	1
69	1	2	2	1	1
70	1	2	2	2	2
71	1	2	2	1	1
72					
73	1	1	1	1	1
74	2	2	2	1	2
75	1	1	2	1	1

**Intraclass Correlation:** 0.8108

**Pairwise Comparison:** 0.6782

Table 9-12.7

Notes by Reviewer

OCCT Algebra I Alignment Study

Item Number	Comments by Reviewer
8	Item should say that student should use the results shown in the table...
8	Question would be better if it read: "Using the table how many times can R be expected as the outcome if the experiment is repeated 30 times?"
12	Table is extraneous. Student can easily do problem without it.
24	Although triangular sections are familiar 3-4-5 rt triangles, students may need to use Pythagorean theorem. Seems more a geometry item.
44	Data in table form is extraneous. Seems would be better if it were usable, provided additional means for answering the question.
65	Can answer question by only checking slope
75	This item asks the student to identify the equation that has a certain y-intercept. This skill is not addressed in the detailed objectives under 2.2.
75	There is no objective for finding the y-intercept.

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT Algebra I Alignment Study

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	S1Ob j3	DOK 4	PObj 4	S1Ob j4
1	1	2.1c		1	2.1c		1	2.1c		2	2.1c		1	2.1c	
2	2	3.1b		2	3.1b		2	3.2		2	3.2		1	3.2	2.1c
3	1	2.2c		1	2.2c		1	2.2c		1	2.2c		1	2.2e	
4															
5															
6	2	1.1d	2.4	2	2.4		2	1.1d		2	1.1d		2	1.1a	
7	1	2.1a		1	2.1a		1	2.1a		1	2.1a		1	2.1a	
8	2	3.1b		2	3.1b	1.1d	2	3.1b	3.1c	2	3.1c		2	3.1b	
9	1	1.2a		2	1.1d		1	1.2b		2	1.1d		1	1.1d	
10	1	1.1a		2	2.2e		1	1.1a		2	1.1a		1	1.1a	
11	2	2.3a	2.3b	1	2.3a		2	2.3a	2.3b	2	2.3b		1	3.2	
12															
13															
14	2	3.2		2	3.2		2	3.2		1	3.2		2	3.2	
15	1	2.2a		1	2.2a		1	2.2a		1	2.2a		1	2.2a	
16	2	2.3a	2.3b	2	2.3b		2	2.3a	2.3b	2	2.3b		2	2.3a	
17	1	1.2a		1	1.2a		1	1.2a		1	1.2a		1	2.2a	
18	1	2.2c		1	2.2c		1	2.2c		1	2.2c		1	2.2c	
19	2	3.1a		2	3.1a		2	3.1a		2	3.1a		1	3.1b	
20															
21															
22															
23	1	2.2c		1	2.2c		1	2.2c		1	2.2c		2	2.2c	
24	2	1.1c		3	1.1c		2	1.1c		2	1.1c		2	1.1c	
25	2	1.1d		2	1.1d		2	1.1d		3	1.1d		2	1.1d	
26	1	1.2b		1	1.2b		1	1.2b		2	1.2b		2	1.2b	
27	2	2.2b		2	2.2b		2	2.2b		2	2.2b	2.2c	1	2.2b	
28	2	2.2e		2	2.2e		1	1.1a		1	1.1a		1	2.1c	
29	1	1.2a		1	1.2a		1	1.2a		2	1.2a		1	1.2b	
30	2	1.2c		2	1.2c		2	1.2c		2	1.2c		2	1.2c	
31															
32	2	1.1b		1	2.2a		2	1.1b		3	1.1b		2	1.1b	
33															
34															
35	1	1.2a		1	1.2a		1	1.2a		1	1.2a		1	1.2a	
36	1	1.2c		2	1.2c		2	1.2c		1	1.2c		1	1.2c	
37	2	2.3b		2	2.3b		2	2.3b		1	2.3b		1	2.3b	
38	2	3.2		1	3.2		1	3.2		1	3.2		1	3.2	
39	1	2.2e		2	2.2e		1	2.2e		1	2.2e		1	2.2e	

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT Algebra I Alignment Study

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	S1Ob j3	DOK 4	PObj 4	S1Ob j4
40	1	2.1d		1	2.1d		1	2.1d		2	2.1d		2	2.1d	
41	1	2.3b		1	2.3b		1	2.3b		1	2.3b		1	2.3b	
42	1	2.1c		1	2.1c		1	2.1c		1	2.1c		1	2.1c	
43															
44															
45	2	1.2c		2	1.2c		2	1.2c		2	1.2c		2	1.2c	
46	2	1.1d		2	1.1c		3	1.1c		3	1.1c		2	1.1c	
47	1	1.1c		1	1.1c		1	1.1c		2	1.1c		1	1.2b	
48	2	2.4		2	2.4		2	2.4		2	2.4		2	2.4	
49	1	2.2a		1	2.2a		1	2.2a		1	2.2a		1	2.2a	
50	1	2.3a		1	2.3a		1	2.3a		1	2.3a		1	2.3a	
51	1	2.2d		2	2.2c		1	2.2d		1	2.2d		1	2.2d	
52															
53	2	3.1b		2	3.1b		1	3.1b		1	3.1b		1	3.1b	
54															
55															
56															
57	2	3.1a		2	3.1a		2	3.1a		1	3.1a		1	3.1b	
58	2	2.2e		2	2.2e		2	2.2e		3	2.2d	3.2	2	2.2d	
59	2	2.2c		2	2.2c		2	2.2c		2	2.2c		1	2.2c	
60	1	3.1b		2	2.1d		1	2.1d		1	3.1b		1	2.2c	
61															
62	2	2.4		2	2.4		2	2.4		2	2.4		2	2.4	
63	1	2.1b		1	2.1b		1	2.1b		1	2.1b		1	2.1b	
64	2	2.2b		2	2.2b		1	2.2b		1	2.2b		1	2.2b	
65	2	3.2		2	3.2		2	3.2		1	2.2e	3.2	2	2.2d	
66															
67															
68	2	2.4		2	2.4		1	2.4		1	2.4	3.1b	1	3.1b	
69	1	3.2		2	3.1b		2	3.1b		1	3.1b	3.2	1	3.1b	
70	1	1.1a		2	2.2e		2	1.1a		2	1.1a		2	1.1a	
71	1	2.3b		2	2.3b		2	2.3b		1	2.3b		1	2.3b	
72															
73	1	1.2a	1.2b	1	1.2a		1	1.2a		1	1.2b	1.2a	1	1.2b	
74	2	2.4		2	2.4		2	2.4		1	2.4		2	2.4	
75	1	2.2d		1	2.2		2	2.4		1	2.2		1	2.2d	

**Objective Pairwise Comparison:** 0.7228**Standard Pairwise Comparison:** 0.8868

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT Algebra I Alignment Study

Low		Medium		High
0		3.866667		7

1	2.1c	2.1c	2.1c	2.1c	2.1c	
2	2.1c	3.1b	3.1b	3.2	3.2	3.2
3	2.2c	2.2c	2.2c	2.2c	2.2e	
4						
5						
6	1.1a	1.1d	1.1d	1.1d	2.4	2.4
7	2.1a	2.1a	2.1a	2.1a	2.1a	
8	1.1d	3.1b	3.1b	3.1b	3.1b	3.1c 3.1c
9	1.1d	1.1d	1.1d	1.2a	1.2b	
10	1.1a	1.1a	1.1a	1.1a	2.2e	
11	2.3a	2.3a	2.3a	2.3b	2.3b	2.3b 3.2
12						
13						
14	3.2	3.2	3.2	3.2	3.2	
15	2.2a	2.2a	2.2a	2.2a	2.2a	
16	2.3a	2.3a	2.3a	2.3b	2.3b	2.3b 2.3b
17	1.2a	1.2a	1.2a	1.2a	2.2a	
18	2.2c	2.2c	2.2c	2.2c	2.2c	
19	3.1a	3.1a	3.1a	3.1a	3.1b	
20						
21						
22						
23	2.2c	2.2c	2.2c	2.2c	2.2c	
24	1.1c	1.1c	1.1c	1.1c	1.1c	
25	1.1d	1.1d	1.1d	1.1d	1.1d	
26	1.2b	1.2b	1.2b	1.2b	1.2b	
27	2.2b	2.2b	2.2b	2.2b	2.2b	2.2c
28	1.1a	1.1a	2.1c	2.2e	2.2e	
29	1.2a	1.2a	1.2a	1.2a	1.2b	
30	1.2c	1.2c	1.2c	1.2c	1.2c	
31						
32	1.1b	1.1b	1.1b	1.1b	2.2a	
33						
34						
35	1.2a	1.2a	1.2a	1.2a	1.2a	
36	1.2c	1.2c	1.2c	1.2c	1.2c	
37	2.3b	2.3b	2.3b	2.3b	2.3b	
38	3.2	3.2	3.2	3.2	3.2	
39	2.2e	2.2e	2.2e	2.2e	2.2e	
40	2.1d	2.1d	2.1d	2.1d	2.1d	
41	2.3b	2.3b	2.3b	2.3b	2.3b	
42	2.1c	2.1c	2.1c	2.1c	2.1c	
43						
44						

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT Algebra I Alignment Study

45	1.2c	1.2c	1.2c	1.2c	1.2c		
46	1.1c	1.1c	1.1c	1.1c	1.1d		
47	1.1c	1.1c	1.1c	1.1c	1.2b		
48	2.4	2.4	2.4	2.4	2.4		
49	2.2a	2.2a	2.2a	2.2a	2.2a		
50	2.3a	2.3a	2.3a	2.3a	2.3a		
51	2.2c	2.2d	2.2d	2.2d	2.2d		
52							
53	3.1b	3.1b	3.1b	3.1b	3.1b		
54							
55							
56							
57	3.1a	3.1a	3.1a	3.1a	3.1b		
58	2.2d	2.2d	2.2e	2.2e	2.2e	3.2	
59	2.2c	2.2c	2.2c	2.2c	2.2c		
60	2.1d	2.1d	2.2c	3.1b	3.1b		
61							
62	2.4	2.4	2.4	2.4	2.4		
63	2.1b	2.1b	2.1b	2.1b	2.1b		
64	2.2b	2.2b	2.2b	2.2b	2.2b		
65	2.2d	2.2e	3.2	3.2	3.2	3.2	
66							
67							
68	2.4	2.4	2.4	2.4	3.1b	3.1b	
69	3.1b	3.1b	3.1b	3.1b	3.2	3.2	
70	1.1a	1.1a	1.1a	1.1a	2.2e		
71	2.3b	2.3b	2.3b	2.3b	2.3b		
72							
73	1.2a	1.2a	1.2a	1.2a	1.2b	1.2b	1.2b
74	2.4	2.4	2.4	2.4	2.4		
75	2.2	2.2	2.2d	2.2d	2.4		

Table 9-12.10

Items Coded by Reviewers to Each Objective

OCCT Algebra I Alignment Study

Low		Medium		High
0		8.787879		22

1																				
1.1																				
1.1a	6	10	10	10	10	28	28	70	70	70	70									
1.1b	32	32	32	32																
1.1c	24	24	24	24	24	46	46	46	46	47	47	47	47							
1.1d	6	6	6	8	9	9	9	25	25	25	25	25	46							
1.2																				
1.2a	9	17	17	17	17	29	29	29	29	35	35	35	35	35	73	73	73	73		
1.2b	9	26	26	26	26	26	29	47	73	73	73									
1.2c	30	30	30	30	30	36	36	36	36	36	45	45	45	45	45					
2																				
2.1																				
2.1a	7	7	7	7	7															
2.1b	63	63	63	63	63															
2.1c	1	1	1	1	1	2	28	42	42	42	42	42								
2.1d	40	40	40	40	40	60	60													
2.2	75	75																		
2.2a	15	15	15	15	15	17	32	49	49	49	49	49								
2.2b	27	27	27	27	27	64	64	64	64	64										
2.2c	3	3	3	3	18	18	18	18	18	23	23	23	23	23	27	51	59	59	59	59
	59	60																		
2.2d	51	51	51	51	58	58	65	75	75											
2.2e	3	10	28	28	39	39	39	39	39	58	58	58	65	70						
2.3																				
2.3a	11	11	11	16	16	16	50	50	50	50	50									
2.3b	11	11	11	16	16	16	16	37	37	37	37	37	41	41	41	41	41	71	71	71
	71	71																		
2.4	6	6	48	48	48	48	48	62	62	62	62	62	68	68	68	68	74	74	74	74
	74	75																		
3																				
3.1																				
3.1a	19	19	19	19	57	57	57	57												
3.1b	2	2	8	8	8	8	19	53	53	53	53	53	57	60	60	68	68	69	69	69
	69																			
3.1c	8	8																		
3.2	2	2	2	11	14	14	14	14	14	38	38	38	38	38	58	65	65	65	65	69
	69																			

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)  
OCCT Algebra I Alignment Study

1								
1.1								
1.1a	6:1	10:4	28:2	70:4				
1.1b	32:4							
1.1c	24:5	46:4	47:4					
1.1d	6:3	8:1	9:3	25:5	46:1			
1.2								
1.2a	9:1	17:4	29:4	35:5	73:4			
1.2b	9:1	26:5	29:1	47:1	73:3			
1.2c	30:5	36:5	45:5					
2								
2.1								
2.1a	7:5							
2.1b	63:5							
2.1c	1:5	2:1	28:1	42:5				
2.1d	40:5	60:2						
2.2	75:2							
2.2a	15:5	17:1	32:1	49:5				
2.2b	27:5	64:5						
2.2c	3:4	18:5	23:5	27:1	51:1	59:5	60:1	
2.2d	51:4	58:2	65:1	75:2				
2.2e	3:1	10:1	28:2	39:5	58:3	65:1	70:1	
2.3								
2.3a	11:3	16:3	50:5					
2.3b	11:3	16:4	37:5	41:5	71:5			
2.4	6:2	48:5	62:5	68:4	74:5	75:1		
3								
3.1								
3.1a	19:4	57:4						
3.1b	2:2	8:4	19:1	53:5	57:1	60:2	68:2	69:4
3.1c	8:2							
3.2	2:3	11:1	14:5	38:5	58:1	65:4	69:2	

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Algebra I Alignment Study

Low		Medium		High
1		2		5

1	2.1c: 5		
2	2.1c: 1	3.1b: 2	3.2:3
3	2.2c: 4	2.2e: 1	
4			
5			
6	1.1a: 1	1.1d: 3	2.4:2
7	2.1a: 5		
8	1.1d: 1	3.1b: 4	3.1c: 2
9	1.1d: 3	1.2a: 1	1.2b: 1
10	1.1a: 4	2.2e: 1	
11	2.3a: 3	2.3b: 3	3.2:1
12			
13			
14	3.2:5		
15	2.2a: 5		
16	2.3a: 3	2.3b: 4	
17	1.2a: 4	2.2a: 1	
18	2.2c: 5		
19	3.1a: 4	3.1b: 1	
20			
21			
22			
23	2.2c: 5		
24	1.1c: 5		
25	1.1d: 5		
26	1.2b: 5		
27	2.2b:	2.2c:	

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Algebra I Alignment Study

	5	1	
28	1.1a: 2	2.1c: 1	2.2e: 2
29	1.2a: 4	1.2b: 1	
30	1.2c: 5		
31			
32	1.1b: 4	2.2a: 1	
33			
34			
35	1.2a: 5		
36	1.2c: 5		
37	2.3b: 5		
38	3.2:5		
39	2.2e: 5		
40	2.1d: 5		
41	2.3b: 5		
42	2.1c: 5		
43			
44			
45	1.2c: 5		
46	1.1c: 4	1.1d: 1	
47	1.1c: 4	1.2b: 1	
48	2.4:5		
49	2.2a: 5		
50	2.3a: 5		
51	2.2c: 1	2.2d: 4	
52			
53	3.1b: 5		
54			
55			
56			
57	3.1a:	3.1b:	

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Algebra I Alignment Study

	4	1	
58	2.2d: 2	2.2e: 3	3.2:1
59	2.2c: 5		
60	2.1d: 2	2.2c: 1	3.1b: 2
61			
62	2.4:5		
63	2.1b: 5		
64	2.2b: 5		
65	2.2d: 1	2.2e: 1	3.2:4
66			
67			
68	2.4:4	3.1b: 2	
69	3.1b: 4	3.2:2	
70	1.1a: 4	2.2e: 1	
71	2.3b: 5		
72			
73	1.2a: 4	1.2b: 3	
74	2.4:5		
75	2.2:2	2.2d: 2	2.4:1

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

1 [2]:							
1.1 [2]:							
1.1a [1]:	6:1[2]	10:4[1.25]	28:2[1]	70:4[1.75]			
1.1b [2]:	32:4[2.25]						
1.1c [2]:	24:5[2.2]	46:4[2.5]	47:4[1.25]				
1.1d [2]:	6:3[2]	8:1[2]	9:3[1.67]	25:5[2.2]	46:1[2]		
1.2 [1]:							
1.2a [1]:	9:1[1]	17:4[1]	29:4[1.25]	35:5[1]	73:4[1]		
1.2b [1]:	9:1[1]	26:5[1.4]	29:1[1]	47:1[1]	73:3[1]		
1.2c [2]:	30:5[2]	36:5[1.4]	45:5[2]				
2 [2]:							
2.1 [1]:							
2.1a [2]:	7:5[1]						
2.1b [1]:	63:5[1]						
2.1c [1]:	1:5[1.2]	2:1[1]	28:1[1]	42:5[1]			
2.1d [1]:	40:5[1.4]	60:2[1.5]					
2.2 [2]:	75:2[1]						
2.2a [1]:	15:5[1]	17:1[1]	32:1[1]	49:5[1]			
2.2b [2]:	27:5[1.8]	64:5[1.4]					
2.2c [2]:	3:4[1]	18:5[1]	23:5[1.2]	27:1[2]	51:1[2]	59:5[1.8]	60:1[1]
2.2d [2]:	51:4[1]	58:2[2.5]	65:1[2]	75:2[1]			
2.2e [2]:	3:1[1]	10:1[2]	28:2[2]	39:5[1.2]	58:3[2]	65:1[1]	70:1[2]
2.3 [2]:							

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT Algebra I Alignment Study

2.3a [1]:	11:3[ 1.67]	16:3[ 2]	50:5[ 1]							
2.3b [2]:	11:3[ 2]	16:4[ 2]	37:5[ 1.6]	41:5[ 1]	71:5[ 1.4]					
2.4 [2]:	6:2[2]	48:5[ 2]	62:5[ 2]	68:4[ 1.5]	74:5[ 1.8]	75:1[ 2]				
3 [2]:										
3.1 [2]:										
3.1a [2]:	19:4[ 2]	57:4[ 1.75]								
3.1b [3]:	2:2[2]	8:4[2]	19:1[ 1]	53:5[ 1.4]	57:1[ 1]	60:2[ 1]	68:2[ 1]	69:4[ 1.5]		
3.1c [2]:	8:2[2]									
3.2 [2]:	2:3[1. 67]	11:1[ 1]	14:5[ 1.8]	38:5[ 1.2]	58:1[ 3]	65:4[ 1.75]	69:2[ 1]			

Table 9-12.14  
Group Consensus  
OCCT Algebra I EOI standards, Mathematics, Grade 9

Level	Description	DOK
1	Number Sense and Algebraic Operations - The student will use expressions and equations to model number relationships.	2
1.1	Equations and Formulas	2
1.1a	Translate word phrases and sentences into expressions and equations and vice versa	1
1.1b	Solve literal equations involving several variables for one variable in terms of the others.	2
1.1c	Use the formulas from measurable attributes of geometric models (perimeter, circumference, area, and volume), science, and statistics to solve problems within an algebraic context.	2
1.1d	Solve two-step and three-step problems using concepts such as rules of exponents, rate, distance, ratio and proportion, and percent.	2
1.2	Expressions	1
1.2a	Simplify and evaluate linear, absolute value, rational, and radical expressions.	1
1.2b	Simplify polynomials by adding, subtracting, or multiplying.	1
1.2c	Factor polynomial expressions.	2
2	Relations and Functions - The student will use relations and functions to model number relationships.	2
2.1	Relations and Functions	1
2.1a	Distinguish between linear and nonlinear data.	2
2.1b	Distinguish between relations and functions.	1
2.1c	Identify dependent and independent variables, domain, and range.	1
2.1d	Evaluate a function using tables, equations, or graphs.	1
2.2	Linear Equations and Graphs	2
2.2a	Solve linear equations by graphing or using properties of equality.	1
2.2b	Recognize the parent graph of the functions $y = k$ , $y = x$ , $y =  x $ , and predict the effects of transformations on the parent graph.	2
2.2c	Slope: (I) Calculate the slope of a line using a graph, an equation, two points or a set of data points; (II) Use the slope to differentiate between lines that are parallel, perpendicular, horizontal, or vertical; (III) Interpret the slope and intercepts within the context of everyday life (e.g., telephone charges based on base rate [y-intercept] plus rate per minute [slope]).	2
2.2d	Develop the equation of a line and graph linear relationships given the following: slope and y-intercept, slope and one point on the line, two points on the line, x-intercept and y-intercept, a set of data points.	2
2.2e	Match equations to a graph, table, or situation and vice versa.	2
2.3	Linear Inequalities and Graphs	2

Table 9-12.14  
 Group Consensus  
 OCCT Algebra I EOI standards, Mathematics, Grade 9

Level	Description	DOK
2.3a	Solve linear inequalities by graphing or using properties of inequalities.	1
2.3b	Match inequalities (with 1 or 2 variables) to a graph, table, or situation and vice versa.	2
2.4	Solve a system of linear equations by graphing, substitution or elimination.	2
3	Data Analysis, Probability and Statistics - The student will use data analysis, probability, and statistics to formulate and justify predictions from a set of data.	2
3.1	Data Analysis	2
3.1a	Translate from one representation of data to another and understand that the data can be represented using a variety of tables, graphs, or symbols and that different modes of representation often convey different messages.	2
3.1b	Make valid inferences, predictions, and/or arguments based on data from graphs, tables, and charts.	3
3.1c	Solve two-step and three-step problems using concepts such as probability and measures of central tendency.	2
3.2	Collect data involving two variables and display on a scatter plot; interpret results using a linear model/equation and identify whether the model/equation is a line best fit for the data.	2

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

- Yes, I think the coverage was pretty good.
- All objectives were covered, however there are objectives that are heavily represented by these items, in particular the scatterplots and systems of equations.
- I felt that the items covered the most important aspects of each objective/standard.
- yes

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

- No. I don't believe I coded any STs to any of the objectives
- Yes
- Yes, I felt the majority of the items were at the DOK 2 level, with not too many at DOK 1 or DOK 3.
- yes

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

- yes
- Standard 1.1d is very broad. Standard 2.2c also covers a lot and could be broken down further.
- Yes, the questions were level specific.
- Yes, there was one question that could have been a bit clearer, and I made a note on that question.
- yes

**D. What is your general opinion of the alignment between the standards and assessment:**

- ii. Acceptable Alignment (4) : 80%
- iii. Needs slight improvement (1) : 20%

**E. Comments**



## **Appendix B: Alignment Analysis Tables—Geometry**



Table 9-12.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

OCCT Geometry Alignment Study

Number of Assessment Items - 55

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
1 - Logical Reasoning — The student will use deductive ...	2	2	2 3	1 1	50 50	6.2	0.4	YES
2 - Properties of 2-Dimensional Figures — The student ...	5	13	1 2	1 12	7 92	22.8	1.33	YES
3 - Triangles and Trigonometric Ratios — The student w ...	3	3	2	3	100	12.2	0.4	YES
4 - Properties of 3-Dimensional Figures — The student ...	3	5	1 2	1 4	20 80	10	1.10	YES
5 - Coordinate Geometry — The student will solve probl ...	2	3	1 2	1 2	33 66	7	0	YES
Total	15	26	1 2 3	3 22 1	11 84 3	58.2	1.17	

Table 9-12.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

OCCT Geometry Alignment Study

Number of Assessment Items - 55

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
1 - Logical Reasoning — The student will use deductive ...	2	2	6.2	0.4	62	38	38	38	0	0	NO
2 - Properties of 2-Dimensional Figures — The student ...	5	13	22.8	1.33	31	39	64	41	5	17	YES
3 - Triangles and Trigonometric Ratios — The student w ...	3	3	12.2	0.4	28	22	67	20	4	9	YES
4 - Properties of 3-Dimensional Figures — The student ...	3	5	10	1.10	12	25	74	33	13	25	YES
5 - Coordinate Geometry — The student will solve probl ...	2	3	7	0	17	35	70	38	13	26	YES
Total	15	26	58.2	1.17	28	36	65	38	7	19	

Table 9-12.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers

OCCT Geometry Alignment Study

Number of Assessment Items - 55

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
1 - Logical Reasoning — The student will use deductive ...	2	2	6.2	0.4	2	0	100	0	YES	11	1	0.82	0.02	YES
2 - Properties of 2-Dimensional Figures — The student ...	5	13	22.8	1.33	12.2	0.75	94	6	YES	39	2	0.81	0.05	YES
3 - Triangles and Trigonometric Ratios — The student w ...	3	3	12.2	0.4	3	0	100	0	YES	21	1	0.91	0.08	YES
4 - Properties of 3-Dimensional Figures — The student ...	3	5	10	1.10	5	0	100	0	YES	17	2	0.83	0.04	YES
5 - Coordinate Geometry — The student will solve probl ...	2	3	7	0	3	0	100	0	YES	12	0	0.76	0	YES
Total	15	26	58.2	1.17	5.04	3.73	99	4		20	10	0.83	0.07	

Table 9-12.4

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

OCCT Geometry Alignment Study

Number of Assessment Items - 55

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
1 - Logical Reasoning — The student will use deductive ...	YES	NO	YES	YES
2 - Properties of 2-Dimensional Figures — The student ...	YES	YES	YES	YES
3 - Triangles and Trigonometric Ratios — The student w ...	YES	YES	YES	YES
4 - Properties of 3-Dimensional Figures — The student ...	YES	YES	YES	YES
5 - Coordinate Geometry — The student will solve probl ...	YES	YES	YES	YES

*Table 9-12.5*

Source-of-Challenge Issues by Reviewer  
OCCT Geometry Alignment Study

Item Number	Comments by Reviewer
20	Access to trigonometry: ratios/calc should be provided.
59	Tangent points would help.

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT Geometry Alignment Study

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	1	1	2	1	1
2	2	3	2	2	1
3	2	3	2	3	1
4	2	2	2	2	2
5	1	1	1	1	1
6					
7					
8	1	1	2	1	1
9	2	3	2	3	2
10	3	2	2	2	2
11	3	2	2	2	3
12					
13					
14	2	2	2	1	1
15	2	2	1	1	2
16					
17	1	1	1	1	1
18	1	2	1	1	1
19	1	2	2	1	1
20	2	2	2	2	2
21	2	3	1	2	1
22	2	2	1	2	2
23	1	2	1	1	2
24	2	2	2	2	2
25	1	1	1	1	1
26	2	2	2	2	2
27					
28					
29					
30	2	2	2	1	2
31	2	2	2	1	2
32	3	2	2	2	2
33					
34					
35	1	2	3	2	1
36	2	2	2	2	2
37	1	2	1	1	1
38	1	1	1	1	1
39	1	2	1	1	2
40	2	2	2	2	1
41	2	2	2	2	1
42	1	2	2	1	1
43	2	2	1	2	2
44	1	2	2	1	1
45					
46					
47					
48	1	1	1	1	1

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT Geometry Alignment Study

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	1	1	2	2	1
50	1	2	1	2	1
51	2	2	2	2	1
52	1	1	1	1	1
53					
54					
55	3	2	3	2	1
56	2	2	2	2	2
57	1	2	2	1	3
58	2	2	1	2	2
59	2	2	2	2	3
60	2	2	2	1	2
61					
62					
63	2	2	2	2	2
64	2	2	2	1	2
65	2	2	2	2	2
66					
67					
68	2	2	2	2	2
69	2	2	2	1	2
70	1	1	1	1	1
71					
72	2	2	2	1	2
73	2	1	2	2	3
74	2	2	2	1	2
75	2	2	2	1	1

**Intraclass Correlation:** 0.735

**Pairwise Comparison:** 0.6255

*Table 9-12.7*

Notes by Reviewer

OCCT Geometry Alignment Study

Item Number	Comments by Reviewer
59	Drawing may needs points on a circlce where tangent.

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer  
OCCT Geometry Alignment Study

Item	DOK 0	PObj 0	S1Obj 0	DOK 1	PObj 1	S1Obj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4	S1Obj 4
1	1	2.2a		1	2.2a		2	2.2a		1	2.2a		1	2.2a	
2	2	2.5b		3	2.3c		2	2.5b	2.3b	2	2.3d	2.3c	1	2.2c	
3	2	4.2b	4.1b	3	4.2b	4.1b	2	4.2b		3	4.1b		1	2.3d	
4	2	3.3		2	3.3		2	3.1		2	3.3		2	3.3	
5	1	2.3a		1	2.3a		1	2.3a		1	2.3a		1	2.3a	
6															
7															
8	1	2.2b		1	2.2b		2	2.2b		1	2.2b		1	2.2a	
9	2	2.2a	2.2c	3	2.2a	2.2c	2	2.2a		3	2.2a		2	2.2b	
10	3	3.2		2	3.2		2	3.2		2	3.1		2	3.2	
11	3	3.1		2	3.1		2	3.1		2	3.1		3	3.1	
12															
13															
14	2	3.2		2	3.2		2	3.2		1	3.2		1	3.2	
15	2	4.3		2	4.3		1	4.3		1	4.3		2	4.3	
16															
17	1	5.1		1	5.1		1	5.1		1	5.1		1	5.1	
18	1	2.2c		2	2.2c		1	2.2c		1	2.2c		1	2.3c	
19	1	1.2		2	1.2		2	1.2		1	1.2		1	1.2	
20	2	3.3		2	3.3		2	3.3		2	3.3		2	3.1	
21	2	2.6b		3	2.6b		1	2.6b	2.3b	2	2.6b	2.6a	1	2.6a	
22	2	2.5b		2	4.2b	4.1b	1	2.5b		2	4.1b	2.3d	2	4.2b	
23	1	2.3c		2	2.3c		1	2.3c		1	2.3c		2	2.3c	
24	2	2.3b		2	2.3b		2	2.3b		2	2.3d	2.3b	2	2.3b	
25	1	2.3a		1	4.1a		1	2.3a		1	4.1a		1	4.1a	
26	2	2.4b		2	2.4b		2	2.4b		2	2.4a		2	2.4b	
27															
28															
29															
30	2	5.2b		2	5.2b		2	5.2b		1	5.2b		2	5.2b	
31	2	2.4b		2	2.4b		2	2.4b		1	2.4b		2	2.4b	
32	3	4.2a		2	4.2a		2	4.2a		2	4.2a		2	4.2a	
33															
34															
35	1	1.1		2	1.1		3	1.1		2	1.1		1	1.1	
36	2	2.4a		2	2.4a		2	2.4a		2	2.4a		2	2.4a	
37	1	2.5a		2	2.5b		1	2.4a		1	2.4a		1	2.5a	
38	1	2.2a		1	2.2a		1	2.2a		1	2.2a		1	2.2a	
39	1	3.1		2	3.1		1	3.1		1	3.1		2	3.1	

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer  
OCCT Geometry Alignment Study

Item	DOK 0	PObj 0	S1Obj j0	DOK 1	PObj 1	S1Obj j1	DOK 2	PObj 2	S1Obj j2	DOK 3	PObj 3	S1Obj j3	DOK 4	PObj 4	S1Obj j4
40	2	1.1		2	1.1		2	1.1		2	1.1		1	1.1	
41	2	2.4a		2	2.4a		2	2.4a		2	2.4a	2.4b	1	2.4a	
42	1	4.1b		2	4.1b		2	4.1b		1	4.1b		1	4.1b	
43	2	5.1		2	5.1		1	5.1		2	5.1		2	5.1	
44	1	1.1		2	1.1		2	1.1		1	1.1		1	1.1	
45															
46															
47															
48	1	5.1		1	5.1		1	5.1		1	5.1		1	5.1	
49	1	3.3		1	3.3		2	3.3		2	3.3		1	3.3	
50	1	4.1a		2	4.1a		1	4.1a		2	4.1a		1	4.1a	
51	2	4.1b		2	2.3d		2	4.1b		2	2.3d		1	2.3d	
52	1	5.1		1	5.1		1	5.1		1	5.1		1	5.1	
53															
54															
55	3	1.1		2	1.1		3	1.1		2	1.1		1	1.1	
56	2	2.6a		2	2.6a		2	2.6a		2	2.6a		2	2.6b	
57	1	5.2a		2	5.2a		2	5.2a		1	5.2a		3	5.2a	
58	2	4.3		2	4.3		1	4.1a		2	4.3		2	4.3	1.1
59	2	2.6b		2	2.3d		2	2.6b		2	2.3d		3	2.3d	
60	2	3.2		2	3.2		2	3.2		1	3.1		2	3.1	3.3
61															
62															
63	2	5.2b		2	5.2b		2	5.2b		2	5.2b		2	5.2b	
64	2	2.6b		2	2.6a		2	2.6a		1	2.6a		2	2.6a	
65	2	2.5b		2	2.5b	2.3b	2	2.5b		2	2.5b		2	2.5b	
66															
67															
68	2	3.2		2	3.2		2	3.2		2	3.2		2	3.3	
69	2	4.1b		2	4.1b		2	4.1b		1	4.1b		2	4.1b	
70	1	3.3		1	3.3		1	3.3		1	3.3		1	3.3	
71															
72	2	1.2		2	1.2		2	1.2		1	1.2		2	1.2	
73	2	4.2b		1	4.2b		2	4.2b		2	4.2b		3	4.2b	
74	2	3.1	2.3d	2	3.1		2	3.1		1	3.1		2	3.1	
75	2	3.1		2	3.1		2	3.1		1	3.1		1	3.1	

