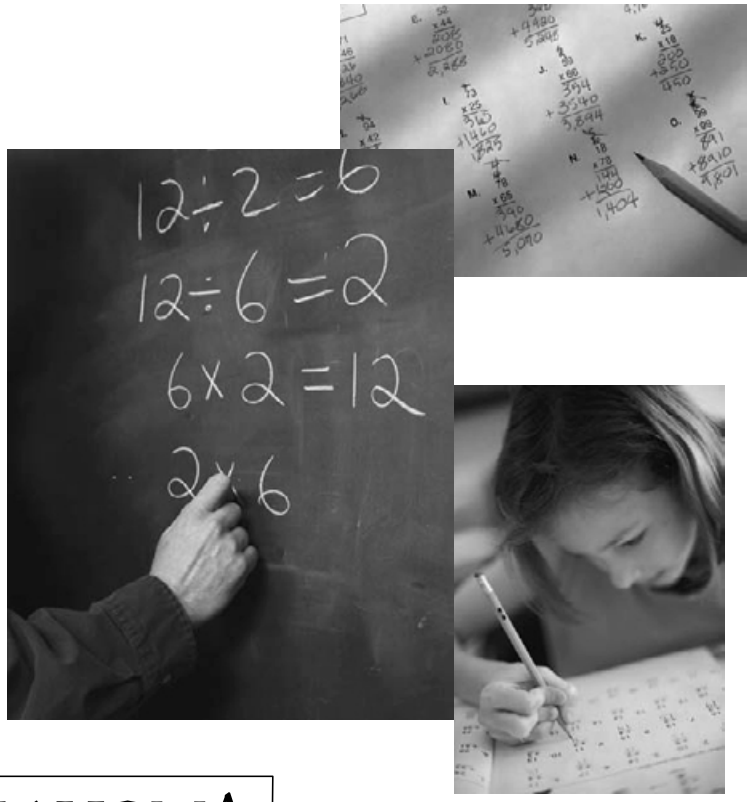
OKLAHOMA SCHOOL TESTING PROGRAM
OKLAHOMA CORE CURRICULUM TESTS

TEST and ITEM SPECIFICATIONS

Mathematics

Grade 4



OKLAHOMA
STATE DEPARTMENT of EDUCATION
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Oklahoma State Department of Education
Oklahoma City, Oklahoma

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Oklahoma Core and Curriculum Tests

TEST AND ITEM SPECIFICATIONS

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Purpose

The purpose of the Grade 4 Mathematics Test is to measure Oklahoma fourth-grade students' level of proficiency in mathematics. On the test, students are required to respond to a variety of items linked to the fourth-grade mathematics content standards identified in the Oklahoma Academic Standards (OAS). Each Mathematics Test form tests each identified content standard and objective listed below. The following standards and objectives are intended to summarize the knowledge as identified in Oklahoma Academic Standards.

OAS Content Standards and Objectives
Algebraic Reasoning: Patterns and Relationships • Algebra Patterns (1.1) • Equations (1.2) • Number Properties (1.3)
Number Sense and Operation • Number Sense (2.1) • Number Operations (2.2)
Geometry • Lines (3.1) • Angles (3.2) • Polygons (3.3) • Transformations (3.4)
Measurement • Measurement (4.1) • Time and Temperature (4.2) • Money (4.3)
Data Analysis • Data Analysis (5.1) • Central Tendency (5.3) • Probability (5.2)

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Test Structure, Format, and Scoring

The Oklahoma Core Curriculum Tests consist of multiple-choice items. Each multiple-choice item is scored as correct or incorrect. The student's raw score is converted to a scaled score using the number correct method. Of the total items, 10 items are field-test items and do not contribute to the student's scaled score.

Content Assessment	Total Items	Total Operational Items	Total Field Test Items
Mathematics	50	50	
Reading	50	50	

Test Alignment with Oklahoma Academic Standards

Criteria for Aligning the Test with the OAS Standards and Objectives
1. Categorical Concurrence The test is constructed so that there are at least six items measuring each OAS standard. The number of items 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. Depth of Knowledge Consistency The test is constructed using items from a variety of Depth of Knowledge levels that are consistent with the processes students need in order to demonstrate proficiency for each OAS objective.
3. Range of Knowledge Correspondence The test is constructed so that at least 75% of the objectives for an OAS standard have at least one corresponding assessment item.
4. Balance of Representation The test is constructed according to the Test Blueprint which reflects the degree of representation given on the test to each OAS standard and/or OAS objective in terms of the percent of total test items measuring each standard and the number of test items measuring each standard and/or objective. The test construction shall yield a balance of representation with an index of 0.7 or higher of assessed objectives related to a standard.
5. Source of Challenge Each test item is constructed in such a way that the major cognitive demand comes directly from the targeted OAS objective or OAS concept of the 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
Oklahoma Core Curriculum Tests
Grade 4 Mathematics
Test Blueprint
School Year 2013-2014

The Test Blueprint reflects the degree to which each standard and objective of the Oklahoma Academic Standards is represented on the test. The overall distribution of operational items in a test form is intended to look as follows:

Standards and Objectives	Ideal Number of Items	Ideal Percentage of Items	Reporting Category
1.0 Algebraic Reasoning: Patterns and Relationships	**7**	**14%**	**7**
1.1 Algebra Patterns	3		5
1.2 Equations	2		
1.3 Number Properties	2		2
2.0 Number Sense and Operation	**18**	**36%**	**18**
2.1 Number Sense	8		8
2.2 Number Operations	10		10
3.0 Geometry	**9**	**18%**	**9**
3.1 Lines	2		4
3.2 Angles	2		
3.3 Polygons	3		5
3.4 Transformations	2		
4.0 Measurement	**9**	**18%**	**9**
4.1 Measurement	5		5
4.2 Time and Temperature	2		4
4.3 Money	2		
5.0 Data Analysis	**7**	**14%**	**7**
5.1 Data Analysis	2		5
5.3 Central Tendency	3		
5.2 Probability	2		2
Total Test	**50**	**100%**	**50**

- A minimum of 4 items is required to report results for an objective, and a minimum of 6 items is required to report a standard.
- Percentages are approximations and may result in a sum other than 100 due to rounding.
- Objectives have been grouped for reporting purposes only.
- The Oklahoma Academic Standards correspond to the *PASS* standards.

Depth of Knowledge Assessed by Test Items

The Oklahoma Core Curriculum Tests will, as closely as possible, reflect the following "Depth of Knowledge" distribution of items.

Grades 3-5	
Depth of Knowledge	**Percent of Items**
Level 1—Recall and Reproduction	20-25%
Level 2—Skills and Concepts	65-70%
Level 3—Strategic Thinking	5-15%

Grades 6-8	
Depth of Knowledge	**Percent of Items**
Level 1—Recall and Reproduction	10-15%
Level 2—Skills and Concepts	65-70%
Level 3—Strategic Thinking	15-25%

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.

Note—The 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 student assessment Web site at <http://www.ok.gov/sde/>.

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Universal Test 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 Core Curriculum Tests, modifications have been made to some items that simplify and clarify instructions, and provide maximum readability, comprehensibility, and legibility. This includes such things as reduction of language load in content areas other than Reading, increased font size, fewer items per page, and boxed items to assist visual focus. Reading tests will have vocabulary at grade level. In all other tests, the vocabulary level will be below the grade being tested except for content words. Grades 3 and 4 will be one grade level below, and grades 5, 6, 7, and 8 will be two grade levels below. These modifications are evident in the sample items included in this document.

Testing Schedules

Each subject test, except Writing, is divided into two separate sections at grades 3, 4, and 5. These two sections of the test may be administered on the same day with a break given between the sections or on consecutive days. At grades 6, 7 and 8, each subject area test is meant to be administered in a separate session. Students may be given additional time if needed, but additional time will be given as an extension of the same testing period, not at a different time.

Grade 4 Mathematics

Test Session

Section 1

	Approximately:
Distributing books, filling in the Student Demographic Page, reading directions	25 minutes
Administering the Mathematics Test; **no calculators are allowed** during this test	30-40 minutes
Total:	55-65 minutes

Section 2

	Approximately:
Distributing books, reading directions	5 minutes
Administering the Mathematics Test; **no calculators are allowed** during this test	30-40 minutes
Total:	35-45 minutes

Grade 4 Reading

Test Session

Section 1

	Approximately:
Distributing books, reading directions	15 minutes
Administering the Reading Test	50-60 minutes
Total:	65-75 minutes

Section 2

	Approximately:
Distributing books, reading directions	5 minutes
Administering the Reading Test	45-55 minutes
Total:	50-60 minutes

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Multiple-Choice Item Guidelines

- All item stems clearly indicate what is expected in an item to help students focus on selecting a response.
- Each multiple-choice item has a stem (question, statement, or incomplete statement, and/or graphic component) and four answer (or completion) options, only one of which is correct.
- Multiple-choice item stems present a complete problem so that students know what to do before looking at the answer choices; students should not need to read all answer choices before knowing what is expected.
- Art incorporated within an item must be functional and assist students in determining the correct response.

In summary, test items assess whether students: understand relevant concepts and procedures; communicate their understandings effectively in content specific terms; approach problems; and develop viable solutions.

Stimulus Materials

Stimulus materials are the passages, graphs, models, figures, etc. that students must read and examine in order to respond to items. The following characteristics are necessary for stimulus materials:

1. When students are given information, data, or an experimental setup to evaluate, they should know the research question and the purpose of the research.
2. Tables, graphs, reading passages, and illustrations provide sufficient information for assessment of multiple standards.
3. Stimulus materials for a set of items may be a combination of multiple stimuli.
4. Information in stimulus materials is representative of concepts and principles described in Oklahoma Academic Standards.
5. For conceptual items, stimulus materials are necessary but not conceptually sufficient for student response.
6. There is a balance of graphic and textual stimulus materials within a test form. At least 50% of the items have appropriate pictorial and graphical representations. Graphs, tables, or figures are clearly associated with their intended items. Graphics appear either on the same page as the stimulus or on the facing page.
7. The stimuli avoid subject matter that might prompt emotional distress on the part of the students.
8. Permission to use stimuli from copyrighted material is obtained as necessary by the testing vendor.

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General Considerations

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 standards and objectives listed in the Test Blueprint for the specific grade and content area. In the Oklahoma Academic Standards document, asterisks have been used to identify standards and objectives that must be assessed by the local school district.

2. Test items that assess each standard are not limited to one particular type of response format. Each item begins with a stem that asks a question or poses a clear problem. Stems may include incomplete sentences in order to reduce unnecessary repetition of text.

3. Test items attempt to focus on content that is authentic and that grade-level students can relate to and understand.

4. Test items are worded precisely and clearly. The more focused an item, the more reliable and fair it will be, and the more likely all students will understand what is required of them.

5. All items are reviewed to eliminate language that is biased or is otherwise likely to 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 multiple-choice answer options, including the correct response and distractors, are similar in length and syntax. Students should not be able to rule out a wrong answer or identify a correct response solely because it looks or sounds different from the other answer choices. Distractors are created so that students reason their way to the correct answer rather than simply identify incorrect responses because of a distractor's obviously inappropriate nature. Distractors should always be plausible (but incorrect) in the context of the item stem. Correct responses are reasonably distributed among As, Bs, Cs, and Ds. The distractors adopt the language and sense of the material in the selection. Test items focus on reading skills and comprehension strategies, avoiding measurement of a student's feelings or values.

7. Items deal with issues and details that are of consequence in the stimulus and central to students' understanding and interpretation of the stimulus.

