OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT AND ITEM SPECIFICATIONS

MATHEMATICS GRADE 3

OKLAHOMA STATE DEPARTMENT OF EDUCATION
CHAMPION EXCELLENCE

TABLE OF CONTENTS

Oklahoma School Testing Program Test and Item Specifications 1
Purpose 1
Test Structure, Format, and Scoring 2
Test Alignment with Oklahoma Academic Standards (OAS) 2
Test Blueprint 3
Depth-of-Knowledge Assessed by Test Items 4
Universal Design Considerations 4
Testing Schedules 5
Item Types 5
Multiple-Choice Item Guidelines 5
Stimulus Materials 6
General Considerations—Oklahoma School Testing Program 7
Considerations Specific to the Grade 3 Mathematics Test 8
Overview of Item Specifications 9
Standards & Sample Items 10
OAS Strand—Number & Operations (N): Standard 3.N.1 11
OAS Strand—Number & Operations (N): Standard 3.N.2 15
OAS Strand—Number & Operations (N): Standard 3.N.3 20
OAS Strand—Number & Operations (N): Standard 3.N.4 23
OAS Strand—Algebraic Reasoning & Algebra (A): Standard 3.A.1 26
OAS Strand—Algebraic Reasoning & Algebra (A): Standard 3.A.2 29
OAS Strand—Geometry & Measurement (GM): Standard 3.GM.1 33
OAS Strand—Geometry & Measurement (GM): Standard 3.GM.2 36
OAS Strand—Geometry & Measurement (GM): Standard 3.GM.3 41
OAS Strand—Data & Probability (D): Standard 3.D.1 45

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OKLAHOMA SCHOOL TESTING PROGRAM TEST AND ITEM SPECIFICATIONS

Grade 3 Mathematics Test

Purpose

A robust assessment system is predicated upon the knowledge that no one assessment is able to provide answers to all questions affecting instructional decisions. An assessment system utilizes different types of assessment to gather multiple pieces of evidence to provide timely, relevant, actionable, and reliable information about what students know and can do relative to a set of standards.

According to the Oklahoma ESSA Plan (pp 48–49):

Oklahoma recognizes that a **robust assessment system** is tied closely to students' learning and teachers' instructional practices by valuing and promoting **local, classroom-based formative assessments** that help make **student learning visible**. At the same time, that system should provide a **strong summative assessment** program that fits as a component within a multifaceted state, district, and school accountability system.

The OSDE supports an assessment system by working with Oklahoma educators and stakeholders to:

- Ensure that state and federally required annual summative assessments delivered through the Oklahoma School Testing Program (OSTP) are effective and meaningful to families, districts, educators, and members of the community;
- Develop instructional resources to support local formative and interim assessments through the curriculum frameworks projects and assessment guidance toolkit; and
- Build and deliver professional learning through face-to-face and web-based resources to support local assessment needs and interpretation of state assessment data.

Annual assessments delivered through the OSTP are aligned to the Oklahoma Academic Standards and can therefore provide point-in-time data for programmatic and curricular decisions by supporting criterion-referenced interpretations at appropriate levels and grain size (e.g., grade, student group, teacher, building/district administrator, state). Standards-based formative and interim assessments conducted at the local level can provide additional

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information and evidence of learning at a smaller grain size to inform instructional decisions made at the student and classroom level.

While state summative assessments are only one measure of what students know and can do, having Oklahoma students take OSTP assessments:

- ✓ Helps students, their families, and the public know how students have grown over time and how they are performing relative to the standards, their peers in Oklahoma, and the nation;
- ✓ Enables teachers to see how their students are performing against grade-level expectations communicated through the Performance Level Descriptors (PLDs) to support evaluation and enhancement of curriculum and programs for the next school year;
- ✓ Provides a standardized and reliable measure for school/district leaders, the state, policymakers, and the public to determine how well a system is meeting the goals of helping every child grow along a continuum to prepare them for careers, college, and life; and
- ✓ Provides comparable information and data to inform continuous improvement of a system and appropriately support federal and state accountability decisions.

Test Structure, Format, and Scoring

The Grade 3 Mathematics test will consist of 50 operational items and 10 field-test items, written at a reading level about one grade level below a Grade 3 audience, and includes four responses from which to choose: the correct answer and three distractors. The total 60 items will be divided into two test sections.

Each item is scored as correct or incorrect. Only operational items contribute to the total test score. Thus, for example, if a test contains 50 operational items, only those 50 items (not the 10 field-test items) contribute to a student's scaled score on the test.

The student's raw score is converted to a scaled score using the number correct scoring method.

Test Alignment with Oklahoma Academic Standards (OAS)

Criteria for Aligning the Test with the Oklahoma Academic Standards Content Strands and Standards
1. Categorical Concurrence The test is constructed so that there are at least six items measuring each OAS strand. The number of items, six, is based on estimating the number of items that could produce a reasonably reliable estimate of a student's mastery of the content measured.
2. Range-of-Knowledge Correspondence The test is constructed so that every standard for each OAS strand has at least one corresponding assessment item.
3. Source of Challenge Each test item is constructed in such a way that the major cognitive demand comes directly from the targeted OAS strand or standard being assessed, not from specialized knowledge or cultural background that the test-taker may bring to the testing situation.

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OKLAHOMA SCHOOL TESTING PROGRAM

TEST BLUEPRINT MATHEMATICS GRADE 3

This blueprint describes the content and structure of an assessment and defines the ideal number of test items by strand and standard of the Oklahoma Academic Standards (OAS).

IDEAL % OF ITEMS	STRANDS AND STANDARDS
44–48%	**NUMBER AND OPERATIONS** 3.N.1 Number Sense 3.N.2 Number Operations 3.N.3 Fractions 3.N.4 Money
12–18%	**ALGEBRAIC REASONING AND ALGEBRA** 3.A.1 Numerical and Geometric Patterns 3.A.2 Equations
26–30%	**GEOMETRY AND MEASUREMENT** 3.GM.1 Describe and Create Shapes 3.GM.3 Time 3.GM.2 Measurement
12–18%	**DATA AND PROBABILITY** 3.D.1 Data Analysis
100%	**TOTAL: 50 ITEMS**

(Please note this blueprint does not include items that may be field-tested.)
A minimum of 6 items is required to report a strand.

Depth-of-Knowledge Assessed by Test Items

The Grade 3 test will approximately reflect the following "depth-of-knowledge (DOK)" distribution of items:

Depth-of-Knowledge	Percent of Items
Level 1—Recall and Reproduction	40–50%
Level 2—Skills and Concepts	45–55%
Level 3—Strategic Thinking	5–10%

DOK Ranges are based on the DOK of the OAS. The standards increase grade-level expectations and rigor, and set expectations for students to be college- and career-ready.

- **Level 1** (Recall and Reproduction) requires the student to recall facts, terms, definitions, or simple procedures, 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 decisions as to how to approach the problem or activity. Level 2 activities include making observations and collecting data; classifying, comparing, and organizing data; and organizing and displaying data in tables, charts, and graphs.
- **Level 3** (Strategic Thinking) requires reasoning, planning, using evidence, and a higher level of thinking. Level 3 activities include making conjectures, drawing conclusions from observations, citing evidence and developing a logical argument for concepts, explaining phenomena in terms of concepts, and using concepts to solve nonroutine problems.

Note: These descriptions are adapted from Review Background Information and Instructions, Standards and Assessment Alignment Analysis, CCSSO TILSA Alignment Study, May 21–24, 2001, Version 2.0. For an extended description of each depth-of-knowledge level, see the web site at http://facstaff.wcer.wisc.edu/normw/TILSA/INFO and INSTR Align Anal 513.pdf

Universal Design Considerations

Universal Design, as applied to assessments, is a concept that allows the widest possible range of students to participate in assessments and may even reduce the need for accommodations and alternative assessments by expanding access to the tests themselves. In the Oklahoma Grade 3 tests, modifications have been made to some items to simplify and clarify instructions as well as to provide maximum readability, comprehensibility, and legibility. This includes design aspects such as reducing the language load in content areas other than Language Arts, increasing the font size, displaying fewer items per page, and boxing the items to assist visual focus.

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Testing Schedules

This section appears in all of the test specification documents and is provided to give the reader a general sense of the overall testing program at this particular grade level.