**Objective Pairwise Comparison:** 0.7438

**Standard Pairwise Comparison:** 0.9431

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT Geometry Alignment Study

Low		Medium		High
0		3.88		7

1	2.2a	2.2a	2.2a	2.2a	2.2a		
2	2.2c	2.3b	2.3c	2.3c	2.3d	2.5b	2.5b
3	2.3d	4.1b	4.1b	4.1b	4.2b	4.2b	4.2b
4	3.1	3.3	3.3	3.3	3.3		
5	2.3a	2.3a	2.3a	2.3a	2.3a		
6							
7							
8	2.2a	2.2b	2.2b	2.2b	2.2b		
9	2.2a	2.2a	2.2a	2.2a	2.2b	2.2c	2.2c
10	3.1	3.2	3.2	3.2	3.2		
11	3.1	3.1	3.1	3.1	3.1		
12							
13							
14	3.2	3.2	3.2	3.2	3.2		
15	4.3	4.3	4.3	4.3	4.3		
16							
17	5.1	5.1	5.1	5.1	5.1		
18	2.2c	2.2c	2.2c	2.2c	2.3c		
19	1.2	1.2	1.2	1.2	1.2		
20	3.1	3.3	3.3	3.3	3.3		
21	2.3b	2.6a	2.6a	2.6b	2.6b	2.6b	2.6b
22	2.3d	2.5b	2.5b	4.1b	4.1b	4.2b	4.2b
23	2.3c	2.3c	2.3c	2.3c	2.3c		
24	2.3b	2.3b	2.3b	2.3b	2.3b	2.3d	
25	2.3a	2.3a	4.1a	4.1a	4.1a		
26	2.4a	2.4b	2.4b	2.4b	2.4b		
27							
28							
29							
30	5.2b	5.2b	5.2b	5.2b	5.2b		
31	2.4b	2.4b	2.4b	2.4b	2.4b		
32	4.2a	4.2a	4.2a	4.2a	4.2a		
33							
34							
35	1.1	1.1	1.1	1.1	1.1		
36	2.4a	2.4a	2.4a	2.4a	2.4a		
37	2.4a	2.4a	2.5a	2.5a	2.5b		
38	2.2a	2.2a	2.2a	2.2a	2.2a		
39	3.1	3.1	3.1	3.1	3.1		
40	1.1	1.1	1.1	1.1	1.1		
41	2.4a	2.4a	2.4a	2.4a	2.4a	2.4b	
42	4.1b	4.1b	4.1b	4.1b	4.1b		
43	5.1	5.1	5.1	5.1	5.1		
44	1.1	1.1	1.1	1.1	1.1		
45							

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT Geometry Alignment Study

46						
47						
48	5.1	5.1	5.1	5.1	5.1	
49	3.3	3.3	3.3	3.3	3.3	
50	4.1a	4.1a	4.1a	4.1a	4.1a	
51	2.3d	2.3d	2.3d	4.1b	4.1b	
52	5.1	5.1	5.1	5.1	5.1	
53						
54						
55	1.1	1.1	1.1	1.1	1.1	
56	2.6a	2.6a	2.6a	2.6a	2.6b	
57	5.2a	5.2a	5.2a	5.2a	5.2a	
58	1.1	4.1a	4.3	4.3	4.3	4.3
59	2.3d	2.3d	2.3d	2.6b	2.6b	
60	3.1	3.1	3.2	3.2	3.2	3.3
61						
62						
63	5.2b	5.2b	5.2b	5.2b	5.2b	
64	2.6a	2.6a	2.6a	2.6a	2.6b	
65	2.3b	2.5b	2.5b	2.5b	2.5b	2.5b
66						
67						
68	3.2	3.2	3.2	3.2	3.3	
69	4.1b	4.1b	4.1b	4.1b	4.1b	
70	3.3	3.3	3.3	3.3	3.3	
71						
72	1.2	1.2	1.2	1.2	1.2	
73	4.2b	4.2b	4.2b	4.2b	4.2b	
74	2.3d	3.1	3.1	3.1	3.1	3.1
75	3.1	3.1	3.1	3.1	3.1	

Table 9-12.10

Items Coded by Reviewers to Each Objective  
OCCT Geometry Alignment Study

Low		Medium		High
0		7.275		25

1																				
1.1	35	35	35	35	35	40	40	40	40	40	44	44	44	44	44	55	55	55	55	55
	58																			
1.2	19	19	19	19	19	72	72	72	72	72										
2																				
2.2																				
2.2a	1	1	1	1	1	8	9	9	9	9	38	38	38	38	38					
2.2b	8	8	8	8	9															
2.2c	2	9	9	18	18	18	18													
2.3																				
2.3a	5	5	5	5	5	25	25													
2.3b	2	21	24	24	24	24	24	65												
2.3c	2	2	18	23	23	23	23	23												
2.3d	2	3	22	24	51	51	51	59	59	59	74									
2.4																				
2.4a	26	36	36	36	36	36	37	37	41	41	41	41	41							
2.4b	26	26	26	26	31	31	31	31	31	41										
2.5																				
2.5a	37	37																		
2.5b	2	2	22	22	37	65	65	65	65	65										
2.6																				
2.6a	21	21	56	56	56	56	64	64	64	64										
2.6b	21	21	21	21	56	59	59	64												
3																				
3.1	4	10	11	11	11	11	11	20	39	39	39	39	39	60	60	74	74	74	74	74
	75	75	75	75	75															
3.2	10	10	10	10	14	14	14	14	14	60	60	60	68	68	68	68				
3.3	4	4	4	4	20	20	20	20	49	49	49	49	49	60	68	70	70	70	70	70
4																				
4.1																				
4.1a	25	25	25	50	50	50	50	50	58											
4.1b	3	3	3	22	22	42	42	42	42	42	51	51	69	69	69	69	69			
4.2																				
4.2a	32	32	32	32	32															
4.2b	3	3	3	22	22	73	73	73	73	73										
4.3	15	15	15	15	15	58	58	58	58											
5																				
5.1	17	17	17	17	17	43	43	43	43	43	48	48	48	48	48	52	52	52	52	52
5.2																				
5.2a	57	57	57	57	57															
5.2b	30	30	30	30	30	63	63	63	63	63										

Table 9-12.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

OCCT Geometry Alignment Study

Low		Medium		High
1		2		5

1								
1.1	35:5	40:5	44:5	55:5	58:1			
1.2	19:5	72:5						
2								
2.2								
2.2a	1:5	8:1	9:4	38:5				
2.2b	8:4	9:1						
2.2c	2:1	9:2	18:4					
2.3								
2.3a	5:5	25:2						
2.3b	2:1	21:1	24:5	65:1				
2.3c	2:2	18:1	23:5					
2.3d	2:1	3:1	22:1	24:1	51:3	59:3	74:1	
2.4								
2.4a	26:1	36:5	37:2	41:5				
2.4b	26:4	31:5	41:1					
2.5								
2.5a	37:2							
2.5b	2:2	22:2	37:1	65:5				
2.6								
2.6a	21:2	56:4	64:4					
2.6b	21:4	56:1	59:2	64:1				
3								
3.1	4:1	10:1	11:5	20:1	39:5	60:2	74:5	75:5
3.2	10:4	14:5	60:3	68:4				
3.3	4:4	20:4	49:5	60:1	68:1	70:5		
4								
4.1								
4.1a	25:3	50:5	58:1					
4.1b	3:3	22:2	42:5	51:2	69:5			
4.2								
4.2a	32:5							
4.2b	3:3	22:2	73:5					
4.3	15:5	58:4						
5								
5.1	17:5	43:5	48:5	52:5				
5.2								
5.2a	57:5							
5.2b	30:5	63:5						

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Geometry Alignment Study

Low		Medium		High
1		2		5

1	2.2a: 5				
2	2.2c: 1	2.3b: 1	2.3c: 2	2.3d: 1	2.5b: 2
3	2.3d: 1	4.1b: 3	4.2b: 3		
4	3.1:1	3.3:4			
5	2.3a: 5				
6					
7					
8	2.2a: 1	2.2b: 4			
9	2.2a: 4	2.2b: 1	2.2c: 2		
10	3.1:1	3.2:4			
11	3.1:5				
12					
13					
14	3.2:5				
15	4.3:5				
16					
17	5.1:5				
18	2.2c: 4	2.3c: 1			
19	1.2:5				
20	3.1:1	3.3:4			
21	2.3b: 1	2.6a: 2	2.6b: 4		
22	2.3d: 1	2.5b: 2	4.1b: 2	4.2b: 2	
23	2.3c: 5				
24	2.3b: 5	2.3d: 1			
25	2.3a: 2	4.1a: 3			
26	2.4a: 1	2.4b: 4			
27					
28					
29					
30	5.2b: 5				
31	2.4b: 5				

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Geometry Alignment Study

32	4.2a: 5		
33			
34			
35	1.1:5		
36	2.4a: 5		
37	2.4a: 2	2.5a: 2	2.5b: 1
38	2.2a: 5		
39	3.1:5		
40	1.1:5		
41	2.4a: 5	2.4b: 1	
42	4.1b: 5		
43	5.1:5		
44	1.1:5		
45			
46			
47			
48	5.1:5		
49	3.3:5		
50	4.1a: 5		
51	2.3d: 3	4.1b: 2	
52	5.1:5		
53			
54			
55	1.1:5		
56	2.6a: 4	2.6b: 1	
57	5.2a: 5		
58	1.1:1	4.1a: 1	4.3:4
59	2.3d: 3	2.6b: 2	
60	3.1:2	3.2:3	3.3:1
61			
62			
63	5.2b: 5		
64	2.6a: 4	2.6b: 1	
65	2.3b: 1	2.5b: 5	

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Geometry Alignment Study

66		
67		
68	3.2:4	3.3:1
69	4.1b: 5	
70	3.3:5	
71		
72	1.2:5	
73	4.2b: 5	
74	2.3d: 1	3.1:5
75	3.1:5	

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

Low DOK		Matched DOK		High DOK
1		2		5

1 [3]:								
1.1 [3]:	35:5[ 1.8]	40:5[ 1.8]	44:5[ 1.4]	55:5[ 2.2]	58:1[ 2]			
1.2 [2]:	19:5[ 1.4]	72:5[ 1.8]						
2 [2]:								
2.2 [2]:								
2.2a [2]:	1:5[1. 2]	8:1[1]	9:4[2. 5]	38:5[ 1]				
2.2b [2]:	8:4[1. 25]	9:1[2]						
2.2c [2]:	2:1[1]	9:2[2. 5]	18:4[ 1.25]					
2.3 [2]:								
2.3a [1]:	5:5[1]	25:2[ 1]						
2.3b [2]:	2:1[2]	21:1[ 1]	24:5[ 2]	65:1[ 2]				
2.3c [2]:	2:2[2. 5]	18:1[ 1]	23:5[ 1.4]					
2.3d [2]:	2:1[2]	3:1[1]	22:1[ 2]	24:1[ 2]	51:3[ 1.67]	59:3[ 2.33]	74:1[ 2]	
2.4 [2]:								
2.4a [2]:	26:1[ 2]	36:5[ 2]	37:2[ 1]	41:5[ 1.8]				
2.4b [2]:	26:4[ 2]	31:5[ 1.8]	41:1[ 2]					
2.5 [2]:								
2.5a [2]:	37:2[ 1]							
2.5b [2]:	2:2[2]	22:2[ 1.5]	37:1[ 2]	65:5[ 2]				
2.6 [2]:								
2.6a [2]:	21:2[ 1.5]	56:4[ 2]	64:4[ 1.75]					
2.6b [2]:	21:4[ 2]	56:1[ 2]	59:2[ 2]	64:1[ 2]				
3 [2]:								
3.1 [2]:	4:1[2]	10:1[ 2]	11:5[ 2.4]	20:1[ 2]	39:5[ 1.4]	60:2[ 1.5]	74:5[ 1.8]	75:5[ 1.6]

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT Geometry Alignment Study

3.2 [2]:	10:4[ 2.25]	14:5[ 1.6]	60:3[ 2]	68:4[ 2]		
3.3 [2]:	4:4[2]	20:4[ 2]	49:5[ 1.4]	60:1[ 2]	68:1[ 2]	70:5[ 1]
4 [2]:						
4.1 [2]:						
4.1a [1]:	25:3[ 1]	50:5[ 1.4]	58:1[ 1]			
4.1b [2]:	3:3[2. 67]	22:2[ 2]	42:5[ 1.4]	51:2[ 2]	69:5[ 1.8]	
4.2 [2]:						
4.2a [2]:	32:5[ 2.2]					
4.2b [2]:	3:3[2. 33]	22:2[ 2]	73:5[ 2]			
4.3 [2]:	15:5[ 1.6]	58:4[ 2]				
5 [2]:						
5.1 [1]:	17:5[ 1]	43:5[ 1.8]	48:5[ 1]	52:5[ 1]		
5.2 [2]:						
5.2a [2]:	57:5[ 1.8]					
5.2b [2]:	30:5[ 1.8]	63:5[ 2]				

Table 9-12.14  
Group Consensus  
OCCT Geometry EOI Standards, Mathematics, Grade 10

Level	Description	DOK
1	Logical Reasoning — The student will use deductive and inductive reasoning to solve problems.	3
1.1	Identify and use logical reasoning skills (inductive and deductive) to make and test conjectures, formulate counter examples, and follow logical arguments.	3
1.2	State, use, and examine the validity of the converse, inverse, and contrapositive of "if-then" statements.	2
2	Properties of 2-Dimensional Figures — The student will use the properties and formulas of geometric figures to solve problems.	2
2.2	Line and Angle Relationships	2
2.2a	Use the angle relationships formed by parallel lines cut by a transversal to solve problems.	2
2.2b	Use the angle relationships formed by two lines cut by a transversal to determine if the two lines are parallel and verify, using algebraic and deductive proofs.	2
2.2c	Use relationships between pairs of angles (for example, adjacent, complementary, vertical) to solve problems.	2
2.3	Polygons and Other Plane Figures	2
2.3a	Identify, describe, and analyze polygons (for example, convex, concave, regular, pentagonal, hexagonal, n-gonal).	1
2.3b	Apply the interior and exterior angle sum of convex polygons to solve problems, and verify using algebraic and deductive proofs.	2
2.3c	Develop and apply the properties of quadrilaterals to solve problems (for example, rectangles, parallelograms, rhombi, trapezoids, kites).	2
2.3d	Use properties of 2-dimensional figures and side length, perimeter or circumference, and area to determine unknown values and correctly identify the appropriate unit of measure of each.	2
2.4	Similarity	2
2.4a	Determine and verify the relationships of similarity of triangles, using algebraic and deductive proofs.	2
2.4b	Use ratios of similar 2-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference, and area.	2
2.5	Congruence	2
2.5a	Determine and verify the relationships of congruency of triangles, using algebraic and deductive proofs.	2
2.5b	Use the relationships of congruency of 2-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference, and area.	2
2.6	Circles	2
2.6a	Find angle measures and arc measures related to circles.	2
2.6b	Find angle measures and segment lengths using the relationships among radii, chords, secants, and tangents of a circle.	2
3	Triangles and Trigonometric Ratios — The student will use the properties of right triangles and trigonometric ratios to solve problems.	2
3.1	Use the Pythagorean Theorem and its converse to find missing side lengths and to determine acute, right, and obtuse triangles, and verify using algebraic and deductive proofs.	2
3.2	Apply the 45-45-90 and 30-60-90 right triangle relationships to solve problems, and verify using algebraic and deductive proofs.	2
3.3	Express the trigonometric functions as ratios and use sine, cosine, and tangent ratios to solve real-world problems.	2
4	Properties of 3-Dimensional Figures — The student will use the properties and formulas of geometric figures to solve problems.	2
4.1	Polyhedra and Other Solids	2
4.1a	Identify, describe, and analyze polyhedra (for example, regular,	1

Table 9-12.14  
Group Consensus  
OCCT Geometry EOI Standards, Mathematics, Grade 10

Level	Description	DOK
	decahedral).	
4.1b	Use properties of 3-dimensional figures; side lengths, perimeter or circumference, and area of a face; and volume, lateral area, and surface area to determine unknown values and correctly identify the appropriate unit of measure of each.	2
4.2	Similarity and Congruence	2
4.2a	Use ratios of similar 3-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.	2
4.2b	Use the relationships of congruency of 3-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.	2
4.3	Create a model of a 3-dimensional figure from a 2-dimensional drawing and make a 2-dimensional representation of a 3-dimensional object (for example, nets, blueprints, perspective drawings).	2
5	Coordinate Geometry — The student will solve problems with geometric figures in the coordinate plane.	2
5.1	Use coordinate geometry to find the distance between two points; the midpoint of a segment; and to calculate the slopes of parallel, perpendicular, horizontal, and vertical lines.	1
5.2	Properties of Figures	2
5.2a	Given a set of points, determine the type of figure formed based on its properties.	2
5.2b	Use transformations (reflection, rotation, translation) on geometric figures to solve problems within coordinate geometry.	2

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

- Yes, I think the items generally covered the most important parts of the standards.
- yes

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

- DOK coverage was good.
- The item dealing with standard 2.4 could have been a bit higher on DOK

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

- Yes, the standards are pretty good.
- No

**D. What is your general opinion of the alignment between the standards and assessment:**

- ii. Acceptable Alignment (4) : 80%
- iii. Needs slight improvement (1) : 20%

**E. Comments**



## **Appendix C: Alignment Analysis Tables—Algebra II**



Table 9-12.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

OCCT Algebra II Alignment Study

Number of Assessment Items - 55

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
1 - Number Systems and Algebraic Operations — The stud ...	3	5	1 2	1 4	20 80	15.2	0.98	YES
2 - Relations and Functions — The student will use the ...	7	22.8	1 2 3	1 16 5	4 72 22	32.2	0.98	YES
3 - Data Analysis and Statistics — The student will us ...	2	4	1 2	1 3	25 75	8	0	YES
Total	12	31.8	1 2 3	3 23 5	9 74 16	55.4	0.49	

Table 9-12.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

OCCT Algebra II Alignment Study

Number of Assessment Items - 55

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
1 - Number Systems and Algebraic Operations — The stud ...	3	5	15.2	0.98	23	33	63	36	14	30	YES
2 - Relations and Functions — The student will use the ...	7	22.8	32.2	0.98	19	36	73	39	8	23	YES
3 - Data Analysis and Statistics — The student will us ...	2	4	8	0	4	10	96	10	0	0	YES
Total	12	31.8	55.4	0.49	18	34	74	37	8	23	

Table 9-12.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers  
 OCCT Algebra II Alignment Study  
 Number of Assessment Items - 55

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
1 - Number Systems and Algebraic Operations — The stud ...	3	5	15.2	0.98	4.8	0.4	96	8	YES	27	2	0.80	0.04	YES
2 - Relations and Functions — The student will use the ...	7	22.8	32.2	0.98	19.2	0.75	84	4	YES	58	2	0.76	0.02	YES
3 - Data Analysis and Statistics — The student will us ...	2	4	8	0	3.4	0.49	85	12	YES	14	0	0.8	0.04	YES
Total	12	31.8	55.4	0.49	9.13	7.16	88	10		33	18	0.79	0.04	

Table 9-12.4

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

OCCT Algebra II Alignment Study

Number of Assessment Items - 55

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of- Knowledge Consistency	Range of Knowledge	Balance of Representation
1 - Number Systems and Algebraic Operations — The stud ...	YES	YES	YES	YES
2 - Relations and Functions — The student will use the ...	YES	YES	YES	YES
3 - Data Analysis and Statistics — The student will us ...	YES	YES	YES	YES

*Table 9-12.5*

Source-of-Challenge Issues by Reviewer  
OCCT Algebra II Alignment Study

Item Number	Comments by Reviewer
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Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT Algebra II Alignment Study

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	1	2	2	1	1
2	2	2	2	2	2
3	3	2	3	3	3
4	2	2	2	2	2
5	2	2	2	2	3
6					
7					
8	2	2	2	2	2
9	2	2	2	2	2
10	2	2	2	2	2
11	2	2	2	2	2
12	2	2	2	1	2
13	2	2	2	2	2
14	2	2	2	2	2
15	2	2	2	2	2
16					
17					
18					
19	1	1	2	2	2
20	1	1	1	1	2
21	2	1	2	2	1
22					
23					
24	2	2	2	3	2
25	2	2	2	2	2
26	2	2	2	2	1
27	2	2	2	2	2
28					
29	2	2	2	2	3
30	1	2	2	2	2
31	1	2	2	2	2
32					
33					
34	2	2	2	2	2
35	1	1	1	1	1
36	1	1	2	2	2
37	2	2	2	2	2
38	2	2	2	2	3
39	2	1	2	1	1
40	1	1	2	2	2
41					
42					
43	1	2	2	2	1
44	1	2	2	2	2
45	2	2	2	2	3
46	2	2	2	2	2
47	2	2	2	2	2
48	2	2	2	2	3

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT Algebra II Alignment Study

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	1	1	1	1	2
50	1	2	1	2	2
51	1	2	2	2	2
52					
53					
54	2	2	2	2	2
55	2	1	2	2	2
56	2	2	2	2	2
57	2	2	1	2	2
58	1	2	1	2	2
59	1	2	2	2	2
60					
61					
62					
63	2	2	2	2	2
64	1	1	2	1	1
65					
66					
67	3	3	3	3	2
68	1	2	2	2	1
69	2	2	3	3	3
70	1	1	1	2	2
71					
72	2	2	2	3	2
73	2	2	2	2	1
74	2	2	2	2	2
75	1	1	1	2	2

**Intraclass Correlation:** 0.7837

**Pairwise Comparison:** 0.6982

Table 9-12.7

Notes by Reviewer

OCCT Algebra II Alignment Study

Item Number	Comments by Reviewer
27	Cannot find specific objective dealing with inverse of functions other than logarithmic and exponential.
27	None of the standards mentions finding the inverse of a function.
27	Inverse is a transformation? so it would be good to include this specifically in the standard/objective 2.1/2.1a
27	not really an objective involving inverse of a function
29	This item doesn't quite fit any of the specific standards under 2.7.
32	Cannot find appropriate objective for inverse functions
32	None of the standards under 2.1 mentions finding the inverse of a function.
32	No objective with inverse of function

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT Algebra II Alignment Study

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4
1	1	2.6c	2	2.6c	2	2.6c		1	2.6c		1	2.3b
2	2	3.3	2	3.3	2	3.3		2	3.3		2	3.3
3	3	2.2a	2	2.2a	3	2.2a	2.2b	3	2.2a		3	2.3c
4	2	2.5b	2	2.5c	2	2.5b		2	2.5b		2	2.5b
5	2	2.1b	2	2.1b	2	2.1b		2	2.1c		3	2.1c
6												
7												
8	2	3.1b	2	3.1b	2	3.1c		2	3.1c		2	3.1b
9	2	2.3a	2	2.3a	2	2.3a		2	2.3a		2	2.6a
10	2	2.1d	2	2.1d	2	2.1d		2	2.1d		2	2.1d
11	2	1.2b	2	1.2b	2	1.2b		2	1.3b		2	1.1b
12	2	2.4	2	2.4	2	2.4		1	2.4		2	2.4
13	2	2.3a	2	2.3a	2	2.3a		2	2.3a		2	2.6a
14	2	2.2b	2	2.2b	2	2.2b		2	2.2b		2	2.2b
15	2	2.6a	2	2.6a	2	2.6a		2	2.6a		2	2.3a
16												
17												
18												
19	1	1.1b	1	1.1b	2	1.1b		2	1.1a		2	1.1b
20	1	2.4	1	2.4	1	2.4		1	2.4		2	2.4
21	2	1.1a	1	1.1a	2	1.1a		2	1.1a		1	1.1a
22												
23												
24	2	2.3a	2	2.7a	2	2.7a		3	2.7a		2	2.7a
25	2	2.3a	2	2.3c	2	2.3a		2	1.1b		2	2.6d
26	2	2.5c	2	2.5c	2	2.5c		2	2.5c		1	2.5c
27	2	2.1	2	2.1	2	2.1a		2	2.1		2	2.1a
28												
29	2	2.7b	2	2.7	2	2.7c		2	2.7c		3	2.4
30	1	1.2a	2	1.2a	2	1.2a		2	1.2a		2	1.2a
31	1	1.3b	2	1.3b	2	1.3b		2	1.3b		2	1.3b
32												
33												
34	2	2.2b	2	2.2b	2	2.2b		2	2.2b		2	2.2b
35	1	3.1a	1	3.1a	1	3.1a		1	3.1a		1	3.1a
36	1	1.1b	1	1.1b	2	1.1b		2	1.1b		2	1.1b
37	2	3.3	2	3.3	2	3.3		2	3.3		2	3.3
38	2	2.6c	2	2.7b	2	2.6b		2	2.6b		3	2.6b
39	2	3.3	1	3.3	2	3.3		1	3.3		1	3.3

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT Algebra II Alignment Study

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4
40	1	1.3b	1	1.3b	2	1.3b		2	1.3b		2	1.3b
41												
42												
43	1	1.2b	2	1.2b	2	1.2b		2	1.1b		1	1.2b
44	1	2.3a	2	2.3a	2	2.3a		2	2.3a		2	2.3a
45	2	2.4	2	2.3b	2	2.3b		2	2.4		3	2.4
46	2	3.1c	2	3.1b	2	3.1c		2	3.1c		2	3.1b
47	2	2.4	2	2.3b	2	2.3b		2	2.3b		2	2.4
48	2	1.3b	2	1.3b	2	1.3b		2	1.3b		3	1.3b
49	1	3.1a	1	3.1a	1	3.1a		1	3.1a		2	3.1c
50	1	2.7c	2	2.7c	1	2.7c		2	2.7c		2	2.7c
51	1	1.2a	2	1.2a	2	1.2a		2	1.2a		2	1.2a
52												
53												
54	2	3.3	2	3.3	2	3.3		2	3.3		2	3.3
55	2	1.1b	1	1.1b	2	1.1b		2	1.1b		2	1.1b
56	2	2.1c	2	2.1c	2	2.1c		2	2.1c		2	2.1c
57	2	2.5a	2	2.5a	1	2.5a		2	2.5a		2	2.1a
58	1	2.1a	2	2.1a	1	2.1a		2	2.1a		2	2.1a
59	1	1.1a	2	1.1b	2	1.1b		2	1.1b		2	1.1a
60												
61												
62												
63	2	2.3c	2	2.5c	2	2.5c		2	2.1b	1.1b	2	2.5c
64	1	1.1b	1	1.1b	2	1.1b		1	1.1b		1	1.1b
65												
66												
67	3	2.2c	3	2.3b	3	2.2a		3	2.2a		2	2.6c
68	1	2.4	2	2.7b	2	2.7b		2	2.7b		1	2.1d
69	2	2.2a	2	2.2a	3	2.2a		3	2.2a		3	2.2a
70	1	2.5a	1	2.5a	1	2.5a		2	2.5a		2	2.5a
71												
72	2	2.2c	2	2.2c	2	2.2c		3	2.2b		2	2.2c
73	2	2.4	2	2.4	2	2.4		2	2.4		1	2.4
74	2	1.2a	2	1.2a	2	2.3c		2	1.2a		2	1.2a
75	1	1.3b	1	1.3b	1	1.3b		2	1.3b		2	1.3b

**Objective Pairwise Comparison:** 0.7186

**Standard Pairwise Comparison:** 0.9783

Table 9-12.9  
Objectives Coded to Each Item by Reviewers  
OCCT Algebra II Alignment Study

Low		Medium		High
0		3.693333		6

1	2.3b	2.6c	2.6c	2.6c	2.6c	2.3c
2	3.3	3.3	3.3	3.3	3.3	
3	2.2a	2.2a	2.2a	2.2a	2.2b	
4	2.5b	2.5b	2.5b	2.5b	2.5c	
5	2.1b	2.1b	2.1b	2.1c	2.1c	
6						
7						
8	3.1b	3.1b	3.1b	3.1c	3.1c	
9	2.3a	2.3a	2.3a	2.3a	2.6a	
10	2.1d	2.1d	2.1d	2.1d	2.1d	
11	1.1b	1.2b	1.2b	1.2b	1.3b	
12	2.4	2.4	2.4	2.4	2.4	
13	2.3a	2.3a	2.3a	2.3a	2.6a	
14	2.2b	2.2b	2.2b	2.2b	2.2b	
15	2.3a	2.6a	2.6a	2.6a	2.6a	
16						
17						
18						
19	1.1a	1.1b	1.1b	1.1b	1.1b	
20	2.4	2.4	2.4	2.4	2.4	
21	1.1a	1.1a	1.1a	1.1a	1.1a	
22						
23						
24	2.3a	2.7a	2.7a	2.7a	2.7a	
25	1.1b	2.3a	2.3a	2.3c	2.6d	
26	2.5c	2.5c	2.5c	2.5c	2.5c	
27	2.1	2.1	2.1	2.1a	2.1a	
28						
29	2.4	2.7	2.7b	2.7c	2.7c	
30	1.2a	1.2a	1.2a	1.2a	1.2a	
31	1.3b	1.3b	1.3b	1.3b	1.3b	
32						
33						
34	2.2b	2.2b	2.2b	2.2b	2.2b	
35	3.1a	3.1a	3.1a	3.1a	3.1a	
36	1.1b	1.1b	1.1b	1.1b	1.1b	
37	3.3	3.3	3.3	3.3	3.3	
38	2.6b	2.6b	2.6b	2.6c	2.7b	
39	3.3	3.3	3.3	3.3	3.3	
40	1.3b	1.3b	1.3b	1.3b	1.3b	
41						
42						
43	1.1b	1.2b	1.2b	1.2b	1.2b	
44	2.3a	2.3a	2.3a	2.3a	2.3a	

Table 9-12.9  
Objectives Coded to Each Item by Reviewers  
OCCT Algebra II Alignment Study

45	2.3b	2.3b	2.4	2.4	2.4	
46	3.1b	3.1b	3.1c	3.1c	3.1c	
47	2.3b	2.3b	2.3b	2.4	2.4	
48	1.3b	1.3b	1.3b	1.3b	1.3b	
49	3.1a	3.1a	3.1a	3.1a	3.1c	
50	2.7c	2.7c	2.7c	2.7c	2.7c	
51	1.2a	1.2a	1.2a	1.2a	1.2a	
52						
53						
54	3.3	3.3	3.3	3.3	3.3	
55	1.1b	1.1b	1.1b	1.1b	1.1b	
56	2.1c	2.1c	2.1c	2.1c	2.1c	
57	2.1a	2.5a	2.5a	2.5a	2.5a	
58	2.1a	2.1a	2.1a	2.1a	2.1a	
59	1.1a	1.1a	1.1b	1.1b	1.1b	
60						
61						
62						
63	1.1b	2.1b	2.3c	2.5c	2.5c	2.5c
64	1.1b	1.1b	1.1b	1.1b	1.1b	
65						
66						
67	2.2a	2.2a	2.2c	2.3b	2.6c	
68	2.1d	2.4	2.7b	2.7b	2.7b	
69	2.2a	2.2a	2.2a	2.2a	2.2a	
70	2.5a	2.5a	2.5a	2.5a	2.5a	
71						
72	2.2b	2.2c	2.2c	2.2c	2.2c	
73	2.4	2.4	2.4	2.4	2.4	
74	1.2a	1.2a	1.2a	1.2a	2.3c	
75	1.3b	1.3b	1.3b	1.3b	1.3b	

### Items Coded by Reviewers to Each Objective

#### OCCT Algebra II Alignment Study

1																					
1.1																					
1.1a	19	21	21	21	21	21	59	59													
1.1b	11	19	19	19	19	25	36	36	36	36	36	43	55	55	55	55	55	59	59	59	
	63	64	64	64	64	64															
1.2																					
1.2a	30	30	30	30	30	51	51	51	51	51	74	74	74	74							
1.2b	11	11	11	43	43	43	43														
1.3																					
1.3b	11	31	31	31	31	31	40	40	40	40	40	48	48	48	48	48	75	75	75	75	
	75																				
2																					
2.1	27	27	27																		
2.1a	27	27	57	58	58	58	58	58													
2.1b	5	5	5	63																	
2.1c	5	5	56	56	56	56	56														
2.1d	10	10	10	10	10	68															
2.2																					
2.2a	3	3	3	3	67	67	69	69	69	69	69										
2.2b	3	14	14	14	14	14	34	34	34	34	34	34	72								
2.2c	67	72	72	72	72																
2.3																					
2.3a	9	9	9	9	13	13	13	13	15	24	25	25	44	44	44	44	44				
2.3b	1	45	45	47	47	47	67														
2.3c	3	25	63	74																	
2.4	12	12	12	12	12	20	20	20	20	20	29	45	45	45	47	47	68	73	73	73	
	73	73																			
2.5																					
2.5a	57	57	57	57	70	70	70	70	70												
2.5b	4	4	4	4																	
2.5c	4	26	26	26	26	26	63	63	63												
2.6																					
2.6a	9	13	15	15	15	15															
2.6b	38	38	38																		
2.6c	1	1	1	1	38	67															
2.6d	25																				
2.7	29																				
2.7a	24	24	24	24																	
2.7b	29	38	68	68	68																
2.7c	29	29	50	50	50	50	50														
2.7d																					
3																					
3.1																					
3.1a	35	35	35	35	35	49	49	49	49												

Table 9-12.10

Items Coded by Reviewers to Each Objective

OCCT Algebra II Alignment Study

3.1b	8	8	8	46	46															
3.1c	8	8	46	46	46	49														
3.3	2	2	2	2	2	37	37	37	37	37	39	39	39	39	39	54	54	54	54	54

Table 9-12.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

OCCT Algebra II Alignment Study

Low		Medium		High
1		2		5
1				
1.1				
1.1a	19:1	21:5	59:2	
1.1b	11:1	19:4	25:1	36:5 43:1 55:5 59:3 63:1 64:5
1.2				
1.2a	30:5	51:5	74:4	
1.2b	11:3	43:4		
1.3				
1.3b	11:1	31:5	40:5	48:5 75:5
2				
2.1	27:3			
2.1a	27:2	57:1	58:5	
2.1b	5:3	63:1		
2.1c	5:2	56:5		
2.1d	10:5	68:1		
2.2				
2.2a	3:4	67:2	69:5	
2.2b	3:1	14:5	34:5	72:1
2.2c	67:1	72:4		
2.3				
2.3a	9:4	13:4	15:1	24:1 25:2 44:5
2.3b	1:1	45:2	47:3	67:1
2.3c	3:1	25:1	63:1	74:1
2.4	12:5	20:5	29:1	45:3 47:2 68:1 73:5
2.5				
2.5a	57:4	70:5		
2.5b	4:4			
2.5c	4:1	26:5	63:3	
2.6				
2.6a	9:1	13:1	15:4	
2.6b	38:3			
2.6c	1:4	38:1	67:1	
2.6d	25:1			
2.7	29:1			
2.7a	24:4			
2.7b	29:1	38:1	68:3	
2.7c	29:2	50:5		
2.7d				
3				
3.1				
3.1a	35:5	49:4		
3.1b	8:3	46:2		
3.1c	8:2	46:3	49:1	
3.3	2:5	37:5	39:5	54:5

