

Grade 4	Grade 5	Grade 6
<p><b>Standard 1 - Number Sense</b></p> <p><i>Students understand the place value of whole numbers* and decimals to two decimal places and how whole numbers and decimals relate to simple fractions.</i></p>	<p><b>Standard 1 - Number Sense</b></p> <p><i>Students compute with whole numbers*, decimals, and fractions and understand the relationship among decimals, fractions, and percents. They understand the relative magnitudes of numbers. They understand Prime* and composite* numbers.</i></p>	<p><b>Standard 1 – Number Sense</b></p> <p><i>Students compare and order positive and negative integers*, decimals, fractions, and mixed numbers. They find multiples* and factors*.</i></p>
<p>4.1.1 Read and write whole numbers up to 1,000,000. Example: Read aloud the number 394,734.</p> <p>4.1.2 Identify and write whole numbers up to 1,000,000, given a place-value model. Example: Write the number that has 2 hundred thousands, 7 ten thousands, 4 thousands, 8 hundreds, 6 tens, and 2 ones.</p> <p>4.1.3 Round whole numbers up to 10,000 to the nearest ten, hundred, and thousand. Example: is 7,683 closer to 7,600 or 7,700? Explain your answer.</p> <p>4.1.4 Order and compare whole numbers using symbols for “less than” (&lt;), “equal to” (=), and “greater than” (&gt;). Example: Put the correct symbol in 328 __ 142.</p>	<p>5.1.1 Convert between numbers in words and numbers in figures, for numbers up to millions and decimals to thousandths. Example: Write the number 198,536 in words.</p> <p>5.1.2 Round whole numbers and decimals to any place value. Example: Is 7,683,559 closer to 7,600,000 or 7,700,000? Explain your answer.</p> <p>5.1.3 Arrange in numerical order and compare whole numbers or decimals to two decimal places by using the symbols for less than (&lt;), equals (=), and greater than (&gt;). Example: Write from smallest to largest: 0.5, 0.26, 0.08.</p> <p>5.1.4 Interpret percents as a part of a hundred. Find decimal and percent equivalents for common fractions and explain why they represent the same value.</p>	<p>6.1.1 Understand and apply the basic concept of negative numbers (e.g., on a number line, in counting, in temperature, in “owing”). Example: The temperature this morning was -6° and now it is 3°. How much has the temperature risen? Explain your answer.</p> <p>6.1.2 Interpret the absolute value of a number as the distance from zero on a number line, and find the absolute value of real numbers. Example: Use a number line to explain the absolute values of -3 and of 7.</p> <p>6.1.3 Compare and represent on a number line positive and negative integers, fractions, decimals (to hundredths), and mixed numbers. Example: Find the positions on a number line of 3.56, -2.5, <math>1\frac{5}{6}</math>, and -4.</p> <p>6.1.4 Convert between any two representations of numbers (fractions, decimals, and percents) without the use</p>