Each Grade 3 test is meant to be administered in two sessions within one day with a break given between sessions or on consecutive days. Estimated time for scheduling purposes is given in the table below.

Section 1 Grade 3 Mathematics Test Time Schedule	
Distributing Grade 3 Mathematics Test Booklets, reading directions	Approximately 15 minutes
Administering the Mathematics Test	30–40 minutes
Total:	45–55 minutes

Section 2 Grade 3 Mathematics Test Time Schedule	
Distributing Grade 3 Mathematics Test Booklets, reading directions	Approximately 15 minutes
Administering the Mathematics Test	30–40 minutes
Total:	45–55 minutes

Item Types

The test will consist of multiple choice items.

Most stems are positively worded—avoiding the use of the word "not." If a negative is required, it is underlined for emphasis (e.g., if a bag has the same number of red, blue, and black marbles, what is the probability that a marble randomly selected from the bag is <u>not</u> red?).

Multiple-Choice Item Guidelines

- All items must clearly indicate what is expected in a response and direct students to focus on their responses.
- Each multiple-choice item has a stem (question, statement, and/or graphic component) and four answer options—the correct answer and three distractors. Distractors will be developed based on the types of errors students are most likely to make.
- Multiple-choice item stems ask a question or pose a clear problem so that students will know what to do before looking at the answer choices. Students should not need to read all answer choices before knowing what is expected. A stem will seldom include an incomplete sentence.

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Stimulus Materials

Stimulus materials are the tables, charts, graphs, passages, and illustrations students must use in order to respond to items. The following characteristics are necessary for stimulus materials:

1. A stimulus that gives information must precede a question or a set of questions.
2. When students are given information to evaluate, they should know the question and the purpose of the information.
3. Passages, graphics, tables, etc., provide sufficient information for assessment of multiple objectives.
4. Stimulus materials for a set of items may be a combination of multiple stimuli.
5. Information in stimulus materials is based on situations students would encounter in or beyond school.
6. For conceptual items, stimulus materials are necessary but not conceptually sufficient for student response.
7. There is a balance of graphic and textual stimulus materials within a test form. Approximately 50 percent of the items will have appropriate pictorial or graphical representations. Graphs, tables, or figures are clearly associated with their intended items. Graphics appear on the same page as the textual stimulus or on the facing page.

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General Considerations—Oklahoma School Testing Program

1. Items deal with issues and details that are of consequence in the stimulus and central to students' understanding and interpretation of the stimulus.
2. Test items are varied and address all OAS standards listed in the Test Blueprint.
3. To the greatest extent possible, no item or response choice clues the answer to any other item.
4. All items reviewed and approved by the Oklahoma Item Review Committee are assigned an OAS strand, standard and/or objective. The Test Blueprints and score reports reflect the degree to which each OAS strand is represented on the test.
5. Test items are tied closely and particularly to the stimuli from which they derive, so that the impact of outside (prior) knowledge, while never wholly avoidable, is minimized.
6. Each multiple-choice item contains a question and four answer options, only one of which is correct. Correct answers will be approximately equally distributed among A, B, C, and D responses.
7. Distractors adopt the language and sense of the material in the stimuli so that students must think their way to the correct answer rather than simply identify incorrect responses by virtue of a distractor's obviously inappropriate nature.
8. Distractors should always be plausible (but, of course, incorrect) in the context of the stimulus. Students should not be able to rule out a wrong answer or identify a correct response solely because it looks different from the other answer choices.
9. Order of presentation of item types is dictated by logic (chronological, spatial, etc.).
10. Items are worded precisely and clearly. The better focused an item, the more reliable and fair it is certain to be, and the more likely all students will understand it in the same way.
11. The range of items measuring an OAS standard consisting of more than one skill will provide a balanced representation of those skills.
12. Items should be focused on what all students should know and be able to do as they complete their Grade 3 coursework.
13. The responses "Both of the above," "All of the above," "None of the above," and "Neither of the above" will not be used.
14. The material presented is balanced, culturally diverse, well written, and of interest to Grade 3 test level students. The stimuli and items are fairly presented in order to gain a true picture of students' skills.
15. Across all forms, a balance of gender and active/passive roles by gender is maintained.
16. Forms attempt to represent the ethnic diversity of Oklahoma students.
17. Calculators, formula sheets, and other resource materials may not be used on the Grade 3 Mathematics test. More information regarding the calculator policy can be found at http://sde.ok.gov/sde/assessment-administrator-resources-administrators.
18. The stimuli avoid subject matter that might prompt emotional distress on the part of the students.
19. Permission to use stimuli from copyrighted material is obtained as necessary by testing vendor.

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Considerations Specific to the Grade 3 Mathematics Test

It is necessary to create test items that are reliable, fair, and targeted to the Oklahoma Academic Standards listed on the following pages. There are some general considerations and procedures for effective item development.

These considerations include, but are not limited to, the following:

1. Each test form contains items assessing all content standards.
2. Test items that assess each standard are not limited to one particular type of response format.
3. Test questions attempt to focus on content that is authentic and that Grade 3 level students can relate to and understand.
4. Test items are worded precisely and clearly. The better focused an item, the more reliable and fair it is likely to be, and the more likely all students will understand what is required of them.
5. All items are reviewed to eliminate language that shows bias or that would otherwise likely disadvantage a particular group of students. That is, items do not display unfair representations of gender, race, ethnicity, disability, culture, or religion; nor do items contain elements that are offensive to any such groups.
6. All test items and answer choices have appropriate labels and units.
7. Most graphs are placed on a gray grid, with the horizontal and vertical axes labeled and marked.

All items developed using these specifications are reviewed annually by Oklahoma educators and approved by the Oklahoma State Department of Education. The distribution of newly developed items is based on difficulty, cognitive ability, percentage of art/graphics, and grade-level appropriateness as determined by an annual Item Development Plan approved by the Oklahoma State Department of Education.

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Overview of Item Specifications

For each OAS strand, item specifications are organized under the following headings:

- OAS Strand
- OAS Standard
- OAS Objectives
- Item Specifications
    a. Emphasis
    b. Stimulus Attributes
    c. Format
    d. Content Limits
    e. Primary Process Standard(s)
    f. Distractor Domain
    g. Sample Test Items

The headings "OAS Strands" and "OAS Standards" state the OAS strand followed by the OAS standard being measured in the mathematics section of the Oklahoma Academic Standards document.

For each standard, the information under the heading "Item Specifications" highlights important points about a test item's emphasis, format, content limits, and distractor domain. Sample test items are provided with each strand to illustrate these specifications. Although it is sometimes possible to score single items for more than one concept, all items in these tests are written to address a single objective as the primary concept.

Note: With the exception of content limits, the Item Specifications offer suggestions of what might be included in the OSTP assessment and do not provide an exhaustive list of what can be included. For this reason, Item Specifications are only meant to be a supplemental resource for classroom instruction.

In addition, the sample test items are not intended to be definitive in nature or construction—the stimuli and the test items that follow them may differ from test form to test form, as may their presentations. Sample test items are not intended to predict a student's performance on the actual test, but rather to allow students to familiarize themselves with the item types and formats that they may see on the test.

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STANDARDS & SAMPLE ITEMS

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OAS STRAND—NUMBER & OPERATIONS (N): STANDARD 3.N.1

OAS STANDARD

3.N.1 Compare and represent whole numbers up to 100,000 with an emphasis on place value and equality.

OAS OBJECTIVES

3.N.1.1 Read, write, discuss, and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives.

3.N.1.2 Use place value to describe whole numbers between 1,000 and 100,000 in terms of ten thousands, thousands, hundreds, tens, and ones, including expanded form.

3.N.1.3 Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.

3.N.1.4 Use place value to compare and order whole numbers up to 100,000, using comparative language, numbers, and symbols.

ITEM SPECIFICATIONS

Emphasis:

- Represent whole numbers up to 100,000.
- Use place value to describe whole numbers between 1,000 and 100,000.
- Find 10,000 more or 10,000 less than a given five-digit number; find 1,000 more or 1,000 less than a given four- or five-digit number; and find 100 more or 100 less than a given four- or five-digit number.
- Compare and order whole numbers up to 100,000.