8. To the greatest extent possible, no item or response choice clues the answer to any other item. No item stem or answer option provides clues to any other item's answer, nor is the same fact of the passage assessed more than once, including the same vocabulary or technical term.

9. 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.

10. The responses "Both of the above," "All of the above," "None of the above," and "Neither of the above" are not used.

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11. Most stems are positively worded—avoiding the use of the word not. If a negative is required, the format is "All of the following . . . except."

12. The material presented is balanced, culturally diverse, well-written, and of interest to students. The stimuli and items are presented fairly in order to gain a true picture of students' skills.

13. Across all forms, a balance of gender and active/passive roles by gender is maintained.

14. No resource materials or calculators may be used by students during the test.

Vocabulary

No single source is available to determine the reading level of various words. Therefore, the appropriateness and difficulty of a word is determined in various ways. Vocabulary words are checked in the following: *EDL Core Vocabularies in Reading, Mathematics, Science, and Social Studies*; *Basic Reading Vocabularies*; the *Living Word*; or other reliable readability sources. In addition to using the aforementioned printed resources to assist in creating vocabulary items, each vocabulary item must be approved by Oklahoma's Content Review Committee. The committee, comprised of Oklahoma educators from across the state, reviews proposed vocabulary items for grade level appropriateness. Reading tests will have vocabulary at grade level. In all other tests, the vocabulary level will be below the grade being tested except for content words. Grades 3 and 4 will be one grade level below, and grades 5, 6, 7, and 8 will be two grade levels below.

All items developed using these specifications are reviewed by Oklahoma educators and approved by the Oklahoma State Department of Education. The distribution of newly developed items is based on content and process alignment, 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 standard, item specifications are organized under the following headings:

- OAS Standard and OAS Objective
- Item Specifications
  a. Emphasis
  b. Stimulus Attributes
  c. Format
  d. Content Limits
  e. Primary Process Standards
  f. Distractor Domain
  g. Sample Test Items

The headings "OAS Standard" and "OAS Objective" state the standard and objective being measured as found in the fourth-grade mathematics section of the Oklahoma Academic Standards document.

The heading "Item Specifications" highlights important points about the items' emphasis, stimulus attributes, format, content limits, primary process standards, distractor domain, and sample test items. 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 content standard as the primary concept.

Note about the Item Specifications and Sample Test Items:

With the exception of content limits, the item specifications give suggestions of what might be included and do not give an exhaustive list of what can be included. 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 one test form to another, as may their presentations.

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Oklahoma Academic Standards

MATHEMATICS CONTENT STANDARDS

Grade 4

Asterisks (*) have been used to identify standards and objectives that must be assessed by the local school district. All other skills may be assessed by the Oklahoma School Testing Program (OSTP).

Standard 1: Algebraic Reasoning: Patterns and Relationships - The student will use a variety of problem-solving approaches to create, extend, and analyze patterns.

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).

2. Find variables in simple arithmetic problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, and division with whole numbers.

3. Recognize and apply the associative property of multiplication (e.g., 6 • (2 • 3) = (6 • 2) • 3).

Standard 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.

1. Number Sense

   a. Place Value

      i. Apply the concept of place value through 6 digits (e.g., write numbers in expanded form).

      ii. Model, read, write and rename decimal numbers to the hundredths (e.g., money, numerals to words).

   b. Whole Number, Fraction, and Decimal

      i. Compare and order whole numbers and decimals to the hundredths place (e.g., pictures of shaded regions of two-dimensional figures, use >, <, = symbols).

      ii. Use 0, 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., 1/3, 3/4, 0.7, 0.4, 62%, 12%).

      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).

      *iv. Explore and connect negative numbers using real world situations (e.g. owing money, temperature, measuring elevations above and below sea level).

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2. Number Operation

   a. Estimate and find the product of up to three-digit by three-digit using a variety of strategies to solve application problems.

   b. Division Concepts and Fact Families

      i. Demonstrate fluency (memorize and apply) with basic division facts up to 144 ÷ 12 and the associated multiplication facts (e.g., 44 ÷ 12 = 12 and 12 x 12 = 144).

      ii. Estimate the quotient with one- and two-digit divisors and a two- or three-digit dividend to solve application problems.

      iii. Find the quotient (with and without remainders) with 1-digit divisors and a 2- or 3-digit dividend to solve application problems.

Standard 3: Geometry—The student will use geometric properties and relationships to analyze shapes.

1. Identify, draw, and construct models of intersecting, parallel, and perpendicular lines.

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).

3. Identify, draw, and construct models of regular and irregular polygons including triangles, quadrilaterals, pentagons, hexagons, heptagons, and octagons to solve problems.

4. Describe the effects on two-dimensional objects when they slide (translate), flip (reflect), and turn (rotate) (e.g., tessellations).

Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

1. Measurement

   a. Estimate the measures of a variety of objects using customary units.

   b. 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).

   c. Select appropriate customary and metric units of measure and measurement instruments to solve application problems involving length, weight, mass, area, and volume.

   d. Develop and use the concept of area of different shapes using grids to solve problems.

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2. Time and Temperature

   a. Solve elapsed time problems.

   b. Read thermometers using different intervals (intervals of 1, 2, or 5) and solve for temperature change.

3. Money: Determine the correct amount of change when a purchase is made with a twenty dollar bill.

Standard 5: Data Analysis—The student will demonstrate an understanding of collection, display, and interpretation of data and probability.

1. Data Analysis

   a. 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).

   b. Collect, organize and record data in tables and graphs (e.g., line graphs (plots), bar graphs, pictographs).

2. Probability: Predict the probability of outcomes of simple experiments using words such as certain, equally likely, impossible (e.g., coins, number cubes, spinners).

3. Central Tendency: Determine the median (middle), and the mode (most often) of a set of data.

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MATHEMATICS PROCESS STANDARDS

Grade 4

Process Standard 1: Problem Solving

1. Use problem-solving approaches (e.g., act out situations, represent problems with drawings and lists, use concrete, pictorial, graphical, oral, written, and/or algebraic models, understand a problem, devise a plan, carry out the plan, look back).
2. Formulate problems from everyday and mathematical situations (e.g., how many forks are needed?, how many students are absent?, how can we share/divide these cookies?, how many different ways can we find to compare these fractions?).
3. Develop, test, and apply strategies to solve a variety of routine and nonroutine problems (e.g., look for patterns, make a table, make a problem simpler, process of elimination, trial and error).
4. Verify and interpret results with respect to the original problem (e.g., students explain verbally why an answer makes sense, explain in a written format why an answer makes sense, verify the validity of each step taken to obtain a final result).
5. Distinguish between necessary and irrelevant information in solving problems (e.g., play games and discuss "best" clues, write riddles with sufficient information, identify unnecessary information in written story problems).

Process Standard 2: Communication

1. Express mathematical ideas coherently and clearly to peers, teachers, and others (e.g., with verbal ideas, models or manipulatives, pictures, or symbols).
2. Extend mathematical knowledge by considering the thinking and strategies of others (e.g., agree or disagree, rephrase another student's explanation, analyze another student's explanation).
3. Relate manipulatives, pictures, diagrams, and symbols to mathematical ideas.
4. Represent, discuss, write, and read mathematical ideas and concepts. Start by relating everyday language to mathematical language and symbols and progress toward the use of appropriate terminology (e.g., "add more" becomes "plus", "repeated addition" becomes "multiplication", "fair share" becomes "divide", "balance the equation" becomes "solve the equation").

Process Standard 3: Reasoning

1. Explain mathematical situations using patterns and relationships (e.g., identify patterns in situations, represent patterns in a variety of ways, extend patterns to connect with more general cases).
2. Demonstrate thinking processes using a variety of age-appropriate materials and reasoning processes (e.g., manipulatives, models, known facts, properties and relationships, inductive (specific to general), deductive (general to specific), spatial, proportional, logical reasoning ("and" "or" "not") and recursive reasoning).

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3. Make predictions and draw conclusions about mathematical ideas and concepts. Predictions become conjectures and conclusions become more logical as students mature mathematically.

Process Standard 4: Connections

1. Relate various concrete and pictorial models of concepts and procedures to one another (e.g., use two colors of cubes to represent addition facts for the number 5, relate patterns on a hundreds chart to multiples, use base-10 blocks to represent decimals).

2. Link concepts to procedures and eventually to symbolic notation (e.g., represent actions like snap, clap, clap with symbols A B B, demonstrate 3 • 4 with a geometric array, divide a candy bar into 3 equal pieces that represent one piece as 1/3).

3. Recognize relationships among different topics within mathematics (e.g., the length of an object can be represented by a number, multiplication facts can be modeled with geometric arrays, 1/2 can be written as 0.5 and 50%).

4. Use mathematical strategies to solve problems that relate to other curriculum areas and the real world (e.g., use a timeline to sequence events, use symmetry in art work, explore fractions in quilt designs and to describe pizza slices).

Process Standard 5: Representation

1. Create and use a variety of representations appropriately and with flexibility to organize, record, and communicate mathematical ideas (e.g., dramatizations, manipulatives, drawings, diagrams, tables, graphs, symbolic representations).

2. Use representations to model and interpret physical, social, and mathematical situations (e.g., counters, pictures, tally marks, number sentences, geometric models; translate between diagrams, tables, charts, graphs).

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Oklahoma Academic Standards

SAMPLE TEST ITEMS BY STANDARD

Grade 4

OAS Standard:
Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use a variety of problem-solving approaches to create, extend, and analyze patterns.

OAS Objective:

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).

Item Specifications:

Emphasis:
Extend and create patterns using a variety of stimuli.

Stimulus Attributes:
Test items may include illustrations of the following: graphs, tables, lists, charts, models, function machines, and pictures.

Format:
- Determine a pattern by using a rule
- Extend a pattern from a table, graph, rule, or model

Content Limits:
- Limit patterns to whole numbers
- Limit rules to one operation
- Limit operations to addition, subtraction, and multiplication
- Limit extending patterns to next two elements

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Computational error
- Inappropriate operation selected
- Misrepresentation of pattern or rule

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Oklahoma Academic Standards 1.1 Sample Test Items:

Primary Process Standard: 4M2.4
Depth of Knowledge: 1
Correct Answer: B

Dana chose a number to begin a pattern. Then she used the rule "multiply by 2" to find the other numbers in the pattern. Which could be Dana's pattern?

A 4, 6, 9, 10, 12

B 3, 6, 12, 24, 48

C 5, 10, 15, 20, 25

D 1, 3, 6, 9, 12

Primary Process Standard: 4M2.1
Depth of Knowledge: 1
Correct Answer: C

Sam used the same subtraction rule to find each number in the pattern shown. Sam plans to continue the pattern.

31	29	27	25	23	?	?

What should Sam write for the two missing numbers in the table?

A 25, 27

B 22, 21

C 21, 19

D 24, 25

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Primary Process Standard: 4M4.2
Depth of Knowledge: 1
Correct Answer: A

Travis used a rule to make this number pattern.

2, 7, 12, 17

What rule could Travis have used for the pattern?

A add 5

B multiply by 4

C add 3

D multiply by 3

Primary Process Standard: 4M5.1
Depth of Knowledge: 1
Correct Answer: C

Cindy chose 28 as the first number in a pattern. Then she used the same rule to find each number after the first.

28, 35, 42, 49, 56

Which could be Cindy's rule?

A add 3

B multiply by 3

C add 7

D multiply by 7

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Primary Process Standard: 4M3.3
Depth of Knowledge: 2
Correct Answer: B

Jim started a pattern with 3 as shown. Then he used an addition rule to continue his pattern.