<p>4.1.5 Rename and rewrite whole numbers as fractions.</p> <p>Example: <math>3 = \frac{6}{2} = \frac{9}{3} = \frac{?}{4} = \frac{?}{5}</math></p> <p>4.1.6 Name and write mixed numbers, using objects or pictures.</p> <p>Example: You have 5 whole straws and half a straw. Write the number that represents these objects.</p> <p>4.1.7 Name and write mixed numbers as improper fractions, using objects or pictures.</p> <p>Example: Use a picture of 3 rectangles, each divided into 5 equal pieces, to write <math>2\frac{3}{5}</math> as an improper fraction.</p> <p>4.1.8 Write tenths and hundredths in decimal and fraction notations. Know the fraction and decimal equivalents for halves and fourths (e.g., <math>\frac{1}{2} = 0.5 = 0.50</math>, <math>\frac{7}{4} = 1\frac{3}{4} = 1.75</math>).</p> <p>Example: Write <math>\frac{26}{10}</math> and <math>2\frac{3}{4}</math> as decimals.</p> <p>4.1.9 Round two-place decimals to tenths or to the nearest whole number.</p> <p>Example: You ran the 50-yard dash in 6.73 seconds. Round your time to the nearest tenth.</p> <p>*whole numbers: 0, 1, 2, 3, etc.</p>	<p>Example: Shade a 100-square grid to show 30%. What fraction is this?</p> <p>5.1.5 Explain different interpretations of fractions: as parts of a whole, parts of a set, and division of whole numbers by whole numbers.</p> <p>Example: What fraction of a pizza will each person get when 3 pizzas are divided equally among 5 people?</p> <p>5.1.6 Describe and identify prime and composite numbers.</p> <p>Example: Which of the following numbers are prime: 3, 7, 12, 17, 18? Justify your choices.</p> <p>5.1.7 Identify on a number line the relative position of simple positive fractions, positive mixed numbers, and positive decimals.</p> <p>Example: Find the positions on a number line of <math>1\frac{1}{4}</math> and 1.4.</p> <p>*whole numbers: 0, 1, 2, 3, etc.</p> <p>*prime number: number that can be evenly divided only by 1 and itself (e.g., 2, 3, 5, 7, 11)</p> <p>*composite number: not a prime number (e.g., 4, 6, 8, 9, 10)</p>	<p>of a calculator.</p> <p>Example: Write <math>\frac{5}{8}</math> as a decimal and as a percent.</p> <p>6.1.5 Recognize decimal equivalents for commonly used fractions without the use of a calculator.</p> <p>Example: Know that <math>\frac{1}{3} = 0.333 \dots</math>, <math>\frac{1}{2} = 0.5</math>, <math>\frac{2}{5} = 0.4</math>, etc.</p> <p>6.1.6 Use models to represent ratios.</p> <p>Example: Divide 27 pencils to represent the ratio 4:5.</p> <p>6.1.7 Find the least common multiple* and the greatest common factor* of whole numbers. Use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).</p> <p>Example: Find the smallest number that both 12 and 18 divide into. How does this help you add the fractions <math>\frac{5}{12}</math> and <math>\frac{7}{18}</math>?</p> <p>*positive and negative integers: <math>\dots, -3, -2, -1, 0, 1, 2, 3, \dots</math></p> <p>*multiples: e.g., multiples of 7 are 7, 14, 21, 28, etc.</p> <p>*factors: e.g., factors of 12 are 1, 2, 3, 4, 6, 12</p> <p>*least common multiple: e.g., least common multiple of 4 and 6 is 12</p> <p>*greatest common factor: e.g., greatest common factor of 18 and 42 is 6</p>
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<p><b>Standard 2 – Computation</b></p> <p><i>Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among these operations. They extend their use and understanding of whole numbers to the addition and subtraction of simple fractions and decimals.</i></p>	<p><b>Standard 2 – Computation</b></p> <p><i>Students solve problems involving multiplication and division of whole numbers and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.</i></p>	<p><b>Standard 2 – Computation</b></p> <p><i>Students solve problems involving addition, subtraction, multiplication, and division of integers. They solve problems involving fractions, decimals, ratios, proportions, and percentages.</i></p>
<p>4.2.1 Understand and use standard algorithms* for addition and subtraction.</p> <p>Example: <math>45,329 + 6,984 = ?</math>, <math>36,296 = 12,075 = ?</math></p> <p>4.2.2 Represent as multiplication any situation involving repeated addition.</p> <p>Example: Each of the 20 students in your physical education class has 3 tennis balls. Find the total number of tennis balls in the class.</p> <p>4.2.3 Represent as division any situation involving the sharing of objects or the number of groups of shared objects.</p> <p>Example: Divide 12 cookies equally among 4 students. Divide 12 cookies equally so that each person gets 4 cookies. Compare your answers and methods.</p> <p>4.2.4 Demonstrate mastery of the multiplication tables for numbers between 1 and 10 and of the corresponding division facts.</p> <p>Example: Know the answers to <math>9 \times 4</math></p>	<p>5.2.1 Solve problems involving multiplication and division of any whole numbers.</p> <p>Example: <math>2,867 \times 34 = ?</math> Explain your answer.</p> <p>5.2.2 Add and subtract fractions (including mixed numbers) with different denominators.</p> <p>Example: <math>3\frac{4}{5} - 2\frac{2}{3} = ?</math></p> <p>5.2.3 Use models to show an understanding of multiplication and division of fractions.</p> <p>Example: Draw a rectangle 5 squares long and 3 squares wide. Shade <math>\frac{4}{5}</math> of the rectangle, starting from the left. Shade <math>\frac{2}{3}</math> of the rectangle, starting from the top. Look at the fraction of the squares that you have double-shaded and use that to show how to multiply <math>\frac{4}{5}</math> by <math>\frac{2}{3}</math>.</p> <p>5.2.4 Multiply and divide fractions to solve problems.</p> <p>Example: You have <math>3\frac{1}{2}</math> pizzas left</p>	<p>6.2.1 Add and subtract positive and negative integers.</p> <p>Example: <math>17 \div -4 = ?</math>, <math>-8 - 5 = ?</math></p> <p>6.2.2 Multiply and divide positive and negative integers.</p> <p>Example: Continue the pattern: <math>3 \times 2 = ?</math>, <math>2 \times 2 = ?</math>, <math>1 \times 2 = ?</math>, <math>0 \times 2 = ?</math>, <math>-1 \times 2 = ?</math>, <math>-2 \times 2 = ?</math>, etc.</p> <p>6.2.3 Multiply and divide decimals.</p> <p>Example: <math>3.265 \times 0.96 = ?</math>, <math>56.79 \div 2.4 = ?</math></p> <p>6.2.4 Explain how to multiply and divide positive fractions and perform the calculations.</p> <p>Example: Explain why <math>\frac{5}{8} \div \frac{15}{16} = \frac{5}{8} \times \frac{16}{15} = \frac{2}{3}</math>.</p>