Stimulus Attributes:

- Test items may include numerals, expressions with operations, words, base-10 blocks, bundles of 10, place value mats, number lines, pictures, and drawings.

Format:

- Select a whole number through six digits from a model
- Select a model of a whole number through six digits
- Identify equivalent representations of a whole number, including expanded form
- Identify relationship between two or more whole numbers as greater than (>), less than (<), or equal to (=)
- Order whole numbers in ascending or descending order
- Find 10,000 more, 1,000 more, or 100 more than a given number
- Find 10,000 less, 1,000 less, or 100 less than a given number

Content Limits:

- Limit whole numbers to the hundred-thousands place
- Limit numbers to whole numbers
- Limit representations to standard form, expanded form, written form, or models
- Limit ordering to three numbers
- Addition and subtraction limited to finding 10,000 more or less than a given five-digit number or finding 1,000 or 100 more or 1,000 or 100 less than a given four- or five-digit number

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ITEM SPECIFICATIONS

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding
- Develop the Ability to Make Conjectures, Model, and Generalize

Distractor Domain:

- Misrepresentation of place value
- Computational error
- Predictable misrepresentation of digits
- Incorrect value for a digit
- Failure to establish correspondence between the appropriate model and its numerical or symbolic representation
- Misinterpretation of symbols
- Regrouping errors

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1 **The distance between Washington, D.C., and Oklahoma City is about one thousand, three hundred, twenty miles. How is this distance written in numerals?**

A 132 miles

B 1,032 miles

C 1,302 miles

D 1,320 miles

Standard: 3.N.1.1 Read, write, discuss, and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives.
Depth-of-Knowledge: 1

Distractor Rationale

A. The student did not account for the 0 in 20.
B. The student confused 320 with 32.
C. The student confused 320 with 302.
D. Correct. The student demonstrated an ability to write a number up to 100,000.

2 **Which number could be placed in the blank to make the number sentence true?**

5,426 > ?

A 5,430

B 5,617

C 5,584

D 5,418

Standard: 3.N.1.4 Use place value to compare and order whole numbers up to 100,000, using comparative language, numbers, and symbols.
Depth-of-Knowledge: 1

Distractor Rationale

A. The student confused the greater than and less than symbols or compared the ones places only.
B. The student confused the greater than and less than symbols or compared the tens places only.
C. The student confused the greater than and less than symbols or compared the ones places only.
D. Correct. The student demonstrated an ability to use place value to compare numbers up to 100,000.

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3 **An airplane flew a total of 38,215 miles last week. This week the plane will fly 10,000 miles fewer than it did last week.**

What is the distance the airplane will fly this week, in miles?

A 28,215 miles

B 37,215 miles

C 39,215 miles

D 48,215 miles

Standard: 3.N.1.3 Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.
Depth-of-Knowledge: 1

Distractor Rationale

A. **Correct. The student demonstrated an ability to find 10,000 less than a given five-digit number.**
B. The student confused 10,000 and 1,000.
C. The student confused 10,000 and 1,000 and found 1,000 more instead of 10,000 fewer.
D. The student found 10,000 more instead of 10,000 fewer.

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OAS STRAND—NUMBER & OPERATIONS (N): STANDARD 3.N.2

OAS STANDARD	**3.N.2**	Add and subtract multi-digit whole numbers; multiply with factors up to 10; represent multiplication and division in various ways; solve real-world and mathematical problems through the representation of related operations.
OAS OBJECTIVES	**3.N.2.1**	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting.
	3.N.2.2	Demonstrate fluency of multiplication facts with factors up to 10.
	3.N.2.3	Use strategies and algorithms based on knowledge of place value and equality to fluently add and subtract multi-digit numbers.
	3.N.2.4	Recognize when to round numbers and apply understanding to round numbers to the nearest ten thousand, thousand, hundred, and ten, and use compatible numbers to estimate sums and differences.
	3.N.2.5	Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.
	3.N.2.6	Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups.
	3.N.2.7	Recognize the relationship between multiplication and division to represent and solve real-world problems.
	3.N.2.8	Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two-digit number by a one-digit number.
ITEM SPECIFICATIONS	**Emphasis:** • Represent multiplication and division facts by using a variety of approaches. • Demonstrate fluency of multiplication facts with factors up to 10. • Fluently add and subtract multi-digit numbers. • Use rounding to estimate sums and differences. • Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. • Recognize the relationship between multiplication and division to represent and solve real-world problems. • Multiply a two-digit number by a one-digit number. **Stimulus Attributes:** • Test items may include repeated addition, arrays, area models, equal jumps on a number line, tables, pictures, counters, other counting manipulatives, drawings, and graphs.	

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ITEM SPECIFICATIONS

Format:

- Identify the multiplication fact represented by a model
- Identify the correct multiplication algorithm
- Identify and extend multiplication and division patterns
- Solve multiplication and division problems
- Identify the missing fact in a fact family
- Fluently add and subtract multi-digit whole numbers
- Solve application problems by adding and subtracting multi-digit whole numbers
- Solve application problems by rounding and then adding or subtracting
- Fluently multiply with factors up to 10
- Model division facts
- Use strategies to multiply a two-digit number by a one-digit number

Content Limits:

- Limit to product of 2-digit number by 1-digit number
- For fluency, limit to multiplication facts with factors up to 10
- Limit to whole numbers
- Limit multiplication facts and associated division facts up to 10 × 10
- For addition and subtraction, limit to three- and four-digit numbers
- For estimations, limit to numbers up to 5 digits

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding
- Develop the Ability to Make Conjectures, Model, and Generalize

Distractor Domain:

- Computational errors
- Misidentification of multiplication pattern
- Misidentification of division facts
- Misidentification of model or algorithm
- Regrouping errors
- Rounding errors

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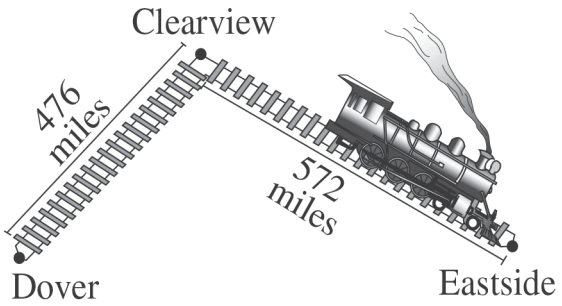
4



To the nearest ten, about how far does the train travel from Dover to Eastside?

A 950 miles

B 1050 miles

C 1060 miles

D 1150 miles

Standard: 3.N.2.4 Recognize when to round numbers and apply understanding to round numbers to the nearest ten thousand, thousand, hundred, and ten, and use compatible numbers to estimate sums and differences.
Depth-of-Knowledge: 2

Distractor Rationale:
A. The student added only the numbers in the hundreds place.
B. Correct. The student demonstrated an ability to round numbers to the nearest ten to estimate a sum.
C. The student rounded 572 incorrectly.
D. The student estimated a distance too high.

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5 **Three elephants at a zoo weigh a total of 9,898 pounds. One elephant weighs 7,859 pounds. Another elephant weighs 1,602 pounds. How many pounds does the third elephant weigh?**

A 437 pounds

B 1,447 pounds

C 1,641 pounds

D 2,263 pounds

Standard: 3.N.2.5 Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.

Depth-of-Knowledge: 2

Distractor Rationale:

A. **Correct. The student demonstrated an ability to use addition and subtraction to solve a real-world problem involving whole numbers.**

B. The student made a computation error.

C. The student made a computation error.

D. The student selected the answer closest to 9,898 – 7,859.

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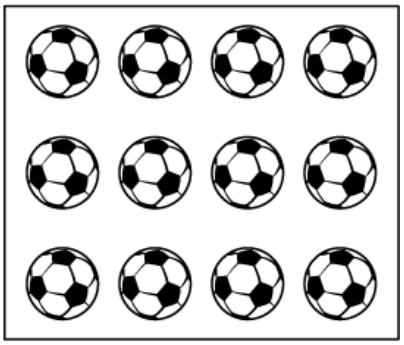
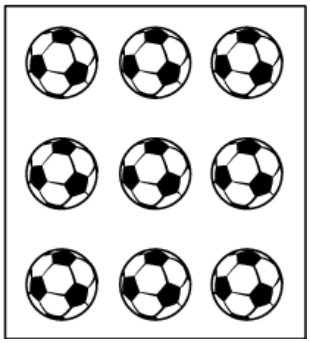
6 **This array shows 3 × 4.**



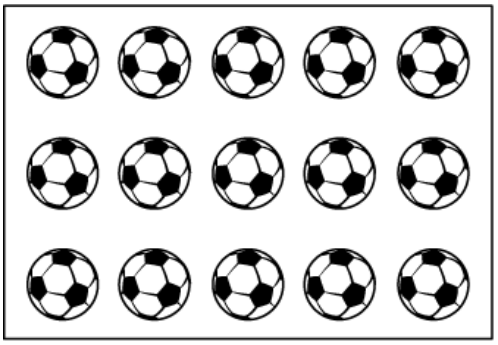
3 × 4

Which array shows 3 × 6?