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Algebra II Alignment Study

Low		Medium		High
1		2		5

1	2.3b: 1	2.6c: 4		
2	3.3:5			
3	2.2a: 4	2.2b: 1	2.3c: 1	
4	2.5b: 4	2.5c: 1		
5	2.1b: 3	2.1c: 2		
6				
7				
8	3.1b: 3	3.1c: 2		
9	2.3a: 4	2.6a: 1		
10	2.1d: 5			
11	1.1b: 1	1.2b: 3	1.3b: 1	
12	2.4:5			
13	2.3a: 4	2.6a: 1		
14	2.2b: 5			
15	2.3a: 1	2.6a: 4		
16				
17				
18				
19	1.1a: 1	1.1b: 4		
20	2.4:5			
21	1.1a: 5			
22				
23				
24	2.3a: 1	2.7a: 4		
25	1.1b: 1	2.3a: 2	2.3c: 1	2.6d: 1
26	2.5c: 5			
27	2.1:3	2.1a: 2		
28				

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Algebra II Alignment Study

29	2.4:1	2.7:1	2.7b:1	2.7c:2
30	1.2a:5			
31	1.3b:5			
32				
33				
34	2.2b:5			
35	3.1a:5			
36	1.1b:5			
37	3.3:5			
38	2.6b:3	2.6c:1	2.7b:1	
39	3.3:5			
40	1.3b:5			
41				
42				
43	1.1b:1	1.2b:4		
44	2.3a:5			
45	2.3b:2	2.4:3		
46	3.1b:2	3.1c:3		
47	2.3b:3	2.4:2		
48	1.3b:5			
49	3.1a:4	3.1c:1		
50	2.7c:5			
51	1.2a:5			
52				
53				
54	3.3:5			
55	1.1b:5			
56	2.1c:5			
57	2.1a:1	2.5a:4		

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT Algebra II Alignment Study

58	2.1a: 5				
59	1.1a: 2	1.1b: 3			
60					
61					
62					
63	1.1b: 1	2.1b: 1	2.3c: 1	2.5c: 3	
64	1.1b: 5				
65					
66					
67	2.2a: 2	2.2c: 1	2.3b: 1	2.6c: 1	
68	2.1d: 1	2.4:1	2.7b: 3		
69	2.2a: 5				
70	2.5a: 5				
71					
72	2.2b: 1	2.2c: 4			
73	2.4:5				
74	1.2a: 4	2.3c: 1			
75	1.3b: 5				

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT Algebra II Alignment Study

Low DOK		Matched DOK		High DOK
1		2		5

1 [2]:									
1.1 [2]:									
1.1a [1]:	19:1[2]	21:5[1.6]	59:2[1.5]						
1.1b [2]:	11:1[2]	19:4[1.5]	25:1[2]	36:5[1.6]	43:1[2]	55:5[1.8]	59:3[2]	63:1[2]	64:5[1.2]
1.2 [2]:									
1.2a [2]:	30:5[1.8]	51:5[1.8]	74:4[2]						
1.2b [2]:	11:3[2]	43:4[1.5]							
1.3 [2]:									
1.3b [2]:	11:1[2]	31:5[1.8]	40:5[1.6]	48:5[2.2]	75:5[1.4]				
2 [2]:									
2.1 [2]:	27:3[2]								
2.1a [2]:	27:2[2]	57:1[2]	58:5[1.6]						
2.1b [2]:	5:3[2]	63:1[2]							
2.1c [2]:	5:2[2.5]	56:5[2]							
2.1d [2]:	10:5[2]	68:1[1]							
2.2 [2]:									
2.2a [3]:	3:4[2.75]	67:2[3]	69:5[2.6]						
2.2b [2]:	3:1[3]	14:5[2]	34:5[2]	72:1[3]					
2.2c [2]:	67:1[3]	72:4[2]							
2.3 [2]:									
2.3a [2]:	9:4[2]	13:4[2]	15:1[2]	24:1[2]	25:2[2]	44:5[1.8]			
2.3b [2]:	1:1[1]	45:2[2]	47:3[2]	67:1[3]					
2.3c [3]:	3:1[3]	25:1[2]	63:1[2]	74:1[2]					

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT Algebra II Alignment Study

2.4 [2]:	12:5[ 1.8]	20:5[ 1.2]	29:1[ 3]	45:3[ 2.33]	47:2[ 2]	68:1[ 1]	73:5[ 1.8]
2.5 [2]:							
2.5a [1]:	57:4[ 1.75]	70:5[ 1.4]					
2.5b [2]:	4:4[2]						
2.5c [3]:	4:1[2]	26:5[ 1.8]	63:3[ 2]				
2.6 [2]:							
2.6a [2]:	9:1[2]	13:1[ 2]	15:4[ 2]				
2.6b [2]:	38:3[ 2.33]						
2.6c [2]:	1:4[1. 5]	38:1[ 2]	67:1[ 2]				
2.6d [3]:	25:1[ 2]						
2.7 [2]:	29:1[ 2]						
2.7a [2]:	24:4[ 2.25]						
2.7b [2]:	29:1[ 2]	38:1[ 2]	68:3[ 2]				
2.7c [2]:	29:2[ 2]	50:5[ 1.6]					
2.7d [3]:							
3 [2]:							
3.1 [2]:							
3.1a [1]:	35:5[ 1]	49:4[ 1]					
3.1b [2]:	8:3[2]	46:2[ 2]					
3.1c [2]:	8:2[2]	46:3[ 2]	49:1[ 2]				
3.3 [2]:	2:5[2]	37:5[ 2]	39:5[ 1.4]	54:5[ 2]			

Table 9-12.14

Group Consensus

OCCT Algebra II EOI Standards, Mathematics, Grade 11

Level	Description	DOK
1	Number Systems and Algebraic Operations — The student will perform operations with rational, radical, and polynomial expressions, as well as expressions involving complex numbers.	2
1.1	Rational Exponents	2
1.1a	Convert expressions from radical notations to rational exponents and vice versa.	1
1.1b	Add, subtract, multiply, divide, and simplify radical expressions and expressions containing rational exponents.	2
1.2	Polynomial and Rational Expressions	2
1.2a	Divide polynomial expressions by lower degree polynomials.	2
1.2b	Add, subtract, multiply, divide, and simplify rational expressions, including complex fractions.	2
1.3	Complex Numbers	2
1.3b	Add, subtract, multiply, divide, and simplify expressions involving complex numbers.	2
2	Relations and Functions — The student will use the relationships among the solution of an equation, zero of a function, x-intercepts of a graph, and factors of a polynomial expression to solve problems involving relations and functions.	2
2.1	Functions and Function Notation	2
2.1a	Recognize the parent graphs of polynomial, exponential, and logarithmic functions and predict the effects of transformations on the parent graphs, using various methods and tools which may include graphing calculators.	2
2.1b	Use function notation to add, subtract, multiply, and divide functions.	2
2.1c	Combine functions by composition.	2
2.1d	Use algebraic, interval, and set notations to specify the domain and range of functions of various types.	2
2.2	Systems of Equations	2
2.2a	Model a situation that can be described by a system of equations and inequalities, and use the model to answer questions about the situation.	3
2.2b	Solve systems of linear equations and inequalities using various methods and tools which may include substitution, elimination, matrices, graphing, and graphing calculators.	2
2.2c	Use either one quadratic equation and one linear equation or two quadratic equations to solve problems. [This indicator is * on 2007 PASS, but no * on 2009 test specs; so if no items, do we omit this indicator in the WAT?]	2
2.3	Quadratic Equations and Functions	2
2.3a	Solve quadratic equations by graphing, factoring, completing the square, and quadratic formula.	2
2.3b	Graph a quadratic function and identify the x- and y-intercepts and maximum or minimum value, using various methods and tools which may include a graphing calculator.	2
2.3c	Model a situation that can be described by a quadratic function, and use the model to answer questions about the situation.	3
2.4	Identify, graph, and write the equations of the conic sections (circle, ellipse, parabola, and hyperbola).	2
2.5	Exponential and Logarithmic Functions	2
2.5a	Graph exponential and logarithmic functions.	1
2.5b	Apply the inverse relationship between exponential and logarithmic	2

Table 9-12.14

Group Consensus

OCCT Algebra II EOI Standards, Mathematics, Grade 11

Level	Description	DOK
	functions to convert from one form to another.	
2.5c	Model a situation that can be described by an exponential or logarithmic function, and use the model to answer questions about the situation.	3
2.6	Polynomial Equations and Functions	2
2.6a	Solve polynomial equations using various methods and tools which may include factoring and synthetic division.	2
2.6b	Sketch the graph of a polynomial function.	2
2.6c	Given the graph of a polynomial function, identify the x- and y-intercepts, relative maximums and relative minimums, using various methods and tools which may include a graphing calculator.	2
2.6d	Model a situation that can be described by a polynomial function, and use the model to answer questions about the situation.	3
2.7	Rational Equations and Functions	2
2.7a	Solve rational equations.	2
2.7b	Sketch the graph of a rational function.	2
2.7c	Given the graph of a rational function, identify the x- and y-intercepts, asymptotes, using various methods and tools which may include a graphing calculator.	2
2.7d	Model a situation that can be described by a rational function, and use the model to answer questions about the situation.	3
3	Data Analysis and Statistics — The student will use data analysis and statistics to formulate and justify predictions from a set of data.	2
3.1	Analysis of Collected Data Involving Two Variables	2
3.1a	Display data on a scatter plot.	1
3.1b	Interpret results [i.e., data on a scatter plot] using a linear, exponential, or quadratic model/equation.	2
3.1c	Identify whether the model/equation is a curve of best fit for the data, using various methods and tools which may include a graphing calculator.	2
3.3	Identify and use arithmetic and geometric sequences and series to solve problems.	2

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

- 
- Yes, the most important parts of the standards were generally the ones covered.
- Inverse functions were included but it was sketchy as to whether or not it was addressed in the standards.
- yes
- Yes

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

- 
- Standards 2.2a, 2.3c, 2.5c, 2.6d, and 2.7d are about modeling situations with various types of functions, and we decided after much discussion that the intent of these standards was a high-level type of thinking that merited DOK 3. But the items in my opinion did not generally reach DOK 3, which is not surprising given the constraints of a multiple-choice test.
- standard 3.1 seemed weak for Alg II--these items were all DOK 1 in my opinion
- We cover a lot of level 2's in the exam test book.

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

- 
- Yes, the standards are pretty good.
- The standards were written an appropriate level in all objectives except 3.1a. It was below level.
- no

**D. What is your general opinion of the alignment between the standards and assessment:**

- ii. Acceptable Alignment (4) : 80%
- iii. Needs slight improvement (1) : 20%

**E. Comments**



## **Appendix D: Alignment Analysis Tables—English II**



Table 10.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

English II

Number of Assessment Items - 60

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
10.1 - Vocabulary - The student will expand vocabulary th ...	4	4	1 2	1 3	25 75	7.2	0.4	YES
10.2 - Comprehension - The student will interact with the ...	4	13	1 2 3	1 7 5	7 53 38	20.6	2.58	YES
10.3 - Literature - The student will read, construct mean ...	4	12	2 3	3 9	25 75	16	2.76	YES
10.4 - Research and Information: The student will conduct ...	2	6	2 3	5 1	83 16	5.4	1.2	NO
3 - Grammar/Usage and Mechanics - The student will dem ...	3	14	1 2	10 4	71 28	12	0	YES
Total	17	49	1 2 3	12 22 15	24 44 30	61.2	1.6	

Table 10.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

English II

Number of Assessment Items - 60

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
10.1 - Vocabulary - The student will expand vocabulary th ...	4	4	7.2	0.4	34	37	66	37	0	0	YES
10.2 - Comprehension - The student will interact with the ...	4	13	20.6	2.58	26	40	69	39	5	12	YES
10.3 - Literature - The student will read, construct mean ...	4	12	16	2.76	57	46	40	45	3	16	WEAK
10.4 - Research and Information: The student will conduct ...	2	6	5.4	1.2	0	0	91	26	9	26	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	3	14	12	0	0	0	90	28	10	28	YES
Total	17	49	61.2	1.6	24	40	70	42	6	21	

Table 10.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers  
 English II  
 Number of Assessment Items - 60

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
10.1 - Vocabulary - The student will expand vocabulary th ...	4	4	7.2	0.4	2.2	0.4	55	10	YES	12	1	0.77	0.03	YES
10.2 - Comprehension - The student will interact with the ...	4	13	20.6	2.58	7.6	1.02	58	8	YES	34	4	0.68	0.10	WEAK
10.3 - Literature - The student will read, construct mean ...	4	12	16	2.76	7.4	1.50	62	12	YES	26	5	0.81	0.04	YES
10.4 - Research and Information: The student will conduct ...	2	6	5.4	1.2	3.4	0.49	57	8	YES	9	2	0.88	0.06	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	3	14	12	0	8.2	1.72	59	12	YES	20	1	0.80	0.05	YES
Total	17	49	61.2	1.6	5.76	2.72	58	11		20	10	0.79	0.09	

Table 10.4

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

English II

Number of Assessment Items - 60

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
10.1 - Vocabulary - The student will expand vocabulary th ...	YES	YES	YES	YES
10.2 - Comprehension - The student will interact with the ...	YES	YES	YES	WEAK
10.3 - Literature - The student will read, construct mean ...	YES	WEAK	YES	YES
10.4 - Research and Information: The student will conduct ...	NO	YES	YES	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	YES	YES	YES	YES

*Table 10.5*

Source-of-Challenge Issues by Reviewer

English II

Item Number	Comments by Reviewer
26	May require prior knowledge?
36	J, or option 4, mirrors the same language of stem. Could miscue student.
38	CA is the only option with a hyphen. Prior knowledge applied?
46	item can be answered without reading the passage.
46	cued by 50
50	cues 46

Table 10.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

English II

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	1	1	1	1	2
2	2	2	2	2	2
3	2	2	2	2	2
4	2	2	2	2	2
5	2	2	2	2	2
6	2	2	2	2	2
7	2	1	1	2	2
8	2	2	2	2	1
9	2	1	1	2	2
10	2	2	2	3	3
11	3	2	2	3	2
12	2	2	2	2	2
13	2	2	2	2	2
14					
15					
16					
17					
18					
19					
20					
21					
22	2	2	2	2	2
23	2	2	2	2	2
24	2	2	2	3	3
25	2	2	2	3	3
26	3	2	3	3	3
27	2	2	2	2	2
28	2	2	2	2	1
29	2	2	2	2	2
30	1	2	1	1	1
31	1	2	1	1	1
32	1	2	2	1	1
33	1	2	1	1	1
34	2	2	2	3	2
35	2	2	2	2	2
36	2	2	3	2	2
37	2	2	2	2	2
38	3	2	3	3	2
39	1	2	2	2	2
40	2	2	2	2	3
41	2	2	2	2	2
42	3	3	3	3	3
43	3	2	3	3	3
44	3	2	3	3	3
45	1	1	1	1	2
46	1	2	2	1	3
47	1	1	1	1	1
48	3	2	2	3	3

Table 10.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

English II

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	2	2	2	2	3
50	2	2	2	2	3
51	2	2	2	2	2
52	2	2	2	2	2
53	1	1	1	1	1
54	2	2	2	2	2
55	2	2	2	2	2
56	2	2	2	3	2
57	2	2	2	3	2
58	2	2	2	3	2
59	2	2	2	2	2
60	3	2	2	3	2
61	3	2	2	3	3
62	3	2	2	3	3
63	1	1	2	1	1
64	2	2	2	2	1
65	1	1	1	1	1
66	1	2	1	1	1
67	1	1	1	1	1
68	2	2	2	2	1
69					
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					

**Intraclass Correlation:** 0.8846

**Pairwise Comparison:** 0.7133

*Table 10.7*  
Notes by Reviewer  
English II

Item Number	Comments by Reviewer
3	Coded this as a DOK 2, not 3, because the correct answer defines internal conflict.
6	Options not the best.
7	Classified this as a DOK 1 because of simplicity of prefix and actual word for grade level.
8	Options not the best.
13	Options could be confusing--fiction and a novel are both fiction--but neither are correct.
19	Although I coded this a DOK 3, the item does not actually require comparing both passages.
20	Again, I coded this a DOK 3, but the use of both passages is not necessarily required to answer the question.
30	Although students need to see context, the skill should be so learned it becomes automatic, or level 1.
32	Could go with a DOK 1 here.
33	Even though it is used in context, the skill should be automatic at this grade.
63	Could probably also be a 1. Skills should be automatic at this grade.
70	Hits best at the 3.2 level.

Table 10.8

DOK Levels and Objectives Coded by Each Reviewer

English II

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	DOK 4	PObj 4	S1Obj 4
1	1	10.3.3.a	1	10.3.3.a	1	10.3.3.a		1	10.3.3.a	2	10.3.3.a	
2	2	10.2.2.a	2	10.2.2.a	2	10.2.2.a		2	10.2.3.a	2	10.2.2.a	10.2.2.b
3	2	10.3.2.a	2	10.3.2.a	2	10.3.2.a		2	10.3.2.a	2	10.3.2.a	
4	2	10.2.2.b	2	10.2.2.b	2	10.2.2.b		2	10.2.2.b	2	10.2.2.b	10.3.2.a
5	2	10.3.2.a	2	10.3.2.a	2	10.3.2.a		2	10.3.2.a	2	10.3.2.a	
6	2	10.3.1.a	2	10.3.1.a	2	10.3.1.a		2	10.3.1.a	2	10.3.1.a	
7	2	10.1.1	1	10.1.1	1	10.1.1		2	10.1.1	2	10.1.1	
8	2	10.1.5	2	10.1.5	2	10.1.5		2	10.1.5	1	10.1.5	
9	2	10.3.3.a	1	10.3.3.a	1	10.3.3.a		2	10.3.3.a	2	10.3.3.a	
10	2	10.2.1.b	2	10.2.2.b	2	10.2.1.a	10.2.4.c	3	10.3.2.b	3	10.2.2.b	
11	3	10.4.2.b	2	10.4.2.b	2	10.4.2.b		3	10.4.2.b	2	10.4.2.b	
12	2	10.4.2.a	2	10.4.2.a	2	10.4.1.c		2	10.4.2.a	2	10.4.1.c	
13	2	10.3.1.a	2	10.3.1.a	2	10.3.1.a		2	10.3.1.a	2	10.3.1.a	
14												
15												
16												
17												
18												
19												
20												
21												
22	2	10.1.5	2	10.1.5	2	10.1.5		2	10.1.5	2	10.1.5	
23	2	10.1.5	2	10.1.5	2	10.1.5		2	10.1.5	2	10.1.5	
24	2	10.2.	2	10.3.	2	10.2.		3	10.3.	3	10.3.	

Table 10.8

DOK Levels and Objectives Coded by Each Reviewer  
English II

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj2	DOK 3	PObj 3	DOK 4	PObj 4	S1Obj4
		2.b		2.e		1.a			1.b		1.a	
25	2	10.2.2.b	2	10.2.1.d	2	10.2.1.d		3	10.3.1.b	3	10.3.1.a	
26	3	10.3.4.a	2	10.3.4.a	3	10.2.1.b	10.3.4.a	3	10.3.4.a	3	10.2.2.b	
27	2	10.4.1.a	2	10.4.1.a	2	10.4.1.a		2	10.4.1.a	2	10.4.1.a	
28	2	3.c	2	2.c	2	3.c		2	3.c	1	2.c	
29	2	3.a	2	3.a	2	3.a		2	3.a	2	3.c	
30	1	2.b	2	2.d	1	2.b		1	2.b	1	2.d	
31	1	2.d	2	2.d	1	2.d		1	1.a	1	2.d	
32	1	2.c	2	2.c	2	2.c		1	2.c	1	2.c	
33	1	1.f	2	1.e	1	1.f		1	1.f	1	1.e	
34	2	10.2.3.a	2	10.2.1.b	2	10.2.1.b		3	10.3.2.b	2	10.2.2.b	
35	2	10.2.4.a	2	10.2.4.a	2	10.2.4.a		2	10.2.4.a	2	10.2.4.a	
36	2	10.2.1.b	2	10.2.4.c	3	10.2.1.b		2	10.2.1.a	2	10.2.1.b	
37	2	10.4.2.b	2	10.4.2.b	2	10.4.2.b		2	10.2.1.b	2	10.2.2.b	
38	3	10.3.4.b	2	10.3.4.a	3	10.3.4.a	10.2.2.b	3	10.3.4.b	2	10.2.2.b	
39	1	10.2.3.a	2	10.2.2.a	2	10.2.2.b		2	10.2.2.a	2	10.2.3.b	
40	2	10.2.2.a	2	10.2.2.b	2	10.2.2.b		2	10.2.3.a	3	10.2.2.b	
41	2	10.4.1.a	2	10.4.1.a	2	10.4.1.a		2	10.4.1.a	2	10.4.1.a	
42	3	10.3.4.c	3	10.3.4.c	3	10.3.4.c		3	10.3.4.c	3	10.3.4.c	
43	3	10.2.3.a	2	10.2.3.b	3	10.3.4.c		3	10.2.3.a	3	10.3.4.c	
44	3	10.2.1.b	2	10.1.4	3	10.2.1.b		3	10.3.1.a	3	10.3.1.a	
45	1	10.3.3.b	1	10.3.3.b	1	10.3.3.a		1	10.3.3.b	2	10.3.3.b	
46	1	10.2.2.b	2	10.2.1.b	2	10.2.3.a		1	10.2.1.b	3	10.3.1.a	

Table 10.8

DOK Levels and Objectives Coded by Each Reviewer  
English II

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	DOK 4	PObj 4	S1Obj 4
47	1	10.3.3.a	1	10.3.3.a	1	10.3.3.a		1	10.3.3.a	1	10.3.3.a	
48	3	10.3.4.a	2	10.2.2.a	2	10.3.2.a		3	10.3.4.b	3	10.2.2.b	
49	2	10.4.2.a	2	10.2.3.b	2	10.4.2.a		2	10.2.3.b	3	10.2.3.a	
50	2	10.2.4.c	2	10.3.2.d	2	10.3.2.d		2	10.3.2.d	3	10.3.2.d	
51	2	10.2.1.b	2	10.2.2.a	2	10.2.4.c		2	10.3.1.a	2	10.2.3.a	
52	2	10.1.5	2	10.1.5	2	10.1.5		2	10.1.5	2	10.1.5	
53	1	10.1.1	1	10.1.1	1	10.1.1		1	10.1.1	1	10.1.1	
54	2	10.1.5	2	10.1.5	2	10.1.5		2	10.1.5	2	10.1.5	
55	2	10.2.3.a	2	10.2.2.a	2	10.2.2.b		2	10.2.3.b	2	10.2.2.b	
56	2	10.2.3.a	2	10.2.3.a	2	10.2.1.b		3	10.2.1.a	2	10.2.2.b	
57	2	10.2.1.a	2	10.2.2.a	2	10.2.1.b		3	10.2.2.b	2	10.2.2.b	
58	2	10.2.1.a	2	10.2.2.a	2	10.3.2.d		3	10.2.1.a	2	10.2.2.b	
59	2	10.2.3.b	2	10.2.2.b	2	10.2.3.b		2	10.2.3.a	2	10.2.3.a	
60	3	10.2.3.a	2	10.2.3.a	2	10.2.3.a		3	10.2.3.b	2	10.2.3.a	
61	3	10.3.4.a	2	10.3.4.a	2	10.2.2.b	10.3.4.a	3	10.3.4.a	3	10.2.2.b	
62	3	10.4.2.c	2	10.4.2.a	2	10.2.2.b		3	10.3.4.b	3	10.2.2.b	
63	1	2.a	1	2.a	2	2.a		1	2.a	1	2.a	
64	2	3.b	2	3.b	2	3.b		2	3.b	1	1.e	
65	1	2.d	1	2.d	1	2.d		1	2.d	1	2.d	
66	1	2.c	2	2.c	1	2.c		1	2.c	1	2.c	
67	1	1.b	1	1.b	1	1.b		1	1.b	1	2.d	
68	2	3.c	2	3.c	2	3.c		2	3.c	1	2.c	
69												

Table 10.8

DOK Levels and Objectives Coded by Each Reviewer

English II

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj2	DOK 3	PObj 3	DOK 4	PObj 4	S1Obj4
70												
71												
72												
73												
74												
75												
76												
77												
78												
79												
80												

**Objective Pairwise Comparison:** 0.5657

**Standard Pairwise Comparison:** 0.836

Table 10.9

Objectives Coded to Each Item by Reviewers

English II

Low		Medium		High
0		3.825		6

1	10.3. 3.a	10.3. 3.a	10.3. 3.a	10.3. 3.a	10.3. 3.a	
2	10.2. 2.a	10.2. 2.a	10.2. 2.a	10.2. 2.a	10.2. 2.b	10.2. 3.a
3	10.3. 2.a	10.3. 2.a	10.3. 2.a	10.3. 2.a	10.3. 2.a	
4	10.2. 2.b	10.2. 2.b	10.2. 2.b	10.2. 2.b	10.2. 2.b	10.3. 2.a
5	10.3. 2.a	10.3. 2.a	10.3. 2.a	10.3. 2.a	10.3. 2.a	
6	10.3. 1.a	10.3. 1.a	10.3. 1.a	10.3. 1.a	10.3. 1.a	
7	10.1. 1	10.1. 1	10.1. 1	10.1. 1	10.1. 1	
8	10.1. 5	10.1. 5	10.1. 5	10.1. 5	10.1. 5	
9	10.3. 3.a	10.3. 3.a	10.3. 3.a	10.3. 3.a	10.3. 3.a	
10	10.2. 1.a	10.2. 1.b	10.2. 2.b	10.2. 2.b	10.2. 4.c	10.3. 2.b
11	10.4. 2.b	10.4. 2.b	10.4. 2.b	10.4. 2.b	10.4. 2.b	
12	10.4. 1.c	10.4. 1.c	10.4. 2.a	10.4. 2.a	10.4. 2.a	
13	10.3. 1.a	10.3. 1.a	10.3. 1.a	10.3. 1.a	10.3. 1.a	
14						
15						
16						
17						
18						
19						
20						
21						
22	10.1. 5	10.1. 5	10.1. 5	10.1. 5	10.1. 5	
23	10.1. 5	10.1. 5	10.1. 5	10.1. 5	10.1. 5	
24	10.2. 1.a	10.2. 2.b	10.3. 1.a	10.3. 1.b	10.3. 2.e	
25	10.2. 1.d	10.2. 1.d	10.2. 2.b	10.3. 1.a	10.3. 1.b	
26	10.2. 1.b	10.2. 2.b	10.3. 4.a	10.3. 4.a	10.3. 4.a	10.3. 4.a
27	10.4. 1.a	10.4. 1.a	10.4. 1.a	10.4. 1.a	10.4. 1.a	

Table 10.9

Objectives Coded to Each Item by Reviewers

English II

28	2.c	2.c	3.c	3.c	3.c	
29	3.a	3.a	3.a	3.a	3.c	
30	2.b	2.b	2.b	2.d	2.d	
31	1.a	2.d	2.d	2.d	2.d	
32	2.c	2.c	2.c	2.c	2.c	
33	1.e	1.e	1.f	1.f	1.f	
34	10.2. 1.b	10.2. 1.b	10.2. 2.b	10.2. 3.a	10.3. 2.b	
35	10.2. 4.a	10.2. 4.a	10.2. 4.a	10.2. 4.a	10.2. 4.a	
36	10.2. 1.a	10.2. 1.b	10.2. 1.b	10.2. 1.b	10.2. 4.c	
37	10.2. 1.b	10.2. 2.b	10.4. 2.b	10.4. 2.b	10.4. 2.b	
38	10.2. 2.b	10.2. 2.b	10.3. 4.a	10.3. 4.a	10.3. 4.b	10.3. 4.b
39	10.2. 2.a	10.2. 2.a	10.2. 2.b	10.2. 3.a	10.2. 3.b	
40	10.2. 2.a	10.2. 2.b	10.2. 2.b	10.2. 2.b	10.2. 3.a	
41	10.4. 1.a	10.4. 1.a	10.4. 1.a	10.4. 1.a	10.4. 1.a	
42	10.3. 4.c	10.3. 4.c	10.3. 4.c	10.3. 4.c	10.3. 4.c	
43	10.2. 3.a	10.2. 3.a	10.2. 3.b	10.3. 4.c	10.3. 4.c	
44	10.1. 4	10.2. 1.b	10.2. 1.b	10.3. 1.a	10.3. 1.a	
45	10.3. 3.a	10.3. 3.b	10.3. 3.b	10.3. 3.b	10.3. 3.b	
46	10.2. 1.b	10.2. 1.b	10.2. 2.b	10.2. 3.a	10.3. 1.a	
47	10.3. 3.a	10.3. 3.a	10.3. 3.a	10.3. 3.a	10.3. 3.a	
48	10.2. 2.a	10.2. 2.b	10.3. 2.a	10.3. 4.a	10.3. 4.b	
49	10.2. 3.a	10.2. 3.b	10.2. 3.b	10.4. 2.a	10.4. 2.a	
50	10.2. 4.c	10.3. 2.d	10.3. 2.d	10.3. 2.d	10.3. 2.d	
51	10.2. 1.b	10.2. 2.a	10.2. 3.a	10.2. 4.c	10.3. 1.a	
52	10.1. 5	10.1. 5	10.1. 5	10.1. 5	10.1. 5	
53	10.1. 1	10.1. 1	10.1. 1	10.1. 1	10.1. 1	
54	10.1. 5	10.1. 5	10.1. 5	10.1. 5	10.1. 5	
55	10.2.	10.2.	10.2.	10.2.	10.2.	

Table 10.9  
Objectives Coded to Each Item by Reviewers  
English II

	2.a	2.b	2.b	3.a	3.b	
56	10.2. 1.a	10.2. 1.b	10.2. 2.b	10.2. 3.a	10.2. 3.a	
57	10.2. 1.a	10.2. 1.b	10.2. 2.a	10.2. 2.b	10.2. 2.b	
58	10.2. 1.a	10.2. 1.a	10.2. 2.a	10.2. 2.b	10.3. 2.d	
59	10.2. 2.b	10.2. 3.a	10.2. 3.a	10.2. 3.b	10.2. 3.b	
60	10.2. 3.a	10.2. 3.a	10.2. 3.a	10.2. 3.a	10.2. 3.b	
61	10.2. 2.b	10.2. 2.b	10.3. 4.a	10.3. 4.a	10.3. 4.a	10.3. 4.a
62	10.2. 2.b	10.2. 2.b	10.3. 4.b	10.4. 2.a	10.4. 2.c	
63	2.a	2.a	2.a	2.a	2.a	
64	1.e	3.b	3.b	3.b	3.b	
65	2.d	2.d	2.d	2.d	2.d	
66	2.c	2.c	2.c	2.c	2.c	
67	1.b	1.b	1.b	1.b	2.d	
68	2.c	3.c	3.c	3.c	3.c	
69						
70						
71						
72						
73						
74						
75						
76						
77						
78						
79						
80						

*Table 10.10*  
Items Coded by Reviewers to Each Objective  
English II

Low		Medium		High
0		4.5		32

10.1																				
10.1.1	7	7	7	7	7	53	53	53	53	53										
10.1.3																				
10.1.4	44																			
10.1.5	8	8	8	8	8	22	22	22	22	22	23	23	23	23	23	52	52	52	52	52
	54	54	54	54	54															
10.2																				
10.2.1																				
10.2.1.a	10	24	36	56	57	58	58													
10.2.1.b	10	26	34	34	36	36	36	37	44	44	46	46	51	56	57					
10.2.1.c																				
10.2.1.d	25	25																		
10.2.2																				
10.2.2.a	2	2	2	2	39	39	40	48	51	55	57	58								
10.2.2.b	2	4	4	4	4	4	10	10	24	25	26	34	37	38	38	39	40	40	40	46
	48	55	55	56	57	57	58	59	61	61	62	62								
10.2.3																				
10.2.3.a	2	34	39	40	43	43	46	49	51	55	56	56	59	59	60	60	60	60		
10.2.3.b	39	43	49	49	55	59	59	60												
10.2.3.c																				
10.2.4																				
10.2.4.a	35	35	35	35	35															
10.2.4.b																				
10.2.4.c	10	36	50	51																
10.2.4.d																				

*Table 10.10*  
Items Coded by Reviewers to Each Objective  
English II

10.3																
10.3. 1																
10.3. 1.a	6	6	6	6	6	13	13	13	13	13	24	25	44	44	46	51
10.3. 1.b	24	25														
10.3. 2																
10.3. 2.a	3	3	3	3	3	4	5	5	5	5	5	48				
10.3. 2.b	10	34														
10.3. 2.c																
10.3. 2.d	50	50	50	50	58											
10.3. 2.e	24															
10.3. 3																
10.3. 3.a	1	1	1	1	1	9	9	9	9	9	45	47	47	47	47	47
10.3. 3.b	45	45	45	45												
10.3. 4																
10.3. 4.a	26	26	26	26	38	38	48	61	61	61	61					
10.3. 4.b	38	38	48	62												
10.3. 4.c	42	42	42	42	42	43	43									
10.4																
10.4. 1																
10.4. 1.a	27	27	27	27	27	41	41	41	41	41						
10.4. 1.c	12	12														
10.4. 2																
10.4. 2.a	12	12	12	49	49	62										
10.4. 2.b	11	11	11	11	11	37	37	37								
10.4. 2.c	62															
10.4.																