<p>and <math>35 \div 7</math>.</p> <p>4.2.5 Use a standard algorithm to multiply numbers up to 100 by numbers up to 10, using relevant properties of the number system. Example: <math>67 \times 3 = ?</math></p> <p>4.2.6 Use a standard algorithm to divide numbers up to 100 by numbers up to 10, without remainders, using relevant properties of the number system. Example: <math>69 \div 3 = ?</math></p> <p>4.2.7 Understand the special properties of 0 and 1 in multiplication and division. Example: Know that <math>73 \times 0 = 0</math> and that <math>42 \div 1 = 42</math>.</p> <p>4.2.8 Add and subtract simple fractions with different denominators, using objects or pictures. Example: Use a picture of a circle divided into 6 equal pieces to find <math>\frac{5}{6} - \frac{1}{3}</math>.</p>	<p>from a party. How many people can have <math>\frac{1}{4}</math> of a pizza each?</p> <p>5.2.5 Add and subtract decimals and verify the reasonableness of the results. Example: Compute <math>39.46 - 20.89</math> and check the answer by estimating.</p> <p>5.2.6 Use estimation to decide whether answers are reasonable in addition, subtraction, multiplication, and division problems. Example: Your friend says that <math>2,867 \times 34 = 20,069</math>. Without solving, explain why you think the answer is wrong.</p> <p>5.2.7 Use mental arithmetic to add or subtract simple decimals. Example: Add 0.006 to .027 without using pencil and paper.</p>	<p>6.2.5 Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain why a particular operation was used for a given situation. Example: you want to place a towel bar <math>9\frac{3}{4}</math> inches long in the center of a door <math>27\frac{1}{2}</math> inches wide. How far from each edge should you place the bar? Explain your method.</p> <p>6.2.6 Interpret and use ratios to show the relative sizes of two quantities. Use the notations: a/b, a to b, a:b. Example: A car moving at a constant speed travels 130 miles in 2 hours. Write the ratio of distance to time and use it to find how far the car will travel in 5 hours.</p> <p>6.2.7 Understand proportions and use them to solve problems. Example: Sam made 8 out of 24 free throws. Use a proportion to show how many free throws Sam would probably make out of 60 attempts.</p> <p>6.2.8 Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips. Example: In a sale, everything is reduced by 20%. Find the sale price of a shirt whose pre-sale price was \$30.</p>
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4.2.9 Add and subtract decimals (to hundredths), using objects or pictures.