3, 7, 11, 15, 19

Which number pattern uses the same addition rule that Jim used?

A 2, 5, 8, 11, 14

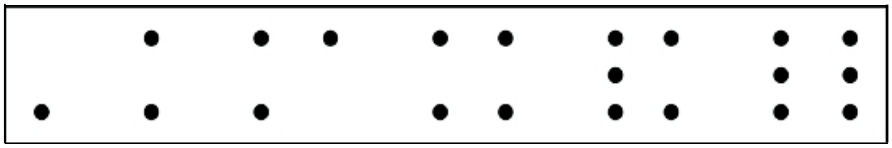
B 4, 8, 12, 16, 20

C 5, 8, 11, 14, 17

D 1, 3, 6, 9, 12

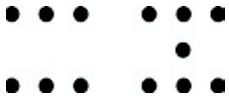
Primary Process Standard: 4M3.2
Depth of Knowledge: 2
Correct Answer: D

Each figure in the pattern shown contains 1 more dot than the figure just before it.

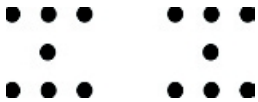


If the pattern continues, which could be the next two figures?

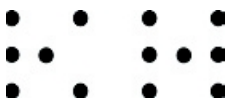
A



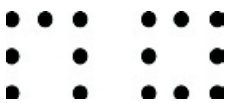
B



C



D



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Primary Process Standard: 4M3.1
Depth of Knowledge: 2
Correct Answer: A

A function machine used a rule to change Robert's numbers. The table shows Robert's numbers and the function machine's numbers.

Robert's Numbers	Function Machine's Numbers
1	4
2	5
7	10
11	14
12	15

Which rule could the function machine have used to change Robert's numbers?

A add 3

B subtract 3

C add 1

D subtract 1

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Primary Process Standard: 4M3.3
Depth of Knowledge: 2
Correct Answer: D

Larry filled pages of his scrapbook with pictures. He made this chart to show the total number of pictures needed for different numbers of pages.

Larry's Scrapbook

Number of Pages	Total Number of Pictures
1	6
2	12
3	18
4	24
5	30

Which of these shows the number of pictures needed for 7 pages?

A add 6 to 30

B add 7 to 30

C multiply 6 by 6

D multiply 7 by 6

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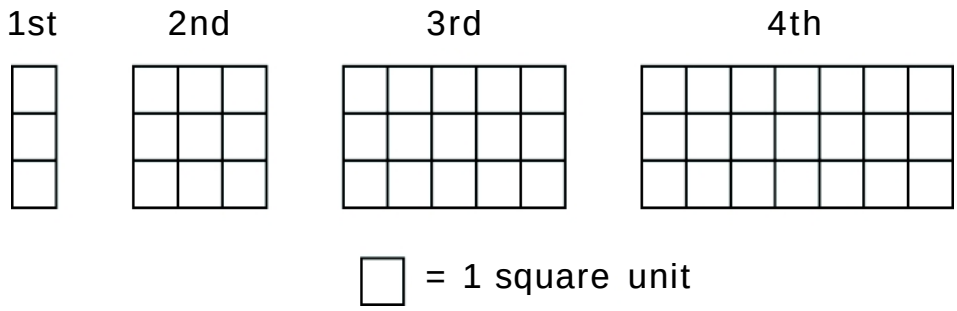
Primary Process Standard: 4M1.3
Depth of Knowledge: 3
Correct Answer: D

Sasha made a pattern of grids as shown.



Sasha added the same number of columns each time to make the next grid. If Sasha continues this pattern, what would the area of the 6th grid be?

A 21 square units

B 23 square units

C 27 square units

D 33 square units

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OAS Standard:

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use a variety of problem-solving approaches to create, extend, and analyze patterns.

OAS Objective:

2. Find variables in simple arithmetic problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, and division with whole numbers.

Item Specifications:

Emphasis:

Determine the value of an unknown to make a math sentence true.

Stimulus Attributes:

Test items may include illustrations of the following: pictures, tables, and counters.

Format:

Solve a math sentence involving a single operation for an unknown quantity.

Content Limits:

- Limit numbers to 2-digit whole numbers
- Limit sentence to one operation
- Limit operation to addition, subtraction, multiplication, or division

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 4: Connections

Distractor Domain:

- Perform incorrect operation
- Computational error

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Oklahoma Academic Standards 1.2 Sample Test Items:

Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: A

Toby has 58 trading cards. The equation shows the number of cards Toby needs to buy, *n*, to have a total of 87 cards.

$$58 + n = 87$$

Which value for *n* makes this equation true?

A 29

B 31

C 135

D 145

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Primary Process Standard: 4M1.1
Depth of Knowledge: 2
Correct Answer: D

What value of *x* makes this equation true?

$$x - 11 = 34$$

A 23

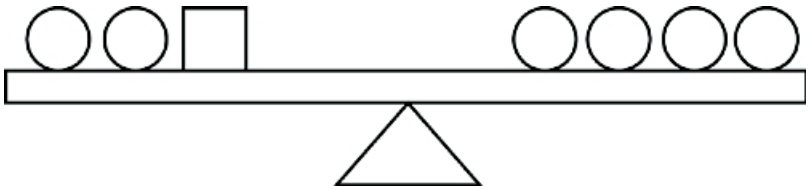
B 25

C 43

D 45

Primary Process Standard: 4M4.2
Depth of Knowledge: 3
Correct Answer: C

Susie balanced this scale.



If she added 1 square to the left side, how many circles would Susie need to add to the right side to balance the scale again?

A 4 circles

B 3 circles

C 2 circles

D 1 circle

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OAS Standard:

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use a variety of problem-solving approaches to create, extend, and analyze patterns.

OAS Objective:

3. Recognize and apply the associative property of multiplication (e.g., 6 • (2 • 3) = (6 • 2) • 3).

Item Specifications:

Emphasis:

Demonstrate a working knowledge of the associative property of multiplication.

Stimulus Attributes:

Test items may include illustrations of the following: number lines, counting manipulatives, balances, two- and three-dimensional geometric figures, data sets, charts, tables, and other diagrams.

Format:

- Identify examples and uses of the associative property of multiplication
- Use the associative property of multiplication to solve mathematical problems and problems in real-world contexts

Content Limits:

- Limit operations to multiplication
- Limit uses to two-digit whole numbers

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of property

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Oklahoma Academic Standards 1.3 Sample Test Items:

Primary Process Standard: 4M3.2
Depth of Knowledge: 2
Correct Answer: D

Which equation shows the associative property of multiplication?

A $(8 \times 2) \times 5 = 16 \times 5$

B $4 \times (7 \times 9) = 7 \times 36$

C $(3 \times 4) \times 5 = 5 \times (4 \times 3)$

D $6 \times (5 \times 2) = (6 \times 5) \times 2$

Primary Process Standard: 4M1.3
Depth of Knowledge: 2
Correct Answer: A

Which expression is equal to $(9 \times 7) \times 12$?

A $9 \times (7 \times 12)$

B $(9 \times 7) + 12$

C $(9 + 7) \times 12$

D $9 + (7 + 12)$

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Primary Process Standard: 4M3.2
Depth of Knowledge: 3
Correct Answer: B

$$(10 \times 8) \times 4 = 10 \times (n \times 4)$$

Which value of *n* makes the equation true?

A 4

B 8

C 10

D 20

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OAS Standard:
Standard 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.

OAS Objective:

1. Number Sense

   a. Place Value

      i. Apply the concept of place value through 6 digits (e.g., write numbers in expanded form).

Item Specifications:

Emphasis:
Use the concept of place value to determine the value of numerals.

Stimulus Attributes:
Test items may include illustrations of the following: base-10 blocks, place-value mats, and pictures.

Format:
- Determine the place value of a digit in a number
- Determine the digit in a number having a given place value

Content Limits:
- Limit numbers to whole numbers
- Limit numbers to six digits

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:
- Incorrect identification of a digit
- Incorrect identification of place value

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Oklahoma Academic Standards 2.1ai Sample Test Items:

Primary Process Standard: 4M4.4
Depth of Knowledge: 1
Correct Answer: B

Bridget's uncle was born in the year 1935. What digit is in the hundreds place in 1935?

A 1

B 9

C 3

D 5

Primary Process Standard: 4M4.4
Depth of Knowledge: 1
Correct Answer: B

The city that is located at the greatest altitude in the world is at 12,087 feet above sea level. What is the place value of the 2 in 12,087?

A ten thousands

B thousands

C hundreds

D tens

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Primary Process Standard: 4M2.4
Depth of Knowledge: 1
Correct Answer: D

A male killer whale can have a mass of 5,442 kilograms. What is 5,442 written in expanded form?

A 50,000 + 400 + 40 + 2

B 5,000 + 440 + 42

C 50,000 + 440 + 42

D 5,000 + 400 + 40 + 2

Primary Process Standard: 4M4.3
Depth of Knowledge: 3
Correct Answer: C

Which of these numbers has a digit in the thousands place that is exactly twice the value of the digit in the tens place?

A 6,328

B 11,985

C 28,841

D 32,121

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OAS Standard:
Standard 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.

OAS Objective:

1. Number Sense

   a. Place Value

      ii. Model, read, write and rename decimal numbers to the hundredths (e.g., money, numerals to words).

Item Specifications:

Emphasis:
Translate among different representations of numbers.

Stimulus Attributes:
Test items may include illustrations of the following: pictures and diagrams.

Format:
- Read numbers in words
- Write numbers as words
- Write numbers as numerals

Content Limits:
- Limit whole numbers to six digits
- Limit decimals to include the hundredths place

Primary Process Standards:
Process Standard 2: Communication
Process Standard 4: Connections

Distractor Domain:
- Misrepresentation of numbers
- Error in translation

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Oklahoma Academic Standards 2.1aii Sample Test Items:

Primary Process Standard: 4M2.1
Depth of Knowledge: 1
Correct Answer: C

Wiley Post traveled fifteen thousand, five hundred ninety-six miles. Which of these shows that distance written as a numeral?

A 1,556

B 1,596

C 15,596

D 15,956

Primary Process Standard: 4M4.4
Depth of Knowledge: 1
Correct Answer: B

The price of a CD player is thirty-nine dollars and ninety-five cents. What is the price of the CD player written as a number?

A $3.95

B $39.95

C $309.50

D $399.50

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Primary Process Standard: 4M2.1
Depth of Knowledge: 2
Correct Answer: C

Which number is five hundred two and seventy-one hundredths?

A 5,027.10

B 527.10

C 502.71

D 52.71

Primary Process Standard: 4M2.1
Depth of Knowledge: 2
Correct Answer: C

Mary bought a car for twelve thousand, forty-nine dollars. What is this amount of money written as a number?

A $1,249.00

B $12,000.49

C $12,049.00

D $12,490.00

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Primary Process Standard: 4M2.4
Depth of Knowledge: 3
Correct Answer: B

Andre wrote a number on the board. His number had 0 tenths, 5 hundredths, 1 hundred, and 3 tens. Which of these could be the number Andre wrote?

A 501.3

B 130.05

C 103.5

D 05.13

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OAS Standard:
Standard 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.

OAS Objective:

1. Number Sense

b. Whole Number, Fraction, and Decimal

i. Compare and order whole numbers and decimals to the hundredths place (e.g., pictures of shaded regions of two-dimensional figures, use >, <, = symbols).

Item Specifications:

Emphasis:
Compare and order whole numbers and decimal numbers.