*Table 10.10*  
Items Coded by Reviewers to Each Objective  
English II

2.d														
3														
1														
1.a	31													
1.b	67	67	67	67	67									
1.c														
1.d														
1.e	33	33	64											
1.f	33	33	33											
2														
2.a	63	63	63	63	63									
2.b	30	30	30											
2.c	28	28	32	32	32	32	32	66	66	66	66	66	68	
2.d	30	30	31	31	31	31	65	65	65	65	65	67		
3.writing														
3.a	29	29	29	29										
3.b	64	64	64	64										
3.c	28	28	28	29	68	68	68	68						
3.d														

Table 10.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

English II

Low		Medium		High
1		2		5

10.1														
10.1.1	7:5	53:5												
10.1.3														
10.1.4	44:1													
10.1.5	8:5	22:5	23:5	52:5	54:5									
10.2														
10.2.1														
10.2.1.a	10:1	24:1	36:1	56:1	57:1	58:2								
10.2.1.b	10:1	26:1	34:2	36:3	37:1	44:2	46:2	51:1	56:1	57:1				
10.2.1.c														
10.2.1.d	25:2													
10.2.2														
10.2.2.a	2:4	39:2	40:1	48:1	51:1	55:1	57:1	58:1						
10.2.2.b	2:1	4:5	10:2	24:1	25:1	26:1	34:1	37:1	38:2	39:1	40:3	46:1	48:1	
	55:2	56:1	57:2	58:1	59:1	61:2	62:2							
10.2.3														
10.2.3.a	2:1	34:1	39:1	40:1	43:2	46:1	49:1	51:1	55:1	56:2	59:2	60:4		
10.2.3.b	39:1	43:1	49:2	55:1	59:2	60:1								
10.2.3.c														
10.2.4														
10.2.4.a	35:5													
10.2.4.b														
10.2.4.c	10:1	36:1	50:1	51:1										
10.2.4.d														
10.3														

Table 10.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

English II

10.3. 1							
10.3. 1.a	6:5	13:5	24:1	25:1	44:2	46:1	51:1
10.3. 1.b	24:1	25:1					
10.3. 2							
10.3. 2.a	3:5	4:1	5:5	48:1			
10.3. 2.b	10:1	34:1					
10.3. 2.c							
10.3. 2.d	50:4	58:1					
10.3. 2.e	24:1						
10.3. 3							
10.3. 3.a	1:5	9:5	45:1	47:5			
10.3. 3.b	45:4						
10.3. 4							
10.3. 4.a	26:4	38:2	48:1	61:4			
10.3. 4.b	38:2	48:1	62:1				
10.3. 4.c	42:5	43:2					
10.4. 1							
10.4. 1.a	27:5	41:5					
10.4. 1.c	12:2						
10.4. 2							
10.4. 2.a	12:3	49:2	62:1				
10.4. 2.b	11:5	37:3					
10.4. 2.c	62:1						
10.4. 2.d							

Table 10.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

English II

3				
1				
1.a	31:1			
1.b	67:4			
1.c				
1.d				
1.e	33:2	64:1		
1.f	33:3			
2				
2.a	63:5			
2.b	30:3			
2.c	28:2	32:5	66:5	68:1
2.d	30:2	31:4	65:5	67:1
3.writing				
3.a	29:4			
3.b	64:4			
3.c	28:3	29:1	68:4	
3.d				

Table 10.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

English II

Low		Medium		High
1		2		5

1	10.3. 3.a:5				
2	10.2. 2.a:4	10.2. 2.b:1	10.2. 3.a:1		
3	10.3. 2.a:5				
4	10.2. 2.b:5	10.3. 2.a:1			
5	10.3. 2.a:5				
6	10.3. 1.a:5				
7	10.1. 1:5				
8	10.1. 5:5				
9	10.3. 3.a:5				
10	10.2. 1.a:1	10.2. 1.b:1	10.2. 2.b:2	10.2. 4.c:1	10.3. 2.b:1
11	10.4. 2.b:5				
12	10.4. 1.c:2	10.4. 2.a:3			
13	10.3. 1.a:5				
14					
15					
16					
17					
18					
19					
20					
21					
22	10.1. 5:5				
23	10.1. 5:5				
24	10.2. 1.a:1	10.2. 2.b:1	10.3. 1.a:1	10.3. 1.b:1	10.3. 2.e:1
25	10.2. 1.d:2	10.2. 2.b:1	10.3. 1.a:1	10.3. 1.b:1	
26	10.2. 1.b:1	10.2. 2.b:1	10.3. 4.a:4		
27	10.4. 1.a:5				

Table 10.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

English II

28	2.c:2	3.c:3			
29	3.a:4	3.c:1			
30	2.b:3	2.d:2			
31	1.a:1	2.d:4			
32	2.c:5				
33	1.e:2	1.f:3			
34	10.2. 1.b:2	10.2. 2.b:1	10.2. 3.a:1	10.3. 2.b:1	
35	10.2. 4.a:5				
36	10.2. 1.a:1	10.2. 1.b:3	10.2. 4.c:1		
37	10.2. 1.b:1	10.2. 2.b:1	10.4. 2.b:3		
38	10.2. 2.b:2	10.3. 4.a:2	10.3. 4.b:2		
39	10.2. 2.a:2	10.2. 2.b:1	10.2. 3.a:1	10.2. 3.b:1	
40	10.2. 2.a:1	10.2. 2.b:3	10.2. 3.a:1		
41	10.4. 1.a:5				
42	10.3. 4.c:5				
43	10.2. 3.a:2	10.2. 3.b:1	10.3. 4.c:2		
44	10.1. 4:1	10.2. 1.b:2	10.3. 1.a:2		
45	10.3. 3.a:1	10.3. 3.b:4			
46	10.2. 1.b:2	10.2. 2.b:1	10.2. 3.a:1	10.3. 1.a:1	
47	10.3. 3.a:5				
48	10.2. 2.a:1	10.2. 2.b:1	10.3. 2.a:1	10.3. 4.a:1	10.3. 4.b:1
49	10.2. 3.a:1	10.2. 3.b:2	10.4. 2.a:2		
50	10.2. 4.c:1	10.3. 2.d:4			
51	10.2. 1.b:1	10.2. 2.a:1	10.2. 3.a:1	10.2. 4.c:1	10.3. 1.a:1
52	10.1. 5:5				
53	10.1. 1:5				
54	10.1. 5:5				
55	10.2.	10.2.	10.2.	10.2.	

Table 10.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

English II

	2.a:1	2.b:2	3.a:1	3.b:1
56	10.2. 1.a:1	10.2. 1.b:1	10.2. 2.b:1	10.2. 3.a:2
57	10.2. 1.a:1	10.2. 1.b:1	10.2. 2.a:1	10.2. 2.b:2
58	10.2. 1.a:2	10.2. 2.a:1	10.2. 2.b:1	10.3. 2.d:1
59	10.2. 2.b:1	10.2. 3.a:2	10.2. 3.b:2	
60	10.2. 3.a:4	10.2. 3.b:1		
61	10.2. 2.b:2	10.3. 4.a:4		
62	10.2. 2.b:2	10.3. 4.b:1	10.4. 2.a:1	10.4. 2.c:1
63	2.a:5			
64	1.e:1	3.b:4		
65	2.d:5			
66	2.c:5			
67	1.b:4	2.d:1		
68	2.c:1	3.c:4		
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])  
English II

10.1 [2]:														
10.1. 1 [2]:	7:5[1. 6]	53:5[ 1]												
10.1. 3 [1]:														
10.1. 4 [2]:	44:1[ 2]													
10.1. 5 [2]:	8:5[1. 8]	22:5[ 2]	23:5[ 2]	52:5[ 2]	54:5[ 2]									
10.2 [2]:														
10.2. 1 [2]:														
10.2. 1.a [3]:	10:1[ 2]	24:1[ 2]	36:1[ 2]	56:1[ 3]	57:1[ 2]	58:2[ 2.5]								
10.2. 1.b [2]:	10:1[ 2]	26:1[ 3]	34:2[ 2]	36:3[ 2.33]	37:1[ 2]	44:2[ 3]	46:2[ 1.5]	51:1[ 2]	56:1[ 2]	57:1[ 2]				
10.2. 1.c [1]:														
10.2. 1.d [2]:	25:2[ 2]													
10.2. 2 [3]:														
10.2. 2.a [2]:	2:4[2]	39:2[ 2]	40:1[ 2]	48:1[ 2]	51:1[ 2]	55:1[ 2]	57:1[ 2]	58:1[ 2]						
10.2. 2.b [3]:	2:1[2]	4:5[2]	10:2[ 2.5]	24:1[ 2]	25:1[ 2]	26:1[ 3]	34:1[ 2]	37:1[ 2]	38:2[ 2.5]	39:1[ 2]	40:3[ 2.33]	46:1[ 1]	48:1[ 3]	
	55:2[ 2]	56:1[ 2]	57:2[ 2.5]	58:1[ 2]	59:1[ 2]	61:2[ 2.5]	62:2[ 2.5]							
10.2. 3 [2]:														
10.2. 3.a [2]:	2:1[2]	34:1[ 2]	39:1[ 1]	40:1[ 2]	43:2[ 3]	46:1[ 2]	49:1[ 3]	51:1[ 2]	55:1[ 2]	56:2[ 2]	59:2[ 2]	60:4[ 2.25]		
10.2. 3.b [2]:	39:1[ 2]	43:1[ 2]	49:2[ 2]	55:1[ 2]	59:2[ 2]	60:1[ 3]								
10.2. 3.c														

Table 10.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English II

[2]:								
10.2. 4 [3]:								
10.2. 4.a [2]:	35:5[ 2]							
10.2. 4.b [3]:								
10.2. 4.c [3]:	10:1[ 2]	36:1[ 2]	50:1[ 2]	51:1[ 2]				
10.2. 4.d [3]:								
10.3 [3]:								
10.3. 1 [3]:								
10.3. 1.a [3]:	6:5[2]	13:5[ 2]	24:1[ 3]	25:1[ 3]	44:2[ 3]	46:1[ 3]	51:1[ 2]	
10.3. 1.b [3]:	24:1[ 3]	25:1[ 3]						
10.3. 2 [3]:								
10.3. 2.a [3]:	3:5[2]	4:1[2]	5:5[2]	48:1[ 2]				
10.3. 2.b [2]:	10:1[ 3]	34:1[ 3]						
10.3. 2.c [3]:								
10.3. 2.d [3]:	50:4[ 2.25]	58:1[ 2]						
10.3. 2.e [3]:	24:1[ 2]							
10.3. 3 [2]:								
10.3. 3.a [2]:	1:5[1. 2]	9:5[1. 6]	45:1[ 1]	47:5[ 1]				
10.3. 3.b [2]:	45:4[ 1.25]							

Table 10.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English II

10.3. 4 [3]:				
10.3. 4.a [3]:	26:4[ 2.75]	38:2[ 2.5]	48:1[ 3]	61:4[ 2.5]
10.3. 4.b [3]:	38:2[ 3]	48:1[ 3]	62:1[ 3]	
10.3. 4.c [3]:	42:5[ 3]	43:2[ 3]		
10.4 [2]:				
10.4. 1 [2]:				
10.4. 1.a [2]:	27:5[ 2]	41:5[ 2]		
10.4. 1.c [2]:	12:2[ 2]			
10.4. 2 [2]:				
10.4. 2.a [2]:	12:3[ 2]	49:2[ 2]	62:1[ 2]	
10.4. 2.b [2]:	11:5[ 2.4]	37:3[ 2]		
10.4. 2.c [3]:	62:1[ 3]			
10.4. 2.d [2]:				
3 [1]:				
1 [1]:				
1.a [1]:	31:1[ 1]			
1.b [1]:	67:4[ 1]			
1.c [1]:				
1.d [1]:				
1.e [1]:	33:2[ 1.5]	64:1[ 1]		
1.f [1]:	33:3[ 1]			
2 [1]:				

Table 10.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English II

2.a [1]:	63:5[ 1.2]			
2.b [1]:	30:3[ 1]			
2.c [1]:	28:2[ 1.5]	32:5[ 1.4]	66:5[ 1.2]	68:1[ 1]
2.d [1]:	30:2[ 1.5]	31:4[ 1.25]	65:5[ 1]	67:1[ 1]
3.writ ing [2]:				
3.a [2]:	29:4[ 2]			
3.b [2]:	64:4[ 2]			
3.c [2]:	28:3[ 2]	29:1[ 2]	68:4[ 2]	
3.d [2]:				

Table 10.14  
Group Consensus  
English II, Language Arts, Grade 10

Level	Description	DOK
10.1	Vocabulary - The student will expand vocabulary through word study, literature, and class discussion.	2
10.1.1	Apply a knowledge of Greek (e.g., tele/phone, micro/phone), Latin (e.g., flex/ible), and Anglo-Saxon (e.g., un/friend/ly) roots, prefixes, and suffixes to determine word meanings.	2
10.1.3	Use reference material such as glossary, dictionary, thesaurus, and available technology to determine precise meaning and usage.	1
10.1.4	Discriminate between connotative and denotative meanings and interpret the connotative power of words.	2
10.1.5	Use word meanings within the appropriate context and verify these meanings by definition, restatement, example, and analogy.	2
10.2	Comprehension - The student will interact with the words and concepts on the page to understand what the writer has said.	2
10.2.1	Literal Understanding	2
10.2.1.a	Identify the structures and format of various informational documents and explain how authors use the features to achieve their purpose.	3
10.2.1.b	Understand specific devices an author uses to accomplish purpose (persuasive techniques, style, literary forms or genre, portrayal of themes, language).	2
10.2.1.c	Use a range of automatic monitoring and self-correcting methods (e.g., rereading, slowing down, subvocalizing, consulting resources, questioning).	1
10.2.1.d	Recognize signal/transitional words and phrases and their contributions to the meaning of the text (e.g., however, in spite of, for example, consequently).	2
10.2.2	Inferences and Interpretation	3
10.2.2.a	Use elements of the text to defend responses and interpretations.	2
10.2.2.b	Draw inferences such as conclusions, generalizations, and predictions, and support them with text evidence and personal experience.	3
10.2.3	Summary and Generalization	2
10.2.3.a	Determine the main idea, locate and interpret minor or subtly stated details in complex passages.	2
10.2.3.b	Use text features and elements to support inferences and generalizations about information.	2
10.2.3.c	Summarize and paraphrase complex, implicit, hierarchic structures in informational texts, including relationships among concepts and details in those structures.	2
10.2.4	Analysis and Evaluation	3
10.2.4.a	Discriminate between fact and opinion and fiction and nonfiction.	2
10.2.4.b	Evaluate deceptive and/or faulty arguments in persuasive texts.	3
10.2.4.c	Analyze the structure and format of informational and literary documents and explain how authors use the features to achieve their purposes.	3
10.2.4.d	Analyze techniques (e.g., language, organization, tone, context) used to convey opinions or impressions.	3
10.3	Literature - The student will read, construct meaning, and respond to a wide variety of literary forms.	3
10.3.1	Literary Genres - Demonstrate a knowledge of and an appreciation for various forms of literature.	3
10.3.1.a	Analyze the characteristics of genres including short story, novel, drama, narrative and lyric poetry, and essay.	3
10.3.1.b	Analyze the characteristics of subgenres such as satire, sonnet, epic, myths and legends, mystery, and editorials.	3
10.3.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and show how they affect the development of a literary work.	3
10.3.2.a	Describe and analyze elements of fiction including plot, conflict, character, setting, theme, mood and point of view with emphasis on how they are addressed and resolved.	3
10.3.2.b	Explain how an author's viewpoint, or choice of a narrator affects the characterization and the tone, plot, mood and credibility of a text.	2
10.3.2.c	Analyze characters' traits by what the characters say about themselves in narration, dialogue, and soliloquy (when they speak out loud to themselves).	3

Table 10.14  
Group Consensus  
English II, Language Arts, Grade 10

Level	Description	DOK
10.3.2.d	Evaluate the significance of various literary devices and techniques, including imagery, irony, tone, allegory (the use of fictional figures and actions to express truths about human experiences), and symbolism (the use of symbols to represent an idea or theme), and explain their appeal.	3
10.3.2.e	Evaluate the author's purpose and the development of time and sequence, including the use of complex literary devices, such as foreshadowing (providing clues to future events) or flashbacks (interrupting the sequence of events to include information about an event that happened in the past).	3
10.3.3	Figurative Language and Sound Devices - Identify and use figurative language and sound devices in writing and recognize how they affect the development of a literary work.	2
10.3.3.a	Identify and use figurative language such as analogy, hyperbole, metaphor, personification, and simile.	2
10.3.3.b	Identify and use sound devices such as rhyme, alliteration, and onomatopoeia.	2
10.3.4	Literary Works - The student will read and respond to historically and culturally significant works of literature.	3
10.3.4.a	Analyze and evaluate works of literature and the historical context in which they were written.	3
10.3.4.b	Analyze and evaluate literature from various cultures to broaden cultural awareness.	3
10.3.4.c	Compare works that express the recurrence of archetypal (universal modes or patterns) characters, settings, and themes in literature and provide evidence to support the ideas expressed in each work.	3
10.4	Research and Information: The student will conduct research and organize information.	2
10.4.1	Accessing Information - Select the best source for a given purpose.	2
10.4.1.a	Access information from a variety of primary and secondary sources.	2
10.4.1.c	Use organizational strategies as an aid to comprehend increasingly difficult content material (e.g., compare/contrast, cause/effect, problem/solution, sequential order).	2
10.4.2	Interpreting Information - Analyze and evaluate information from a variety of sources.	2
10.4.2.a	Summarize, paraphrase, and/or quote relevant information.	2
10.4.2.b	Determine the author's viewpoint to evaluate source credibility and reliability.	2
10.4.2.c	Synthesize information from multiple sources to draw conclusions that go beyond those found in any of the individual studies.	3
10.4.2.d	Identify complexities and inconsistencies in the information and the different perspectives found in each medium, including almanacs, microfiche, news sources, in-depth field studies, speeches, journals, technical documents, or Internet sources.	2
3	Grammar/Usage and Mechanics - The student will demonstrate appropriate practices in writing by applying Standard English conventions of the revising and editing stages of writing. Work independently and in self-directed work teams to revise and edit.	1
1	Standard English Usage - The student will demonstrate correct use of Standard English in speaking and in writing.	1
1.a	Distinguish commonly confused words (e.g. there, their, they're; two, too, to; accept except; affect, effect).	1
1.b	Use correct verb forms and tenses.	1
1.c	Use correct subject-verb agreement.	1
1.d	Distinguish active and passive voice.	1
1.e	Use correct pronoun/antecedent agreement and clear pronoun reference.	1
1.f	Use correct forms of comparative and superlative adjectives.	1
2	Mechanics and Spelling - The student will demonstrate appropriate language mechanics in writing.	1
2.a	Demonstrate correct use of capitals.	1
2.b	Use correct formation of plurals.	1
2.c	Demonstrate correct use of punctuation and recognize its effects on sentence structure.	1
2.d	Distinguish correct spelling of commonly misspelled words and homonyms.	1
3.writing	Sentence Structure - The student will demonstrate appropriate sentence structure in writing.	2
3.a	Use parallel structure.	2
3.b	Correct dangling and misplaced modifiers.	2

*Table 10.14*  
 Group Consensus  
 English II, Language Arts, Grade 10

Level	<b><i>Description</i></b>	<b><i>DOK</i></b>
3.c	Correct run-on sentences.	2
3.d	Correct fragments.	2

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

- Standard 3.4c (Compare works that express the recurrence of archetypal ...[patterns] was obliquely addressed by only one question.

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

**D. What is your general opinion of the alignment between the standards and assessment:**

- (3) : 60%
- ii. Acceptable Alignment (2) : 40%

**E. Comments**



## **Appendix E: Alignment Analysis Tables—English III**



Table 11.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

English III

Number of Assessment Items - 62

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
11.1 - Vocabulary - The student will expand vocabulary th ...	5	5	1 2 3	1 3 1	20 60 20	6.2	0.4	YES
11.2 - Comprehension - The student will interact with the ...	4	15	2 3	9 6	60 40	21.4	1.50	YES
11.3 - Literature - The student will read, construct mean ...	4	14	2 3	2 12	14 85	15.6	1.02	YES
11.4 - Research and Information - The student will conduc ...	2	8	2 3	6 2	75 25	6	1.90	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	4	15	1 2	10 5	66 33	14	0	YES
Total	19	57	1 2 3	11 25 21	19 43 36	63.2	1.47	

Table 11.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

English III

Number of Assessment Items - 62

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
11.1 - Vocabulary - The student will expand vocabulary th ...	5	5	6.2	0.4	0	0	98	5	2	5	YES
11.2 - Comprehension - The student will interact with the ...	4	15	21.4	1.50	9	27	87	32	4	19	YES
11.3 - Literature - The student will read, construct mean ...	4	14	15.6	1.02	46	46	52	46	2	8	YES
11.4 - Research and Information - The student will conduc ...	2	8	6	1.90	0	0	88	29	12	29	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	4	15	14	0	0	0	95	21	5	21	YES
Total	19	57	63.2	1.47	15	34	81	37	4	18	

Table 11.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers

English III

Number of Assessment Items - 62

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
11.1 - Vocabulary - The student will expand vocabulary th ...	5	5	6.2	0.4	1.8	0.4	36	8	NO	10	0	0.79	0.12	YES
11.2 - Comprehension - The student will interact with the ...	4	15	21.4	1.50	10.8	0.75	72	5	YES	34	2	0.74	0.03	YES
11.3 - Literature - The student will read, construct mean ...	4	14	15.6	1.02	8.6	1.02	61	7	YES	25	2	0.76	0.04	YES
11.4 - Research and Information - The student will conduc ...	2	8	6	1.90	2.6	1.02	32	13	NO	9	3	0.91	0.08	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	4	15	14	0	9.2	1.47	61	10	YES	22	1	0.80	0.04	YES
Total	19	57	63.2	1.47	6.6	3.81	53	18		20	9	0.80	0.09	

*Table 11.4*

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

English III

Number of Assessment Items - 62

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
11.1 - Vocabulary - The student will expand vocabulary th ...	YES	YES	NO	YES
11.2 - Comprehension - The student will interact with the ...	YES	YES	YES	YES
11.3 - Literature - The student will read, construct mean ...	YES	YES	YES	YES
11.4 - Research and Information - The student will conduc ...	YES	YES	NO	YES
3 - Grammar/Usage and Mechanics - The student will dem ...	YES	YES	YES	YES

*Table 11.5*

Source-of-Challenge Issues by Reviewer  
English III

Item Number	Comments by Reviewer
26	Not in the context of the given sentence, but in the passage. Might be confusing to students to isolate sentence.
27	The likelihood of using a paraphrase of this is slim. Students may be confused by this.
29	Cues 30.
30	29 and 30 cue.
75	cues item 76
75	75 and 77 clue each other
76	two possible caa
76	2 possible CAs for creative, broad minded students- g and h. Assesses correct organizer rather than capturing the information in a style for understanding. Also is cued or cues other items.
77	clangs with 75 and 76
77	cues other items in set.
78	giggle factor; kids could get correct answer for wrong reasons
78	Not the best quote for this day and age. Giggle factor and may get answer correct for matching the wrong word. Also requires prior knowledge.

Table 11.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

English III

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	2	2	2	2	2
2	1	1	1	2	2
3	2	2	2	2	3
4	2	3	2	2	2
5	2	2	2	2	2
6	2	2	2	2	2
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19	1	1	1	1	1
20	1	1	1	1	1
21	1	1	1	1	1
22	1	1	1	1	1
23	2	3	3	3	3
24	2	2	2	2	2
25	2	3	2	2	2
26	2	2	2	2	2
27	2	2	2	2	2
28	2	3	2	2	2
29	2	2	2	3	3
30	3	3	2	2	2
31	2	2	2	3	3
32	2	2	2	3	2
33	1	1	1	1	1
34	2	2	2	2	2
35	2	2	2	1	1
36	1	1	1	1	1
37	1	1	1	1	1
38	2	2	2	2	2
39	1	1	1	2	2
40	2	3	2	2	2
41	3	3	2	2	2
42	2	2	3	2	2
43	2	2	1	3	3
44	2	2	2	3	2
45	2	3	3	3	3
46	3	3	3	3	3
47	2	2	2	2	2
48	2	2	2	2	2

Table 11.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

English III

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	2	3	2	2	2
50	2	2	2	2	3
51	2	2	2	2	2
52	2	2	2	2	2
53	2	2	2	2	3
54	2	2	2	2	2
55	2	3	2	3	2
56	2	2	2	2	2
57	2	2	2	2	2
58	2	2	2	2	2
59	3	2	3	3	3
60	3	3	3	3	3
61	1	2	2	1	1
62	1	1	1	1	1
63	2	2	2	1	1
64	2	2	2	2	2
65	2	2	2	1	1
66					
67					
68					
69					
70					
71					
72					
73					
74	3	3	2	3	3
75	2	3	3	2	3
76	2	2	2	2	2
77	2	3	2	2	3
78	2	2	2	2	2
79	2	2	2	3	3
80	2	2	1	3	2
81	2	2	2	3	2
82	3	2	2	3	2

**Intraclass Correlation:** 0.895

**Pairwise Comparison:** 0.7274

*Table 11.7*  
Notes by Reviewer  
English III

Item Number	Comments by Reviewer
6	Low 2 because ranch is in passage and also in CA.
21	Should be automatic skill at this grade.
22	Even though the item is in context of the passage, the skill should be automatic at this grade.
24	Not research likely, but skill is paraphrasing.
29	Does not directly align with standard.
33	Although assessed in context of passage, should be an automatic skill at this grade.
62	Although assessed in context of a passage, the skill should be automatic at this grade level.
69	Slight paraphrasing.

Table 11.8

DOK Levels and Objectives Coded by Each Reviewer

English III

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4	S1Obj 4
1	2	11.3.2.c	2	11.2.3.b	2	11.3.2.c		2	11.2.3.b		2	11.2.3.b	
2	1	11.3.3.a	1	11.3.3.b	1	11.3.3.a		2	11.3.3.a		2	11.3.3.a	
3	2	11.3.2.e	2	11.3.2.e	2	11.3.2.e		2	11.3.2.e		3	11.3.2.e	
4	2	11.2.2.b	3	11.3.2.c	2	11.2.3.b		2	11.2.3.b		2	11.2.2.b	
5	2	11.3.1.a	2	11.3.1.a	2	11.3.1.a		2	11.3.1.a		2	11.3.1.a	
6	2	11.4.1.a	2	11.4.1.a	2	11.4.1.a		2	11.4.1.a		2	11.4.1.a	
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19	1	2.a	1	2.a	1	2.a		1	2.a		1	2.a	
20	1	1.e	1	1.e	1	1.e		1	1.e		1	1.e	
21	1	1.b	1	1.c	1	1.c		1	1.c		1	1.c	
22	1	2.c	1	2.c	1	2.c		1	2.c		1	2.c	
23	2	11.2.1.b	3	11.2.4.b	3	11.2.4.b		3	11.2.4.b		3	11.2.4.a	
24	2	11.4.2.a	2	11.2.3.b	2	11.4.2.a		2	11.2.3.c		2	11.2.3.c	
25	2	11.2.1.a	3	11.2.1.b	2	11.3.3.a		2	11.3.3.a		2	11.2.2.b	
26	2	11.1.5	2	11.1.4	2	11.1.4		2	11.1.4		2	11.1.4	
27	2	11.4.2.a	2	11.4.1.c	2	11.4.2.a		2	11.4.2.a		2	11.2.3.c	
28	2	11.2.	3	11.3.	2	11.2.	11.2.	2	11.2.		2	11.2.	

Table 11.8

DOK Levels and Objectives Coded by Each Reviewer

English III

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4	S1Obj 4
		1.b		2.c		3.b	2.d		3.b			2.b	
29	2	11.3.2.b	2	11.3.2.b	2	11.3.2.d		3	11.3.2.b		3	11.3.2.d	
30	3	11.3.2.a	3	11.3.1.a	2	11.3.4.c		2	11.2.2.d		2	11.2.2.d	
31	2	11.2.1.b	2	11.2.1.b	2	11.3.2.d		3	11.3.2.d		3	11.3.2.c	
32	2	11.3.1.b	2	11.3.1.a	2	11.3.1.b		3	11.3.1.a		2	11.3.1.a	
33	1	2.a	1	2.a	1	2.a		1	2.a		1	2.a	
34	2	3.a	2	3.a	2	3.a		2	3.a		2	3.a	
35	2	3.d	2	3.d	2	3.d		1	2.c		1	2.c	
36	1	1.b	1	1.b	1	1.b		1	1.b		1	1.b	
37	1	2.d	1	2.d	1	2.d		1	2.d		1	2.d	
38	2	11.2.3.c	2	11.4.1.b	2	11.4.2.a		2	11.4.2.a		2	11.2.3.a	
39	1	11.3.3.a	1	11.3.3.a	1	11.3.3.a		2	11.3.3.a		2	11.3.3.a	
40	2	11.2.2.d	3	11.3.2.d	2	11.2.3.b		2	11.2.3.b		2	11.2.2.d	
41	3	11.3.2.b	3	11.2.1.b	2	11.1.4		2	11.2.4.c		2	11.2.2.a	
42	2	11.2.2.d	2	11.2.3.b	3	11.3.2.a		2	11.2.2.d		2	11.2.3.a	
43	2	11.2.1.b	2	11.2.1.b	1	11.2.1.b		3	11.2.1.b		3	11.2.1.b	
44	2	11.3.1.b	2	11.3.1.a	2	11.3.1.b		3	11.3.1.a		2	11.3.1.a	
45	2	11.2.1.a	3	11.2.1.a	3	11.2.4.b	11.2.1.a	3	11.2.4.b		3	11.2.1.a	
46	3	11.2.4.d	3	11.2.4.d	3	11.2.4.d		3	11.2.4.d	11.3.2.b	3	11.2.4.d	
47	2	11.1.5	2	11.1.4	2	11.1.4		2	11.1.4		2	11.1.4	
48	2	11.1.5	2	11.1.4	2	11.1.4		2	11.1.4		2	11.1.4	
49	2	11.2.2.d	3	11.2.2.d	2	11.2.3.b		2	11.2.2.d		2	11.2.2.a	
50	2	11.2.	2	11.4.	2	11.2.		2	11.2.		3	11.3.	

Table 11.8

DOK Levels and Objectives Coded by Each Reviewer

English III

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4	S1Obj 4
		2.d		2.b		3.b			2.d			2.a	
51	2	11.3.1.a	2	11.3.1.a	2	11.3.1.a		2	11.3.1.a		2	11.3.1.a	
52	2	11.1.4	2	11.1.4	2	11.1.4		2	11.1.4		2	11.1.4	
53	2	11.1.5	2	11.1.5	2	11.1.5		2	11.1.5		3	11.1.4	
54	2	11.2.3.a	2	11.2.3.c	2	11.2.3.c	11.4.2.a	2	11.3.3.a		2	11.2.2.a	
55	2	11.2.1.b	3	11.2.1.b	2	11.2.4.c		3	11.2.1.b		2	11.2.2.d	
56	2	11.4.1.a	2	11.4.1.a	2	11.4.1.a		2	11.4.1.a		2	11.4.1.a	
57	2	11.2.3.a	2	11.2.3.a	2	11.2.3.a		2	11.2.3.a		2	11.2.3.a	
58	2	11.4.1.a	2	11.4.1.a	2	11.4.1.a		2	11.2.3.a		2	11.4.1.a	
59	3	11.2.4.a	2	11.2.3.c	3	11.2.4.a		3	11.2.4.a		3	11.3.4.d	11.2.3.c
60	3	11.2.4.a	3	11.2.4.a	3	11.2.4.a		3	11.2.4.a		3	11.3.4.c	
61	1	1.d	2	1.d	2	1.d		1	2.c		1	2.c	
62	1	1.b	1	1.c	1	1.b		1	1.b		1	1.b	
63	2	3.d	2	3.d	2	3.d		1	2.c		1	2.c	
64	2	3.b	2	3.b	2	3.b		2	3.b		2	3.a	
65	2	3.c	2	3.c	2	2.c		1	2.c		1	2.c	
66													
67													
68													
69													
70													
71													
72													
73													
74	3	11.3.2.d	3	11.3.3.a	2	11.3.3.a	11.2.3.b	3	11.3.3.a		3	11.3.2.d	
75	2	11.2.4.b	3	11.4.1.c	3	11.4.1.c		2	11.4.1.c		3	11.2.4.c	
76	2	11.2.	2	11.2.	2	11.2.		2	11.2.		2	11.2.	