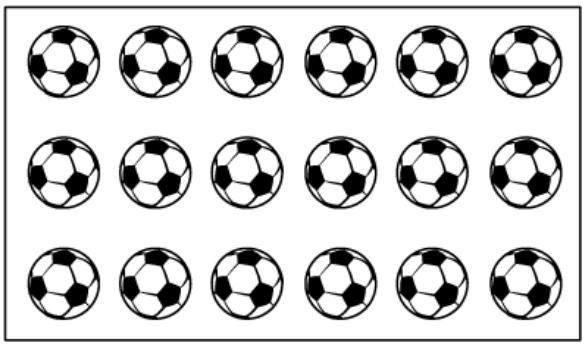
A



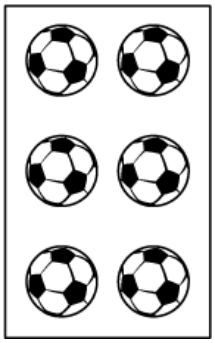
B



C



D



Standard: 3.N.2.1 Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting.

Depth-of-Knowledge: 2

Distractor Rationale:

A. The student confused 3×6 and 3×3.

B. The student confused 3×6 and 3×5.

C. Correct. The student demonstrated an ability to represent a multiplication fact by using an array.

D. The student saw 3 groups and a total of 6 soccer balls.

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OAS STRAND—NUMBER & OPERATIONS (N): STANDARD 3.N.3

OAS STANDARD

3.N.3 Understand meanings and uses of fractions in real-world and mathematical situations.

OAS OBJECTIVES

3.N.3.1 Read and write fractions with words and symbols.

3.N.3.2 Construct fractions using length, set, and area models.

3.N.3.3 Recognize unit fractions and use them to compose and decompose fractions related to the same whole. Use the numerator to describe the number of parts and the denominator to describe the number of partitions.

3.N.3.4 Use models and number lines to order and compare fractions that are related to the same whole.

ITEM SPECIFICATIONS

Emphasis:

- Use and translate between different representations of fractions.
- Use length, set, and area models to construct fractions.
- Use unit fractions to compose and decompose fractions related to the same whole.
- Compare and order fractional numbers using concrete models and number lines.

Stimulus Attributes:

- Test items may include fraction circles, fraction strips, pictures, egg cartons, rectangles, number lines, area models, and counters.

Format:

- Identify equivalent representations of a fraction
- Use modeling to construct fractions
- Identify unit fractions and use them to compose and decompose fractions related to the same whole
- Use the numerator to describe the number of parts and the denominator to describe the number of partitions.
- Use models to compare fractions
- Use models to identify fractions
- Identify relationship among fractions as greater than (>), less than (<), or equal to (=)
- Identify fraction with the greatest value or the least value
- Order three fractions from least to greatest or greatest to least

Content Limits:

- Limit fractions to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths

Primary Process Standards:

- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding

Distractor Domain:

- Computational errors
- Misrepresentation of numerator and denominator

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7 **What is the value of the fraction $\frac{5}{8}$?**

A one fifth

B eight fifths

C one eighth

D five eighths

Standard: 3.N.3.1 Read and write fractions with words and symbols.
Depth-of-Knowledge: 1

Distractor Rationale:

A. The student focused on the number in the numerator.
B. The student reversed the numerator and the denominator.
C. The student focused on the number in the denominator.
D. Correct. The student demonstrated an ability to read fractions with words and symbols.

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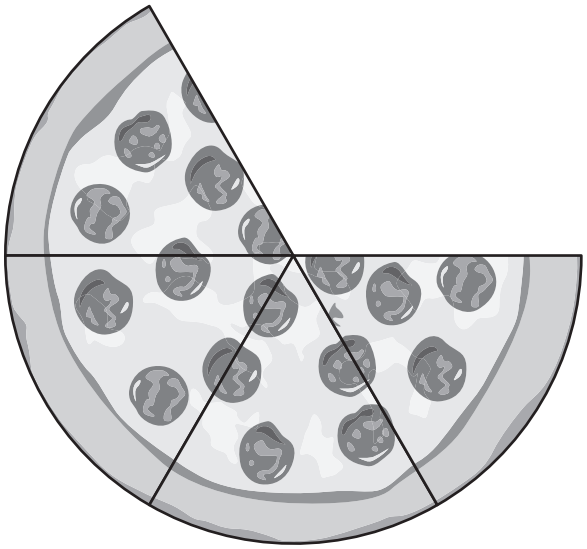
8 **Joe cut a pizza into 6 equal pieces. He ate 2 pieces.**



What fraction of the pizza is left?

A $\frac{2}{4}$

B $\frac{4}{6}$

C $\frac{6}{4}$

D $\frac{4}{2}$

Standard: 3.N.3.3 Recognize unit fractions and use them to compose and decompose fractions related to the same whole. Use the numerator to describe the number of parts and the denominator to describe the number of partitions.
Depth-of-Knowledge: 2

Distractor Rationale:

A. The student used the number of pieces Joe ate as the numerator and the number of pieces left as the denominator.
B. **Correct. The student demonstrated an ability to use the numerator to describe the number of parts and the denominator to describe the number of partitions.**
C. The student confused the numerator and the denominator.
D. The student used the number of pieces left as the numerator and the number of pieces Joe ate as the denominator.

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OAS STRAND—NUMBER & OPERATIONS (N): STANDARD 3.N.4

OAS STANDARD

3.N.4 Determine the value of a set of coins or bills.

OAS OBJECTIVES

3.N.4.1 Use addition to determine the value of a collection of coins up to one dollar using the cent symbol and a collection of bills up to twenty dollars.

3.N.4.2 Select the fewest number of coins for a given amount of money up to one dollar.

ITEM SPECIFICATIONS

Emphasis:

- Apply addition skills to find the value of a collection of coins or a collection of bills.
- Determine the fewest number of coins for a given amount of money.

Stimulus Attributes:

- Test items may include pictures and counting manipulatives.

Format:

- Add coins or bills to solve real world problems
- Select the fewest number of coins for a given amount of money

Content Limits:

- Limit value of the collection of coins to one dollar
- Limit value of the collection of bills to twenty dollars
- Limit coins to pennies, nickels, dimes, and quarters
- Limit bills to ones, fives, and tens

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding

Distractor Domain:

- Computational errors
- Incorrect value for a coin or bill

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9 **Sarah has 27 cents in her pocket. What is the fewest number of coins that Sarah could have in her pocket?**

A 3

B 4

C 5

D 7

Standard: 3.N.4.2 Select the fewest number of coins for a given amount of money up to one dollar.
Depth-of-Knowledge: 2

Distractor Rationale:

A. **Correct. The student demonstrated an ability to select the fewest number of coins for a given amount of money up to one dollar.**
B. Balance distractor
C. The student did not think about quarters.
D. The student focused on the 7 in the 27 cents.

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10 **Jorge has collected these bills.**

Which number sentence shows the total value of the bills?

A $10 + $3 = $13

B $13 + $3 = $16

C $15 + $3 = $18

D $18 + $3 = $21

Standard: 3.N.4.1 Use addition to determine the value of a collection of coins up to one dollar using the cent symbol and a collection of bills up to twenty dollars.

Depth-of-Knowledge: 2

Distractor Rationale:

A. The student forgot the $5 bill.

B. The student forgot the $5 bill and added the three $1 bills twice.

C. Correct. The student demonstrated an ability to use addition to determine the value of a collection of bills up to twenty dollars.