Stimulus Attributes:
Test items may include illustrations of the following: rectangles, pictures, egg cartons, and number lines.

Format:
- Determine the relationship among whole numbers and decimal numbers as greater than (>), less than (<), or equal to (=)
- Identify the number with the greatest value
- Identify the number with the least value
- Identify numbers that are of equal value

Content Limits:
- Limit whole numbers to six digits
- Limit decimals to include the hundredths place
- Limit to four numbers to compare

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
Misinterpretation of place value

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Oklahoma Academic Standards 2.1bi Sample Test Items:

Primary Process Standard: 4M3.1
Depth of Knowledge: 1
Correct Answer: A

Which number has the greatest value?

A 4.50

B 4.05

C 0.54

D 0.45

Primary Process Standard: 4M2.3
Depth of Knowledge: 2
Correct Answer: D

Which number sentence is true?

A 907 > 970

B 7,800 = 780

C 15,321 > 15,325

D 163,406 < 163,511

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Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: D

Frank measured the mass of 3 different rocks. The first rock had a mass of 12.5 grams. The second rock had a mass of 12.08 grams, and the third had a mass of 13.2 grams. Which lists the masses of the rocks in order from <u>greatest</u> to <u>least</u>?

A 12.08, 13.2, 12.5

B 12.08, 12.5, 13.2

C 13.2, 12.08, 12.5

D 13.2, 12.5, 12.08

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OAS Standard:
Standard 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.

OAS Objective:

1. Number Sense

b. Whole Number, Fraction, and Decimal

ii. Use 0, 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., 1/3, 3/4, 0.7, 0.4, 62%, 12%).

Item Specifications:

Emphasis:
Demonstrate the understanding of the use of benchmarks 0, 1/2, (0.50), and 1 to estimate.

Stimulus Attributes:
Test items may include illustrations of the following: pictures, models, fraction strips, and number lines.

Format:
Determine which two benchmarks a given number lies between.

Content Limits:
- Limit to common fractions (halves, thirds, fourths, fifths, eighths, and tenths)
- Limit to non-repeating decimals through the tenths place
- Limit comparison to three objects
- Limit items to values between 0 and 1

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 5: Representation

Distractor Domain:
- Conceptual errors in number sense
- Rounding and estimation errors

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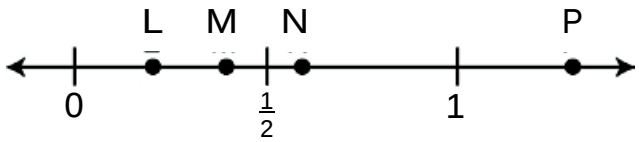
Oklahoma Academic Standards 2.1bii Sample Test Items:

Primary Process Standard: 4M5.1
Depth of Knowledge: 2
Correct Answer: B



Which point best describes the location of 0.4 on the number line?

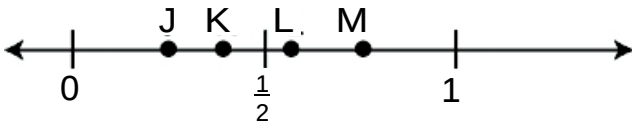
A L

B M

C N

D P

Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: D



Which point best describes the location of $\frac{1}{2}$ on the number line?

A J
B K
C L
D M

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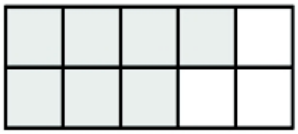
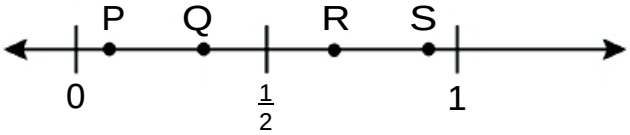
Primary Process Standard: 4M3.2
Depth of Knowledge: 2
Correct Answer: C

The shaded part of the large rectangle represents a fraction.



Which point on the number line <u>best</u> shows the location of the fraction that represents the shaded part of the rectangle?



A P

B Q

C R

D S

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OAS Standard:
Standard 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.

OAS Objective:

1. Number Sense

b. Whole Number, Fraction, and Decimal

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).

Item Specifications:

Emphasis:
Compare, add, or subtract fractions using concrete models.

Stimulus Attributes:
Test items may include illustrations of the following: pictures, egg cartons, fraction strips, circles, rectangles, and counters.

Format:
- Use models to compare fractions with like or unlike denominators
- Use models to calculate the sum or difference of fractions

Content Limits:
- Limit items to two fractions
- Limit to common fractions (halves, thirds, fourths, fifths, eighths, and tenths)
- Limit operations to simple addition or subtraction using models with the same denominator

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Representational errors
- Misinterpretation of numerator and denominator

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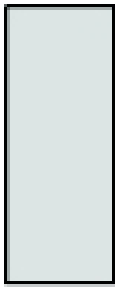
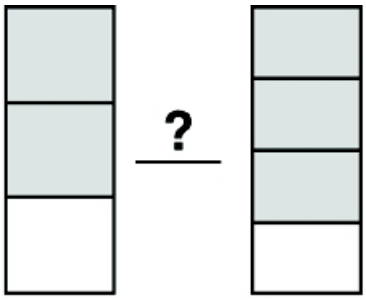
<u>Oklahoma Academic Standards 2.1biii Sample Test Items</u>:

Primary Process Standard: 4M2.3
Depth of Knowledge: 1
Correct Answer: A

This is 1.



What symbol makes the statement true?



A <

B >

C =

D ≥

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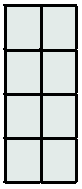
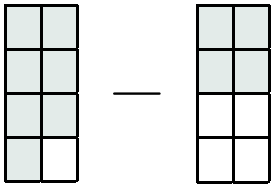
Primary Process Standard: 4M1.1
Depth of Knowledge: 2
Correct Answer: D

This is 1 unit.



What fraction represents the difference (-) shown?



A $\frac{9}{8}$

B $\frac{7}{8}$

C $\frac{4}{8}$

D $\frac{3}{8}$

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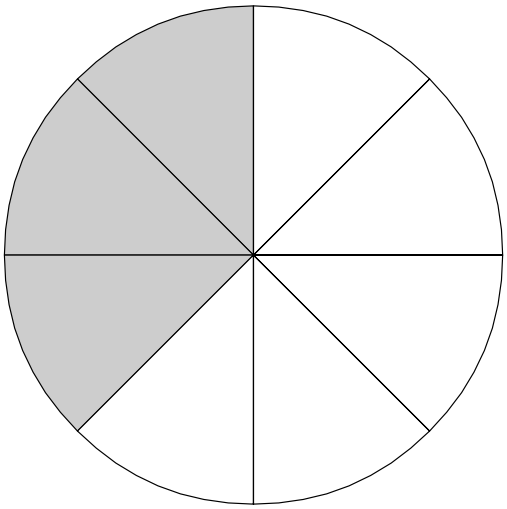
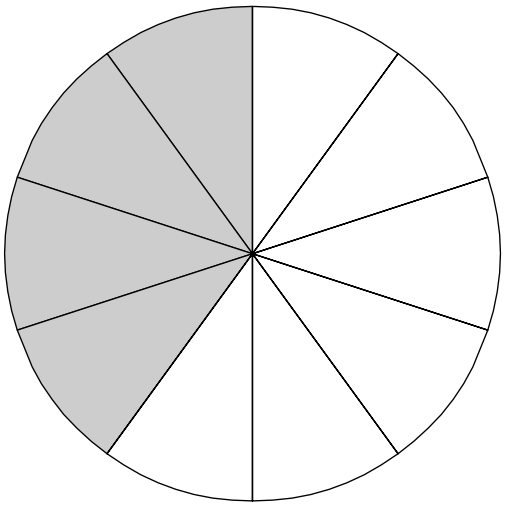
Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: B

Margaret's family and Hanna's family each ate some pizza for dinner. The shaded parts of the models show the fractions of a pizza each family had left.

Margaret's Family



Hanna's Family



Which statement correctly compares the fractions of a pizza that each family had left?

A $\frac{3}{8} > \frac{4}{10}$

B $\frac{3}{8} < \frac{4}{10}$

C $\frac{3}{5} < \frac{4}{6}$

D $\frac{3}{5} > \frac{4}{6}$

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OAS Standard:
Standard 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.

OAS Objective:

2. Number Operation

   a. Estimate and find the product of up to three-digit by three-digit using a variety of strategies to solve application problems.

Item Specifications:

Emphasis:
Solve application problems that require the estimation or calculation of products of three-digit numbers.

Stimulus Attributes:
Test items may include illustrations of the following: tables, charts, pictures, counters, and other manipulatives.

Format:
- Solve an application problem by estimating the product of three-digit numbers
- Solve an application problem by calculating the product of three-digit numbers

Content Limits:
- Limit items to up to three-digit by three-digit multiplication
- Limit items to whole numbers

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 4: Connections

Distractor Domain:
- Computational errors
- Rounding errors
- Regrouping errors

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Oklahoma Academic Standards 2.2a Sample Test Items:

Primary Process Standard: 4M2.2
Depth of Knowledge: 1
Correct Answer: B

Cody rounded the numbers in this expression to the nearest tens place.

396 × 73

Which expression shows the numbers rounded to the nearest tens place?

A 390 × 80

B 400 × 70

C 390 × 70

D 400 × 80

Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: B

Darian read 12 pages in his book each day for 27 days. Which expression shows about how many total pages Darian read?

A 10 × 20

B 10 × 30

C 20 × 20

D 20 × 30

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Primary Process Standard: 4M1.2
Depth of Knowledge: 2
Correct Answer: D

Mrs. Smith bought 38 boxes of donuts for the school. Each box contains 12 donuts. What is the total number of donuts that she bought?

A 350 donuts

B 400 donuts

C 412 donuts

D 456 donuts

Primary Process Standard: 4M1.3
Depth of Knowledge: 2
Correct Answer: D

Debbie rode her bicycle 12 miles every day for five months. There were 153 days in those five months. How many miles did she ride?

A 60 miles

B 165 miles

C 1,506 miles

D 1,836 miles

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Primary Process Standard: 4M1.1
Depth of Knowledge: 2
Correct Answer: C

A school cafeteria serves about 179 meals each school day. There are about 22 school days each month. Which is closest to the total number of meals the cafeteria serves each month?

A 2,000 meals

B 3,000 meals

C 4,000 meals

D 6,000 meals

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OAS Standard:
Standard 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.

OAS Objective:

2. Number Operation

b. Division Concepts and Fact Families

i. Demonstrate fluency (memorize and apply) with basic division facts up to 144 ÷ 12 and the associated multiplication facts (e.g., 144 ÷ 12 = 12 and 12 × 12 = 144).

Item Specifications:

Emphasis:
Show knowledge of basic division facts and identify their relationships to a fact family.

Stimulus Attributes:
Test items may include illustrations of the following: tables, pictures, and counters.

Format:
- Identify the fact family related to a division fact
- Calculate the quotient of two whole numbers
- Identify the missing fact from a fact family

Content Limits:
- Limit items to division with no remainder
- Limit divisors to whole numbers up to 12

Primary Process Standards:
Process Standard 2: Communication
Process Standard 4: Connections

Distractor Domain:
- Computational errors
- Misidentification of related facts

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Oklahoma Academic Standards 2.2bi Sample Test Items:

Primary Process Standard: 4M2.4
Depth of Knowledge: 1
Correct Answer: D

54 ÷ 6 =

A 6

B 7

C 8

D 9

Primary Process Standard: 4M4.3
Depth of Knowledge: 1
Correct Answer: A

The fact family below is missing a fact.