Table 11.8

DOK Levels and Objectives Coded by Each Reviewer

English III

Item	DOK 0	PObj 0	DOK 1	PObj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	S1Obj 3	DOK 4	PObj 4	S1Obj 4
		1.d		1.d		1.d			1.d			1.d	
77	2	11.2.4.a	3	11.2.4.a	2	11.2.1.d		2	11.4.1.c		3	11.3.1.a	
78	2	11.1.4	2	11.1.4	2	11.1.5		2	11.1.4		2	11.1.4	
79	2	11.3.2.a	2	11.2.3.b	2	11.2.3.b		3	11.3.2.d		3	11.3.4.b	
80	2	11.3.3.b	2	11.3.3.b	1	11.3.3.b		3	11.3.2.c		2	11.3.1.a	
81	2	11.3.2.a	2	11.4.2.b	2	11.2.3.a		3	11.3.4.b		2	11.2.2.b	
82	3	11.3.4.a	2	11.2.2.a	2	11.2.1.d		3	11.3.4.a		2	11.2.3.a	

**Objective Pairwise Comparison:** 0.5109

**Standard Pairwise Comparison:** 0.794

Table 11.9  
Objectives Coded to Each Item by Reviewers  
English III

Low		Medium		High
0		3.853658		6

1	11.2. 3.b	11.2. 3.b	11.2. 3.b	11.3. 2.c	11.3. 2.c
2	11.3. 3.a	11.3. 3.a	11.3. 3.a	11.3. 3.a	11.3. 3.b
3	11.3. 2.e	11.3. 2.e	11.3. 2.e	11.3. 2.e	11.3. 2.e
4	11.2. 2.b	11.2. 2.b	11.2. 3.b	11.2. 3.b	11.3. 2.c
5	11.3. 1.a	11.3. 1.a	11.3. 1.a	11.3. 1.a	11.3. 1.a
6	11.4. 1.a	11.4. 1.a	11.4. 1.a	11.4. 1.a	11.4. 1.a

7
8
9
10
11
12
13
14
15
16
17
18

19	2.a	2.a	2.a	2.a	2.a
20	1.e	1.e	1.e	1.e	1.e
21	1.b	1.c	1.c	1.c	1.c
22	2.c	2.c	2.c	2.c	2.c
23	11.2. 1.b	11.2. 4.a	11.2. 4.b	11.2. 4.b	11.2. 4.b
24	11.2. 3.b	11.2. 3.c	11.2. 3.c	11.4. 2.a	11.4. 2.a
25	11.2. 1.a	11.2. 1.b	11.2. 2.b	11.3. 3.a	11.3. 3.a
26	11.1. 4	11.1. 4	11.1. 4	11.1. 4	11.1. 5
27	11.2. 3.c	11.4. 1.c	11.4. 2.a	11.4. 2.a	11.4. 2.a
28	11.2. 1.b	11.2. 2.b	11.2. 2.d	11.2. 3.b	11.2. 3.b
29	11.3. 2.b	11.3. 2.b	11.3. 2.b	11.3. 2.d	11.3. 2.d
30	11.2. 2.d	11.2. 2.d	11.3. 1.a	11.3. 2.a	11.3. 4.c
31	11.2. 1.b	11.2. 1.b	11.3. 2.c	11.3. 2.d	11.3. 2.d

11.3. 2.c
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Table 11.9

Objectives Coded to Each Item by Reviewers

English III

32	11.3. 1.a	11.3. 1.a	11.3. 1.a	11.3. 1.b	11.3. 1.b	
33	2.a	2.a	2.a	2.a	2.a	
34	3.a	3.a	3.a	3.a	3.a	
35	2.c	2.c	3.d	3.d	3.d	
36	1.b	1.b	1.b	1.b	1.b	
37	2.d	2.d	2.d	2.d	2.d	
38	11.2. 3.a	11.2. 3.c	11.4. 1.b	11.4. 2.a	11.4. 2.a	
39	11.3. 3.a	11.3. 3.a	11.3. 3.a	11.3. 3.a	11.3. 3.a	
40	11.2. 2.d	11.2. 2.d	11.2. 3.b	11.2. 3.b	11.3. 2.d	
41	11.1. 4	11.2. 1.b	11.2. 2.a	11.2. 4.c	11.3. 2.b	
42	11.2. 2.d	11.2. 2.d	11.2. 3.a	11.2. 3.b	11.3. 2.a	
43	11.2. 1.b	11.2. 1.b	11.2. 1.b	11.2. 1.b	11.2. 1.b	
44	11.3. 1.a	11.3. 1.a	11.3. 1.a	11.3. 1.b	11.3. 1.b	
45	11.2. 1.a	11.2. 1.a	11.2. 1.a	11.2. 1.a	11.2. 4.b	11.2. 4.b
46	11.2. 4.d	11.2. 4.d	11.2. 4.d	11.2. 4.d	11.2. 4.d	11.3. 2.b
47	11.1. 4	11.1. 4	11.1. 4	11.1. 4	11.1. 5	
48	11.1. 4	11.1. 4	11.1. 4	11.1. 4	11.1. 5	
49	11.2. 2.a	11.2. 2.d	11.2. 2.d	11.2. 2.d	11.2. 3.b	
50	11.2. 2.d	11.2. 2.d	11.2. 3.b	11.3. 2.a	11.4. 2.b	
51	11.3. 1.a	11.3. 1.a	11.3. 1.a	11.3. 1.a	11.3. 1.a	
52	11.1. 4	11.1. 4	11.1. 4	11.1. 4	11.1. 4	
53	11.1. 4	11.1. 5	11.1. 5	11.1. 5	11.1. 5	
54	11.2. 2.a	11.2. 3.a	11.2. 3.c	11.2. 3.c	11.3. 3.a	11.4. 2.a
55	11.2. 1.b	11.2. 1.b	11.2. 1.b	11.2. 2.d	11.2. 4.c	
56	11.4. 1.a	11.4. 1.a	11.4. 1.a	11.4. 1.a	11.4. 1.a	
57	11.2. 3.a	11.2. 3.a	11.2. 3.a	11.2. 3.a	11.2. 3.a	
58	11.2. 3.a	11.4. 1.a	11.4. 1.a	11.4. 1.a	11.4. 1.a	

Table 11.9

Objectives Coded to Each Item by Reviewers

English III

59	11.2. 3.c	11.2. 3.c	11.2. 4.a	11.2. 4.a	11.2. 4.a	11.3. 4.d
60	11.2. 4.a	11.2. 4.a	11.2. 4.a	11.2. 4.a	11.3. 4.c	
61	1.d	1.d	1.d	2.c	2.c	
62	1.b	1.b	1.b	1.b	1.c	
63	2.c	2.c	3.d	3.d	3.d	
64	3.a	3.b	3.b	3.b	3.b	
65	2.c	2.c	2.c	3.c	3.c	
66						
67						
68						
69						
70						
71						
72						
73						
74	11.2. 3.b	11.3. 2.d	11.3. 2.d	11.3. 3.a	11.3. 3.a	11.3. 3.a
75	11.2. 4.b	11.2. 4.c	11.4. 1.c	11.4. 1.c	11.4. 1.c	
76	11.2. 1.d	11.2. 1.d	11.2. 1.d	11.2. 1.d	11.2. 1.d	
77	11.2. 1.d	11.2. 4.a	11.2. 4.a	11.3. 1.a	11.4. 1.c	
78	11.1. 4	11.1. 4	11.1. 4	11.1. 4	11.1. 5	
79	11.2. 3.b	11.2. 3.b	11.3. 2.a	11.3. 2.d	11.3. 4.b	
80	11.3. 1.a	11.3. 2.c	11.3. 3.b	11.3. 3.b	11.3. 3.b	
81	11.2. 2.b	11.2. 3.a	11.3. 2.a	11.3. 4.b	11.4. 2.b	
82	11.2. 1.d	11.2. 2.a	11.2. 3.a	11.3. 4.a	11.3. 4.a	

Table 11.10  
Items Coded by Reviewers to Each Objective  
English III

Low		Medium		High
0		4.157895		23

11.1																				
11.1.1																				
11.1.2																				
11.1.3																				
11.1.4	26	26	26	26	41	47	47	47	47	48	48	48	48	52	52	52	52	52	53	78
	78	78	78																	
11.1.5	26	47	48	53	53	53	53	78												
11.2																				
11.2.1																				
11.2.1.a	25	45	45	45	45															
11.2.1.b	23	25	28	31	31	41	43	43	43	43	43	55	55	55						
11.2.1.c																				
11.2.1.d	76	76	76	76	76	77	82													
11.2.2																				
11.2.2.a	41	49	54	82																
11.2.2.b	4	4	25	28	81															
11.2.2.c																				
11.2.2.d	28	30	30	40	40	42	42	49	49	49	50	50	55							
11.2.3																				
11.2.3.a	38	42	54	57	57	57	57	57	58	81	82									
11.2.3.b	1	1	1	4	4	24	28	28	40	40	42	49	50	74	79	79				
11.2.3.c	24	24	27	38	54	54	59	59												
11.2.4																				
11.2.4.a	23	59	59	59	60	60	60	60	77	77										
11.2.	23	23	23	45	45	75														

*Table 11.10*  
Items Coded by Reviewers to Each Objective  
English III

4.b																			
11.2. 4.c	41	55	75																
11.2. 4.d	46	46	46	46	46														
11.3																			
11.3. 1																			
11.3. 1.a	5	5	5	5	5	30	32	32	32	44	44	44	51	51	51	51	51	77	80
11.3. 1.b	32	32	44	44															
11.3. 2																			
11.3. 2.a	30	42	50	79	81														
11.3. 2.b	29	29	29	41	46														
11.3. 2.c	1	1	4	28	31	80													
11.3. 2.d	29	29	31	31	40	74	74	79											
11.3. 2.e	3	3	3	3	3														
11.3. 3																			
11.3. 3.a	2	2	2	2	25	25	39	39	39	39	39	54	74	74	74				
11.3. 3.b	2	80	80	80															
11.3. 3.c																			
11.3. 4																			
11.3. 4.a	82	82																	
11.3. 4.b	79	81																	
11.3. 4.c	30	60																	
11.3. 4.d	59																		
11.4																			
11.4. 1																			
11.4. 1.a	6	6	6	6	6	56	56	56	56	56	58	58	58	58					
11.4. 1.b	38																		

### Items Coded by Reviewers to Each Objective

#### English III

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Table 11.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

English III

Low		Medium		High
1		2		5

11.1										
11.1.1										
11.1.2										
11.1.3										
11.1.4	26:4	41:1	47:4	48:4	52:5	53:1	78:4			
11.1.5	26:1	47:1	48:1	53:4	78:1					
11.2										
11.2.1										
11.2.1.a	25:1	45:4								
11.2.1.b	23:1	25:1	28:1	31:2	41:1	43:5	55:3			
11.2.1.c										
11.2.1.d	76:5	77:1	82:1							
11.2.2										
11.2.2.a	41:1	49:1	54:1	82:1						
11.2.2.b	4:2	25:1	28:1	81:1						
11.2.2.c										
11.2.2.d	28:1	30:2	40:2	42:2	49:3	50:2	55:1			
11.2.3										
11.2.3.a	38:1	42:1	54:1	57:5	58:1	81:1	82:1			
11.2.3.b	1:3	4:2	24:1	28:2	40:2	42:1	49:1	50:1	74:1	79:2
11.2.3.c	24:2	27:1	38:1	54:2	59:2					
11.2.4										
11.2.4.a	23:1	59:3	60:4	77:2						
11.2.4.b	23:3	45:2	75:1							

Table 11.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

English III

11.2. 4.c	41:1	55:1	75:1				
11.2. 4.d	46:5						
11.3.							
11.3. 1							
11.3. 1.a	5:5	30:1	32:3	44:3	51:5	77:1	80:1
11.3. 1.b	32:2	44:2					
11.3. 2							
11.3. 2.a	30:1	42:1	50:1	79:1	81:1		
11.3. 2.b	29:3	41:1	46:1				
11.3. 2.c	1:2	4:1	28:1	31:1	80:1		
11.3. 2.d	29:2	31:2	40:1	74:2	79:1		
11.3. 2.e	3:5						
11.3. 3							
11.3. 3.a	2:4	25:2	39:5	54:1	74:3		
11.3. 3.b	2:1	80:3					
11.3. 3.c							
11.3. 4							
11.3. 4.a	82:2						
11.3. 4.b	79:1	81:1					
11.3. 4.c	30:1	60:1					
11.3. 4.d	59:1						
11.4.							
11.4. 1							
11.4. 1.a	6:5	56:5	58:4				
11.4. 1.b	38:1						
11.4.	27:1	75:3	77:1				

Table 11.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

English III

1.c			
11.4. 2			
11.4. 2.a	24:2	27:3	38:2 54:1
11.4. 2.b	50:1	81:1	
11.4. 2.c			
11.4. 2.d			
11.4. 2.e			
3			
1			
1.a			
1.b	21:1	36:5	62:4
1.c	21:4	62:1	
1.d	61:3		
1.e	20:5		
1.f			
2			
2.a	19:5	33:5	
2.b			
2.c	22:5	35:2	61:2 63:2 65:3
2.d	37:5		
3.writ ing			
3.a	34:5	64:1	
3.b	64:4		
3.c	65:2		
3.d	35:3	63:3	
4			

Table 11.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

English III

Low		Medium		High
1		2		5

1	11.2. 3.b:3	11.3. 2.c:2		
2	11.3. 3.a:4	11.3. 3.b:1		
3	11.3. 2.e:5			
4	11.2. 2.b:2	11.2. 3.b:2	11.3. 2.c:1	
5	11.3. 1.a:5			
6	11.4. 1.a:5			
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	2.a:5			
20	1.e:5			
21	1.b:1	1.c:4		
22	2.c:5			
23	11.2. 1.b:1	11.2. 4.a:1	11.2. 4.b:3	
24	11.2. 3.b:1	11.2. 3.c:2	11.4. 2.a:2	
25	11.2. 1.a:1	11.2. 1.b:1	11.2. 2.b:1	11.3. 3.a:2
26	11.1. 4:4	11.1. 5:1		
27	11.2. 3.c:1	11.4. 1.c:1	11.4. 2.a:3	
28	11.2. 1.b:1	11.2. 2.b:1	11.2. 2.d:1	11.2. 3.b:2
29	11.3. 2.b:3	11.3. 2.d:2		
30	11.2. 2.d:2	11.3. 1.a:1	11.3. 2.a:1	11.3. 4.c:1
31	11.2. 1.b:2	11.3. 2.c:1	11.3. 2.d:2	

Table 11.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

English III

32	11.3. 1.a:3	11.3. 1.b:2			
33	2.a:5				
34	3.a:5				
35	2.c:2	3.d:3			
36	1.b:5				
37	2.d:5				
38	11.2. 3.a:1	11.2. 3.c:1	11.4. 1.b:1	11.4. 2.a:2	
39	11.3. 3.a:5				
40	11.2. 2.d:2	11.2. 3.b:2	11.3. 2.d:1		
41	11.1. 4:1	11.2. 1.b:1	11.2. 2.a:1	11.2. 4.c:1	11.3. 2.b:1
42	11.2. 2.d:2	11.2. 3.a:1	11.2. 3.b:1	11.3. 2.a:1	
43	11.2. 1.b:5				
44	11.3. 1.a:3	11.3. 1.b:2			
45	11.2. 1.a:4	11.2. 4.b:2			
46	11.2. 4.d:5	11.3. 2.b:1			
47	11.1. 4:4	11.1. 5:1			
48	11.1. 4:4	11.1. 5:1			
49	11.2. 2.a:1	11.2. 2.d:3	11.2. 3.b:1		
50	11.2. 2.d:2	11.2. 3.b:1	11.3. 2.a:1	11.4. 2.b:1	
51	11.3. 1.a:5				
52	11.1. 4:5				
53	11.1. 4:1	11.1. 5:4			
54	11.2. 2.a:1	11.2. 3.a:1	11.2. 3.c:2	11.3. 3.a:1	11.4. 2.a:1
55	11.2. 1.b:3	11.2. 2.d:1	11.2. 4.c:1		
56	11.4. 1.a:5				
57	11.2. 3.a:5				
58	11.2. 3.a:1	11.4. 1.a:4			

Table 11.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

English III

59	11.2. 3.c:2	11.2. 4.a:3	11.3. 4.d:1		
60	11.2. 4.a:4	11.3. 4.c:1			
61	1.d:3	2.c:2			
62	1.b:4	1.c:1			
63	2.c:2	3.d:3			
64	3.a:1	3.b:4			
65	2.c:3	3.c:2			
66					
67					
68					
69					
70					
71					
72					
73					
74	11.2. 3.b:1	11.3. 2.d:2	11.3. 3.a:3		
75	11.2. 4.b:1	11.2. 4.c:1	11.4. 1.c:3		
76	11.2. 1.d:5				
77	11.2. 1.d:1	11.2. 4.a:2	11.3. 1.a:1	11.4. 1.c:1	
78	11.1. 4:4	11.1. 5:1			
79	11.2. 3.b:2	11.3. 2.a:1	11.3. 2.d:1	11.3. 4.b:1	
80	11.3. 1.a:1	11.3. 2.c:1	11.3. 3.b:3		
81	11.2. 2.b:1	11.2. 3.a:1	11.3. 2.a:1	11.3. 4.b:1	11.4. 2.b:1
82	11.2. 1.d:1	11.2. 2.a:1	11.2. 3.a:1	11.3. 4.a:2	

Table 11.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English III

Low DOK		Matched DOK		High DOK
1		2		5

11.1 [2]:							
11.1. 1 [2]:							
11.1. 2 [1]:							
11.1. 3 [3]:							
11.1. 4 [2]:	26:4[ 2]	41:1[ 2]	47:4[ 2]	48:4[ 2]	52:5[ 2]	53:1[ 3]	78:4[ 2]
11.1. 5 [2]:	26:1[ 2]	47:1[ 2]	48:1[ 2]	53:4[ 2]	78:1[ 2]		
11.2 [2]:							
11.2. 1 [3]:							
11.2. 1.a [3]:	25:1[ 2]	45:4[ 2.75]					
11.2. 1.b [3]:	23:1[ 2]	25:1[ 3]	28:1[ 2]	31:2[ 2]	41:1[ 3]	43:5[ 2.2]	55:3[ 2.67]
11.2. 1.c [2]:							
11.2. 1.d [2]:	76:5[ 2]	77:1[ 2]	82:1[ 2]				
11.2. 2 [2]:							
11.2. 2.a [2]:	41:1[ 2]	49:1[ 2]	54:1[ 2]	82:1[ 2]			
11.2. 2.b [2]:	4:2[2]	25:1[ 2]	28:1[ 2]	81:1[ 2]			
11.2. 2.c [3]:							
11.2. 2.d [2]:	28:1[ 2]	30:2[ 2]	40:2[ 2]	42:2[ 2]	49:3[ 2.33]	50:2[ 2]	55:1[ 2]
11.2. 3 [2]:							
11.2. 3.a	38:1[ 2]	42:1[ 2]	54:1[ 2]	57:5[ 2]	58:1[ 2]	81:1[ 2]	82:1[ 2]

Table 11.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English III

[2]:										
11.2. 3.b [2]:	1:3[2]	4:2[2]	24:1[ 2]	28:2[ 2]	40:2[ 2]	42:1[ 2]	49:1[ 2]	50:1[ 2]	74:1[ 2]	79:2[ 2]
11.2. 3.c [2]:	24:2[ 2]	27:1[ 2]	38:1[ 2]	54:2[ 2]	59:2[ 2.5]					
11.2. 4 [3]:										
11.2. 4.a [3]:	23:1[ 3]	59:3[ 3]	60:4[ 3]	77:2[ 2.5]						
11.2. 4.b [3]:	23:3[ 3]	45:2[ 3]	75:1[ 2]							
11.2. 4.c [2]:	41:1[ 2]	55:1[ 2]	75:1[ 3]							
11.2. 4.d [3]:	46:5[ 3]									
11.3 [3]:										
11.3. 1 [3]:										
11.3. 1.a [3]:	5:5[2]	30:1[ 3]	32:3[ 2.33]	44:3[ 2.33]	51:5[ 2]	77:1[ 3]	80:1[ 2]			
11.3. 1.b [3]:	32:2[ 2]	44:2[ 2]								
11.3. 2 [3]:										
11.3. 2.a [3]:	30:1[ 3]	42:1[ 3]	50:1[ 3]	79:1[ 2]	81:1[ 2]					
11.3. 2.b [3]:	29:3[ 2.33]	41:1[ 3]	46:1[ 3]							
11.3. 2.c [3]:	1:2[2]	4:1[3]	28:1[ 3]	31:1[ 3]	80:1[ 3]					
11.3. 2.d [3]:	29:2[ 2.5]	31:2[ 2.5]	40:1[ 3]	74:2[ 3]	79:1[ 3]					
11.3. 2.e [3]:	3:5[2. 2]									
11.3. 3 [2]:										

Table 11.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English III

11.3. 3.a [2]:	2:4[1. 5]	25:2[ 2]	39:5[ 1.4]	54:1[ 2]	74:3[ 2.67]
11.3. 3.b [2]:	2:1[1]	80:3[ 1.67]			
11.3. 3.c [3]:					
11.3. 4 [3]:					
11.3. 4.a [3]:	82:2[ 3]				
11.3. 4.b [3]:	79:1[ 3]	81:1[ 3]			
11.3. 4.c [3]:	30:1[ 2]	60:1[ 3]			
11.3. 4.d [3]:	59:1[ 3]				
11.4 [2]:					
11.4. 1 [2]:					
11.4. 1.a [2]:	6:5[2]	56:5[ 2]	58:4[ 2]		
11.4. 1.b [2]:	38:1[ 2]				
11.4. 1.c [2]:	27:1[ 2]	75:3[ 2.67]	77:1[ 2]		
11.4. 2 [2]:					
11.4. 2.a [2]:	24:2[ 2]	27:3[ 2]	38:2[ 2]	54:1[ 2]	
11.4. 2.b [2]:	50:1[ 2]	81:1[ 2]			
11.4. 2.c [3]:					
11.4. 2.d [2]:					

Table 11.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

English III

11.4. 2.e [3]:						
3 [1]:						
1 [1]:						
1.a [1]:						
1.b [1]:	21:1[ 1]	36:5[ 1]	62:4[ 1]			
1.c [1]:	21:4[ 1]	62:1[ 1]				
1.d [1]:	61:3[ 1.67]					
1.e [1]:	20:5[ 1]					
1.f [1]:						
2 [1]:						
2.a [1]:	19:5[ 1]	33:5[ 1]				
2.b [1]:						
2.c [1]:	22:5[ 1]	35:2[ 1]	61:2[ 1]	63:2[ 1]	65:3[ 1.33]	
2.d [1]:	37:5[ 1]					
3.writ ing [2]:						
3.a [2]:	34:5[ 2]	64:1[ 2]				
3.b [2]:	64:4[ 2]					
3.c [2]:	65:2[ 2]					
3.d [2]:	35:3[ 2]	63:3[ 2]				
4 [2]:						

Table 11.14  
Group Consensus  
English III, Language Arts, Grade 11

Level	Description	DOK
11.1	Vocabulary - The student will expand vocabulary through word study, literature, and class discussion.	2
11.1.1	Apply knowledge of Greek, Latin, and Anglo-Saxon roots and word parts to draw inferences about the meaning of scientific and mathematical terminology.	2
11.1.2	Use reference material such as glossary, dictionary, thesaurus, and available technology to determine precise meaning and usage.	1
11.1.3	Analyze the meaning of analogies encountered, analyzing specific comparisons as well as relationships and inferences.	3
11.1.4	Rely on context to determine meanings of words and phrases such as figurative language, connotations and denotations of words, analogies, idioms, and technical vocabulary.	2
11.1.5	Use word meanings within the appropriate context and verify these meanings by definition, restatement, example, and analogy.	2
11.2	Comprehension - The student will interact with the words and concepts on the page to understand what the writer has said.	2
11.2.1	Literal Understanding	3
11.2.1.a	Identify the structures and format of various informational documents and explain how authors use the features to achieve their purpose.	3
11.2.1.b	Select and explain specific devices an author uses to accomplish purpose (persuasive techniques, style, literary forms or genre, portrayal of themes, language).	3
11.2.1.c	Use study strategies such as note taking, outlining, and using study guide questions to better understand texts.	2
11.2.1.d	Construct images such as graphic organizers based on text descriptions and text structures.	2
11.2.2	Inferences and Interpretation	2
11.2.2.a	Interpret the possible inferences of the historical context on literary works.	2
11.2.2.b	Describe the development of plot and identify conflict and how they are addressed and resolved.	2
11.2.2.c	Investigate influences on a reader's response to a text (e.g., personal experience and values; perspective shaped by age, gender, class, or nationality).	3
11.2.2.d	Make reasonable assertions about author's arguments by using elements of the text to defend and clarify interpretations.	2
11.2.3	Summary and Generalization	2
11.2.3.a	Determine the main idea, locate and interpret minor subtly stated details in complex passages.	2
11.2.3.b	Use text features and elements to support inferences and generalizations about information.	2
11.2.3.c	Summarize and paraphrase complex, implicit hierarchic structures in informational texts, including relationships among concepts and details in those structures.	2
11.2.4	Analysis and Evaluation	3
11.2.4.a	Compare and contrast aspects of texts such as themes, conflicts, and allusions both within and across texts.	3
11.2.4.b	Analyze the structure and format of informational and literary documents and explain how authors use the features to achieve their purposes.	3
11.2.4.c	Examine the way in which clarity of meaning is affected by the patterns of organization, repetition of the main ideas, organization of language, and word choice in the text.	2
11.2.4.d	Analyze the way in which authors have used archetypes (universal modes or patterns) drawn from myth and tradition in literature, film, political speeches, and religious writings.	3
11.3	Literature - The student will read, construct meaning, and respond to a wide variety of literary forms.	3
11.3.1	Literary Genres - Demonstrate a knowledge of and an appreciation for various forms of literature.	3
11.3.1.a	Analyze the characteristics of genres including short story, novel, drama, poetry, and essay.	3
11.3.1.b	Analyze the characteristics of subgenres including allegory and ballad.	3
11.3.2	Literary Elements - Demonstrate knowledge of literary elements and techniques and show how they affect the development of a literary work.	3
11.3.2.a	Analyze the way in which the theme or meaning of a selection represents a view or comment on life,	3

*Table 11.14*  
Group Consensus  
English III, Language Arts, Grade 11

Level	Description	DOK
	using textual evidence to support the claim.	
11.3.2.b	Analyze the way in which irony, tone, mood, the author's style, and the "sound" of language achieve specific rhetorical (communication) or aesthetic (artistic) purposes or both.	3
11.3.2.c	Analyze characters' traits by what the characters say about themselves in narration, dialogue, and soliloquy (when they speak out loud to themselves).	3
11.3.2.d	Evaluate the significance of various literary devices and techniques, including imagery, irony, tone, allegory (the use of fictional figures and actions to express truths about human experiences), and symbolism (the use of symbols to represent an idea or theme), and explain their appeal.	3
11.3.2.e	Evaluate the author's purpose and the development of time and sequence, including the use of complex literary devices, such as foreshadowing (providing clues to future events) or flashbacks (interrupting the sequence of events to include information about an event that happened in the past).	3
11.3.3	Figurative Language and Sound Devices - Identify figurative language and sound devices and analyze how they affect the development of a literary work.	2
11.3.3.a	Identify and explain figurative language including analogy, hyperbole, metaphor, personification, and simile.	2
11.3.3.b	Identify and explain sound devices including alliteration and rhyme.	2
11.3.3.c	Analyze the melodies of literary language, including its use of evocative words, rhythms and rhymes.	3
11.3.4	Literary Works - Read and respond to historically and culturally significant works of literature.	3
11.3.4.a	Analyze and evaluate works of literature and the historical context in which they were written.	3
11.3.4.b	Analyze and evaluate literature from various cultures to broaden cultural awareness.	3
11.3.4.c	Compare works that express the recurrence of archetypal (universal) characters, settings, and themes in literature and provide evidence to support the ideas expressed in each work.	3
11.3.4.d	Analyze the clarity and consistency of political assumptions in a selection of literary works or essays on a topic.	3
11.4	Research and Information - The student will conduct research and organize information.	2
11.4.1	Accessing Information - Select the best source for a given purpose.	2
11.4.1.a	Access information from a variety of primary and secondary sources.	2
11.4.1.b	Skim text for an overall impression and scan text for particular information.	2
11.4.1.c	Use organizational strategies as an aid to comprehend increasingly difficult content material (e.g., compare/contrast, cause/effect, problem/solution, sequential order).	2
11.4.2	Interpreting Information - Analyze and evaluate information from a variety of sources.	2
11.4.2.a	Summarize, paraphrase, and/or quote relevant information.	2
11.4.2.b	Determine the author's viewpoint to evaluate source credibility and reliability.	2
11.4.2.c	Synthesize information from multiple sources to draw conclusions that go beyond those found in any of the individual studies.	3
11.4.2.d	Identify complexities and inconsistencies in the information and the different perspectives found in each medium, including almanacs, microfiche, news sources, in-depth field studies, speeches, journals, technical documents, or Internet sources.	2
11.4.2.e	Develop presentations by using clear research questions and creative and critical research strategies, such as field studies, oral histories, interviews, experiments, and Internet sources.	3
3	Grammar/Usage and Mechanics - The student will demonstrate appropriate practices in writing by applying Standard English conventions to the revising and editing stages of writing. Work independently and in self-directed work teams to edit and revise.	1
1	Standard English Usage -Demonstrate correct use of Standard English in speaking and writing.	1
1.a	Distinguish commonly confused words (e.g. there, their, they're; two, too, to; accept, except; affect, effect).	1
1.b	Use correct verb forms and tenses.	1
1.c	Use correct subject-verb agreement.	1
1.d	Distinguish active and passive voice.	1

*Table 11.14*  
Group Consensus  
English III, Language Arts, Grade 11

Level	Description	DOK
1.e	Use correct pronoun/antecedent agreement and clear pronoun reference.	1
1.f	Use correct forms of comparative and superlative adjectives.	1
2	Mechanics and Spelling -Demonstrate appropriate language mechanics in writing.	1
2.a	Demonstrate correct use of capitals.	1
2.b	Use correct formation of plurals.	1
2.c	Demonstrate correct use of punctuation and recognize its effect on sentence structure.	1
2.d	Use correct spelling of commonly misspelled words and homonyms.	1
3.writing	Sentence Structure-Demonstrate appropriate sentence structure in writing.	2
3.a	Use parallel structure.	2
3.b	Correct dangling and misplaced modifiers.	2
3.c	Correct run-on sentences.	2
3.d	Correct fragments.	2
4	Apply appropriate manuscript conventions in writing including title page presentation, pagination, space and margins, and integration of sources and support material, by citing sources within the text, using direct quotations and paraphrasing.	2

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

**D. What is your general opinion of the alignment between the standards and assessment:**

(3) : 60%

i. Perfect Alignment (1) : 20%

ii. Acceptable Alignment (1) : 20%

**E. Comments**



## **Appendix F: Alignment Analysis Tables—U.S. History**



Table 12.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

OCCT U.S. History EOI Study 2

Number of Assessment Items - 60

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
1 - The student will demonstrate process skills in soc ...	4	4	2	4	100	6	1.10	YES
2 - The student will analyze causes, key events, and e ...	6	6	1 2 3	1 2 3	16 33 50	7.2	0.4	YES
3 - The student will analyze the impact of immigration ...	3	4	1 2	1 2	33 66	6	0.63	YES
4 - The student will examine the effects of the Indust ...	4	4	2 3	2 2	50 50	6.6	0.8	YES
5 - The student will analyze the changing role of the ...	6	6	2 3	5 1	83 16	5.8	0.75	NO
6 - The student will describe the social, cultural, ec ...	5	5	1 2 3	2 2 1	40 40 20	4.6	0.8	NO
7 - The student will investigate and analyze the cause ...	5	5.8	1 2 3	1 2 2	20 40 40	6.8	0.4	YES
8 - The student will analyze the major causes, events, ...	4	4.8	1 2 3	1 2 1	25 50 25	5	0.63	NO
9 - The student will assess the successes and shortcom ...	6	6	2 3	4 2	66 33	7	0	YES
10 - The student will analyze the economic, social, and ...	5	5	2 3	3 2	60 40	7	0	YES
Total	48	50.6	1 2 3	6 28 14	12 58 29	62	2.10	

Table 12.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

OCCT U.S. History EOI Study 2

Number of Assessment Items - 60

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
1 - The student will demonstrate process skills in soc ...	4	4	6	1.10	10	21	63	43	27	44	YES
2 - The student will analyze causes, key events, and e ...	6	6	7.2	0.4	59	47	39	45	2	10	WEAK
3 - The student will analyze the impact of immigration ...	3	4	6	0.63	18	29	69	31	14	21	YES
4 - The student will examine the effects of the Indust ...	4	4	6.6	0.8	53	39	44	40	3	12	WEAK
5 - The student will analyze the changing role of the ...	6	6	5.8	0.75	52	45	48	45	0	0	WEAK
6 - The student will describe the social, cultural, ec ...	5	5	4.6	0.8	24	42	41	46	35	45	YES
7 - The student will investigate and analyze the cause ...	5	5.8	6.8	0.4	22	41	59	48	19	38	YES
8 - The student will analyze the major causes, events, ...	4	4.8	5	0.63	50	50	32	45	18	36	YES
9 - The student will assess the successes and shortcom ...	6	6	7	0	70	43	22	31	8	12	NO
10 - The student will analyze the economic, social, and ...	5	5	7	0	60	41	30	37	10	19	WEAK
Total	48	50.6	62	2.10	42	46	45	44	13	29	

Table 12.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers  
 OCCT U.S. History EOI Study 2  
 Number of Assessment Items - 60

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
1 - The student will demonstrate process skills in soc ...	4	4	6	1.10	3	0	75	0	YES	10	1	0.77	0.05	YES
2 - The student will analyze causes, key events, and e ...	6	6	7.2	0.4	4.4	0.49	73	8	YES	12	0	0.86	0.05	YES
3 - The student will analyze the impact of immigration ...	3	4	6	0.63	3.2	0.4	80	10	YES	10	1	0.89	0.06	YES
4 - The student will examine the effects of the Indust ...	4	4	6.6	0.8	3.4	0.49	85	12	YES	11	1	0.83	0.01	YES
5 - The student will analyze the changing role of the ...	6	6	5.8	0.75	4.6	0.49	77	8	YES	9	1	0.85	0.01	YES
6 - The student will describe the social, cultural, ec ...	5	5	4.6	0.8	3.4	0.8	68	16	YES	7	1	0.85	0.01	YES
7 - The student will investigate and analyze the cause ...	5	5.8	6.8	0.4	4.6	0.49	79	6	YES	11	1	0.82	0.03	YES
8 - The student will analyze the major causes, events, ...	4	4.8	5	0.63	2.8	0.4	58	4	YES	8	1	0.77	0.05	YES
9 - The student will assess the successes and shortcom ...	6	6	7	0	3	0	50	0	YES	11	0	0.76	0	YES
10 - The student will analyze the economic, social, and ...	5	5	7	0	3.6	0.49	72	10	YES	11	0	0.78	0.01	YES
Total	48	50.6	62	2.10	3.6	0.8	72	13		10	2	0.82	0.06	

*Table 12.4*

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

OCCT U.S. History EOI Study 2

Number of Assessment Items - 60

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
1 - The student will demonstrate process skills in soc ...	YES	YES	YES	YES
2 - The student will analyze causes, key events, and e ...	YES	WEAK	YES	YES
3 - The student will analyze the impact of immigration ...	YES	YES	YES	YES
4 - The student will examine the effects of the Indust ...	YES	WEAK	YES	YES
5 - The student will analyze the changing role of the ...	NO	WEAK	YES	YES
6 - The student will describe the social, cultural, ec ...	NO	YES	YES	YES
7 - The student will investigate and analyze the cause ...	YES	YES	YES	YES
8 - The student will analyze the major causes, events, ...	NO	YES	YES	YES
9 - The student will assess the successes and shortcom ...	YES	NO	YES	YES
10 - The student will analyze the economic, social, and ...	YES	WEAK	YES	YES

*Table 12.5*

Source-of-Challenge Issues by Reviewer  
OCCT U.S. History EOI Study 2

Item Number	Comments by Reviewer
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Table 12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT U.S. History EOI Study 2