D. The student added the three $1 bills twice.

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OAS STRAND—ALGEBRAIC REASONING & ALGEBRA (A): STANDARD 3.A.1

OAS STANDARD

3.A.1 Describe and create representations of numerical and geometric patterns.

OAS OBJECTIVES

3.A.1.1 Create, describe, and extend patterns involving addition, subtraction, or multiplication to solve problems in a variety of contexts.

3.A.1.2 Describe the rule (single operation) for a pattern from an input/output table or function machine involving addition, subtraction, or multiplication.

3.A.1.3 Explore and develop visual representations of growing geometric patterns and construct the next steps.

ITEM SPECIFICATIONS

Emphasis:

- Create, extend, and describe the rules for patterns involving addition, subtraction, or multiplication to solve real-world and mathematical problems.
- Explore, develop, and extend visual representations of growing geometric patterns.

Stimulus Attributes:

- Test items may include function machines, input/output tables, lists, pictures, hundreds charts, and geometric patterns.

Format:

- Use rules to complete patterns
- Use rules to extend patterns
- Determine a rule from a table, chart, or list
- Determine a missing element in a pair of numbers by using generalizations from other pairs with the same relationship
- Determine the rule for a growing geometric pattern
- Determine the missing element in a growing geometric pattern

Content Limits:

- Limit rule to one operation
- Limit operations to addition, subtraction, and multiplication
- Limit multiplication to multiplication by 2, 5, and 10
- Limit extension of pattern to next element
- Limit to whole numbers

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding

Distractor Domain:

- Inappropriate operation selected
- Predictable misrepresentation of pattern

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11 **Connie is learning to play 15 songs on the piano. The table shows the number of songs Connie has left to learn at the end of each month.**

Songs for Connie to Learn

Month	Number of Songs
January	15
February	13
March	11
April	9
May	**?**

Connie learns the same number of songs each month. How many songs will Connie have left to learn at the end of May?

A 2 songs

B 6 songs

C 7 songs

D 8 songs

Standard: 3.A.1.1 Create, describe, and extend patterns involving addition, subtraction, or multiplication to solve problems in a variety of contexts.

Depth-of-Knowledge: 2

Distractor Rationale:

A. The student found that the numbers in the table decrease by 2 each month and did not know how to use this information.

B. The student subtracted the largest number in the table from the smallest number.

C. Correct. The student demonstrated an understanding of how to extend a pattern.

D. The student thought that May should be 1 less than April.

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12

Input	Output
12	5
19	12
25	18

Which rule could be used to change the input number to the output number in the table above?

A divide by 7

B multiply by 6

C add 6

D subtract 7

Standard: 3.A.1.2 Describe the rule (single operation) for a pattern from an input/output table or function machine involving addition, subtraction, or multiplication.

Depth-of-Knowledge: 2

Distractor Rationale:

A. The student chose the wrong operation.

B. Balance distractor

C. The student saw 12 and 18 in the output and applied the rule 12 + 6 = 18.

D. Correct. The student demonstrated an ability to describe the rule for a pattern from an input/output table.

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OAS STRAND—ALGEBRAIC REASONING & ALGEBRA (A): STANDARD 3.A.2

OAS STANDARD

3.A.2 Use number sentences involving multiplication and unknowns to represent and solve real-world and mathematical problems.

OAS OBJECTIVES

3.A.2.1 Find unknowns represented by symbols in arithmetic problems by solving one-step open sentences (equations) and other problems involving addition, subtraction, and multiplication. Generate real-world situations to represent number sentences.

3.A.2.2 Recognize, represent, and apply the number properties (commutative, identity, and associative properties of addition and multiplication) using models and manipulatives to solve problems.

ITEM SPECIFICATIONS

Emphasis:

- Determine the value of an unknown to make a one-step open sentence true.
- Use number sentences to represent real-world situations.
- Recognize, represent, and apply the commutative, identity, and associative properties, and use them to solve problems.

Stimulus Attributes:

- Test items may include pictures, tables, counters, number lines, counting manipulatives, balances, two- and three-dimensional geometric figures, data sets, charts, and other diagrams.

Format:

- Solve a math sentence involving a single operation for an unknown quantity
- Generate real-world situations to represent number sentences.
- Identify simple examples and basic uses of the commutative, identity, and associative properties of addition and multiplication to solve mathematical problems and problems in real-world contexts
- Use the commutative, identity, and associative properties of numbers to develop computational skills
- Use a square for an unknown

Content Limits:

- Limit numbers to 2-digit whole numbers for addition and subtraction
- Limit sentence to one operation
- Limit operation to addition, subtraction, or multiplication (for the commutative property)
- Limit properties to commutative, identity, and associative
- Limit to factors up to 10
- Limit operations to addition and multiplication (for the associative property)

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ITEM SPECIFICATIONS

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding

Distractor Domain:

- Perform incorrect operation
- Common errors
- Computational errors
- Incorrect procedures
- Incorrect use of rules or properties

13 **Seth wants to visit all 50 states. He has visited 14 states. The number sentence shows, ☐, the number of states Seth has left to visit.**

$$\square + 14 = 50$$

How many states does Seth have left to visit?

A 36

B 44

C 46

D 64

Standard: 3.A.2.1 Find unknowns represented by symbols in arithmetic problems by solving one-step open sentences (equations) and other problems involving addition, subtraction, and multiplication. Generate real-world situations to represent number sentences.

Depth-of-Knowledge: 2

Distractor Rationale:

A. **Correct. The student demonstrated an ability to find an unknown represented by a symbol in an arithmetic problem by solving a one-step equation.**
B. Balance distractor
C. The student computed 50−4.
D. The student added instead of subtracting.

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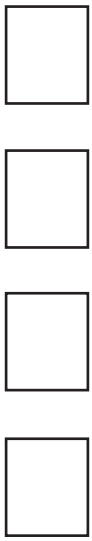
14 **Joey put pictures on his locker door as shown.**



Which number sentence shows how many pictures Joey put on his locker door?

A $4 \times 1 = 4$

B $4 \times 0 = 4$

C $4 + 1 = 4$

D $4 \div 0 = 4$

Standard: 3.A.2.2 Recognize, represent, and apply the number properties (commutative, identity, and associative properties of addition and multiplication) using models and manipulatives to solve problems.

Depth-of-Knowledge: 1

Distractor Rationale:

A. **Correct. The student demonstrated an ability to represent the identity property of multiplication using a model.**
B. The student confused 0 and 1.
C. The student confused multiplication and addition.
D. The student chose an incorrect operation.

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15 **Which expression equals (4 × 2) × 3?**

A (4 + 2) + 3

B (2 × 4) + 3

C 4 × (2 × 3)

D 2 + (4 × 3)

Standard: 3.A.2.2 Recognize, represent, and apply the number properties (commutative, identity, and associative properties of addition and multiplication) using models and manipulatives to solve problems.
Depth-of-Knowledge: 1

Distractor Rationale:

A. The student thought multiplication and addition can be interchanged or chose because the order of the numbers is the same as in the original expression.
B. The student knew the order of the factors can be changed when multiplying, but thought multiplication and addition can be interchanged.
C. Correct. The student demonstrated an ability to apply the associative property of multiplication.
D. The student knew the order of the factors can be changed when multiplying, but thought multiplication and addition can be interchanged.

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OAS STRAND—GEOMETRY & MEASUREMENT (GM): STANDARD 3.GM.1

OAS STANDARD

3.GM.1 Use geometric attributes to describe and create shapes in various contexts.

OAS OBJECTIVES

3.GM.1.1 Sort three-dimensional shapes based on attributes.

3.GM.1.2 Build a three-dimensional figure using unit cubes when picture/shape is shown.

3.GM.1.3 Classify angles as acute, right, obtuse, and straight.

ITEM SPECIFICATIONS

Emphasis:

- Sort three-dimensional shapes.
- Use unit cubes to form three-dimensional figures.
- Classify angles as acute, right, obtuse, and straight.

Stimulus Attributes:

- Test items may include pictures, diagrams, tables, grids, gridded figures, pattern blocks, pictures, and any of the following terms or phrases: acute, right, obtuse, less than 90 degrees, equal to 90 degrees, or greater than 90 degrees.