3 × 8 = 24
8 × 3 = 24
24 ÷ 8 = 3

?

Which is the missing fact?

A 24 ÷ 3 = 8

B 24 ÷ 4 = 6

C 24 + 3 = 27

D 24 - 4 = 20

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Primary Process Standard: 4M4.3
Depth of Knowledge: 1
Correct Answer: D

Which number sentence is in the same fact family as $7 \times 6 = 42$?

A $7 \div 42 = 6$

B $6 \times 8 = 48$

C $48 \div 6 = 8$

D $42 \div 6 = 7$

Primary Process Standard: 4M2.4
Depth of Knowledge: 3
Correct Answer: B

Which number is a factor of 12 but <u>not</u> a multiple of 2?

A 2

B 3

C 4

D 9

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OAS Standard:
Standard 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.

OAS Objective:

2. Number Operation

b. Division Concepts and Fact Families

ii. Estimate the quotient with one- and two-digit divisors and a two- or three-digit dividend to solve application problems.

Item Specifications:

Emphasis:
Apply knowledge of division to estimate quotients to solve problems.

Stimulus Attributes:
Test items may include illustrations of the following: pictures, charts, tables, and counters.

Format:
- Estimate quotients to solve real-world problems

Content Limits:
- Limit numbers to whole numbers
- Limit to 1- and 2-digit divisors and 2- or 3-digit dividends

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Rounding errors

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Oklahoma Academic Standards 2.2bii Sample Test Item:

Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: C

A company bought 20 tickets to a music festival. The company paid a total of $275 for all of the tickets. What was the approximate cost of each ticket?

A $10

B $12

C $14

D $20

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OAS Standard:
Standard 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.

OAS Objective:

2. Number Operation

b. Division Concepts and Fact Families

iii. Find the quotient (with and without remainders) with 1-digit divisors and a 2- or 3-digit dividend to solve application problems.

Item Specifications:

Emphasis:
Apply knowledge of division to calculate quotients to solve problems.

Stimulus Attributes:
Test items may include illustrations of the following: pictures, charts, tables, and counters.

Format:
Calculate quotients with and without remainders to solve real-world problems

Content Limits:
- Limit numbers to whole numbers
- Limit to 1-digit divisor and 2-digit dividend with or without a remainder
- Limit to 1-digit divisor and 3-digit dividend without a remainder

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Computational errors
- Algorithmic errors
- Regrouping errors
- Misinterpretation of remainder

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Oklahoma Academic Standards 2.2biii Sample Test Items:

Primary Process Standard: 4M1.1
Depth of Knowledge: 2
Correct Answer: D

A movie theater in Oklahoma City has 675 seats arranged in 9 rows. If each row has the same number of seats, how many seats are in each row?

A 125 seats

B 92 seats

C 87 seats

D 75 seats

Primary Process Standard: 4M1.2
Depth of Knowledge: 2
Correct Answer: A

Jay cooked 12 eggs for himself and 3 other family members. If they shared the eggs equally, how many eggs did each person get?

A 3 eggs

B 4 eggs

C 7 eggs

D 12 eggs

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Primary Process Standard: 4M1.5
Depth of Knowledge: 3
Correct Answer: C

Mrs. Gregg and 26 of her students are going on a field trip. They will be traveling in school vans. If each van can seat 8 passengers, what is the <u>least</u> number of vans they will need?

A 2 vans

B 3 vans

C 4 vans

D 5 vans

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OAS Standard:
Standard 3: Geometry—The student will use geometric properties and relationships to analyze shapes.

OAS Objective:

1. Identify, draw, and construct models of intersecting, parallel, and perpendicular lines.

Item Specifications:

Emphasis:
Identify pairs of intersecting, parallel, and perpendicular lines.

Stimulus Attributes:
Test items may include illustrations of the following: tables, grids, and pictures.

Format:
Identify examples or models of intersecting, parallel, and perpendicular lines.

Content Limits:
- Limit items to pairs of lines
- Limit to intersecting, parallel, and perpendicular lines

Primary Process Standards:
Process Standard 2: Communication
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
Misunderstanding of intersecting, parallel, and perpendicular lines

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Oklahoma Academic Standards 3.1 Sample Test Items:

Primary Process Standard: 4M5.2
Depth of Knowledge: 1
Correct Answer: A

Which of these letters best shows perpendicular line segments?

A T

B X

C S

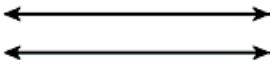
D N

Primary Process Standard: 4M2.3
Depth of Knowledge: 1
Correct Answer: B

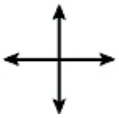
Which pair of lines appears to be parallel?

A

B



C



D

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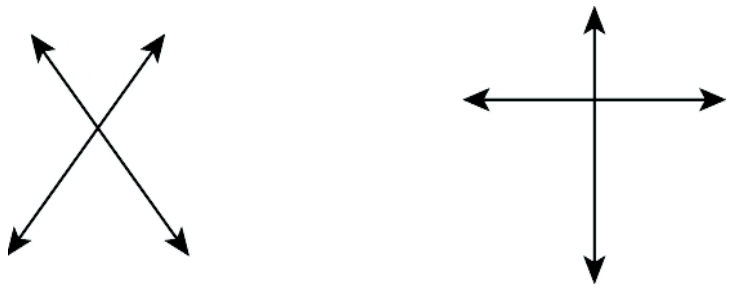
Primary Process Standard: 4M2.4
Depth of Knowledge: 3
Correct Answer: D

The picture shows 2 pairs of lines.



Which statement about these 2 pairs of lines is true?

A Both pairs appear to show parallel lines.

B Both pairs appear to show perpendicular lines.

C Exactly one pair appears to show intersecting lines.

D Exactly one pair appears to show perpendicular lines.

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OAS Standard:
Standard 3: Geometry—The student will use geometric properties and relationships to analyze shapes.

OAS Objective:
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).

Item Specifications:
Emphasis:
Apply concept of acute, right, and obtuse angles to classify other angles.

Stimulus Attributes:
- Test items may include illustrations of the following: diagrams and pictures.
- Test items may include any of the following terms or phrases: acute, right, obtuse, less than 90 degrees, equal to 90 degrees, or greater than 90 degrees.

Format:
- Use comparison to classify an angle.

Content Limits:
- Limit classifications to angles that are equal to (right), less than (acute), and greater than (obtuse) 90 degrees.

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 5: Representation

Distractor Domain:
- Misinterpretation of the concepts of acute, right, and obtuse angles
- Misunderstanding of vocabulary

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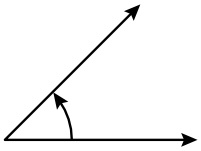
Oklahoma Academic Standards 3.2 Sample Test Items:

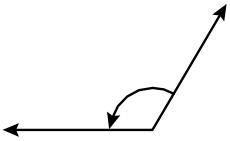
Primary Process Standard: 4M2.3
Depth of Knowledge: 1
Correct Answer: D

This angle is less than 90 degrees.

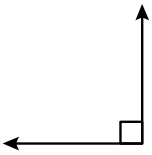


Which angle below is also less than 90 degrees?

A

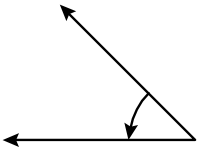


B



C

D



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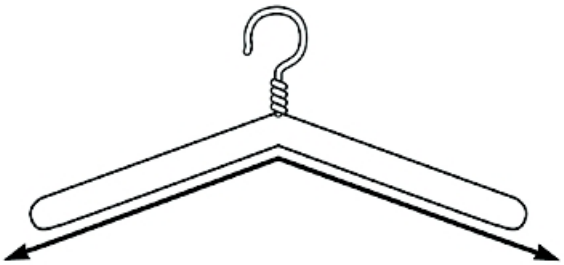
Primary Process Standard: 4M3.2
Depth of Knowledge: 1
Correct Answer: B



Which kind of angle is <u>best</u> modeled by the coat hanger?

A acute angle

B obtuse angle

C right angle

D straight angle

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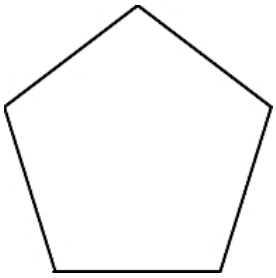
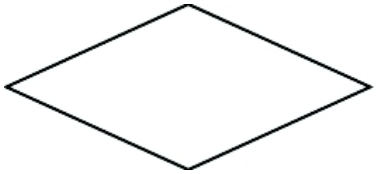
Primary Process Standard: 4M3.3
Depth of Knowledge: 2
Correct Answer: B

Which of these figures appears to have two obtuse angles <u>and</u> two acute angles inside the figure?

A

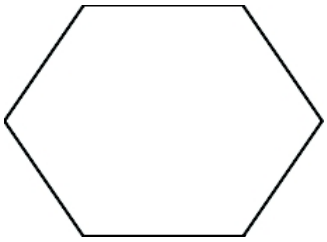


B



C

D



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OAS Standard:
Standard 3: Geometry—The student will use geometric properties and relationships to analyze shapes.

OAS Objective:
3. Identify, draw, and construct models of regular and irregular polygons including triangles, quadrilaterals, pentagons, hexagons, heptagons, and octagons to solve problems.

Item Specifications:
Emphasis:
Describe the attributes and build models of polygons.

Stimulus Attributes:
Test items may include illustrations of the following: diagrams, grids, gridded figures, pattern blocks, and pictures.

Format:
- Identify basic 2-dimensional figures
- Build models of regular and irregular polygons

Content Limits:
- Limit to 2-dimensional figures up to octagons

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 5: Representation

Distractor Domain:
- Misidentification of basic figures

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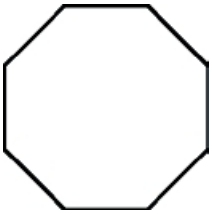
Oklahoma Academic Standards 3.3 Sample Test Items:

Primary Process Standard: 4M2.3
Depth of Knowledge: 1
Correct Answer: C

Michelle used this polygon to make a design.



What is the name of the polygon Michelle used?

A heptagon
B hexagon
C octagon
D pentagon

Primary Process Standard: 4M3.2
Depth of Knowledge: 1
Correct Answer: B

Which polygon has 7 angles?

A pentagon
B heptagon
C hexagon
D octagon

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Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: D

Ryan combined two shapes to make this polygon.

Which two shapes could Ryan have combined to make the polygon?

A a triangle and a heptagon

B a triangle and an octagon

C a triangle and a pentagon

D a triangle and a rectangle

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OAS Standard:
Standard 3: Geometry—The student will use geometric properties and relationships to analyze shapes.

OAS Objective:
4. Describe the effects on two-dimensional objects when they slide (translate), flip (reflect), and turn (rotate) (e.g., tessellations).

Item Specifications:
Emphasis:
Demonstrate knowledge of geometric transformations.

Stimulus Attributes:
- Test items may include illustrations of the following: diagrams, pictures, and grids.
- Test items may include any of the following terms: slide, translation, flip, reflection, turn, or rotation.

Format:
- Identify the result of geometric transformations on two-dimensional objects.

Content Limits:
- Limit transformations to translation, rotation, and reflection
- Limit to two-dimensional objects

Primary Process Standards:
Process Standard 2: Communication
Process Standard 5: Representation

Distractor Domain:
- Misidentification of transformation

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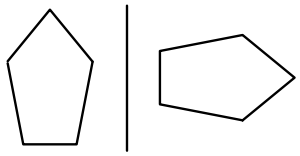
<u>Oklahoma Academic Standards 3.4 Sample Test Items</u>:

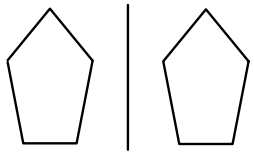
Primary Process Standard: 4M2.3
Depth of Knowledge: 1
Correct Answer: B

Which of these pictures shows a translation of the figure from left to right?