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	3	3	3	3	3
2	2	2	2	3	2
3	2	2	2	2	2
4	1	1	1	1	1
5					
6					
7					
8	1	2	1	1	1
9	2	1	2	2	1
10	1	1	2	1	1
11	2	2	2	2	2
12	2	2	2	2	2
13	1	1	1	1	1
14	2	2	2	2	2
15	1	2	1	1	2
16					
17					
18	2	2	2	2	2
19	2	3	3	2	2
20					
21					
22	2	3	3	3	3
23	1	1	1	1	1
24	2	2	2	2	2
25	1	2	1	1	1
26	2	2	2	1	2
27	2	2	2	2	2
28	1	1	1	1	1
29	2	2	2	2	2
30	2	2	2	2	2
31	2	2	1	2	1
32					
33					
34	2	2	2	2	2
35	1	1	2	1	1
36	1	1	1	2	2
37					
38	1	1	1	1	1
39	1	1	1	1	1
40	1	1	1	2	2
41	1	1	1	1	1
42	1	1	2	1	1
43	1	1	1	1	1
44	2	4	2	2	2
45					
46					
47	1	1	1	1	1
48	1	2	1	1	1

Table 12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT U.S. History EOI Study 2

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	2	2	2	2	2
50	1	1	2	2	1
51	3	3	2	3	2
52	2	1	1	1	1
53					
54					
55					
56	3	3	3	3	3
57	2	3	2	1	2
58	2	1	1	2	2
59	1	1	1	1	1
60	2	2	2	1	2
61	2	2	2	2	2
62					
63					
64	1	2	1	2	2
65	2	2	1	2	1
66	1	1	1	1	1
67	1	1	1	2	2
68	2	1	2	2	2
69	2	2	2	2	2
70	2	2	2	2	2
71	2	3	2	2	2
72					
73					
74	2	2	2	2	2
75					
76	2	2	2	2	2
77	1	1	1	1	1
78	2	2	2	2	2
79	3	2	3	3	3
80	2	1	2	2	1

**Intraclass Correlation:** 0.9114

**Pairwise Comparison:** 0.7583

*Table 12.7*

Notes by Reviewer

OCCT U.S. History EOI Study 2

Item Number	Comments by Reviewer
3	not aligned
3	not aligned
3	not aligned
3	not aligned
19	not aligned
19	not aligned
19	not aligned
19	not aligned
39	not aligned
39	not aligned
39	not aligned
39	not aligned
56	not aligned
56	not aligned
56	not aligned
56	not aligned

Table 12.8

DOK Levels and Objectives Coded by Each Reviewer  
OCCT U.S. History EOI Study 2

Item	DOK 0	PObj 0	S1Obj 0	DOK 1	PObj 1	S1Obj 1	DOK 2	PObj 2	S1Obj 2	DOK 3	PObj 3	DOK 4	PObj 4	S1Obj 4
1	3	9.2		3	9.2		3	9.2		3	9.2	3	9.2	
2	2	2.2		2	2.2	1.1	2	2.2		3	2.2	2	2.2	
3	2	3		2	3		2	3		2	1.1	2	3	1.1
4	1	2.3		1	2.3		1	2.3		1	2.3	1	2.3	
5														
6														
7														
8	1	5.3		2	5.3		1	5.3		1	5.3	1	5.3	
9	2	9.2		1	9.2		2	9.2		2	9.2	1	9.2	
10	1	6.1		1	6.1		2	6.1		1	6.1	1	6.1	
11	2	9.2		2	9.2		2	9.2		2	9.2	2	9.2	
12	2	7.3		2	7.3		2	7.3		2	7.3	2	7.3	1.1
13	1	7.4		1	7.3		1	7.4		1	7.4	1	7.4	
14	2	3.3		2	3.4		2	3.3		2	3.3	2	3.3	
15	1	8.3		2	8.4		1	8.3		1	8.3	2	8.3	
16														
17														
18	2	6.4		2	3.3		2	6.4		2	6.4	2	2.6	1.1
19	2	8		3	8		3	8.2		2	8	2	8	
20														
21														
22	2	1.4		3	1.4		3	1.4		3	1.4	3	1.4	
23	1	2.5		1	2.5		1	2.5		1	2.5	1	2.5	
24	2	4.3		2	4.3		2	4.5		2	4.3	2	4.3	
25	1	9.4		2	9.4		1	9.4		1	9.4	1	9.4	
26	2	2.4		2	2.4		2	2.4		1	2.4	2	2.2	
27	2	7.1		2	7.1		2	7.1		2	7.1	2	7.1	
28	1	3.1		1	3.1		1	3.1		1	3.1	1	3.1	
29	2	7.2		2	7.2		2	7.2		2	7.2	2	7.2	
30	2	9.6		2	9.6		2	9.6		2	9.6	2	9.6	
31	2	1.3		2	1.3		1	1.3		2	1.3	1	1.3	
32														
33														
34	2	4.3		2	4.3		2	4.3		2	4.3	2	4.3	
35	1	5.2		1	5.2		2	5.2		1	5.2	1	5.2	
36	1	10.9		1	10.9		1	10.9		2	10.9	2	10.9	
37														
38	1	2.3		1	2.3		1	2.3		1	2.3	1	2.3	

Table 12.8

DOK Levels and Objectives Coded by Each Reviewer  
OCCT U.S. History EOI Study 2

Item	DOK 0	PObj 0	S1Obj j0	DOK 1	PObj 1	S1Obj j1	DOK 2	PObj 2	S1Obj j2	DOK 3	PObj 3	DOK 4	PObj 4	S1Obj j4
39	1	3		1	3		1	3.3		1	3	1	3	
40	1	2.2		1	2.1		1	2.2		2	2.2	2	2.2	
41	1	10.6		1	10.6		1	10.6		1	10.6	1	10.6	
42	1	10.1		1	10.1		2	10.1		1	10.6	1	10.6	
43	1	3.1		1	3.1		1	3.1		1	3.1	1	3.1	
44	2	4.1		4	4.1		2	4.1		2	4.1	2	4.1	
45														
46														
47	1	7.3		1	7.3		1	7.3		1	7.3	1	7.3	
48	1	6.1		2	6.1		1	6.1		1	6.1	1	6.1	
49	2	5.6		2	5.6		2	5.6		2	5.6	2	5.6	
50	1	8.2		1	5.6		2	8.2		2	8.2	1	8.2	
51	3	10.8		3	10.8		2	10.8		3	10.8	2	10.8	1.1
52	2	8.3		1	8.3		1	8.3		1	8.3	1	8.3	
53														
54														
55														
56	3	7		3	7		3	7.1		3	7	3	7	
57	2	10.6		3	10.6		2	10.6		1	10.6	2	10.6	
58	2	10.8		1	10.8		1	10.8		2	10.8	2	10.8	
59	1	8.3		1	8.3		1	8.3		1	8.3	1	8.3	
60	2	1.3		2	1.3		2	1.3		1	1.3	2	1.3	
61	2	1.1		2	1.1		2	1.1		2	1.1	2	1.1	
62														
63														
64	1	5.5		2	5.5		1	1.3		2	5.5	2	5.5	
65	2	1.3		2	1.3		1	8.3		2	1.3	1	6.2	
66	1	4.1		1	4.1		1	4.1		1	4.1	1	4.1	
67	1	5.3		1	5.3		1	5.3		2	5.3	2	5.3	
68	2	2.4		1	2.4		2	2.4		2	2.4	2	2.4	
69	2	5.1		2	5.1		2	5.1		2	5.1	2	4.1	
70	2	7.1	6.6	2	7.1	6.6	2	7.1	6.6	2	6.6	2	7.1	6.6
71	2	4.2		3	4.2		2	4.2		2	4.2	2	4.2	3.1
72														
73														
74	2	9.6		2	9.4		2	9.6		2	9.6	2	9.6	
75														
76	2	9.2		2	9.2		2	9.2		2	9.2	2	9.2	

Table 12.8

DOK Levels and Objectives Coded by Each Reviewer  
OCCT U.S. History EOI Study 2

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	DOK 4	PObj 4	S1Ob j4
77	1	10.6		1	10.6		1	10.6		1	10.6	1	10.6	
78	2	4.5		2	4.3		2	4.3		2	4.3	2	4.3	
79	3	3.3		2	4.2		3	3.3		3	3.3	3	3.3	
80	2	6.2		1	4.3		2	6.2		2	6.2	1	6.2	

**Objective Pairwise Comparison:** 0.8186

**Standard Pairwise Comparison:** 0.8975

Table 12.9

Objectives Coded to Each Item by Reviewers

OCCT U.S. History EOI Study 2

Low		Medium		High
0		3.875		9

1	9.2	9.2	9.2	9.2	9.2	
2	1.1	2.2	2.2	2.2	2.2	2.2
3	1.1	1.1	3	3	3	3
4	2.3	2.3	2.3	2.3	2.3	
5						
6						
7						
8	5.3	5.3	5.3	5.3	5.3	
9	9.2	9.2	9.2	9.2	9.2	
10	6.1	6.1	6.1	6.1	6.1	
11	9.2	9.2	9.2	9.2	9.2	
12	1.1	7.3	7.3	7.3	7.3	7.3
13	7.3	7.4	7.4	7.4	7.4	
14	3.3	3.3	3.3	3.3	3.4	
15	8.3	8.3	8.3	8.3	8.4	
16						
17						
18	1.1	2.6	3.3	6.4	6.4	6.4
19	8	8	8	8	8.2	
20						
21						
22	1.4	1.4	1.4	1.4	1.4	
23	2.5	2.5	2.5	2.5	2.5	
24	4.3	4.3	4.3	4.3	4.5	
25	9.4	9.4	9.4	9.4	9.4	
26	2.2	2.4	2.4	2.4	2.4	
27	7.1	7.1	7.1	7.1	7.1	
28	3.1	3.1	3.1	3.1	3.1	
29	7.2	7.2	7.2	7.2	7.2	
30	9.6	9.6	9.6	9.6	9.6	
31	1.3	1.3	1.3	1.3	1.3	
32						
33						
34	4.3	4.3	4.3	4.3	4.3	
35	5.2	5.2	5.2	5.2	5.2	
36	10.9	10.9	10.9	10.9	10.9	
37						
38	2.3	2.3	2.3	2.3	2.3	
39	3	3	3	3	3.3	
40	2.1	2.2	2.2	2.2	2.2	
41	10.6	10.6	10.6	10.6	10.6	
42	10.1	10.1	10.1	10.6	10.6	
43	3.1	3.1	3.1	3.1	3.1	
44	4.1	4.1	4.1	4.1	4.1	
45						

*Table 12.9*  
Objectives Coded to Each Item by Reviewers  
OCCT U.S. History EOI Study 2

46									
47	7.3	7.3	7.3	7.3	7.3				
48	6.1	6.1	6.1	6.1	6.1				
49	5.6	5.6	5.6	5.6	5.6				
50	5.6	8.2	8.2	8.2	8.2				
51	1.1	10.8	10.8	10.8	10.8	10.8			
52	8.3	8.3	8.3	8.3	8.3				
53									
54									
55									
56	7	7	7	7	7.1				
57	10.6	10.6	10.6	10.6	10.6				
58	10.8	10.8	10.8	10.8	10.8				
59	8.3	8.3	8.3	8.3	8.3				
60	1.3	1.3	1.3	1.3	1.3				
61	1.1	1.1	1.1	1.1	1.1				
62									
63									
64	1.3	5.5	5.5	5.5	5.5				
65	1.3	1.3	1.3	6.2	8.3				
66	4.1	4.1	4.1	4.1	4.1				
67	5.3	5.3	5.3	5.3	5.3				
68	2.4	2.4	2.4	2.4	2.4				
69	4.1	5.1	5.1	5.1	5.1				
70	6.6	6.6	6.6	6.6	6.6	7.1	7.1	7.1	7.1
71	3.1	4.2	4.2	4.2	4.2	4.2			
72									
73									
74	9.4	9.6	9.6	9.6	9.6				
75									
76	9.2	9.2	9.2	9.2	9.2				
77	10.6	10.6	10.6	10.6	10.6				
78	4.3	4.3	4.3	4.3	4.5				
79	3.3	3.3	3.3	3.3	4.2				
80	4.3	6.2	6.2	6.2	6.2				

Table 12.10

Items Coded by Reviewers to Each Objective  
OCCT U.S. History EOI Study 2

Low		Medium		High
0		5.254237		20

1														
1.1	2	3	3	12	18	51	61	61	61	61	61			
1.3	31	31	31	31	31	60	60	60	60	60	64	65	65	65
1.4	22	22	22	22	22									
1.5														
2														
2.1	40													
2.2	2	2	2	2	2	26	40	40	40	40				
2.3	4	4	4	4	4	38	38	38	38	38				
2.4	26	26	26	26	68	68	68	68	68					
2.5	23	23	23	23	23									
2.6	18													
3	3	3	3	3	39	39	39	39						
3.1	28	28	28	28	28	43	43	43	43	43	71			
3.3	14	14	14	14	18	39	79	79	79	79				
3.4	14													
4														
4.1	44	44	44	44	44	66	66	66	66	66	69			
4.2	71	71	71	71	71	79								
4.3	24	24	24	24	34	34	34	34	34	78	78	78	78	80
4.5	24	78												
5														
5.1	69	69	69	69										
5.2	35	35	35	35	35									
5.3	8	8	8	8	8	67	67	67	67	67				
5.4														
5.5	64	64	64	64										
5.6	49	49	49	49	49	50								
6														
6.1	10	10	10	10	10	48	48	48	48	48				
6.2	65	80	80	80	80									
6.3														
6.4	18	18	18											
6.6	70	70	70	70	70									
7	56	56	56	56										
7.1	27	27	27	27	27	56	70	70	70	70				
7.2	29	29	29	29	29									
7.3	12	12	12	12	12	13	47	47	47	47	47			
7.4	13	13	13	13										
7.5														
8	19	19	19	19										
8.2	19	50	50	50	50									
8.3	15	15	15	15	52	52	52	52	52	59	59	59	59	65
8.4	15													
8.5														

Table 12.10

Items Coded by Reviewers to Each Objective

OCCT U.S. History EOI Study 2

9																				
9.1																				
9.2	1	1	1	1	1	9	9	9	9	9	11	11	11	11	11	76	76	76	76	76
9.3																				
9.4	25	25	25	25	25	74														
9.5																				
9.6	30	30	30	30	30	74	74	74	74											
10																				
10.1	42	42	42																	
10.2																				
10.6	41	41	41	41	41	42	42	57	57	57	57	57	77	77	77	77	77			
10.8	51	51	51	51	51	58	58	58	58	58										
10.9	36	36	36	36	36															

Table 12.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

OCCT U.S. History EOI Study 2

Low		Medium		High
1		2		5

1						
1.1	2:1	3:2	12:1	18:1	51:1	61:5
1.3	31:5	60:5	64:1	65:3		
1.4	22:5					
1.5						
2						
2.1	40:1					
2.2	2:5	26:1	40:4			
2.3	4:5	38:5				
2.4	26:4	68:5				
2.5	23:5					
2.6	18:1					
3	3:4	39:4				
3.1	28:5	43:5	71:1			
3.3	14:4	18:1	39:1	79:4		
3.4	14:1					
4						
4.1	44:5	66:5	69:1			
4.2	71:5	79:1				
4.3	24:4	34:5	78:4	80:1		
4.5	24:1	78:1				
5						
5.1	69:4					
5.2	35:5					
5.3	8:5	67:5				
5.4						
5.5	64:4					
5.6	49:5	50:1				
6						
6.1	10:5	48:5				
6.2	65:1	80:4				
6.3						
6.4	18:3					
6.6	70:5					
7	56:4					
7.1	27:5	56:1	70:4			
7.2	29:5					
7.3	12:5	13:1	47:5			
7.4	13:4					
7.5						
8	19:4					
8.2	19:1	50:4				
8.3	15:4	52:5	59:5	65:1		
8.4	15:1					
8.5						

Table 12.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

OCCT U.S. History EOI Study 2

9				
9.1				
9.2	1:5	9:5	11:5	76:5
9.3				
9.4	25:5	74:1		
9.5				
9.6	30:5	74:4		
10				
10.1	42:3			
10.2				
10.6	41:5	42:2	57:5	77:5
10.8	51:5	58:5		
10.9	36:5			

Table 12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT U.S. History EOI Study 2

Low		Medium		High
1		2		5

1	9.2:5			
2	1.1:1	2.2:5		
3	1.1:2	3:4		
4	2.3:5			
5				
6				
7				
8	5.3:5			
9	9.2:5			
10	6.1:5			
11	9.2:5			
12	1.1:1	7.3:5		
13	7.3:1	7.4:4		
14	3.3:4	3.4:1		
15	8.3:4	8.4:1		
16				
17				
18	1.1:1	2.6:1	3.3:1	6.4:3
19	8:4	8.2:1		
20				
21				
22	1.4:5			
23	2.5:5			
24	4.3:4	4.5:1		
25	9.4:5			
26	2.2:1	2.4:4		
27	7.1:5			
28	3.1:5			
29	7.2:5			
30	9.6:5			
31	1.3:5			
32				
33				
34	4.3:5			
35	5.2:5			
36	10.9: 5			
37				
38	2.3:5			
39	3:4	3.3:1		
40	2.1:1	2.2:4		
41	10.6: 5			
42	10.1: 3	10.6: 2		

Table 12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT U.S. History EOI Study 2

43	3.1:5		
44	4.1:5		
45			
46			
47	7.3:5		
48	6.1:5		
49	5.6:5		
50	5.6:1	8.2:4	
51	1.1:1	10.8:5	
52	8.3:5		
53			
54			
55			
56	7:4	7.1:1	
57	10.6:5		
58	10.8:5		
59	8.3:5		
60	1.3:5		
61	1.1:5		
62			
63			
64	1.3:1	5.5:4	
65	1.3:3	6.2:1	8.3:1
66	4.1:5		
67	5.3:5		
68	2.4:5		
69	4.1:1	5.1:4	
70	6.6:5	7.1:4	
71	3.1:1	4.2:5	
72			
73			
74	9.4:1	9.6:4	
75			
76	9.2:5		
77	10.6:5		
78	4.3:4	4.5:1	
79	3.3:4	4.2:1	
80	4.3:1	6.2:4	

Table 12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT U.S. History EOI Study 2

Low DOK		Matched DOK		High DOK
1		2		5

1 [2]:						
1.1 [2]:	2:1[2]	3:2[2]	12:1[2]	18:1[2]	51:1[2]	61:5[2]
1.3 [2]:	31:5[1.6]	60:5[1.8]	64:1[1]	65:3[2]		
1.4 [2]:	22:5[2.8]					
1.5 [2]:						
2 [3]:						
2.1 [2]:	40:1[1]					
2.2 [2]:	2:5[2.2]	26:1[2]	40:4[1.5]			
2.3 [1]:	4:5[1]	38:5[1]				
2.4 [3]:	26:4[1.75]	68:5[1.8]				
2.5 [3]:	23:5[1]					
2.6 [3]:	18:1[2]					
3 [2]:	3:4[2]	39:4[1]				
3.1 [1]:	28:5[1]	43:5[1]	71:1[2]			
3.3 [2]:	14:4[2]	18:1[2]	39:1[1]	79:4[3]		
3.4 [2]:	14:1[2]					
4 [3]:						
4.1 [2]:	44:5[2.4]	66:5[1]	69:1[2]			
4.2 [3]:	71:5[2.2]	79:1[2]				
4.3 [2]:	24:4[2]	34:5[2]	78:4[2]	80:1[1]		
4.5 [3]:	24:1[2]	78:1[2]				
5 [2]:						
5.1 [2]:	69:4[2]					
5.2 [2]:	35:5[1.2]					
5.3	8:5[1]	67:5[1]				

Table 12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT U.S. History EOI Study 2

[2]:	2]	1.4]		
5.4				
[2]:				
5.5	64:4[			
[3]:	1.75]			
5.6	49:5[	50:1[		
[2]:	2]	1]		
6 [2]:				
6.1	10:5[	48:5[		
[1]:	1.2]	1.2]		
6.2	65:1[	80:4[		
[3]:	1]	1.75]		
6.3				
[2]:				
6.4	18:3[			
[2]:	2]			
6.6	70:5[			
[1]:	2]			
7 [2]:	56:4[			
	3]			
7.1	27:5[	56:1[	70:4[	
[2]:	2]	3]	2]	
7.2	29:5[			
[2]:	2]			
7.3	12:5[	13:1[	47:5[	
[3]:	2]	1]	1]	
7.4	13:4[			
[1]:	1]			
7.5				
[3]:				
8 [2]:	19:4[			
	2.25]			
8.2	19:1[	50:4[		
[2]:	3]	1.5]		
8.3	15:4[	52:5[	59:5[	65:1[
[3]:	1.25]	1.2]	1]	1]
8.4	15:1[			
[1]:	2]			
8.5				
[2]:				
9 [2]:				
9.1				
[2]:				
9.2	1:5[3]	9:5[1.	11:5[	76:5[
[2]:		6]	2]	2]
9.3				
[2]:				
9.4	25:5[	74:1[		
[3]:	1.2]	2]		

Table 12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT U.S. History EOI Study 2

9.5 [2]:				
9.6 [3]:	30:5[ 2]	74:4[ 2]		
10 [2]:				
10.1 [3]:	42:3[ 1.33]			
10.2 [3]:				
10.6 [2]:	41:5[ 1]	42:2[ 1]	57:5[ 2]	77:5[ 1]
10.8 [2]:	51:5[ 2.6]	58:5[ 1.6]		
10.9 [2]:	36:5[ 1.4]			

Table 12.14  
Group Consensus  
OCCT U.S. History EOI Standards, Social Science, Grade 12

Level	Description	DOK
1	The student will demonstrate process skills in social studies.	2
1.1	Identify, analyze, and interpret primary and secondary sources (e.g., artifacts, diaries, letters, photographs, documents, newspapers, media, and computer-based technologies).	2
1.3	Distinguish between fact and opinion in examining documentary sources.	2
1.4	Construct timelines of United States history (e.g., landmark dates of economic changes, social movements, military conflicts, constitutional amendments, and presidential elections).	2
1.5	Explain the relationships between geography and the historical development of the United States by using maps, graphs, charts, visual images, and computer-based technologies.	2
2	The student will analyze causes, key events, and effects of the Civil War era.	3
2.1	Examine the economic and philosophical differences between the North and South, as exemplified by such persons as Daniel Webster and John C. Calhoun.	2
2.2	Trace the events leading to secession and war (e.g., the Compromise of 1850, the Kansas-Nebraska Act, and the Dred Scott case).	2
2.3	Identify leaders on both sides of the war (e.g., Abraham Lincoln, Ulysses S. Grant, Jefferson Davis, Robert E. Lee, Frederick Douglass, and William Lloyd Garrison).	1
2.4	Interpret the importance of critical developments in the war, such as major battles (e.g., Fort Sumter, Gettysburg, and Vicksburg), the Emancipation Proclamation, and Lee's surrender at Appomattox.	3
2.5	Relate the basic provisions and postwar impact of the 13th, 14th, and 15th Amendments to the Constitution.	3
2.6	Evaluate the continuing impact of Reconstruction policies on the South, including southern reaction (e.g., sharecropping, Black Codes, Ku Klux Klan, Plessy v. Ferguson, and Jim Crow laws).	3
3	The student will analyze the impact of immigration and the Westward Movement on American society.	2
3.1	Detail the contributions of various immigrant, cultural, and ethnic groups (e.g., Irish, Chinese, Italians, and Germans).	1
3.3	Investigate changes in the domestic policies of the United States relating to immigration.	2
3.4	Compare and contrast the attitudes toward Native American groups as exhibited by federal Indian policy (e.g., establishment of reservations, assimilation, and the Dawes Act) and actions of the United States Army, missionaries, and settlers.	2
4	The student will examine the effects of the Industrial Revolution on the economy of the United States.	3
4.1	Identify the impact of new inventions and industrial production methods, including new technologies in transportation and communication.	2
4.2	Evaluate the significance of immigration on the labor supply and the movement to organize workers.	3
4.3	Describe the effects of the "muckrakers" and reform movements (e.g., women's suffrage and temperance) that resulted in government policies affecting child labor, wages, working conditions, trade, monopolies, taxation, and the money supply.	2
4.5	Evaluate the rise of the Progressive Movement in relation to political changes at the national and state levels (e.g., workers' compensation, the direct primary, initiative petition, referendum, and recall).	3
5	The student will analyze the changing role of the United States in world affairs at the turn of the twentieth century.	2
5.1	Identify the goals of imperialism, explaining its impact on developed and developing nations.	2
5.2	Identify the role of the Spanish-American War in the development of the United States as a world power.	2
5.3	Evaluate the role of United States foreign policy and presidential leadership in the construction of a canal in Panama.	2
5.4	Describe the strengths and weaknesses of Theodore Roosevelt's "Big Stick Diplomacy."	2
5.5	Analyze the causes and effects of United States involvement in World War I.	3
5.6	Examine the rationale for the failure of the United States to join the League of Nations and the nation's return to isolationism.	2
6	The student will describe the social, cultural, economic, and technological ideas and events in the United States in the era between the World Wars.	2

Table 12.14  
Group Consensus  
OCCT U.S. History EOI Standards, Social Science, Grade 12

Level	Description	DOK
6.1	Evaluate literature, music, dance, and forms of entertainment, including the Harlem Renaissance, the Jazz Age, and "talkies."	1
6.2	Investigate the longterm effects of reform movements, such as women's suffrage and prohibition (e.g., the 18th, 19th, and 21st Amendments to the Constitution).	3
6.3	Analyze the impact of the automobile, and urban and rural electrification on society.	2
6.4	Describe the rising racial tensions and labor unrest common in the era (e.g., the Tulsa Race Riots and the sit-down strikes).	2
6.6	Identify causes contributing to an unstable economy (e.g., the increased reliance on installment buying, a greater willingness to speculate and buy on margin in the stock market, and government reluctance to interfere in the economy).	1
7	The student will investigate and analyze the causes and legacy of the Great Depression.	2
7.1	Examine changes in business cycles, weaknesses in key sectors of the economy, and government economic policies in the late 1920s.	2
7.2	Analyze the effects of the Stock Market Crash.	2
7.3	Evaluate the impact of the Great Depression, the Dust Bowl, and the New Deal economic policies on business and agriculture, and on the American people, their culture and political behavior.	3
7.4	Identify the contributions of key individuals of the period (e.g., Will Rogers, Eleanor and Franklin Roosevelt, Charles Lindbergh, and Woody Guthrie).	1
7.5	Assess the impact of the expanded role of government in the economy since the 1930s.	3
8	The student will analyze the major causes, events, and effects of United States involvement in World War II.	2
8.2	Investigate appeasement, isolationism, and the war debates in the United States prior to the outbreak of war.	2
8.3	Evaluate the impact of preparation and mobilization for war, including the internment policies and their effects (e.g., Korematsu v. United States).	3
8.4	Detail major battles, military turning points, and key strategic decisions in both European and Pacific theatres.	1
8.5	Analyze public and political reactions in the United States to the events of the Holocaust.	2
9	The student will assess the successes and shortcomings of United States foreign policy since World War II.	2
9.1	Identify the origins of the Cold War and its foreign and domestic consequences, including confrontations with the Soviet Union in Berlin and Cuba.	2
9.2	Examine the proliferation of nuclear weapons and the arms race.	2
9.3	Describe the role of the United States in the formation of the United Nations, NATO, and other alliances.	2
9.4	Evaluate the role of the United States in attempts at the containment of communism in Europe, Asia, and Latin America, including the Truman Doctrine and the involvement of the United Nations in Korea.	3
9.5	Describe the fear of communist influence within the United States, including the McCarthy hearings.	2
9.6	Evaluate the causes and longterm foreign and domestic consequences of United States military commitments in southeast Asia, especially Vietnam.	3
10	The student will analyze the economic, social, and political transformation of the United States since World War II.	2
10.1	Describe de jure and de facto segregation policies, attempts at desegregation and integration, and the impact of the Civil Rights Movement on society (e.g., Brown v. Board of Education of Topeka, Kansas).	3
10.2	Evaluate the success of the women's liberation movement and the changing roles of women in society.	3
10.6	Identify the contributions of political leaders, political activists, and civil rights leaders, and the major issues and trends in national elections (e.g., differences between the two major political parties and the rise of third-party candidates).	2
10.8	Evaluate the impact of political scandals (e.g., Watergate, Iran-Contra, and the Clinton impeachment) on federal law, national policies, and political behavior.	2
10.9	Analyze how the principles and structures of the United States Constitution have changed through	2

Table 12.14  
 Group Consensus  
 OCCT U.S. History EOI Standards, Social Science, Grade 12

Level	Description	DOK
	amendment and judicial interpretation (e.g., the 22nd and 25th Amendments, and Gideon v. Wainwright and Miranda v. Arizona).	

*Table 12.15*

Debriefing Summary

OCCT U.S. History EOI Study 2

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

**D. What is your general opinion of the alignment between the standards and assessment:**

ii. Acceptable Alignment (5) : 100%

**E. Comments**



## **Appendix G: Alignment Analysis Tables—Biology I (Content)**



Table 9-12.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Content

Number of Assessment Items - 60

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
B.1 - The Cell - Cells are the fundamental unit of life, ...	2	2	1 2	1 1	50 50	10	3.69	YES
B.2 - The Molecular Basis of Heredity - DNA determines t ...	2	2.2	2 3	1 1	50 50	9.2	0.4	YES
B.3 - Biological Diversity - Diversity of species is dev ...	2	2	3	2	100	6.6	2.42	YES
B.4 - The Interdependence of Organisms - Interrelationsh ...	3	3	2 3	2 1	66 33	11.2	2.99	YES
B.5 - Matter, Energy, and Organization in Living Systems ...	2	2	2 3	1 1	50 50	11.2	1.72	YES
B.6 - The Behavior of Organisms - Organisms have behavio ...	2	2	2 3	1 1	50 50	7.2	4.07	YES
Total	13	13.2	1 2 3	1 6 6	7 46 46	55.4	11.77	

Table 9-12.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Content

Number of Assessment Items - 60

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
B.1 - The Cell - Cells are the fundamental unit of life, ...	2	2	10	3.69	18	29	53	25	29	29	YES
B.2 - The Molecular Basis of Heredity - DNA determines t ...	2	2.2	9.2	0.4	59	25	36	18	5	11	WEAK
B.3 - Biological Diversity - Diversity of species is dev ...	2	2	6.6	2.42	60	25	40	25	0	0	WEAK
B.4 - The Interdependence of Organisms - Interrelationsh ...	3	3	11.2	2.99	52	40	34	36	14	22	WEAK
B.5 - Matter, Energy, and Organization in Living Systems ...	2	2	11.2	1.72	48	43	34	31	18	23	YES
B.6 - The Behavior of Organisms - Organisms have behavio ...	2	2	7.2	4.07	40	36	42	34	18	37	YES
Total	13	13.2	55.4	11.77	46	37	39	30	14	25	

Table 9-12.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Content

Number of Assessment Items - 60

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
B.1 - The Cell - Cells are the fundamental unit of life, ...	2	2	10	3.69	2	0	100	0	YES	18	3	0.92	0.04	YES
B.2 - The Molecular Basis of Heredity - DNA determines t ...	2	2.2	9.2	0.4	2.2	0.4	100	0	YES	17	4	0.88	0.12	YES
B.3 - Biological Diversity - Diversity of species is dev ...	2	2	6.6	2.42	1.8	0.4	90	20	YES	12	3	0.97	0.04	YES
B.4 - The Interdependence of Organisms - Interrelationsh ...	3	3	11.2	2.99	3	0	100	0	YES	21	6	0.83	0.02	YES
B.5 - Matter, Energy, and Organization in Living Systems ...	2	2	11.2	1.72	2	0	100	0	YES	20	2	0.93	0.05	YES
B.6 - The Behavior of Organisms - Organisms have behavio ...	2	2	7.2	4.07	2	0	100	0	YES	12	5	0.84	0.12	YES
Total	13	13.2	55.4	11.77	2.17	0.45	98	9		17	5	0.89	0.09	

Table 9-12.4

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Content

Number of Assessment Items - 60

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
B.1 - The Cell - Cells are the fundamental unit of life, ...	YES	YES	YES	YES
B.2 - The Molecular Basis of Heredity - DNA determines t ...	YES	WEAK	YES	YES
B.3 - Biological Diversity - Diversity of species is dev ...	YES	WEAK	YES	YES
B.4 - The Interdependence of Organisms - Interrelationsh ...	YES	WEAK	YES	YES
B.5 - Matter, Energy, and Organization in Living Systems ...	YES	YES	YES	YES
B.6 - The Behavior of Organisms - Organisms have behavio ...	YES	YES	YES	YES

*Table 9-12.5*

Source-of-Challenge Issues by Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Content

Item Number	Comments by Reviewer
9	Not sure that you would need to know anything about the embryonic development of a chicken to answer this question.
14	The first paragraph of the item stem is unnecessary to answer the item.
26	The introductory paragraph and the stimulus graphics are unnecessary to answer the item.