Format:

- Name a figure with given characteristics
- Identify characteristics of a figure (e.g., edges, faces, vertices)
- Sort figures based on given characteristics
- Identify composite figure formed by combining basic figures
- Use comparison to classify an angle
- Classify types of angles
- Classify angles in two-dimensional figures

Content Limits:

- Limit plane figures (regular or irregular) to a maximum of five sides
- Limit solid figures to spheres, cylinders, rectangular or triangular prisms, and rectangular or triangular pyramids
- Limit plane figures used in composite figures to a maximum of five sides
- Limit to three basic figures in a composite figure
- Limit angle types to acute, right, obtuse, and straight
- Limit building three-dimensional figures to rectangular prisms

Primary Process Standards:

- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding
- Develop the Ability to Make Conjectures, Model, and Generalize

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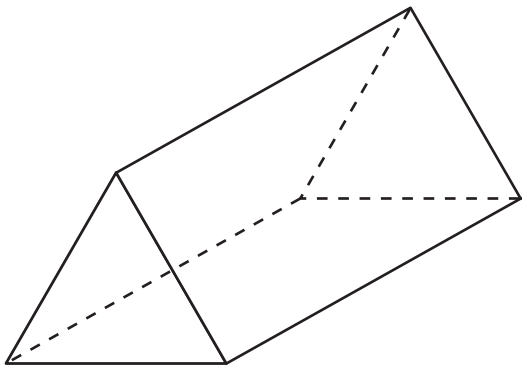
ITEM SPECIFICATIONS

Distractor Domain:

- Misidentification of characteristics, figures, or congruency
- Error in correlation of characteristics with figures
- Misidentification of basic figures
- Misidentification of basic figures used to form a composite figure
- Misinterpretation of the concepts of acute, right, straight, and obtuse angles
- Misunderstanding of vocabulary
- Incorrect classification of angles

16



What is the total number of triangular faces on the figure?

A 2

B 3

C 5

D 6

Standard: 3.GM.1.1 Sort three-dimensional shapes based on attributes.
Depth-of-Knowledge: 1

Distractor Rationale:

A. **Correct. The student demonstrated an understanding of the number of triangular faces on a triangular prism.**
B. The student chose because triangles have 3 sides.
C. The student gave the total number of faces.
D. The student chose the number of edges at the bases.

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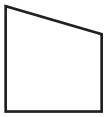
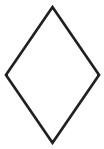
17 **Which shape below appears to contain at least one acute, one obtuse, and one right angle?**

A

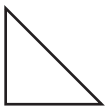


B



C

D



Standard: 3.GM.1.3 Classify angles as acute, right, obtuse, and straight.
Depth-of-Knowledge: 2

Distractor Rationale:

A. **Correct. The student demonstrated an ability to classify angles as acute, right, and obtuse.**
B. The student thought one of the obtuse angles was a right angle.
C. Balance distractor
D. The student thought one of the acute angles was an obtuse angle.

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OAS STRAND—GEOMETRY & MEASUREMENT (GM): STANDARD 3.GM.2

OAS STANDARD

3.GM.2 Understand measurable attributes of real-world and mathematical objects using various tools.

OAS OBJECTIVES

3.GM.2.1 Find perimeter of polygon, given whole number lengths of the sides, in real-world and mathematical situations.

3.GM.2.2 Develop and use formulas to determine the area of rectangles. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.

3.GM.2.3 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole centimeter or meter.

3.GM.2.4 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole yard, whole foot, or half inch.

3.GM.2.5 Using common benchmarks, estimate the lengths (customary and metric) of a variety of objects.

3.GM.2.6 Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.

3.GM.2.7 Count cubes systematically to identify number of cubes needed to pack the whole or half of a three-dimensional structure.

3.GM.2.8 Find the area of two-dimensional figures by counting total number of same-size unit squares that fill the shape without gaps or overlaps.

ITEM SPECIFICATIONS

Emphasis:

- Determine perimeter of simple polygons in real-world and mathematical situations.
- Use formulas to calculate the area of rectangles.
- Choose an appropriate measurement instrument and measure the length of objects.
- Apply knowledge of customary and metric units to estimate the length of objects.
- Apply skill of reading thermometers to solve problems.
- Determine the number of cubes needed to pack the whole or half of a three-dimensional figure.
- Determine area of plane figures by counting unit squares.

Stimulus Attributes:

- Test items may include graphs, grids, gridded figures, charts, diagrams of rectangles or squares, dot grids, geoboards, other geometric manipulatives, diagrams, pictures, and Fahrenheit and Celsius thermometers.

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ITEM SPECIFICATIONS

Format:

- Calculate perimeter given lengths of sides
- Use a formula to find the area of a rectangle
- Use one unit squares to create rows and columns in a rectangle to justify why length and width are multiplied to find the area of a rectangle
- Use a ruler to measure length to the nearest inch or half-inch
- Use a ruler to measure length to the nearest whole centimeter or meter
- Choose correct measurement instrument
- Use common benchmarks to estimate lengths using customary and metric units of measure
- Read temperature on a Fahrenheit or Celsius thermometer
- Calculate area by counting square units
- Determine the number of cubes needed to pack the whole or half of a three-dimensional figure

Content Limits:

- Limit lengths of sides to whole numbers
- Limit shapes to squares and rectangles or figures that can be composed of squares and rectangles
- Limit metric units of measure to whole centimeter or whole meter
- Limit customary units of measure to half-inch, inch, whole yard, whole foot
- Limit temperature readings to whole degrees

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding
- Develop the Ability to Make Conjectures, Model, and Generalize

Distractor Domain:

- Computational errors
- Use incorrect formula
- Calculate perimeter for area
- Inaccurate reading of measurement instrument
- Incorrect choice of measurement instrument
- Inaccurate reading of thermometers

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18 **Mrs. Steinberg's class made a design using square pieces of paper. Each piece of paper was 1 foot wide by 1 foot long. The design was a rectangle, 5 feet wide by 7 feet long. How many square pieces of paper were used to make the design?**

A 12 pieces of paper

B 20 pieces of paper

C 24 pieces of paper

D 35 pieces of paper

Standard: 3.GM.2.2 Develop and use formulas to determine the area of rectangles. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.

Depth-of-Knowledge: 3

Distractor Rationale:

A. The student added the 5 and 7.

B. Balance distractor

C. The student computed 5+7+5+7, finding the perimeter.

D. Correct. The student demonstrated an ability to use formulas to determine the area of a rectangle.

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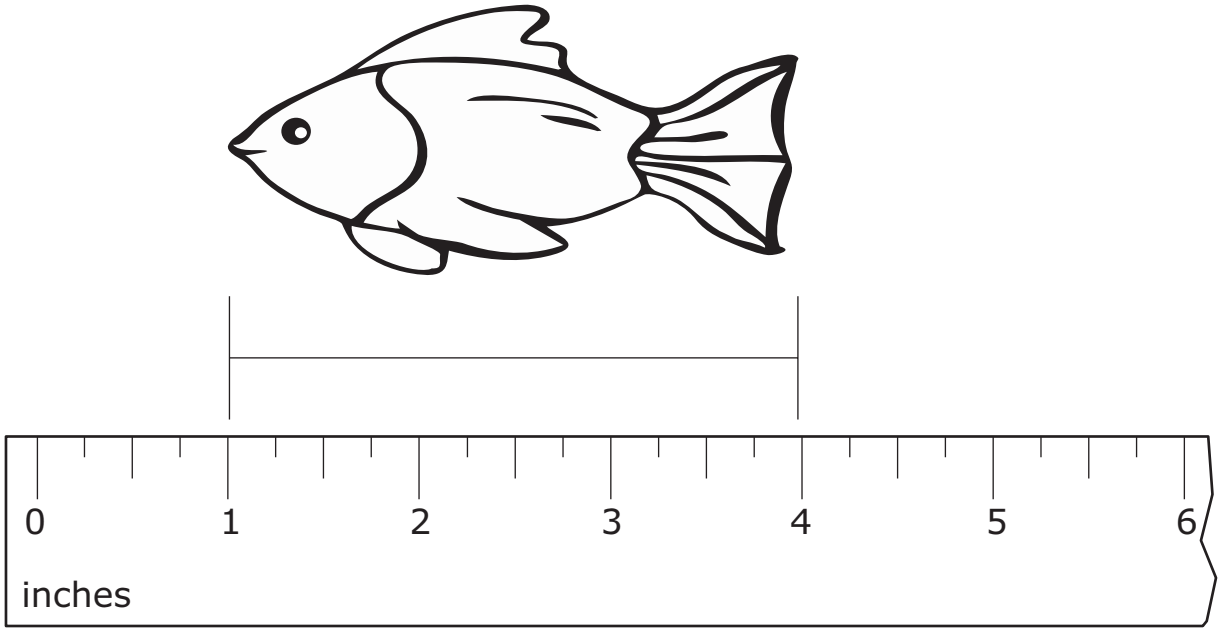
19 **Jessie measured her goldfish as shown.**



What is the length of Jessie's goldfish?