Example: Use coins to help you find  $\$0.43 - \$0.29$ .

4.2.10 Use a standard algorithm to add and subtract decimals (to hundredths).

Example:  $0.74 + 0.800 = ?$

4.2.11 Know and use strategies for estimating results of any whole-number computations.

Example: your friend says that  $45,329 \div 6,984 = 5,213$ . Without solving, explain why you think the answer is wrong.

4.2.12 Use mental arithmetic to add or subtract numbers rounded to hundreds or thousands.

Example: Add 3,000 to 8,000 without using pencil and paper.

\*algorithm: a step-by-step procedure for solving a problem.

6.2.9 Use estimation to decide whether answers are reasonable to decimal problems.

Example: your friend says that  $56.79 \div 2.4 = 2.36625$ . Without solving, explain why you think the answer is wrong.

6.2.10 Use mental arithmetic to add or subtract simple fractions and decimals.

Example: Subtract  $\frac{1}{6}$  from  $\frac{1}{2}$  without using pencil and paper.

<p><b>Standard 3 – Algebra and Functions</b></p> <p><i>Students use and interpret variables, mathematical symbols, and properties to write and simplify numerical expressions and sentences. They understand relationships among the operations of addition, subtraction, multiplication, and division.</i></p>	<p><b>Standard 3 – Algebra and Functions</b></p> <p><i>Students use variables in simple expressions, compute the value of an expression for specific values of the variable, and plot and interpret the results. They use two-dimensional coordinate grids to represent points and graph lines.</i></p>	<p><b>Standard 3 – Algebra and Functions</b></p> <p><i>Students write verbal expressions and sentences as algebraic expressions and equations. They evaluate algebraic expressions, solve simple linear equations, and graph and interpret their results. They investigate geometric relationships and describe them algebraically.</i></p>
<p>4.3.1 Use letters, boxes, or other symbols to represent any number in simple expressions, equations, or inequalities (i.e., demonstrate an understanding and the use of the concept of a variable).</p> <p>Example: In the expression <math>3x + 5</math>, what does <math>x</math> represent?</p> <p>4.3.2 Use and interpret formulas to answer questions about quantities and their relationships.</p> <p>Example: Write the formula for the area of a rectangle in words. Now let <math>l</math> stand for the length, <math>w</math> for the width, and <math>A</math> for the area. Write the formula using these symbols.</p> <p>4.3.3 Understand that multiplication and division are performed before addition and subtraction in expressions without parentheses.</p> <p>Example: You go to a store with 90¢ and buy 3 pencils that cost 20¢ each. Write an expression for the amount of money you have left and find its value.</p>	<p>5.3.1 Use a variable to represent an unknown number.</p> <p>Example: When a certain number is multiplied by 3 and then 5 is added, the result is 29. Let <math>x</math> stand for the unknown number and write an equation for the relationship.</p> <p>5.3.2 Write simple algebraic expressions in one or two variables and evaluate them by substitution.</p> <p>Example: Find the value of <math>5x + 2</math> when <math>x = 3</math>.</p> <p>5.3.3 Use the distributive property* in numerical equations and expressions.</p> <p>Example: Rewrite <math>3(16-11)</math> by removing the parentheses.</p>	<p>6.3.1 Write and solve one-step linear equations and inequalities in one variable and check the answers.</p> <p>Example: The area of a rectangle is <math>143 \text{ cm}^2</math> and the length is 11 cm. Write an equation to find the width of the rectangle and use it to solve the problem. Describe how you will check to be sure that your answer is correct.</p> <p>6.3.2 Write and use formulas with up to three variables to solve problems.</p> <p>Example: You have <math>P</math> dollars in a bank that gives <math>r\%</math> simple interest per year. Write a formula for the amount of interest you will receive in one year. Use the formula to find the amount of interest on \$80 at 6% per year.</p> <p>6.3.3 Interpret and evaluate mathematical expressions that use grouping symbols such as parentheses.</p> <p>Example: Find the values of <math>10 - (7 - 3)</math> and of <math>(10 - 7) - 3</math>.</p>