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT EOI Biology I Spring 2009 Form 1 Content

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	2	2	1	1	1
2	2	2	2	2	2
3	2	2	3	2	2
4	2	2	3	1	2
5					
6	2	2	3	3	3
7	2	3	3	3	3
8	3	2	2	2	3
9	2	1	2	2	2
10					
11					
12	1	2	2	1	1
13	3	3	3	3	2
14	1	1	1	2	1
15	1	2	1	1	1
16	2	1	1	3	1
17					
18					
19					
20	2	2	1	1	1
21	2	2	2	3	2
22	2	2	2	3	2
23	3	2	3	3	3
24	1	2	1	1	1
25	1	2	2	2	2
26	1	2	2	3	2
27					
28					
29	1	2	2	2	2
30	2	2	3	2	1
31	2	2	3	3	2
32	1	2	1	1	1
33	2	2	1	2	2
34	2	2	2	2	3
35					
36					
37	2	2	2	2	2
38	2	2	2	3	2
39	1	3	2	2	2
40	2	3	2	2	2
41	2	2	3	2	3
42	3	2	3	3	2
43	1	2	1	3	1
44	2	2	3	3	1
45	2	2	2	2	2
46	2	2	1	3	1
47					
48					

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT EOI Biology I Spring 2009 Form 1 Content

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	2	3	2	1	2
50	1	1	1	2	1
51	2	2	1	2	2
52					
53					
54					
55	1	1	1	1	2
56	2	3	2	3	2
57	2	1	1	2	2
58	1	2	1	3	1
59	2	2	3	3	2
60	2	3	2	3	2
61	2	3	2	2	2
62					
63					
64	2	2	2	2	2
65	2	2	3	3	2
66	2	3	3	2	3
67	2	2	2	2	2
68	2	3	2	2	2
69	2	2	3	2	2
70	2	3	3	3	2
71	3	2	3	3	3
72					
73					
74	1	1	2	2	1
75	1	1	2	2	1
76	2	2	2	2	2
77	3	3	3	3	3
78					
79	2	1	2	2	1
80	2	2	3	3	2

**Intraclass Correlation:** 0.7709

**Pairwise Comparison:** 0.53

Table 9-12.7

Notes by Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Content

Item Number	Comments by Reviewer
1	This is a safety item.
1	Safety
1	Safety Item no content required.
2	Weak alignment.
3	This is a process item that does not require content knowledge.
3	Does not require content knowledge.
4	Very weak alignment.
7	This item is weakly aligned to the content objective.
7	Does not require content knowledge.
10	This is a process item that does not require any content knowledge.
10	Does not require content knowledge.
11	Does not require content knowledge.
12	The item has weak alignment to the content objective.
12	Does not require content knowledge.
13	Safety
14	The item aligns at the standard level but not at the objective level.
15	This is a safety item.
15	No content required.
15	Safety
15	Safety Question-No content required to answer this question.
16	This is a process item and does not require any content knowledge.
16	No content required.
16	Does not require content knowledge.
16	No content about geese required to answer this question.
17	Safety
19	This is a safety item.
19	No content required.
19	Safety question-No content knowledge required to answer.
20	This is a safety item.
20	No content required.
20	Safety
20	Safety question-no content required.
22	Does not require content knowledge.
23	Does not require content knowledge.
24	This is a safety item.
24	No content required.
24	Safety
24	Safety question-no content required.
26	This is a process item and does not require any content knowledge.
26	Does not require content knowledge.
27	This is a process item and does not require any content knowledge.
27	Does not require content knowledge.
38	This is a process item and does not require any content knowledge.
38	Does not require content knowledge.
42	This is a process item and does not require any content knowledge.
43	This is a process item and does not require any content knowledge.
43	Does not require content knowledge.
43	No content knowledge required
44	Math problem
48	This is a safety item.
48	No content required.

Table 9-12.7

Notes by Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Content

Item Number	Comments by Reviewer
48	Safety
56	Item has weak alignment to the content objective.
62	This is a process item and does not require any content knowledge.
63	This is a process item and does not require any content knowledge.
63	No content required.
63	Does not require content knowledge.
63	Do not need to know anything about the specialized cells in the heart to answer this question.
67	This is a process item and does not require any content knowledge.
68	This is a process item and does not require any content knowledge.
68	Does not require content knowledge.
68	Math Problem
70	Does not require content knowledge.
75	The item has weak alignment to the content objective.
77	This is a process item and does not require any content knowledge.
77	Does not require content knowledge.
80	This is a process item and does not require any content knowledge.
80	No content required.
80	Does not require content knowledge.
80	No biology content in this item.

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Content

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	DOK 2	PObj 2	DOK 3	PObj 3	S1Ob j3	S2Ob j3	DOK 4	PObj 4	S1Ob j4
1	2			2			1		1	B.4.3			1		
2	2	B.4.3		2	B.6.2		2	B.4.3	2	B.4.3			2	B.4.3	B.6.2
3	2			2	B.6.2		3		2	B.5.1			2	B.5.2	
4	2	B.4.2		2	B.4.2		3	B.4.2	1	B.4.2			2	B.4.2	
5															
6	2	B.2.2		2	B.2.2		3	B.2.2	3	B.2.2			3	B.2.2	
7	2	B.5.1		3	B.5.1		3		3	B.5.1			3	B.5.1	
8	3	B.2.2		2	B.2.2		2	B.2.2	2	B.2.2	B.3.1		3	B.2.2	
9	2	B.1.2		1	B.1.2		2	B.1.2	2	B.1.2			2	B.1.2	
10															
11															
12	1	B.1.2		2	B.1.2		2		1	B.1.1			1	B.1.2	
13	3	B.4.3		3	B.3.2		3	B.3.2	3	B.3.2			2	B.3.2	
14	1	B.2		1	B.2.1		1	B.2.1	2	B.1.2			1	B.2.1	
15	1			2			1		1	B.4.1			1		
16	2			1			1		3	B.4.3			1		
17															
18															
19															
20	2			2			1		1	B.4.1			1		
21	2	B.5.2		2	B.5.2		2	B.5.2	3	B.5.2			2	B.5.2	
22	2	B.4.3		2	B.4.3		2		3	B.4.3			2	B.4.3	
23	3	B.4.3		2	B.4.3		3		3	B.6.2			3	B.4.1	
24	1			2			1		1	B.4.1			1		
25	1	B.1.1		2	B.1.1		2	B.2.1	2	B.1.2			2	B.1.1	
26	1			2	B.4.2		2		3	B.5.2			2	B.5.2	
27															
28															
29	1	B.3.1	B.1.1	2	B.1.1		2	B.1.1	2	B.1.1			2	B.1.1	
30	2	B.1.2		2	B.1.2		3	B.1.2	2	B.6.2			1	B.1.2	
31	2	B.2.2		2	B.4.3		3	B.2.2	3	B.2.2			2	B.2.2	B.4.3
32	1	B.1.1		2	B.1.1		1	B.5.1	1	B.1.1	B.5.1		1	B.1.1	
33	2	B.5.2		2	B.5.1	B.5.2	1	B.5.2	2	B.5.2			2	B.5.2	
34	2	B.4.2		2	B.4.2		2	B.4.2	2	B.4.3			3	B.4.2	
35															
36															
37	2	B.4.3		2	B.3.2		2	B.3.2	2	B.6.2			2	B.4.3	B.3.2
38	2			2	B.6.2		2		3	B.6.1			2	B.5.2	

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Content

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	DOK 2	PObj 2	DOK 3	PObj 3	S1Ob j3	S2Ob j3	DOK 4	PObj 4	S1Ob j4
39	1	B.4.3		3	B.3.2		2	B.6.2	2	B.6.2			2	B.3.2	
40	2	B.3.1		3	B.2.1		2	B.6.2	2	B.3.1			2	B.3.1	
41	2	B.4.2		2	B.6.2		3	B.6.2	2	B.6.2			3	B.6.2	
42	3			2	B.3.1		3	B.3.1	3	B.3.1			2	B.3.1	
43	1			2	B.3.1		1		3	B.3.1			1		
44	2	B.6.2		2	B.6.2		3	B.6.2	3	B.3.2			1		
45	2	B.5.2		2	B.5.2		2	B.5.2	2	B.5.2			2	B.5.2	
46	2	B.4.3		2	B.6.2		1	B.6.1	3	B.6.1	B.6.2	B.1.2	1	B.3.2	
47															
48															
49	2	B.4.3		3	B.4.3		2	B.4.3	1	B.4.3			2	B.4.3	
50	1	B.1.1		1	B.1.1		1	B.1.1	2	B.1.1			1	B.1.1	
51	2	B.2.2		2	B.2.1		1	B.2.1	2	B.1.2	B.2.2		2	B.2.1	
52															
53															
54															
55	1	B.4.1		1	B.4.1	B.5.2	1	B.5.2	1	B.5.2			2	B.5.2	
56	2	B.6.1		3	B.6.1		2	B.6.1	3	B.1.2	B.6.1		2	B.6.1	
57	2	B.2.1		1	B.2.1		1	B.2.1	2	B.2.1			2	B.2.1	
58	1	B.2.1		2	B.2.1		1	B.2.1	3	B.2.1	B.1.1		1	B.2.1	
59	2	B.4.2		2	B.4.2		3	B.4.2	3	B.4.2			2	B.4.2	
60	2	B.2.2		3	B.2.2		2	B.2.2	3	B.2.2			2	B.2.2	
61	2	B.5.2		3	B.5.2		2	B.5.2	2	B.5.2			2	B.5.2	
62															
63															
64	2	B.5.1		2	B.5.1		2	B.5.1	2	B.5.1	B.6.2		2	B.5.1	
65	2	B.5.1		2	B.5.1		3	B.5.1	3	B.5.1	B.6.1		2	B.5.1	
66	2	B.5.1		3	B.5.1		3	B.5.1	2	B.5.1	B.6.1		3	B.5.1	
67	2			2	B.3.1		2	B.3.1	2	B.3.2	B.1.2		2	B.3.1	
68	2			3			2		2	B.2.1	B.1.2		2		
69	2	B.5.1		2	B.5.1		3	B.5.1	2	B.5.1	B.4.1	B.1.1	2	B.6.2	
70	2	B.4.2		3	B.4.2		3		3	B.3.2			2	B.4.2	
71	3	B.3.1		2	B.3.1		3	B.3.1	3	B.3.1			3	B.3.1	
72															
73															
74	1	B.1.2		1	B.1.2		2	B.1.2	2	B.1.1	B.1.2		1	B.1.2	
75	1	B.4.1		1	B.4.1		2	B.4.1	2	B.4.1			1	B.4.1	
76	2	B.2.2		2	B.2.2		2	B.2.2	2	B.2.2	B.3.2		2	B.2.2	

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Content

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	DOK 2	PObj 2	DOK 3	PObj 3	S1Ob j3	S2Ob j3	DOK 4	PObj 4	S1Ob j4
77	3			3	B.6.2	B.6.1	3		3	B.6.2	B.6.1		3	B.6.2	
78															
79	2	B.1.2		1	B.1.2		2	B.1.2	2	B.1.2			1	B.1.2	
80	2			2			3		3	B.5.1			2		

**Objective Pairwise Comparison:** 0.6508

**Standard Pairwise Comparison:** 0.718

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Content

Low		Medium		High
0		3.4625		7

1	B.4.3					
2	B.4.3	B.4.3	B.4.3	B.4.3	B.6.2	B.6.2
3	B.5.1	B.5.2	B.6.2			
4	B.4.2	B.4.2	B.4.2	B.4.2	B.4.2	
5						
6	B.2.2	B.2.2	B.2.2	B.2.2	B.2.2	
7	B.5.1	B.5.1	B.5.1	B.5.1		
8	B.2.2	B.2.2	B.2.2	B.2.2	B.2.2	B.3.1
9	B.1.2	B.1.2	B.1.2	B.1.2	B.1.2	
10						
11						
12	B.1.1	B.1.2	B.1.2	B.1.2		
13	B.3.2	B.3.2	B.3.2	B.3.2	B.4.3	
14	B.1.2	B.2	B.2.1	B.2.1	B.2.1	
15	B.4.1					
16	B.4.3					
17						
18						
19						
20	B.4.1					
21	B.5.2	B.5.2	B.5.2	B.5.2	B.5.2	
22	B.4.3	B.4.3	B.4.3	B.4.3		
23	B.4.1	B.4.3	B.4.3	B.6.2		
24	B.4.1					
25	B.1.1	B.1.1	B.1.1	B.1.2	B.2.1	
26	B.4.2	B.5.2	B.5.2			
27						
28						
29	B.1.1	B.1.1	B.1.1	B.1.1	B.1.1	B.3.1
30	B.1.2	B.1.2	B.1.2	B.1.2	B.6.2	
31	B.2.2	B.2.2	B.2.2	B.2.2	B.4.3	B.4.3
32	B.1.1	B.1.1	B.1.1	B.1.1	B.5.1	B.5.1
33	B.5.1	B.5.2	B.5.2	B.5.2	B.5.2	B.5.2
34	B.4.2	B.4.2	B.4.2	B.4.2	B.4.3	
35						
36						
37	B.3.2	B.3.2	B.3.2	B.4.3	B.4.3	B.6.2
38	B.5.2	B.6.1	B.6.2			
39	B.3.2	B.3.2	B.4.3	B.6.2	B.6.2	
40	B.2.1	B.3.1	B.3.1	B.3.1	B.6.2	
41	B.4.2	B.6.2	B.6.2	B.6.2	B.6.2	
42	B.3.1	B.3.1	B.3.1	B.3.1		
43	B.3.1	B.3.1				
44	B.3.2	B.6.2	B.6.2	B.6.2		
45	B.5.2	B.5.2	B.5.2	B.5.2	B.5.2	

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Content

46	B.1.2	B.3.2	B.4.3	B.6.1	B.6.1	B.6.2	B.6.2
47							
48							
49	B.4.3	B.4.3	B.4.3	B.4.3	B.4.3		
50	B.1.1	B.1.1	B.1.1	B.1.1	B.1.1		
51	B.1.2	B.2.1	B.2.1	B.2.1	B.2.2	B.2.2	
52							
53							
54							
55	B.4.1	B.4.1	B.5.2	B.5.2	B.5.2	B.5.2	
56	B.1.2	B.6.1	B.6.1	B.6.1	B.6.1	B.6.1	
57	B.2.1	B.2.1	B.2.1	B.2.1	B.2.1		
58	B.1.1	B.2.1	B.2.1	B.2.1	B.2.1	B.2.1	
59	B.4.2	B.4.2	B.4.2	B.4.2	B.4.2		
60	B.2.2	B.2.2	B.2.2	B.2.2	B.2.2		
61	B.5.2	B.5.2	B.5.2	B.5.2	B.5.2		
62							
63							
64	B.5.1	B.5.1	B.5.1	B.5.1	B.5.1	B.6.2	
65	B.5.1	B.5.1	B.5.1	B.5.1	B.5.1	B.6.1	
66	B.5.1	B.5.1	B.5.1	B.5.1	B.5.1	B.6.1	
67	B.1.2	B.3.1	B.3.1	B.3.1	B.3.2		
68	B.1.2	B.2.1					
69	B.1.1	B.4.1	B.5.1	B.5.1	B.5.1	B.5.1	B.6.2
70	B.3.2	B.4.2	B.4.2	B.4.2			
71	B.3.1	B.3.1	B.3.1	B.3.1	B.3.1		
72							
73							
74	B.1.1	B.1.2	B.1.2	B.1.2	B.1.2	B.1.2	
75	B.4.1	B.4.1	B.4.1	B.4.1	B.4.1		
76	B.2.2	B.2.2	B.2.2	B.2.2	B.2.2	B.3.2	
77	B.6.1	B.6.1	B.6.2	B.6.2	B.6.2		
78							
79	B.1.2	B.1.2	B.1.2	B.1.2	B.1.2		
80	B.5.1						

Table 9-12.10

Items Coded by Reviewers to Each Objective

OCCT EOI Biology I Spring 2009 Form 1 Content

Low		Medium		High
0		13.85		29

B.1																				
B.1.1	12	25	25	25	29	29	29	29	29	32	32	32	32	50	50	50	50	50	58	69
	74																			
B.1.2	9	9	9	9	9	12	12	12	14	25	30	30	30	30	46	51	56	67	68	74
	74	74	74	74	79	79	79	79	79											
B.2	14																			
B.2.1	14	14	14	25	40	51	51	51	57	57	57	57	57	58	58	58	58	58	68	
B.2.2	6	6	6	6	6	8	8	8	8	8	31	31	31	31	51	51	60	60	60	60
	60	76	76	76	76	76														
B.3																				
B.3.1	8	29	40	40	40	42	42	42	42	43	43	67	67	67	71	71	71	71	71	
B.3.2	13	13	13	13	37	37	37	39	39	44	46	67	70	76						
B.4																				
B.4.1	15	20	23	24	55	55	69	75	75	75	75	75								
B.4.2	4	4	4	4	4	26	34	34	34	34	41	59	59	59	59	59	70	70	70	
B.4.3	1	2	2	2	2	13	16	22	22	22	22	23	23	31	31	34	37	37	39	46
	49	49	49	49	49															
B.5																				
B.5.1	3	7	7	7	7	32	32	33	64	64	64	64	64	65	65	65	65	65	66	66
	66	66	66	69	69	69	69	80												
B.5.2	3	21	21	21	21	21	26	26	33	33	33	33	33	38	45	45	45	45	45	55
	55	55	55	61	61	61	61	61												
B.6																				
B.6.1	38	46	46	56	56	56	56	56	65	66	77	77								
B.6.2	2	2	3	23	30	37	38	39	39	40	41	41	41	41	44	44	44	46	46	64
	69	77	77	77																

Table 9-12.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Content

Low		Medium		High
1		2		5

B.1													
B.1.1	12:1	25:3	29:5	32:4	50:5	58:1	69:1	74:1					
B.1.2	9:5	12:3	14:1	25:1	30:4	46:1	51:1	56:1	67:1	68:1	74:5	79:5	
B.2	14:1												
B.2.1	14:3	25:1	40:1	51:3	57:5	58:5	68:1						
B.2.2	6:5	8:5	31:4	51:2	60:5	76:5							
B.3													
B.3.1	8:1	29:1	40:3	42:4	43:2	67:3	71:5						
B.3.2	13:4	37:3	39:2	44:1	46:1	67:1	70:1	76:1					
B.4													
B.4.1	15:1	20:1	23:1	24:1	55:2	69:1	75:5						
B.4.2	4:5	26:1	34:4	41:1	59:5	70:3							
B.4.3	1:1	2:4	13:1	16:1	22:4	23:2	31:2	34:1	37:2	39:1	46:1	49:5	
B.5													
B.5.1	3:1	7:4	32:2	33:1	64:5	65:5	66:5	69:4	80:1				
B.5.2	3:1	21:5	26:2	33:5	38:1	45:5	55:4	61:5					
B.6													
B.6.1	38:1	46:2	56:5	65:1	66:1	77:2							
B.6.2	2:2	3:1	23:1	30:1	37:1	38:1	39:2	40:1	41:4	44:3	46:2	64:1	69:1
	77:3												

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Content

Low		Medium		High
1		2		5

1	B.4.3: 1			
2	B.4.3: 4	B.6.2: 2		
3	B.5.1: 1	B.5.2: 1	B.6.2: 1	
4	B.4.2: 5			
5				
6	B.2.2: 5			
7	B.5.1: 4			
8	B.2.2: 5	B.3.1: 1		
9	B.1.2: 5			
10				
11				
12	B.1.1: 1	B.1.2: 3		
13	B.3.2: 4	B.4.3: 1		
14	B.1.2: 1	B.2.1: 1	B.2.1: 3	
15	B.4.1: 1			
16	B.4.3: 1			
17				
18				
19				
20	B.4.1: 1			
21	B.5.2: 5			
22	B.4.3: 4			
23	B.4.1: 1	B.4.3: 2	B.6.2: 1	
24	B.4.1: 1			
25	B.1.1: 3	B.1.2: 1	B.2.1: 1	
26	B.4.2: 1	B.5.2: 2		

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Content

27					
28					
29	B.1.1: 5	B.3.1: 1			
30	B.1.2: 4	B.6.2: 1			
31	B.2.2: 4	B.4.3: 2			
32	B.1.1: 4	B.5.1: 2			
33	B.5.1: 1	B.5.2: 5			
34	B.4.2: 4	B.4.3: 1			
35					
36					
37	B.3.2: 3	B.4.3: 2	B.6.2: 1		
38	B.5.2: 1	B.6.1: 1	B.6.2: 1		
39	B.3.2: 2	B.4.3: 1	B.6.2: 2		
40	B.2.1: 1	B.3.1: 3	B.6.2: 1		
41	B.4.2: 1	B.6.2: 4			
42	B.3.1: 4				
43	B.3.1: 2				
44	B.3.2: 1	B.6.2: 3			
45	B.5.2: 5				
46	B.1.2: 1	B.3.2: 1	B.4.3: 1	B.6.1: 2	B.6.2: 2
47					
48					
49	B.4.3: 5				
50	B.1.1: 5				
51	B.1.2: 1	B.2.1: 3	B.2.2: 2		
52					
53					
54					
55	B.4.1: 2	B.5.2: 4			

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Content

56	B.1.2: 1	B.6.1: 5		
57	B.2.1: 5			
58	B.1.1: 1	B.2.1: 5		
59	B.4.2: 5			
60	B.2.2: 5			
61	B.5.2: 5			
62				
63				
64	B.5.1: 5	B.6.2: 1		
65	B.5.1: 5	B.6.1: 1		
66	B.5.1: 5	B.6.1: 1		
67	B.1.2: 1	B.3.1: 3	B.3.2: 1	
68	B.1.2: 1	B.2.1: 1		
69	B.1.1: 1	B.4.1: 1	B.5.1: 4	B.6.2: 1
70	B.3.2: 1	B.4.2: 3		
71	B.3.1: 5			
72				
73				
74	B.1.1: 1	B.1.2: 5		
75	B.4.1: 5			
76	B.2.2: 5	B.3.2: 1		
77	B.6.1: 2	B.6.2: 3		
78				
79	B.1.2: 5			
80	B.5.1: 1			

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT EOI Biology I Spring 2009 Form 1 Content

Low DOK		Matched DOK		High DOK
1		2		5

B.1														
[2]:														
B.1.1	12:1[1]:	25:3[1.67]	29:5[1.8]	32:4[1.25]	50:5[1.2]	58:1[3]	69:1[2]	74:1[2]						
B.1.2	9:5[1.8]	12:3[1.33]	14:1[2]	25:1[2]	30:4[2]	46:1[3]	51:1[2]	56:1[3]	67:1[2]	68:1[2]	74:5[1.4]	79:5[1.6]		
[2]:														
B.2	14:1[1]													
[3]:														
B.2.1	14:3[1]	25:1[2]	40:1[3]	51:3[1.67]	57:5[1.6]	58:5[1.6]	68:1[2]							
[2]:														
B.2.2	6:5[2.6]	8:5[2.4]	31:4[2.5]	51:2[2]	60:5[2.4]	76:5[2]								
[3]:														
B.3														
[3]:														
B.3.1	8:1[2]	29:1[1]	40:3[2]	42:4[2.5]	43:2[2.5]	67:3[2]	71:5[2.8]							
[3]:														
B.3.2	13:4[2.75]	37:3[2]	39:2[2.5]	44:1[3]	46:1[1]	67:1[2]	70:1[3]	76:1[2]						
[3]:														
B.4														
[2]:														
B.4.1	15:1[1]	20:1[1]	23:1[3]	24:1[1]	55:2[1]	69:1[2]	75:5[1.4]							
[2]:														
B.4.2	4:5[2]	26:1[2]	34:4[2.25]	41:1[2]	59:5[2.4]	70:3[2.33]								
[2]:														
B.4.3	1:1[1]	2:4[2]	13:1[3]	16:1[3]	22:4[2.25]	23:2[2.5]	31:2[2]	34:1[2]	37:2[2]	39:1[1]	46:1[2]	49:5[2]		
[3]:														
B.5														
[3]:														
B.5.1	3:1[2]	7:4[2.75]	32:2[1]	33:1[2]	64:5[2]	65:5[2.4]	66:5[2.6]	69:4[2.25]	80:1[3]					
[2]:														
B.5.2	3:1[2]	21:5[2.2]	26:2[2.5]	33:5[1.8]	38:1[2]	45:5[2]	55:4[1.25]	61:5[2.2]						
[3]:														
B.6														
[3]:														
B.6.1	38:1[3]	46:2[2]	56:5[2.4]	65:1[3]	66:1[2]	77:2[3]								
[2]:														
B.6.2	2:2[2]	3:1[2]	23:1[3]	30:1[2]	37:1[2]	38:1[2]	39:2[2]	40:1[2]	41:4[2.5]	44:3[2.33]	46:2[2.5]	64:1[2]	69:1[2]	
[3]:														
	77:3[3]													

Table 9-12.14

Group Consensus

OCCT EOI Biology I Content Standards, Science, Grade 10

Level	Description	DOK
B.1	The Cell - Cells are the fundamental unit of life, composed of a variety of structures that perform functions necessary to maintain life. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
B.1.1	Cells are composed of a variety of structures such as the nucleus, cell membrane, cell wall, cytoplasm, ribosomes, mitochondria, and chloroplasts.	1
B.1.2	Cells can differentiate and may develop into complex multicellular organisms (i.e., cells, tissues, organs, organ systems, organisms).	2
B.2	The Molecular Basis of Heredity - DNA determines the characteristics of organisms. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	3
B.2.1	Cells function according to the information contained in the master code of DNA (i.e., cell cycle, DNA to DNA, and DNA to RNA). Transfer RNA and protein synthesis will be taught in life science courses with rigor greater than Biology I.	2
B.2.2	A sorting and recombination of genes in reproduction results in a great variety of possible gene combinations from the offspring of any two parents (i.e., Punnett squares and pedigrees). Students will understand the following concepts in a single trait cross: alleles, dominant trait, recessive trait, phenotype, genotype, homozygous, and heterozygous.	3
B.3	Biological Diversity - Diversity of species is developed through gradual processes over many generations. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	3
B.3.1	Different species might look dissimilar, but the unity among organisms becomes apparent from an analysis of internal structures, the similarity of their chemical processes, and the evidence of common ancestry (e.g., homologous and analogous structures).	3
B.3.2	Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology, which may enhance or limit the survival and reproductive success in a particular environment.	3
B.4	The Interdependence of Organisms - Interrelationships and interactions between and among organisms in an environment is the interdependence of organisms. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	2
B.4.1	Matter on the earth cycles among the living and nonliving components of the biosphere.	2
B.4.2	Organisms both cooperate and compete in ecosystems (i.e., parasitism and symbiosis).	2
B.4.3	Living organisms have the capacity to produce populations of infinite size, but environments and resources limit population size (i.e., carrying capacity and limiting factors).	3
B.5	Matter, Energy, and Organization in Living Systems - Living systems require a continuous input of energy to maintain their chemical and physical organizations. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	3
B.5.1	The complexity and organization of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain the organism (i.e., photosynthesis and cellular respiration).	2
B.5.2	As matter and energy flow through different levels of organization of living systems and between living systems and the physical environment, chemical elements are recombined in different ways by different structures. Matter and energy are conserved in each change (i.e., water cycle, carbon cycle, nitrogen cycle, food webs, and energy pyramids).	3
B.6	The Behavior of Organisms - Organisms have behavioral responses to internal changes and to external stimuli. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:	3
B.6.1	Specialized cells enable organisms to monitor what is going on in the world around them (e.g., detect light, sound, specific chemicals, gravity, plant tropism, sense organs, homeostasis).	2
B.6.2	Responses to external stimuli can result from interactions with the organism's own species and others, as	3

Table 9-12.14

Group Consensus

OCCT EOI Biology I Content Standards, Science, Grade 10

Level	Description	DOK
	well as environmental changes; these responses either can be innate or learned. Broad patterns of behavior exhibited by animals have changed over time to ensure reproductive success.	

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

- Standard 6 seemed underrepresented. Standard 3 seemed somewhat underrepresented for objective 2 in addressing the mechanisms of natural selection.
- Yes
- Yes
- Lots of standard 5

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

- The range of DOK levels seemed to match the standards except for standard 6 where there were very few items that were all at level 2.
- Yes
- Yes
- yes

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

- The expectations for Standard 1 seem to be below the high school Biology 1 level in that cell and cellular organelle functions are not addresses in the objectives.
- Yes
- Yes
- yes

**D. What is your general opinion of the alignment between the standards and assessment:**

- ii. Acceptable Alignment (4) : 80%
- iv. Needs major improvement (1) : 20%

**E. Comments**

- The major need for improvement is primarily related to the number of items that were exclusively process items and did not require any content knowledge.
- For item sets 42-43 and 65-66, both items for each stimulus seemed to be matching the same standard. This is usually discouraged with clustered items because a misunderstanding of the stimulus will lead to a disproportionately low score in that standard.



## **Appendix H: Alignment Analysis Tables—Biology I (Process)**



Table 9-12.1

Categorical Concurrence Between Standards and Assessment as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Process

Number of Assessment Items - 60

Standards			Level by Objective			Hits		Cat. Concurr.
Title	Goals #	Objs #	Level	# of objs by Level	% w/in std by Level	Mean	S.D.	
PS.1 - Observe and Measure - Observing is the first actio ...	3	3	2	3	100	7.8	2.14	YES
PS.2 - Classify - Classifying establishes order. Organism ...	2	2	2	2	100	6.8	0.98	YES
PS.3 - Experiment - Experimenting is a method of discover ...	5	5	1 2 3	1 2 2	20 40 40	17.2	3.19	YES
PS.4 - Interpret and Communicate - Interpreting is the pr ...	5	5	2 3	1 4	20 80	26.4	7.79	YES
PS.5 - Model - Modeling is the active process of forming ...	2	2	3	2	100	10.4	2.24	YES
Total	17	17	1 2 3	1 8 8	5 47 47	68.6	7.23	

Table 9-12.2

Depth-of-Knowledge Consistency Between Standards and Assessment as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Process

Number of Assessment Items - 60

Standards			Hits		Level of Item w.r.t. Standard						DOK Consistency
					% Under		% At		% Above		
Title	Goals #	Objs #	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
PS.1 - Observe and Measure - Observing is the first actio ...	3	3	7.8	2.14	35	34	58	35	7	16	YES
PS.2 - Classify - Classifying establishes order. Organism ...	2	2	6.8	0.98	33	36	42	28	24	32	YES
PS.3 - Experiment - Experimenting is a method of discover ...	5	5	17.2	3.19	30	41	57	39	13	25	YES
PS.4 - Interpret and Communicate - Interpreting is the pr ...	5	5	26.4	7.79	59	33	35	28	6	13	WEAK
PS.5 - Model - Modeling is the active process of forming ...	2	2	10.4	2.24	70	24	30	24	0	0	NO
Total	17	17	68.6	7.23	45	38	46	35	9	21	

Table 9-12.3

Range-of-Knowledge Correspondence and Balance of Representation Between Standards and Assessment as Rated by Five Reviewers  
 OCCT EOI Biology I Spring 2009 Form 1 Process  
 Number of Assessment Items - 60

Standards			Hits		Range of Objectives				Rng. of Know.	Balance Index				Bal. of Represent.
					# Objs Hit		% of Total			% Hits in Std/Ttl Hits		Index		
Title	Goals #	Objs #	Mean	S.D.	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
PS.1 - Observe and Measure - Observing is the first actio ...	3	3	7.8	2.14	2.8	0.4	93	13	YES	12	4	0.75	0.06	YES
PS.2 - Classify - Classifying establishes order. Organism ...	2	2	6.8	0.98	1.8	0.4	90	20	YES	10	2	0.81	0.14	YES
PS.3 - Experiment - Experimenting is a method of discover ...	5	5	17.2	3.19	5	0	100	0	YES	25	4	0.84	0.05	YES
PS.4 - Interpret and Communicate - Interpreting is the pr ...	5	5	26.4	7.79	4.8	0.4	96	8	YES	38	7	0.78	0.07	YES
PS.5 - Model - Modeling is the active process of forming ...	2	2	10.4	2.24	2	0	100	0	YES	15	4	0.91	0.07	YES
Total	17	17	68.6	7.23	3.28	1.40	96	12		20	11	0.82	0.10	

Table 9-12.4

Summary of Attainment of Acceptable Alignment Level on Four Content Focus Criteria as Rated by Five Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Process

Number of Assessment Items - 60

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of- Knowledge Consistency	Range of Knowledge	Balance of Representation
PS.1 - Observe and Measure - Observing is the first actio ...	YES	YES	YES	YES
PS.2 - Classify - Classifying establishes order. Organism ...	YES	YES	YES	YES
PS.3 - Experiment - Experimenting is a method of discover ...	YES	YES	YES	YES
PS.4 - Interpret and Communicate - Interpreting is the pr ...	YES	WEAK	YES	YES
PS.5 - Model - Modeling is the active process of forming ...	YES	NO	YES	YES

Table 9-12.5

Source-of-Challenge Issues by Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Process

Item Number	Comments by Reviewer
2	If no births occurred prior to the study, birth rate cannot decrease. It can be lower than the birth rate in other treatments, but it cannot decrease.
7	This item does not describe an experiment. There is no control.
7	"Humidity" may be an unfamiliar term.
8	Many teachers do not know to teach students the term "purebred".
9	This item describes experimentation on animals. This one isn't severe, but may cause concern from certain groups.
10	This item seems to elude to the peppered moth study, which has since been found to be fraudulent.
11	This item does not describe an experiment, as it doesn't have a control group.
13	Hermit crabs do not grow their own shells (white, black, or speckled). They move into existing shells that wash up. There will likely be no difference or change in shell color distribution since the shells come from the ocean.
14	Should choices H & J read, "different FROM"?
14	Noble citation paragraph not necessary to the question.
15	Most teachers tell students to inform them and allow the instructor to dispose of broken glass.
17	Skin scrapings are largely discouraged for school lab activities.
17	Make "chloroplasts" singular.
18	Instead of "chloroplasts visible", change to "chloroplasts present".
20	"What" should be "Which".
25	Vacuoles are non-assessable.
26	This is not an experiment. There is no control group.
26	Stem is way too long. Diagrams are irrelevant.
28	Many teachers do not teach the term "by-product".
31	The question is somewhat misleading to the student. The information provided indirectly relates to the answer according to how the question is interpreted.
35	All are plausible-- not GOOD designs, but plausible.
39	The primary skill involved in this item seems to be reading.
39	"What" should be "Which".
40	"What" should be "Which".
41	The circumstance as presented in the item stem does not represent a valid scientific experiment.
41	This is not an experiment. There is no control group. The text of the stem doesn't tell the outcome. It has to be guessed from the correct option.
41	Backwards reasoning. Fits standard but not one of the objectives
44	All four options are equally valid.
52	There is the potential for more than one plausible correct response due to interdependence between answer choices.
56	Add a comma to close that clause.
60	I couldn't find any animal where brown eyes were dominant over blue except humans. In humans, however, eye color is ruled by multiple alleles. This item suggests that it is one allele.
62	Teachers do not know that they should teach the math of exponential growth at this level of complexity.
66	No correct answer. Nothing is measured indirectly.
68	Suggesting a straight ratio (3:1) is deceptive because surface area and volume are not measured in the same units.
69	A student who has not performed this lab will not know the role of petroleum jelly and will not be able to answer this question.