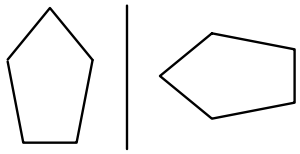
A



B



C



D

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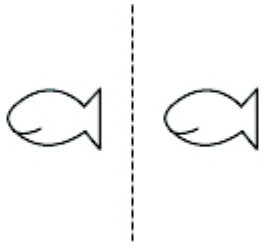
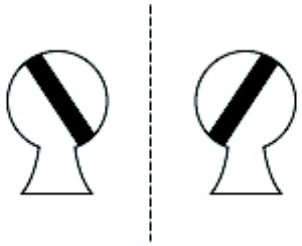
Primary Process Standard: 4M2.3
Depth of Knowledge: 1
Correct Answer: B

Which <u>best</u> represents a reflection of the figure across the dashed line segment?

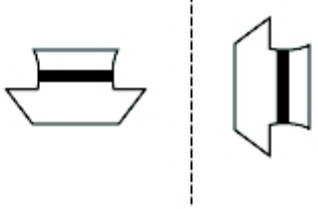
A



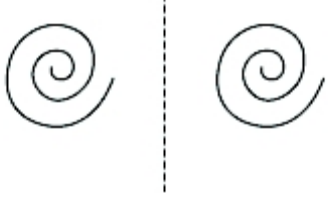
B



C

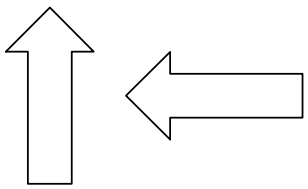


D



Primary Process Standard: 4M2.1
Depth of Knowledge: 1
Correct Answer: C

Ari made this design.



Which term <u>best</u> describes the transformation Ari used to make the design?

A dilation

B reflection

C rotation

D translation

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

1. Measurement

   a. Estimate the measures of a variety of objects using customary units.

Item Specifications:

Emphasis:
Apply knowledge of customary units to estimate measurements

Stimulus Attributes:
Test items may include illustrations of the following: diagrams and pictures.

Format:
- Select the most appropriate customary unit of measurement for an object

Content Limits:
- Limit to inches, feet, and yards for length
- Limit to ounces and pounds for weight (mass)
- Limit to objects common to a fourth-grade student

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:
- Insufficient development of concepts of inch, foot, yard, ounces and pounds

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Oklahoma Academic Standards 4.1a Sample Test Item:

Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: D

A soccer ball weighs about 1 pound.

Which of these also weighs about 1 pound?

A a baby

B a large dog

C a pair of socks

D a loaf of bread

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

1. Measurement

   b. 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).

Item Specifications:

Emphasis:
Apply concept of benchmarking to estimate length and weight of common objects.

Stimulus Attributes:
Test items may include illustrations of the following: diagrams and pictures.

Format:
- Use a benchmark to estimate mass or length in metric units

Content Limits:
- Limit to millimeters, centimeters and meters for length
- Limit to grams and kilograms for weight (mass)
- Limit to objects common to a fourth-grade student

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:
- Misunderstanding the concept of benchmarking
- Insufficient development of concepts of millimeter, centimeter, meter, grams, and kilograms

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<u>Oklahoma Academic Standards 4.1b Sample Test Items</u>:
Primary Process Standard: 4M3.3 Depth of Knowledge: 2
Correct Answer: B

A paperclip has a mass of 1 gram (g).

A textbook has a mass of 1 kilogram (kg).

Which could be the mass of one tennis ball?

A 1 g
B 60 g
C 10 kg
D 60 kg

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Primary Process Standard: 4M4.3
Depth of Knowledge: 3
Correct Answer: B

There are 50 centimeters (cm) in ½ meter. If a walking cane has a length of about 1 meter, what is the length of the walking cane in cm?

A 500 cm

B 100 cm

C 50 cm

D 25 cm

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

1. Measurement

   c. Select appropriate customary and metric units of measure and measurement instruments to solve application problems involving length, weight, mass, area, and volume.

Item Specifications:

Emphasis:
Apply knowledge of measurement concepts to determine appropriate unit and measurement instrument for specific situations.

Stimulus Attributes:
Test items may include illustrations of the following: tables, graphs, charts, pictures, diagrams, and measurement instruments.

Format:
- Identify appropriate unit and instrument of measure needed to solve a length, weight, mass, area, or volume problem.

Content Limits:
- Limit units of length to millimeter, centimeter, meter, kilometer, inch, foot, yard, or mile
- Limit units of weight (mass) to gram, kilogram, ounce, or pound
- Limit units of volume (capacity) to milliliter, liter, cup, pint, quart, or gallon

Primary Process Standards:
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:
- Identify inappropriate unit of measure
- Select inappropriate measurement instrument

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Oklahoma Academic Standards 4.1c Sample Test Items:

Primary Process Standard: 4M4.4
Depth of Knowledge: 1
Correct Answer: B

Sue measured the height of her classroom door.

Which could be the height of the door?

A 7 inches
B 7 feet
C 7 yards
D 7 miles

Primary Process Standard: 4M3.3
Depth of Knowledge: 2
Correct Answer: C

Which measurement could be the length of a school hallway?

A 30 centimeters
B 30 inches
C 30 meters
D 30 miles

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Primary Process Standard: 4M1.4
Depth of Knowledge: 2
Correct Answer: B

Which is the <u>most</u> reasonable length for a new pencil?

A 19 millimeters

B 19 centimeters

C 19 meters

D 19 kilometers

Primary Process Standard: 4M4.1
Depth of Knowledge: 2
Correct Answer: D

Which measurement represents a reasonable amount of water needed to completely fill a standard bathroom sink?

A 2 cups

B 2 pints

C 2 ounces

D 2 gallons

Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: A

Tammy drank a glass of juice at breakfast. Which of these could be the volume of a glass of juice?

A 1 cup

B 10 cups

C 1 gallon

D 10 quarts

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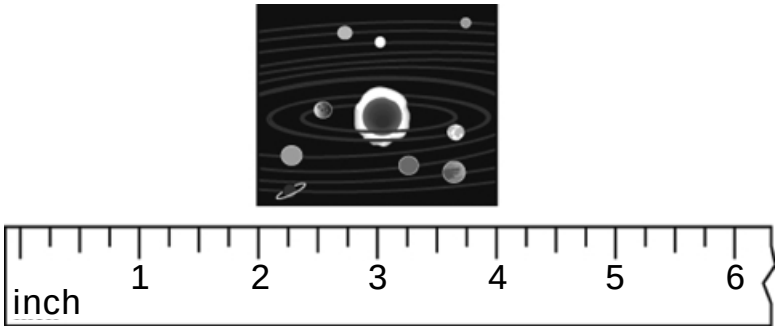
Primary Process Standard: 4M1.3
Depth of Knowledge: 3
Correct Answer: C

David decorated a page inside his sticker book with this sticker.



The sticker book page is 12 inches wide. What is the <u>greatest</u> number of these stickers David can place in a row across the page?

A 2 stickers

B 4 stickers

C 6 stickers

D 12 stickers

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

1. Measurement

   d. Develop and use the concept of area of different shapes using grids to solve problems.

Item Specifications:

Emphasis:
Determine area of plane figures.

Stimulus Attributes:
Test items may include illustrations of the following: graphs, grids, gridded figures, and charts.

Format:
- Calculate area by counting square units

Content Limits:
- Limit area to counting square units

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Computational errors
- Calculate perimeter for area

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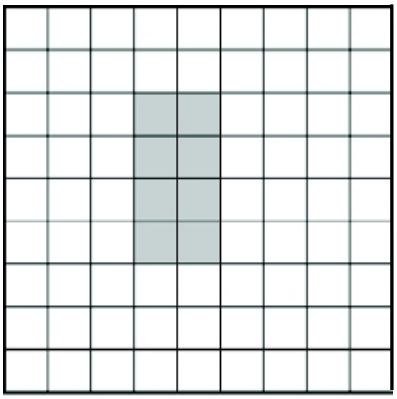
Oklahoma Academic Standards 4.1d Sample Test Items:

Primary Process Standard: 4M2.3
Depth of Knowledge: 2
Correct Answer: C



= 1 square unit

What is the area of the shaded figure on the grid?

A 4 square units

B 6 square units

C 8 square units

D 12 square units

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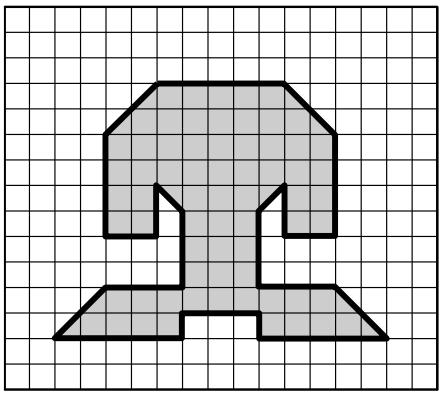
Primary Process Standard: 4M3.3
Depth of Knowledge: 3
Correct Answer: C

Look at the shaded figure.



= 1 square unit

How many square units (sq. units) are equal to the <u>area</u> of the figure?

A 79 sq. units

B 74 sq. units

C 72 sq. units

D 64 sq. units

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

2. Time and Temperature

   a. Solve elapsed time problems.

Item Specifications:

Emphasis:
Apply skill of calculating periods of time to solve problems.

Stimulus Attributes:
Test items may include illustrations of the following: pictures, tables, schedules, calendars, and charts.

Format:
- Solve real-world problems involving time.

Content Limits:
- Limit time to five-minute intervals

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:
- Computational errors
- Select incorrect operation

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Oklahoma Academic Standards 4.2a Sample Test Item:

Primary Process Standard: 4M3.2
Depth of Knowledge: 2
Correct Answer: C

John took a flight from Oklahoma City to Dallas. The flight lasted 50 minutes. If his plane arrived at 10:20 a.m., what time did his plane leave?

A 9:00 a.m.

B 9:20 a.m.

C 9:30 a.m.

D 9:50 a.m.

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

2. Time and Temperature

   b. Read thermometers using different intervals (intervals of 1, 2, or 5) and solve for temperature change.

Item Specifications:

Emphasis:
Apply skill of calculating changes in temperature to solve problems.

Stimulus Attributes:
Test items may include illustrations of the following: thermometers, tables, and charts.

Format:
- Solve real-world problems involving temperature.

Content Limits:
- Limit temperature to whole degrees in degrees Fahrenheit or degrees Celsius
- Limit intervals on thermometers to 1, 2, or 5

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Computational errors
- Select incorrect operation

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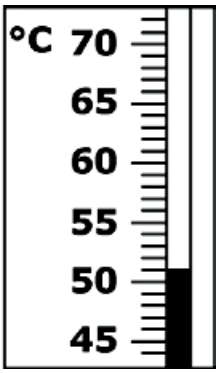
Oklahoma Academic Standards 4.2b Sample Test Items:

Primary Process Standard: 4M4.4
Depth of Knowledge: 1
Correct Answer: C

The thermometer shows the temperature at 9:00 p.m.



By 11 p.m., the temperature dropped 4 °C. What was the temperature at 11 p.m.?