A 1 inch

B 3 inches

C 4 inches

D 6 inches

Standard: 3.GM.2.4 Choose an appropriate measurement instrument and measure the length of objects to the nearest whole yard, whole foot, or half inch.

Depth-of-Knowledge: 1

Distractor Rationale:

A. The student chose the number of inches for the starting point of the fish.

B. Correct. The student demonstrated an ability to measure the length of an object to the nearest half inch.

C. The student chose the number of inches for the ending point of the fish.

D. The student chose the last number shown on the ruler.

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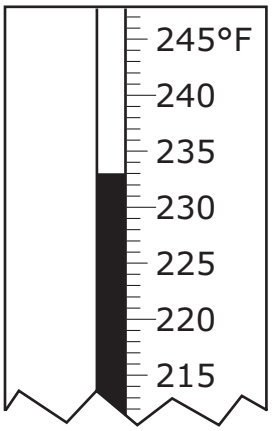
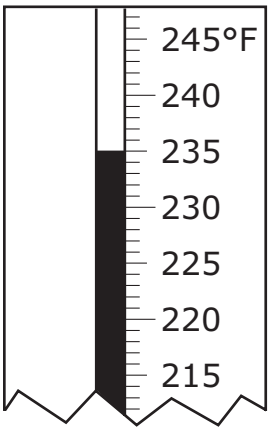
20 **Hiram is making candy. He needs to cook the candy mixture to 237 °F. Which thermometer reading is closest to this temperature?**

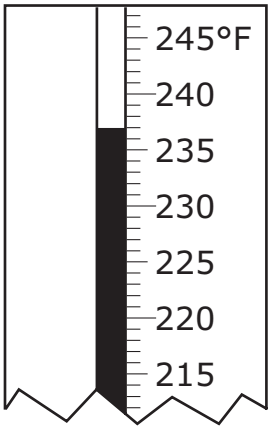
A



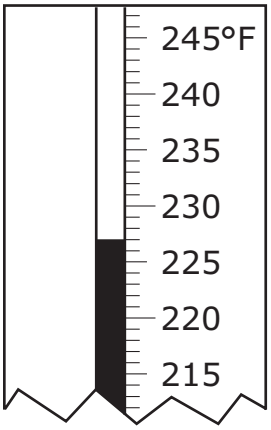
B



C



D



Standard: 3.GM.2.6 Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.

Depth-of-Knowledge: 1

Distractor Rationale:

A. The student moved 2 degrees below 235 instead of above.

B. The student used the closest number shown to 237.

C. Correct. The student demonstrated an ability to use an analog thermometer to determine temperature.

D. The student confused 227 and 237.

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OAS STRAND—GEOMETRY & MEASUREMENT (GM): STANDARD 3.GM.3

OAS STANDARD

3.GM.3 Solve problems by telling time to the nearest 5 minutes.

OAS OBJECTIVES

3.GM.3.1 Read and write time to the nearest 5-minute (analog and digital).

3.GM.3.2 Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.

ITEM SPECIFICATIONS

Emphasis:

- Apply skill of reading clocks to solve problems.
- Apply knowledge of adding and subtracting time to solve problems.

Stimulus Attributes:

- Test items may include digital and analog clocks, pictures, and tables.

Format:

- Tell time on a digital or analog clock
- Add a given number of minutes to given time
- Subtract a given number of minutes from a given time

Content Limits:

- Limit time to 5-minute intervals
- Limit addition and subtraction to intervals of 5 minutes, up to one hour

Primary Process Standards:

- Develop the Ability to Communicate Mathematically
- Develop a Deep and Flexible Conceptual Understanding
- Develop the Ability to Make Conjectures, Model, and Generalize

Distractor Domain:

- Inaccurate reading of clocks
- Computational errors
- Conversion errors (minutes to hours)

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21 **This clock shows the time Jordan's music class starts.**

What time does Jordan's music class start?

A 2:40

B 3:08

C 3:40

D 8:13

Standard: 3.GM.3.1 Read and write time to the nearest 5-minute (analog and digital).
Depth-of-Knowledge: 1

Distractor Rationale:

A. **Correct. The student demonstrated an ability to read time to the nearest 5-minute.**
B. The student chose because the minute hand is pointing to the 8 and the hour hand is closest to the 3.
C. The student chose because the hour hand is closer to the 3 than the 2.
D. The student swapped the hour and minute hands.

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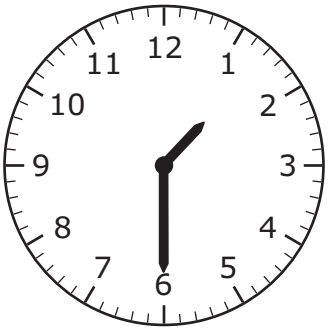
22 **Ann's piano practice starts at 1:30 p.m. The practice ends 55 minutes later.**



What time does the practice end?

A 12:35 p.m.

B 1:25 p.m.

C 1:55 p.m.

D 2:25 p.m.

Standard: 3.GM.3.2 Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.
Depth-of-Knowledge: 2

Distractor Rationale:
A. The student found 55 minutes before 1:30 p.m.
B. Balance distractor
C. The student selected because 55 is given in the problem.
D. Correct. The student demonstrated an ability to determine the solutions to a problem involving addition of time.

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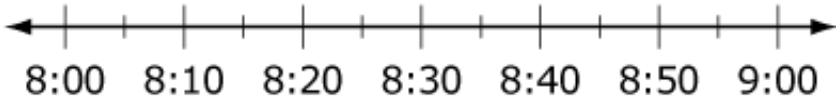
23 **You may use the number line to help answer the question.**



Students at a school begin art class at 8:15 a.m. The art class lasts for 35 minutes.

At what time does the art class end?

A 8:35 a.m.

B 8:40 a.m.

C 8:45 a.m.

D 8:50 a.m.

Standard: 3.GM.3.2 Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.
Depth-of-Knowledge: 2

Distractor Rationale:

A. The student knew the hour is 8 and thinks the minutes are 35 because 35 is given in the problem.
B. The student added 25 minutes to 8:15.
C. The student added 30 minutes to 8:15.
D. **Correct. The student demonstrated an ability to determine a solution to a problem involving the addition of time using a number line.**

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OAS STRAND—DATA & PROBABILITY (D): STANDARD 3.D.1

OAS STANDARD

3.D.1 Summarize, construct, and analyze data.

OAS OBJECTIVES

3.D.1.1 Summarize and construct a data set with multiple categories using a frequency table, line plot, pictograph, and/or bar graph with scaled intervals.

3.D.1.2 Solve one- and two-step problems using categorical data represented with a frequency table, pictograph, or bar graph with scaled intervals.

ITEM SPECIFICATIONS

Emphasis:

- Construct graphical displays of sets of data.
- Solve problems using graphical representations of data.

Stimulus Attributes:

- Test items may include bar graphs, frequency tables, line graphs (plots), pictographs, bar graphs with scaled intervals, pictures, counting manipulatives, tables, graphs, and charts.