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT EOI Biology I Spring 2009 Form 1 Process

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
1	2	2	1	1	1
2	2	2	2	2	2
3	2	2	3	2	2
4	2	2	3	1	2
5					
6	2	2	3	3	3
7	2	3	3	3	3
8	3	2	2	2	3
9	2	1	2	2	2
10					
11					
12	1	2	2	1	2
13	3	3	3	3	2
14	1	1	1	2	1
15	1	2	1	1	1
16	2	1	1	3	2
17					
18					
19					
20	2	2	1	1	1
21	2	2	2	3	2
22	2	2	2	3	2
23	3	3	3	3	3
24	1	2	1	1	1
25	1	2	2	2	2
26	1	2	2	3	2
27					
28					
29	1	2	2	2	2
30	2	2	3	2	1
31	2	2	3	3	2
32	1	2	1	1	1
33	2	2	1	2	2
34	2	3	2	2	3
35					
36					
37	2	2	2	2	2
38	2	2	2	3	2
39	1	3	2	2	2
40	2	3	2	2	2
41	2	2	3	2	3
42	3	2	3	3	2
43	1	2	1	3	1
44	2	2	2	3	1
45	2	2	2	2	2
46	2	2	1	3	1
47					
48					

Table 9-12.6

Depth-of-Knowledge Levels by Item and Reviewers

Intraclass Correlation

OCCT EOI Biology I Spring 2009 Form 1 Process

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5
49	2	3	2	1	2
50	1	1	1	2	1
51	2	2	1	2	2
52					
53					
54					
55	1	1	1	1	1
56	2	3	2	3	2
57	2	1	1	2	2
58	1	2	1	3	1
59	2	2	3	3	2
60	2	3	2	3	2
61	2	3	2	2	2
62					
63					
64	2	2	2	2	2
65	2	2	3	3	2
66	2	3	3	2	2
67	2	2	2	2	2
68	2	3	2	2	2
69	2	2	3	2	2
70	2	3	3	3	2
71	3	2	3	2	3
72					
73					
74	1	1	2	2	1
75	1	1	2	2	1
76	2	2	2	2	2
77	3	3	3	3	3
78					
79	2	1	2	2	1
80	2	2	3	3	2

**Intraclass Correlation:** 0.7773

**Pairwise Comparison:** 0.5367

Table 9-12.7

Notes by Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Process

Item Number	Comments by Reviewer
2	"What" should be "Which", else there are other, and maybe better options in the world available.
5	Also - this is animal experimentation. May cause problems when items are released. The item requires recall of knowledge and does not require science process/inquiry skills.
8	Student must take multiple steps. Incomplete dominance in organism.
14	Item requires recall of content knowledge and does not require science process/inquiry skills.
28	Mass and volume would both work until the student looks at the prefix...therefore it is a level 2.
30	The item requires content knowledge and does not require any science process/inquiry skills.
39	The primary skill involved in this item seems to be reading.
41	The item is a very weak measure of the science process/inquiry skill.
44	Weak alignment with P3.1.
51	The item requires content knowledge and does not require a grade-level appropriate science process/inquiry skill. The use of the table as a stimulus in the item is artificial.
55	Item has very weak alignment to the science process/inquiry objective.
55	No process standard is addressed by this question.
58	Does not align to a process standard.
60	Does not align with a process standard.
75	The item requires recall of content knowledge and does not require science process/inquiry skills.
78	The item requires content knowledge but does not require science process/inquiry skills.

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Process

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	S2Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	S1Ob j3	DOK 4	PObj 4	S1Ob j4
1	2	PS.3.5		2	PS.3.5			1	PS.3.5		1	PS.3.5		1	PS.3.5	
2	2	PS.3.4	PS.3.2	2	PS.3.4	PS.3.1		2	PS.3.4		2	PS.3.4	PS.4.4	2	PS.3.4	
3	2	PS.3.1		2	PS.3.1			3	PS.3.1		2	PS.3.1		2	PS.3.1	
4	2	PS.2.1		2	PS.4.1	PS.1.1		3	PS.2.1		1	PS.2.1		2	PS.2.1	
5																
6	2	PS.3.3	PS.5.2	2	PS.3.3			3	PS.5.2		3	PS.5.2		3	PS.5.1	PS.3.3
7	2	PS.3.1	PS.3.2	3	PS.4.5			3	PS.3.1		3	PS.3.1		3	PS.3.1	
8	3	PS.3.3	PS.5.2	2	PS.3.3			2	PS.5.2		2	PS.3.3		3	PS.5.1	PS.3.3
9	2	PS.1.2		1	PS.1.2			2	PS.1.2		2	PS.1.2		2	PS.1.2	
10																
11																
12	1	PS.1.3		2	PS.1.3			2	PS.1.3		1	PS.1.3		2	PS.1.3	
13	3	PS.4.1	PS.4.3	3	PS.1.1	PS.4.8	PS.4.3	3	PS.4.1		3	PS.5.2		2	PS.4.8	PS.1.1
14	1			1	PS.4.1			1	PS.1.1		2	PS.1.1		1	PS.5.2	
15	1	PS.3.5		2	PS.3.5			1	PS.3.5		1	PS.3.5		1	PS.3.5	
16	2	PS.4.8		1	PS.4.8	PS.4.3		1	PS.4.8		3	PS.4.5		2	PS.4.8	
17																
18																
19																
20	2	PS.3.5		2	PS.3.5			1	PS.3.5		1	PS.3.5		1	PS.3.5	
21	2	PS.5.2	PS.3.3	2	PS.5.2			2	PS.5.2		3	PS.5.2		2	PS.5.2	PS.3.3
22	2	PS.4.8		2	PS.4.8	PS.4.5		2	PS.4.8		3	PS.4.5		2	PS.4.8	
23	3	PS.4.	PS.4.	3	PS.4.	PS.4.		3	PS.4.		3	PS.5.		3	PS.4.	

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Process

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	S2Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	S1Ob j3	DOK 4	PObj 4	S1Ob j4
		5	3		5	3			5			1			5	
24	1	PS.3.5		2	PS.3.5			1	PS.3.5		1	PS.3.5		1	PS.3.5	
25	1	PS.1.2		2	PS.1.2			2	PS.1.2		2	PS.1.1		2	PS.1.2	
26	1	PS.3.2		2	PS.3.2			2	PS.3.2		3	PS.3.2		2	PS.3.2	
27																
28																
29	1	PS.2.1		2	PS.2.1			2	PS.2.1		2	PS.2.1	PS.2.2	2	PS.2.1	
30	2			2	PS.1.1			3	PS.1.1		2	PS.1.1		1	PS.5.2	
31	2	PS.4.1		2	PS.1.1			3	PS.1.1		3	PS.1.1		2	PS.1.1	
32	1	PS.1.2		2	PS.1.2			1	PS.1.2		1	PS.1.2		1	PS.1.2	
33	2	PS.5.1		2	PS.5.2			1	PS.5.1		2	PS.5.1	PS.4.3	2	PS.5.1	
34	2	PS.4.3		3	PS.5.2			2	PS.4.3		2	PS.4.1		3	PS.4.3	
35																
36																
37	2	PS.4.1		2	PS.4.1			2	PS.4.1		2	PS.4.1		2	PS.5.1	
38	2	PS.4.8		2	PS.4.8	PS.4.5		2	PS.4.8		3	PS.4.5		2	PS.4.8	
39	1			3	PS.4.1			2	PS.4.4		2	PS.4.4		2	PS.4.4	
40	2	PS.3.4		3	PS.3.4			2	PS.3.4		2	PS.3.4		2	PS.3.4	
41	2	PS.4.5		2	PS.4.1	PS.4.4	PS.1.1	3	PS.4.4		2	PS.4.4		3	PS.4.4	
42	3	PS.2.1	PS.4.3	2	PS.4.3			3	PS.2.2		3	PS.4.5		2	PS.4.3	
43	1	PS.4.3		2	PS.4.3			1	PS.4.3		3	PS.2.2		1	PS.4.3	
44	2	PS.3.2		2	PS.4.1			2	PS.5.2		3	PS.3.1		1	PS.3.1	

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Process

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	S2Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	S1Ob j3	DOK 4	PObj 4	S1Ob j4
45	2	PS.3.3	PS.5.1	2	PS.5.2			2	PS.5.2		2	PS.5.2		2	PS.5.2	PS.3.3
46	2	PS.4.3		2	PS.4.5	PS.4.1		1	PS.4.3		3	PS.4.3		1	PS.4.3	
47																
48																
49	2	PS.4.3		3	PS.4.3	PS.4.5		2	PS.3.3		1	PS.4.3		2	PS.4.5	PS.4.3
50	1	PS.2.1		1	PS.2.1			1	PS.5.1		2	PS.2.1		1	PS.2.1	
51	2			2	PS.4.3	PS.3.3		1	PS.4.1	PS.4.3	2	PS.1.1		2	PS.4.3	PS.4.1
52																
53																
54																
55	1	PS.5.1		1	PS.4.1			1			1	PS.4.3		1	PS.5.1	
56	2	PS.4.3		3	PS.4.3	PS.4.5		2	PS.4.3		3	PS.4.3		2	PS.4.5	
57	2	PS.5.1		1	PS.5.1			1	PS.1.1		2	PS.4.3		2	PS.5.2	
58	1	PS.4.3		2	PS.5.1	PS.3.3		1			3	PS.5.1		1	PS.1.1	
59	2	PS.4.4		2	PS.4.4	PS.4.3		3	PS.4.4	PS.4.3	3	PS.3.4		2	PS.4.4	
60	2	PS.5.2		3	PS.4.3			2			3	PS.5.1		2	PS.4.5	PS.5.2
61	2	PS.5.1		3	PS.3.3			2	PS.5.2		2	PS.5.2		2	PS.5.2	
62																
63																
64	2	PS.4.8	PS.3.2	2	PS.4.8			2	PS.4.8		2	PS.3.2		2	PS.4.8	
65	2	PS.4.3		2	PS.4.3			3	PS.4.1		3	PS.4.5		2	PS.4.1	
66	2	PS.3.2		3	PS.3.2			3	PS.1.1		2	PS.3.2		2	PS.3.2	
67	2	PS.2.1	PS.4.3	2	PS.4.3			2	PS.2.2		2	PS.4.3		2	PS.4.5	PS.2.1

Table 9-12.8

DOK Levels and Objectives Coded by Each Reviewer

OCCT EOI Biology I Spring 2009 Form 1 Process

Item	DOK 0	PObj 0	S1Ob j0	DOK 1	PObj 1	S1Ob j1	S2Ob j1	DOK 2	PObj 2	S1Ob j2	DOK 3	PObj 3	S1Ob j3	DOK 4	PObj 4	S1Ob j4
68	2	PS.3.3		3	PS.3.3			2	PS.3.3		2	PS.3.3		2	PS.3.3	
69	2	PS.3.1	PS.3.2	2	PS.3.1			3	PS.3.1		2	PS.3.1		2	PS.3.1	
70	2	PS.4.5	PS.4.3	3	PS.4.3	PS.4.5		3	PS.4.5		3	PS.5.1		2	PS.4.5	
71	3	PS.5.2	PS.4.3	2	PS.4.3	PS.5.1		3	PS.5.1		2	PS.2.1		3	PS.5.2	PS.2.2
72																
73																
74	1	PS.2.1		1	PS.2.1			2	PS.2.1		2	PS.1.1		1	PS.2.1	
75	1			1	PS.2.2			2	PS.2.1		2	PS.1.1		1	PS.2.1	
76	2	PS.5.2	PS.3.3	2	PS.3.3			2	PS.5.2		2	PS.3.3		2	PS.5.2	
77	3	PS.4.8	PS.4.3	3	PS.4.4	PS.4.3		3	PS.4.8		3	PS.4.5		3	PS.4.4	
78																
79	2	PS.2.1		1	PS.2.1			2	PS.2.1		2	PS.2.2		1	PS.2.1	
80	2	PS.4.3		2	PS.4.3	PS.4.5		3	PS.4.3		3	PS.4.5		2	PS.4.3	

**Objective Pairwise Comparison:** 0.4913

**Standard Pairwise Comparison:** 0.6966

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Process

Low		Medium		High
0		4.2875		9

1	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5				
2	PS.3. 1	PS.3. 2	PS.3. 4	PS.3. 4	PS.3. 4	PS.3. 4	PS.3. 4	PS.4. 4	
3	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 1				
4	PS.1. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.4. 1			
5									
6	PS.3. 3	PS.3. 3	PS.3. 3	PS.5. 1	PS.5. 2	PS.5. 2	PS.5. 2		
7	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 2	PS.4. 5			
8	PS.3. 3	PS.3. 3	PS.3. 3	PS.3. 3	PS.5. 1	PS.5. 2	PS.5. 2		
9	PS.1. 2	PS.1. 2	PS.1. 2	PS.1. 2	PS.1. 2				
10									
11									
12	PS.1. 3	PS.1. 3	PS.1. 3	PS.1. 3	PS.1. 3				
13	PS.1. 1	PS.1. 1	PS.4. 1	PS.4. 1	PS.4. 3	PS.4. 3	PS.4. 8	PS.4. 8	PS.5. 2
14	PS.1. 1	PS.1. 1	PS.4. 1	PS.5. 2					
15	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5				
16	PS.4. 3	PS.4. 5	PS.4. 8	PS.4. 8	PS.4. 8	PS.4. 8			
17									
18									
19									
20	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5				
21	PS.3. 3	PS.3. 3	PS.5. 2	PS.5. 2	PS.5. 2	PS.5. 2	PS.5. 2		
22	PS.4. 5	PS.4. 5	PS.4. 8	PS.4. 8	PS.4. 8	PS.4. 8			
23	PS.4. 3	PS.4. 3	PS.4. 5	PS.4. 5	PS.4. 5	PS.4. 5	PS.5. 1		
24	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5	PS.3. 5				
25	PS.1. 1	PS.1. 2	PS.1. 2	PS.1. 2	PS.1. 2				
26	PS.3. 2	PS.3. 2	PS.3. 2	PS.3. 2	PS.3. 2				

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Process

27							
28							
29	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 2	
30	PS.1. 1	PS.1. 1	PS.1. 1	PS.5. 2			
31	PS.1. 1	PS.1. 1	PS.1. 1	PS.1. 1	PS.4. 1		
32	PS.1. 2	PS.1. 2	PS.1. 2	PS.1. 2	PS.1. 2		
33	PS.4. 3	PS.5. 1	PS.5. 1	PS.5. 1	PS.5. 1	PS.5. 2	
34	PS.4. 1	PS.4. 3	PS.4. 3	PS.4. 3	PS.5. 2		
35							
36							
37	PS.4. 1	PS.4. 1	PS.4. 1	PS.4. 1	PS.5. 1		
38	PS.4. 5	PS.4. 5	PS.4. 8	PS.4. 8	PS.4. 8	PS.4. 8	
39	PS.4. 1	PS.4. 4	PS.4. 4	PS.4. 4			
40	PS.3. 4	PS.3. 4	PS.3. 4	PS.3. 4	PS.3. 4		
41	PS.1. 1	PS.4. 1	PS.4. 4	PS.4. 4	PS.4. 4	PS.4. 4	PS.4. 5
42	PS.2. 1	PS.2. 2	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 5	
43	PS.2. 2	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 3		
44	PS.3. 1	PS.3. 1	PS.3. 2	PS.4. 1	PS.5. 2		
45	PS.3. 3	PS.3. 3	PS.5. 1	PS.5. 2	PS.5. 2	PS.5. 2	PS.5. 2
46	PS.4. 1	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 5	
47							
48							
49	PS.3. 3	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 5	PS.4. 5
50	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.5. 1		
51	PS.1. 1	PS.3. 3	PS.4. 1	PS.4. 1	PS.4. 3	PS.4. 3	PS.4. 3
52							
53							
54							
55	PS.4. 1	PS.4. 3	PS.5. 1	PS.5. 1			

Table 9-12.9

Objectives Coded to Each Item by Reviewers

OCCT EOI Biology I Spring 2009 Form 1 Process

56	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 5	PS.4. 5		
57	PS.1. 1	PS.4. 3	PS.5. 1	PS.5. 1	PS.5. 2			
58	PS.1. 1	PS.3. 3	PS.4. 3	PS.5. 1	PS.5. 1			
59	PS.3. 4	PS.4. 3	PS.4. 3	PS.4. 4	PS.4. 4	PS.4. 4	PS.4. 4	
60	PS.4. 3	PS.4. 5	PS.5. 1	PS.5. 2	PS.5. 2			
61	PS.3. 3	PS.5. 1	PS.5. 2	PS.5. 2	PS.5. 2			
62								
63								
64	PS.3. 2	PS.3. 2	PS.4. 8	PS.4. 8	PS.4. 8	PS.4. 8		
65	PS.4. 1	PS.4. 1	PS.4. 3	PS.4. 3	PS.4. 5			
66	PS.1. 1	PS.3. 2	PS.3. 2	PS.3. 2	PS.3. 2			
67	PS.2. 1	PS.2. 1	PS.2. 2	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 5	
68	PS.3. 3	PS.3. 3	PS.3. 3	PS.3. 3	PS.3. 3			
69	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 1	PS.3. 2		
70	PS.4. 3	PS.4. 3	PS.4. 5	PS.4. 5	PS.4. 5	PS.4. 5	PS.5. 1	
71	PS.2. 1	PS.2. 2	PS.4. 3	PS.4. 3	PS.5. 1	PS.5. 1	PS.5. 2	PS.5. 2
72								
73								
74	PS.1. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 1			
75	PS.1. 1	PS.2. 1	PS.2. 1	PS.2. 2				
76	PS.3. 3	PS.3. 3	PS.3. 3	PS.5. 2	PS.5. 2	PS.5. 2		
77	PS.4. 3	PS.4. 3	PS.4. 4	PS.4. 4	PS.4. 5	PS.4. 8	PS.4. 8	
78								
79	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 1	PS.2. 2			
80	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 3	PS.4. 5	PS.4. 5		

Table 9-12.10

Items Coded by Reviewers to Each Objective

OCCT EOI Biology I Spring 2009 Form 1 Process

Low				Medium				High	
0				14.91304				52	

PS.1																				
PS.1.1	4	13	13	14	14	25	30	30	30	31	31	31	31	41	51	57	58	66	74	75
PS.1.2	9	9	9	9	9	25	25	25	25	32	32	32	32	32						
PS.1.3	12	12	12	12	12															
PS.2																				
PS.2.1	4	4	4	4	29	29	29	29	29	42	50	50	50	50	67	67	71	74	74	74
	74	75	75	79	79	79	79													
PS.2.2	29	42	43	67	71	75	79													
PS.3																				
PS.3.1	2	3	3	3	3	3	7	7	7	7	44	44	69	69	69	69	69			
PS.3.2	2	7	26	26	26	26	26	44	64	64	66	66	66	66	69					
PS.3.3	6	6	6	8	8	8	8	21	21	45	45	49	51	58	61	68	68	68	68	68
	76	76	76																	
PS.3.4	2	2	2	2	2	40	40	40	40	40	59									
PS.3.5	1	1	1	1	1	15	15	15	15	15	20	20	20	20	20	24	24	24	24	24
PS.4																				
PS.4.1	4	13	13	14	31	34	37	37	37	37	39	41	44	46	51	51	55	65	65	
PS.4.3	13	13	16	23	23	33	34	34	34	42	42	42	43	43	43	43	46	46	46	46
	49	49	49	49	51	51	51	55	56	56	56	56	57	58	59	59	60	65	65	
	67	67	67	70	70	71	71	77	77	80	80	80	80							
PS.4.4	2	39	39	39	41	41	41	41	59	59	59	59	77	77						
PS.4.5	7	16	22	22	23	23	23	23	38	38	41	42	46	49	49	56	56	60	65	67
	70	70	70	70	77	80	80													
PS.4.8	13	13	16	16	16	16	22	22	22	22	38	38	38	38	64	64	64	64	77	77
PS.5																				
PS.5.1	6	8	23	33	33	33	33	37	45	50	55	55	57	57	58	58	60	61	70	71
	71																			

Table 9-12.10

Items Coded by Reviewers to Each Objective

OCCT EOI Biology I Spring 2009 Form 1 Process

PS.5. 2	6	6	6	8	8	13	14	21	21	21	21	21	30	33	34	44	45	45	45	45
	57	60	60	61	61	61	71	71	76	76	76									

Table 9-12.11

Number of Reviewers Coding an Item by Objective (Item Number: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Process

Low		Medium		High
1		2		5

PS.1													
PS.1. 1	4:1	13:2	14:2	25:1	30:3	31:4	41:1	51:1	57:1	58:1	66:1	74:1	75:1
PS.1. 2	9:5	25:4	32:5										
PS.1. 3	12:5												
PS.2													
PS.2. 1	4:4	29:5	42:1	50:4	67:2	71:1	74:4	75:2	79:4				
PS.2. 2	29:1	42:1	43:1	67:1	71:1	75:1	79:1						
PS.3													
PS.3. 1	2:1	3:5	7:4	44:2	69:5								
PS.3. 2	2:1	7:1	26:5	44:1	64:2	66:4	69:1						
PS.3. 3	6:3	8:4	21:2	45:2	49:1	51:1	58:1	61:1	68:5	76:3			
PS.3. 4	2:5	40:5	59:1										
PS.3. 5	1:5	15:5	20:5	24:5									
PS.4													
PS.4. 1	4:1	13:2	14:1	31:1	34:1	37:4	39:1	41:1	44:1	46:1	51:2	55:1	65:2
PS.4. 3	13:2	16:1	23:2	33:1	34:3	42:3	43:4	46:4	49:4	51:3	55:1	56:4	57:1
	58:1	59:2	60:1	65:2	67:3	70:2	71:2	77:2	80:4				
PS.4. 4	2:1	39:3	41:4	59:4	77:2								
PS.4. 5	7:1	16:1	22:2	23:4	38:2	41:1	42:1	46:1	49:2	56:2	60:1	65:1	67:1
	70:4	77:1	80:2										
PS.4. 8	13:2	16:4	22:4	38:4	64:4	77:2							
PS.5													
PS.5. 1	6:1	8:1	23:1	33:4	37:1	45:1	50:1	55:2	57:2	58:2	60:1	61:1	70:1
	71:2												
PS.5. 2	6:3	8:2	13:1	14:1	21:5	30:1	33:1	34:1	44:1	45:4	57:1	60:2	61:3
	71:2	76:3											

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Process

Low		Medium		High
1		2		5

1	PS.3. 5:5				
2	PS.3. 1:1	PS.3. 2:1	PS.3. 4:5	PS.4. 4:1	
3	PS.3. 1:5				
4	PS.1. 1:1	PS.2. 1:4	PS.4. 1:1		
5					
6	PS.3. 3:3	PS.5. 1:1	PS.5. 2:3		
7	PS.3. 1:4	PS.3. 2:1	PS.4. 5:1		
8	PS.3. 3:4	PS.5. 1:1	PS.5. 2:2		
9	PS.1. 2:5				
10					
11					
12	PS.1. 3:5				
13	PS.1. 1:2	PS.4. 1:2	PS.4. 3:2	PS.4. 8:2	PS.5. 2:1
14	PS.1. 1:2	PS.4. 1:1	PS.5. 2:1		
15	PS.3. 5:5				
16	PS.4. 3:1	PS.4. 5:1	PS.4. 8:4		
17					
18					
19					
20	PS.3. 5:5				
21	PS.3. 3:2	PS.5. 2:5			
22	PS.4. 5:2	PS.4. 8:4			
23	PS.4. 3:2	PS.4. 5:4	PS.5. 1:1		
24	PS.3. 5:5				
25	PS.1. 1:1	PS.1. 2:4			
26	PS.3. 2:5				

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Process

27				
28				
29	PS.2. 1:5	PS.2. 2:1		
30	PS.1. 1:3	PS.5. 2:1		
31	PS.1. 1:4	PS.4. 1:1		
32	PS.1. 2:5			
33	PS.4. 3:1	PS.5. 1:4	PS.5. 2:1	
34	PS.4. 1:1	PS.4. 3:3	PS.5. 2:1	
35				
36				
37	PS.4. 1:4	PS.5. 1:1		
38	PS.4. 5:2	PS.4. 8:4		
39	PS.4. 1:1	PS.4. 4:3		
40	PS.3. 4:5			
41	PS.1. 1:1	PS.4. 1:1	PS.4. 4:4	PS.4. 5:1
42	PS.2. 1:1	PS.2. 2:1	PS.4. 3:3	PS.4. 5:1
43	PS.2. 2:1	PS.4. 3:4		
44	PS.3. 1:2	PS.3. 2:1	PS.4. 1:1	PS.5. 2:1
45	PS.3. 3:2	PS.5. 1:1	PS.5. 2:4	
46	PS.4. 1:1	PS.4. 3:4	PS.4. 5:1	
47				
48				
49	PS.3. 3:1	PS.4. 3:4	PS.4. 5:2	
50	PS.2. 1:4	PS.5. 1:1		
51	PS.1. 1:1	PS.3. 3:1	PS.4. 1:2	PS.4. 3:3
52				
53				
54				
55	PS.4. 1:1	PS.4. 3:1	PS.5. 1:2	

Table 9-12.12

Number of Reviewers Coding an Objective by Item (Objective: Number of Reviewers)

OCCT EOI Biology I Spring 2009 Form 1 Process

56	PS.4. 3:4	PS.4. 5:2			
57	PS.1. 1:1	PS.4. 3:1	PS.5. 1:2	PS.5. 2:1	
58	PS.1. 1:1	PS.3. 3:1	PS.4. 3:1	PS.5. 1:2	
59	PS.3. 4:1	PS.4. 3:2	PS.4. 4:4		
60	PS.4. 3:1	PS.4. 5:1	PS.5. 1:1	PS.5. 2:2	
61	PS.3. 3:1	PS.5. 1:1	PS.5. 2:3		
62					
63					
64	PS.3. 2:2	PS.4. 8:4			
65	PS.4. 1:2	PS.4. 3:2	PS.4. 5:1		
66	PS.1. 1:1	PS.3. 2:4			
67	PS.2. 1:2	PS.2. 2:1	PS.4. 3:3	PS.4. 5:1	
68	PS.3. 3:5				
69	PS.3. 1:5	PS.3. 2:1			
70	PS.4. 3:2	PS.4. 5:4	PS.5. 1:1		
71	PS.2. 1:1	PS.2. 2:1	PS.4. 3:2	PS.5. 1:2	PS.5. 2:2
72					
73					
74	PS.1. 1:1	PS.2. 1:4			
75	PS.1. 1:1	PS.2. 1:2	PS.2. 2:1		
76	PS.3. 3:3	PS.5. 2:3			
77	PS.4. 3:2	PS.4. 4:2	PS.4. 5:1	PS.4. 8:2	
78					
79	PS.2. 1:4	PS.2. 2:1			
80	PS.4. 3:4	PS.4. 5:2			

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT EOI Biology I Spring 2009 Form 1 Process

Low DOK		Matched DOK		High DOK
1		2		5

PS.1 [2]:													
PS.1. 1 [2]:	4:1[2]	13:2[2.5]	14:2[1.5]	25:1[2]	30:3[2.33]	31:4[2.5]	41:1[2]	51:1[2]	57:1[1]	58:1[1]	66:1[3]	74:1[2]	75:1[2]
PS.1. 2 [2]:	9:5[1.8]	25:4[1.75]	32:5[1.2]										
PS.1. 3 [2]:	12:5[1.6]												
PS.2 [2]:													
PS.2. 1 [2]:	4:4[2]	29:5[1.8]	42:1[3]	50:4[1.25]	67:2[2]	71:1[2]	74:4[1.25]	75:2[1.5]	79:4[1.5]				
PS.2. 2 [2]:	29:1[2]	42:1[3]	43:1[3]	67:1[2]	71:1[3]	75:1[1]	79:1[2]						
PS.3 [2]:													
PS.3. 1 [3]:	2:1[2]	3:5[2.2]	7:4[2.75]	44:2[2]	69:5[2.2]								
PS.3. 2 [2]:	2:1[2]	7:1[2]	26:5[2]	44:1[2]	64:2[2]	66:4[2.25]	69:1[2]						
PS.3. 3 [3]:	6:3[2.33]	8:4[2.5]	21:2[2]	45:2[2]	49:1[2]	51:1[2]	58:1[2]	61:1[3]	68:5[2.2]	76:3[2]			
PS.3. 4 [2]:	2:5[2]	40:5[2.2]	59:1[3]										
PS.3. 5 [1]:	1:5[1.4]	15:5[1.2]	20:5[1.4]	24:5[1.2]									
PS.4 [3]:													
PS.4. 1 [3]:	4:1[2]	13:2[3]	14:1[1]	31:1[2]	34:1[2]	37:4[2]	39:1[3]	41:1[2]	44:1[2]	46:1[2]	51:2[1.5]	55:1[1]	65:2[2.5]
PS.4. 3 [2]:	13:2[3]	16:1[1]	23:2[3]	33:1[2]	34:3[2.33]	42:3[2.33]	43:4[1.25]	46:4[1.75]	49:4[2]	51:3[1.67]	55:1[1]	56:4[2.5]	57:1[2]
	58:1[1]	59:2[2.5]	60:1[3]	65:2[2]	67:3[2]	70:2[2.5]	71:2[2.5]	77:2[3]	80:4[2.25]				
PS.4. 4 [3]:	2:1[2]	39:3[2]	41:4[2.5]	59:4[2.25]	77:2[3]								
PS.4. 5 [3]:	7:1[3]	16:1[3]	22:2[2.5]	23:4[3]	38:2[2.5]	41:1[2]	42:1[3]	46:1[2]	49:2[2.5]	56:2[2.5]	60:1[2]	65:1[3]	67:1[2]
	70:4[2.5]	77:1[3]	80:2[2.5]										
PS.4. 8 [3]:	13:2[2.5]	16:4[1.5]	22:4[2]	38:4[2]	64:4[2]	77:2[3]							
PS.5 [3]:													
PS.5.	6:1[3]	8:1[3]	23:1[3]	33:4[3]	37:1[3]	45:1[3]	50:1[3]	55:2[3]	57:2[3]	58:2[3]	60:1[3]	61:1[3]	70:1[3]

Table 9-12.13

Assessment Item DOK vs Consensus DOK (Item Number: Number of Reviewers [Average DOK])

OCCT EOI Biology I Spring 2009 Form 1 Process

1 [3]:			3]	1.75]	2]	2]	1]	1]	1.5]	2.5]	3]	2]	3]
	71:2[ 2.5]												
PS.5. 2 [3]:	6:3[2. 67]	8:2[2. 5]	13:1[ 3]	14:1[ 1]	21:5[ 2.2]	30:1[ 1]	33:1[ 2]	34:1[ 3]	44:1[ 2]	45:4[ 2]	57:1[ 2]	60:2[ 2]	61:3[ 2]
	71:2[ 3]	76:3[ 2]											

Table 9-12.14  
Group Consensus  
OCCT EOI Biology I Process Standards, Science, Grade 10

Level	Description	DOK
PS.1	Observe and Measure - Observing is the first action taken by the learner to acquire new information about an organism or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.	2
PS.1.1	Identify qualitative and quantitative changes in cells, organisms, populations, and ecosystems given conditions (e.g., temperature, mass, volume, time, position, length, quantity) before, during, and after an event.	2
PS.1.2	Use appropriate tools (e.g., microscope, pipette, metric ruler, graduated cylinder, thermometer, balances, stopwatches) when measuring cells, organisms, populations, and ecosystems.	2
PS.1.3	Use appropriate System International (SI) units (i.e., grams, meters, liters, degrees Celsius, and seconds); and SI prefixes (i.e., micro-, milli-, centi-, and kilo-) when measuring cells, organisms, populations, and ecosystems.	2
PS.2	Classify - Classifying establishes order. Organisms and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.	2
PS.2.1	Using observable properties, place cells, organisms, and/or events into a biological classification system.	2
PS.2.2	Identify the properties by which a biological classification system is based.	2
PS.3	Experiment - Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.	2
PS.3.1	Evaluate the design of a biology laboratory investigation.	3
PS.3.2	Identify the independent variables, dependent variables, and controls in an experiment.	2
PS.3.3	Use mathematics to show relationships within a given set of observations (e.g., population studies, biomass, probability).	3
PS.3.4	Identify a hypothesis for a given problem in biology investigations.	2
PS.3.5	Recognize potential hazards and practice safety procedures in all biology activities.	1
PS.4	Interpret and Communicate - Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.	3
PS.4.1	Select appropriate predictions based on previously observed patterns of evidence.	3
PS.4.3	Interpret data tables, line, bar, trend, and/or circle graphs.	2
PS.4.4	Accept or reject hypotheses when given results of a biological investigation.	3
PS.4.5	Evaluate experimental data to draw the most logical conclusion.	3
PS.4.8	Identify and/or create an appropriate graph or chart from collected data, tables, or written description (e.g., population studies, plant growth, heart rate).	3
PS.5	Model - Modeling is the active process of forming a mental or physical representation from data, patterns, or relationships to facilitate understanding and enhance prediction. The student will accomplish these objectives to meet this process standard.	3
PS.5.1	Interpret a biological model which explains a given set of observations.	3
PS.5.2	Select predictions based on models such as pedigrees, life cycles and energy pyramids.	3

**A. For each standard, did the items cover the most important topics you expected by the standard? If not, what topics were not assessed that should have been?**

- Standards 1 and 2 seemed somewhat underrepresented. Some items that used the term classify were only recall items that did not involve the process of classification.
- There was good coverage all the way across.
- Yes, the most important topics were covered.
- Yes

**B. For each standard, did the items cover the most important performance (DOK levels) you expected by the standard? If not, what performance was not assessed?**

- Yes
- Yes.
- Yes

**C. Were the standards written at an appropriate level of specificity and directed towards expectations appropriate for the grade level?**

- Items intended to address Standard/Objective PS.1.1 should be more directly focused on observations or measurements as consistent with the intent of the standard.
- Yes
- For the most part, yes. However, #62 is too difficult for high school biology students.
- Yes

**D. What is your general opinion of the alignment between the standards and assessment:**

- ii. Acceptable Alignment (4) : 80%
- iii. Needs slight improvement (1) : 20%

**E. Comments**

- Items that use the term "experiment" should model valid processes for experimentation. In some cases, it seemed like the circumstance described was more representative of a very loosely structured investigation.