A 4 °C

B 12 °C

C 47 °C

D 55 °C

Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: C

The temperature at 7:00 a.m. was 63°F. The temperature at noon was 85°F. What was the change in temperature between 7:00 a.m. and noon?

A 5 °F

B 12 °F

C 22 °F

D 28 °F

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OAS Standard:
Standard 4: Measurement—The student will solve problems using appropriate units of measure in a variety of situations.

OAS Objective:

3. Money: Determine the correct amount of change when a purchase is made with a twenty dollar bill.

Item Specifications:

Emphasis:
Apply skill of calculating amounts of money to solve problems.

Stimulus Attributes:
Test items may include illustrations of the following: money, tables, and charts.

Format:
- Subtract small amounts of money up to $20.00 to solve real world problems.

Content Limits:
- Limit to finding change up to $20 bills

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Computational errors
- Select incorrect operation

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Oklahoma Academic Standards 4.3 Sample Test Items:

Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: A

Jack bought a shirt that cost a total of $13.45 and paid for the shirt with a twenty dollar bill. How much change should Jack receive?

A $6.55

B $6.65

C $7.45

D $7.55

Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: C

The receipt shows the total cost of the groceries Alice bought.

Red's Grocery

Bread	**$1.35**
Milk	**$2.45**
Chips	**$2.19**
Eggs	**$3.48**
School supplies	**$7.89**

Total: $17.36

If she paid for the groceries with a $20 bill, how much change should Alice get?

A $3.64

B $3.36

C $2.64

D $2.36

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Primary Process Standard: 4M4.4
Depth of Knowledge: 3
Correct Answer: A

Kami bought 3 books and 1 poster at the school book fair. Each book cost $3.00 including tax, and each poster cost $1.05 including tax. Kami paid for the 3 books and 1 poster with a $20.00 bill. What is the amount of change Kami should receive?

A $9.95

B $10.05

C $15.95

D $16.05

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OAS Standard:
Standard 5: Data Analysis—The student will demonstrate an understanding of collection, display, and interpretation of data and probability.

OAS Objective:

1. Data Analysis

   a. 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).

Item Specifications:

Emphasis:
Analysis of data presented in a variety of formats.

Stimulus Attributes:
Test items may include illustrations of the following: tables, pictures, charts, tallies, and graphs.

Format:
- Answer questions involving how much, how many more or less, and direction of trend
- Select a question that can be answered by the data

Content Limits:
- Limit data to six categories
- Limit operations to addition and subtraction
- Limit graphs to pictograph, bar graph, and circle graph

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Misinterpretation of data
- Computational errors

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<u>Oklahoma Academic Standards 5.1a Sample Test Items</u>:

Primary Process Standard: 4M1.1
Depth of Knowledge: 2
Correct Answer: B

Five friends recorded the number of glasses of milk each drank in a week. They recorded their results in a chart.

Name	Number of Glasses of Milk
Jan	𝍸 𝍸 ||
Mark	𝍸 𝍸 𝍸 ||||
Christa	𝍸 ||||
Todd	𝍸 𝍸 𝍸 𝍸 |
Angela	𝍸 |||

Which person drank 3 fewer glasses of milk than Jan drank?

A Mark

B Christa

C Todd

D Angela

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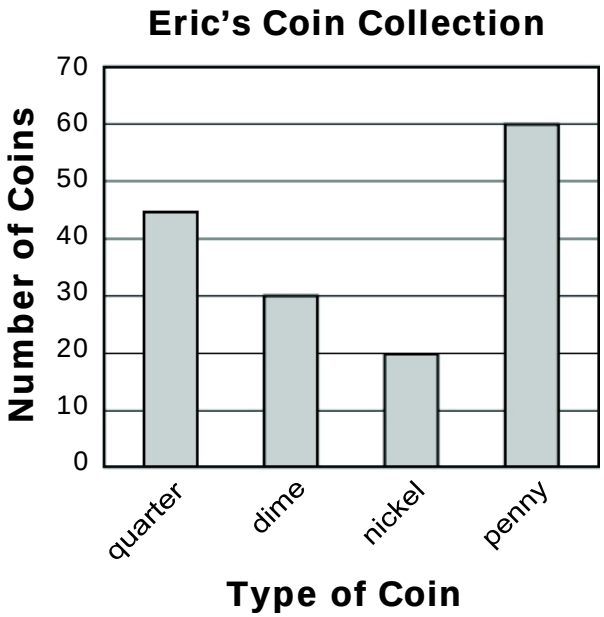
Primary Process Standard: 4M5.2
Depth of Knowledge: 2
Correct Answer: D

Eric collects coins. The number of different types of coins he has collected is shown on the graph.



Based on the information in this graph, which statement is true?

A The total number of quarters is equal to the total number of dimes and nickels combined.

B The total number of pennies is equal to the total number of quarters and nickels combined.

C The total number of nickels is exactly twice as many as the total number of quarters.

D The total number of pennies is exactly twice as many as the total number of dimes.

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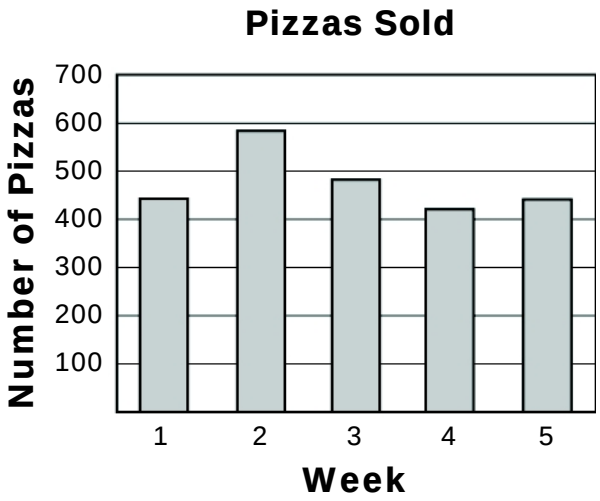
Primary Process Standard: 4M1.2
Depth of Knowledge: 2
Correct Answer: B

The bar graph shows the number of pizzas sold each week for 5 weeks at a restaurant.



Which estimate <u>best</u> represents the total number of pizzas sold during these 5 weeks?

A 2,600 pizzas

B 2,400 pizzas

C 2,100 pizzas

D 2,000 pizzas

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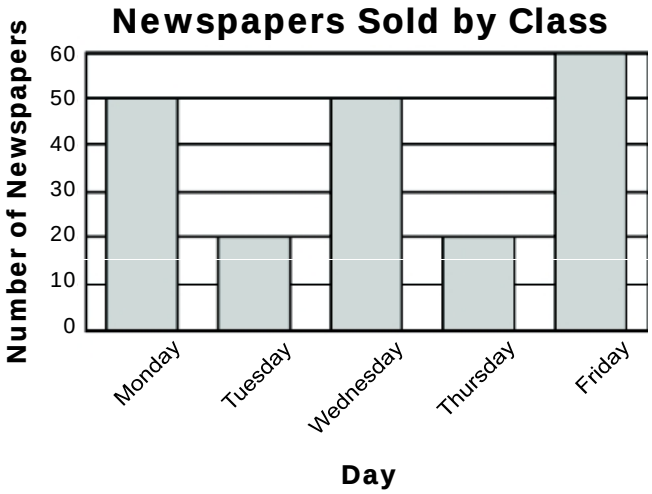
Primary Process Standard: 4M5.2
Depth of Knowledge: 3
Correct Answer: C

The graph shows the number of school newspapers sold by the students in Ms. Canton's class last week.



Which question could be answered using only the information in the graph?

A How many newspapers were sold by Theresa?

B How many more newspapers did John sell on Wednesday than Tuesday?

C How many more newspapers were sold on Friday than on Tuesday?

D How many newspapers in all were sold by the grocery store on Saturday?

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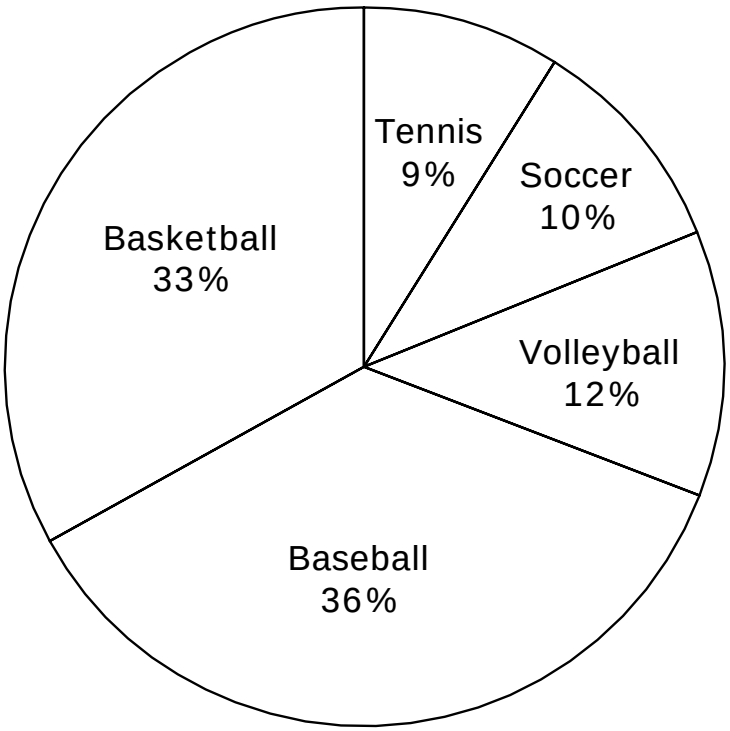
Primary Process Standard: 4M5.2
Depth of Knowledge: 3
Correct Answer: A

The students at LeMay Elementary were asked to name their favorite sport. The circle graph shows the percentage of the students who chose each sport.



Which two sports combined did almost half of the students choose as their favorite?

A baseball and volleyball

B basketball and tennis

C volleyball and soccer

D tennis and baseball

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OAS Standard:
Standard 5: Data Analysis—The student will demonstrate an understanding of collection, display, and interpretation of data and probability.

OAS Objective:

1. Data Analysis

   b. Collect, organize and record data in tables and graphs (e.g., line graphs (plots), bar graphs, pictographs).

Item Specifications:

Emphasis:
Determine accurate display of data.

Stimulus Attributes:
Test items may include illustrations of the following: tables, pictures, charts, and graphs.

Format:
- Identify correct data set for display
- Identify correct representation of data

Content Limits:
- Limit data displays to tables, charts, pictographs, bar graphs, circle graphs, and line plots
- Limit data displays to six categories

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Inaccurate representation of data set
- Misidentification of data set belonging to a display

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Oklahoma Academic Standards 5.1b Sample Test Items:

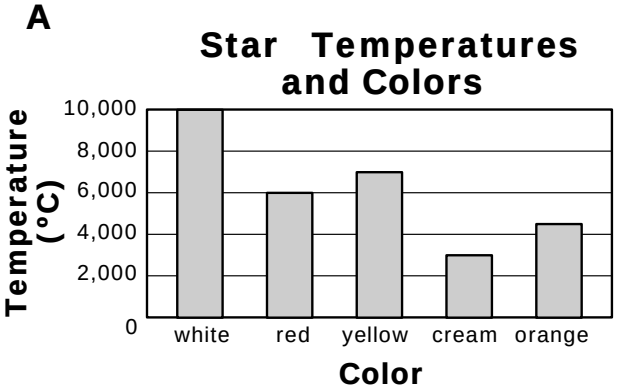
Primary Process Standard: 4M5.1
Depth of Knowledge: 2
Correct Answer: D

The table shows the temperatures for five different colors of stars.