Format:

- Data set displayed correctly as a graph
- Graph representing a unique data set
- Supply missing information in a chart or graph
- Solve one- and two-step problems using graphical representations of data

Content Limits:

- Limit to bar graph, frequency table, line graph (plot), or pictograph
- Limit scale on bar graphs, line graphs, and frequency tables to increments of 1, 2, 5, or 10
- Limit charts and tables to five categories

Primary Process Standards:

- Develop Strategies for Problem Solving
- Develop the Ability to Communicate Mathematically
- Develop Mathematical Reasoning
- Develop a Deep and Flexible Conceptual Understanding
- Develop the Ability to Make Conjectures, Model, and Generalize

Distractor Domain:

- Computational errors
- Misreading scale increments, labels, or key
- Misinterpret information in data set or graph
- Misinterpretation of data

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24 **The table shows the ice-cream cones sold during lunch.**

Ice-Cream Cones Sold

Flavor	Number of Cones
chocolate	5
strawberry	2
vanilla	4

Which pictograph shows the same information as the table?

A

Ice-Cream Cones Sold

Flavor	Number of Cones
chocolate	
strawberry	
vanilla	

Key: = 2 cones

B

Ice-Cream Cones Sold

Flavor	Number of Cones
chocolate	
strawberry	
vanilla	

Key: = 2 cones

C

Ice-Cream Cones Sold

Flavor	Number of Cones
chocolate	
strawberry	
vanilla	

Key: = 2 cones

D

Ice-Cream Cones Sold

Flavor	Number of Cones
chocolate	
strawberry	
vanilla	

Key: = 2 cones

Standard: 3.D.1.1 Summarize and construct a data set with multiple categories using a frequency table, line plot, pictograph, and/or bar graph with scaled intervals.
Depth-of-Knowledge: 2

Distractor Rationale:
A. The student ignored the key and used 1 cone picture to represent 1 cone.
B. Correct. The student demonstrated an ability to represent data in a pictograph with scaled intervals.
C. Balance distractor
D. The student did not know how to represent 5 cones with a key of 2.

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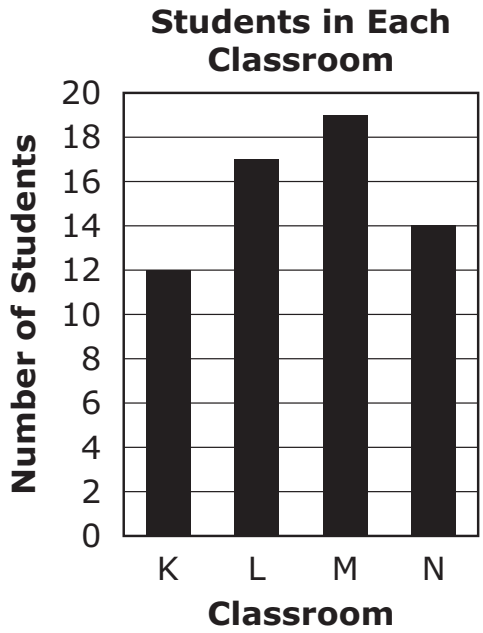
25 **The graph shows the number of students in each of four classrooms.**



How many more students are in classroom L than are in classroom N?

A 3

B 4

C 5

D 7

Standard: 3.D.1.2 Solve one- and two-step problems using categorical data represented with a frequency table, pictograph, or bar graph with scaled intervals.
Depth-of-Knowledge: 2

Distractor Rationale:

A. **Correct. The student demonstrated an understanding of how to solve a problem using categorical data presented in a bar graph.**
B. The student rounded classroom L up to 18 because that is the next closest labeled number.
C. The student found the difference in the number of students in classroom M compared to classroom N.
D. The student found the difference in the number of students in the two classrooms with the largest and smallest bars in the graph.

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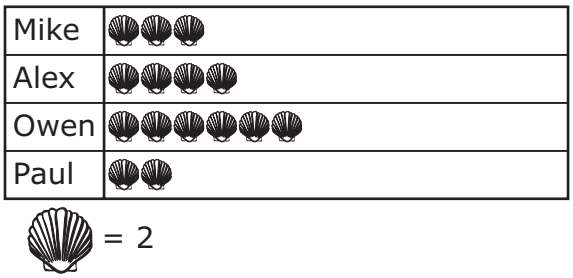
26 **Four friends collected seashells on the beach.**

- **Mike collected 6 seashells.**
- **Alex collected 2 more seashell than Mike.**
- **Owen collected 12 seashells.**
- **Paul and Owen together collected 16 seashells.**

Which pictograph shows how many seashells each friend collected?

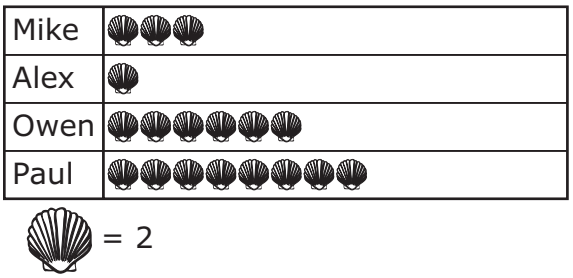
A

Number of Seashells



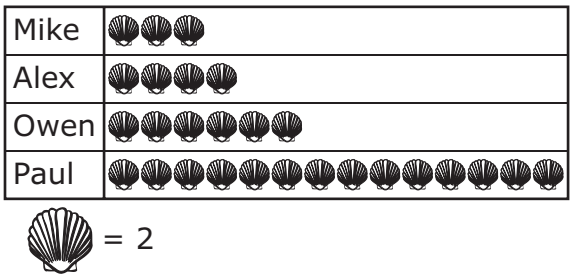
B

Number of Seashells



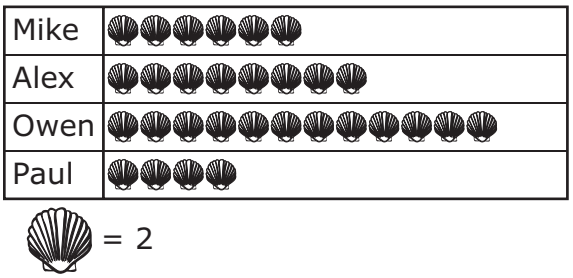
C

Number of Seashells



D

Number of Seashells



Standard: 3.D.1.1 Summarize and construct a data set with multiple categories using a frequency table, line plot, pictograph, and/or bar graph with scaled intervals.
Depth-of-Knowledge: 2

Distractor Rationale:

A. **Correct. The student demonstrated an ability to construct a pictograph with scaled intervals from a data set.**
B. The student used 2 for Alex and 16 for Paul because those are the numbers given in the bullets.
C. The student saw correct for Mike, Alex, and Owen.
D. The student did not use the key and treats each shell picture as 1 shell.

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Cluster Items

The following sample items are part of a cluster. The cluster is presented first and then the two items that follow require use of the cluster. The two items are from different standards.

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Use the information to answer the following two questions.

Casey and her brother, Sam, keep track of their scores while playing their favorite video game. Sam's highest score is 5,400. Casey's scores for her last six games are shown.

Casey's Scores

5,275	5,735
6,005	5,630
6,020	6,250

27 **Casey wants to list her scores from greatest to least. Which list shows Casey's scores from greatest to least?**

A 5,275; 5,630; 5,735; 6,005; 6,020; 6,250

B 5,735; 5,630; 5,275; 6,250; 6,020; 6,005

C 6,250; 6,005; 6,020; 5,275; 5,630; 5,735

D 6,250; 6,020; 6,005; 5,735; 5,630; 5,275

Standard: 3.N.1.4 Use place value to compare and order whole numbers up to 100,000, using comparative language, numbers, and symbols.

Depth-of-Knowledge: 1

Distractor Rationale:

A. The student listed the scores from least to greatest instead of greatest to least.

B. The student listed the scores in the five thousands from greatest to least and then the scores in the six thousands from greatest to least.

C. The student mixed up 6,020 and 6,005 and 5,735 and 5,275.

D. Correct. The student demonstrated an ability to use place value to compare whole numbers up to 100,000.

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28 **Sam's goal for next week is to score 1,000 more than his highest score. What is his goal?**

A 5,500

B 6,400

C 6,500

D 7,250

Standard: 3.N.1.3 Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.
Depth-of-Knowledge: 1

Distractor Rationale:
A. The student confused 1,000 and 100.
B. Correct. The student demonstrated an ability to find 1,000 more than a given four-digit number.
C. The student confused 1,000 and 1,100
D. The student confused Sam and Casey.

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