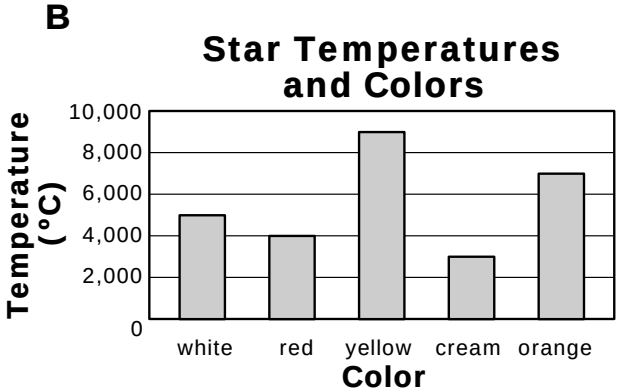
Color	Temperature (°C)
white	10,000
red	3,000
yellow	6,000
cream	7,000
orange	4,500

Which graph best represents the information in the table?

A

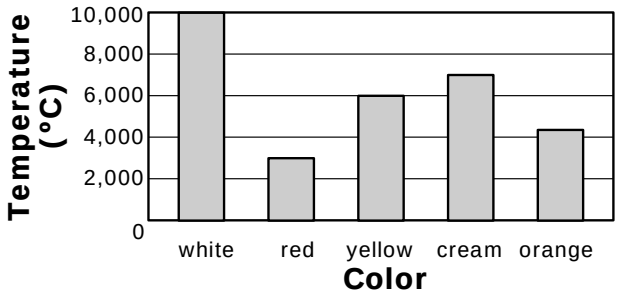


B



C

D



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Primary Process Standard: 4M5.1
Depth of Knowledge: 2
Correct Answer: D

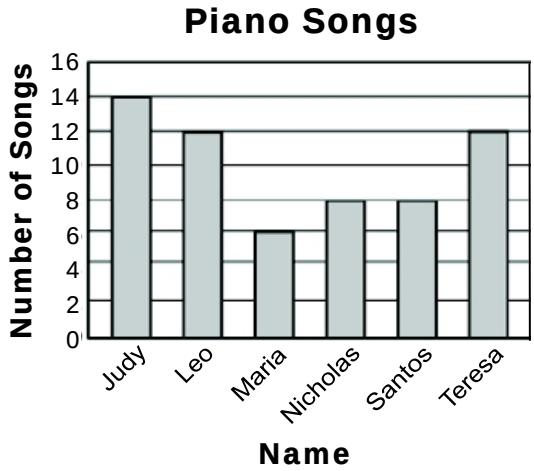
The table shows the number of songs each of six students can play on the piano.

Piano Songs

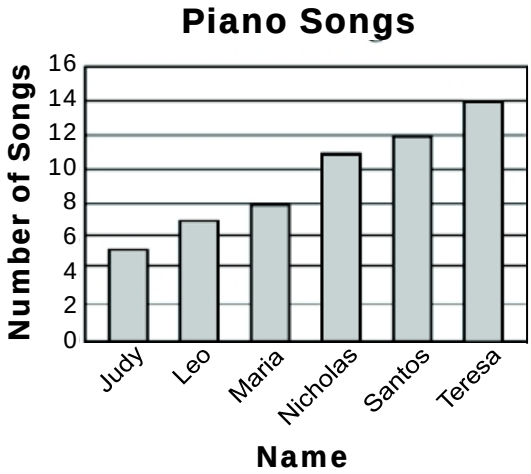
Name	Judy	Leo	Maria	Nicholas	Santos	Teresa
Number of Songs	14	12	5	7	8	11

Which bar graph correctly shows this information?

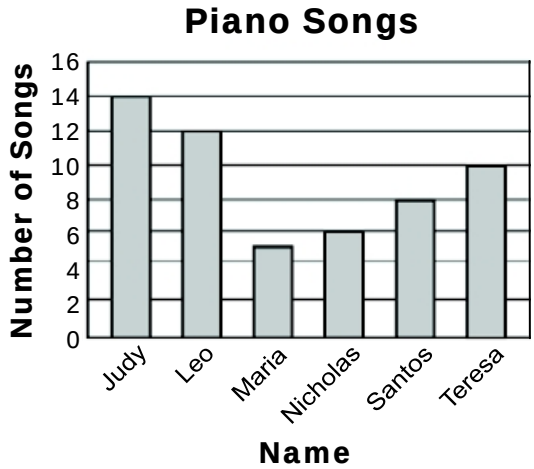
A



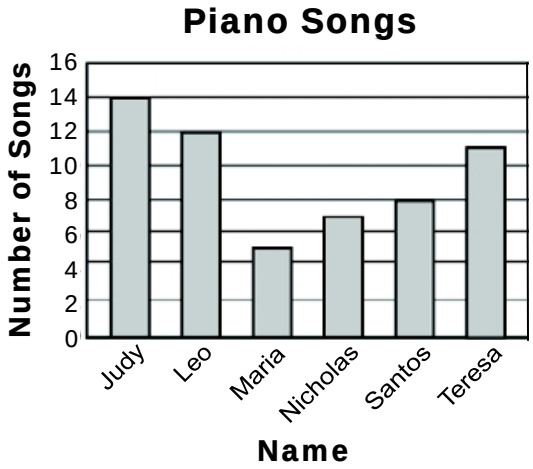
B



C



D



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Primary Process Standard: 4M5.1
Depth of Knowledge: 2
Correct Answer: C

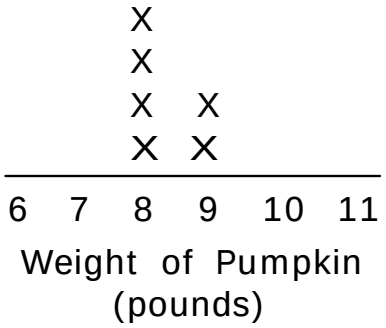
The table shows the weights of pumpkins picked by students in Ms. Daniel's class.

Weights of Picked Pumpkins

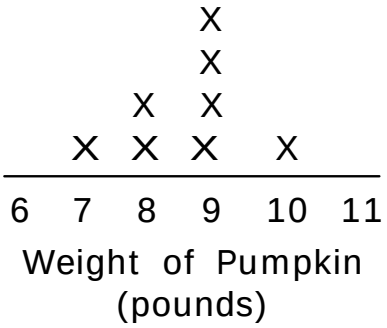
Student	Weight of Pumpkin (pounds)
Frank	9
Gretchen	8
Harry	10
Ingrid	8
Jake	8
Kelly	9
Luke	8
Markus	7

Which line plot shows the weights of the pumpkins picked by students in Ms. Daniel's class?

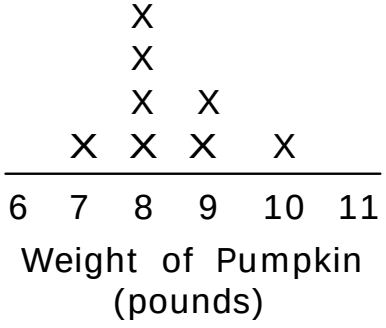
A



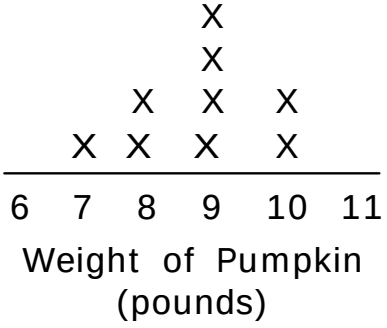
B



C



D



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OAS Standard:
Standard 5: Data Analysis—The student will demonstrate an understanding of collection, display, and interpretation of data and probability.

OAS Objective:
2. Probability: Predict the probability of outcomes of simple experiments using words such as certain, equally likely, impossible (e.g., coins, number cubes, spinners).

Item Specifications:
Emphasis:
Determine the likelihoods of experimental outcomes.

Stimulus Attributes:
Test items may include the following: tables, graphs, charts, pictures.

Format:
- Predict outcomes of an experiment as certain, equally likely or impossible

Content Limits:
- Limit to simple experiments
- Limit predictions to certain, equally likely, or impossible

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:
- Misunderstanding of likelihood of event

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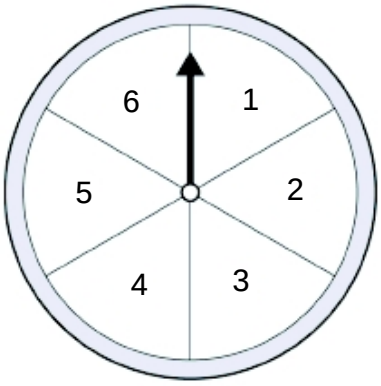
Oklahoma Academic Standards 5.2 Sample Test Items:

Primary Process Standard: 4M1.2
Depth of Knowledge: 2
Correct Answer: C

Kyle spins the arrow on the spinner one time.



Which statement correctly describes the probability of this experiment?

A It is certain for the spinner to land on the number 6.

B It is impossible for the spinner to land on the number 6.

C It is certain for the spinner to land on a whole number less than 7.

D It is impossible for the spinner to land on a whole number less than 7.

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Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: C

Colin rolls a fair number cube once. The number cube has sides numbered 1 through 6. What is the probability of rolling an 8?

A certain

B likely

C impossible

D equally likely

Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: A

Christine has 5 pencils. Three of the pencils are red and 2 of the pencils are yellow. She will choose 1 pencil without looking. What is the probability that Christine will choose a red or a yellow pencil?

A certain

B likely

C impossible

D equally likely

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OAS Standard:
Standard 5: Data Analysis—The student will demonstrate an understanding of collection, display, and interpretation of data and probability.

OAS Objective:

3. Central Tendency: Determine the median (middle), and the mode (most often) of a set of data.

Item Specifications:

Emphasis:
Demonstrate the ability to find the median and mode for a set of data.

Stimulus Attributes:
Test items may include illustrations of the following: data sets, charts, tables, bar graphs, pictographs, frequency charts, line plots, and scatter plots.

Format:
- Given a set of data, the student will determine median and mode.

Content Limits:
- Limit data sets to 10 pieces of data
- Limit data sets to numerical data
- Limit medians to whole numbers
- Limit to 1 mode
- List data in order for median
- Limit to an odd number of pieces of data

Primary Process Standards:
Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Incorrect procedures
- Misunderstanding of concepts

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Oklahoma Academic Standards 5.3 Sample Test Items:

Primary Process Standard: 4M4.1
Depth of Knowledge: 1
Correct Answer: C

2, 2, 3, 4, 6, 7, 9, 9, 9

What is the median of the set of data?

A 2

B 4

C 6

D 7

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Primary Process Standard: 4M4.3
Depth of Knowledge: 2
Correct Answer: B

Five students sold newspapers for a school fundraiser. The frequency chart shows the number of newspapers sold by each student.

Name	Newspapers Sold
Jan	5 3
Mark	5 5 5 4
Christa	5 5 2
Todd	5 5 5 5 1
Angela	5 3

What is the mode of the number of newspapers sold?

A 5

B 8

C 12

D 13

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Primary Process Standard: 4M4.4
Depth of Knowledge: 2
Correct Answer: B

The table shows the weights of pumpkins picked by five students.

Weights of Picked Pumpkins

Student	Weights of Pumpkin (pounds)
Frank	7
Gretchen	7
Harry	8
Ingrid	9
Jake	10

What is the median of the weights of pumpkins picked by the students?

A 7 pounds

B 8 pounds

C 9 pounds

D 10 pounds

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