<p>4.3.4 Understand that an equation such as <math>y = 3x + 5</math> is a rule for find a second number when a first number is given. Example: Use the formula <math>y = 3x + 5</math> to find the value of <math>y</math> when <math>x = 6</math>.</p> <p>4.3.5 Continue number patterns using multiplication and division. Example: What is the next number: 160, 80, 40, 20, ...? Explain your answer.</p> <p>4.3.6 Recognize and apply the relationships between addition and multiplication, between subtraction and division, and the inverse relationship between multiplication and division to solve problems. Example: Find another way of writing <math>13 + 13 + 13 + 13 + 13</math>.</p> <p>4.3.7 Relate problem situations to number sentences involving multiplication and division. Example: you have 150 jelly beans to share among the 30 members of your class. Write a number sentence for this problem and use it to find the number of jelly beans each person will get.</p> <p>4.3.8 Plot and label whole numbers on a line up to 100. Estimate positions on the number line. Example: Draw a number line and label it with 0, 10, 20, 30, ..., 90, 100. Estimate the position of 77 on this number line.</p>	<p>5.3.4 Identify and graph ordered pairs of positive numbers. Example: Plot the points (3, 1), (6, 2), and (9, 3). What do you notice?</p> <p>5.3.5 Find ordered pairs (positive numbers only) that fit a linear equation, graph the ordered pairs, and draw the line they determine. Example: For <math>x = 1, 2, 3,</math> and 4, find points that fit the equation <math>y = 2x + 1</math>. Plot those points on graph paper and join them with a straight line.</p> <p>5.3.6 Understand that the length of a horizontal line segment on a coordinate plane equals the difference between the <math>x</math>-coordinates and that the length of a vertical line segment on a coordinate plane equals the difference between the <math>y</math>-coordinates. Example: Find the distance between the points (2, 5) and (7, 5) and the distance between the points (2, 1) and (2, 5).</p> <p>5.3.7 Use information taken from a graph or equation to answer questions about a problem situation. Example: The speed (<math>v</math> feet per second) of a car <math>t</math> seconds after it starts is given by the formula <math>v = 12t</math>. Find the car's speed after 5 seconds.  *distributive property: e.g., <math>3 \times (5 \div 2) = 3 \times 5 \div 2</math></p>	<p>6.3.4 Use parentheses to indicate which operation to perform first when writing expressions containing more than two terms and different operations. Example: Write in symbols: add 19 and 34 and double the result.</p> <p>6.3.5 Use variables in expressions describing geometric quantities. Example: Let <math>l</math>, <math>w</math>, and <math>P</math> be the length, width, and perimeter of a rectangle. Write a formula for the perimeter in terms of the length and width.</p> <p>6.3.6 Apply the correct order of operations and the properties of real numbers (e.g., identity, inverse, commutative*, associative*, and distributive* properties) to evaluate numerical expressions. Justify each step in the process. Example: Simplify <math>3(4 - 1) + 2</math>. Explain your method.</p> <p>6.3.7 Identify and graph ordered pairs in the four quadrants of the coordinate plane. Example: Plot the points (3, -1), (-6, 2) and (9, -3). What do you notice?</p> <p>6.3.8 Solve the problems involving linear functions with integer* values. Write the equation and graph the resulting ordered pairs of integers on a grid. Example: A plant is 3 cm high the first time you measure it (on Day 0). Each day after that the plant grows by 2 cm.</p>
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<p><b>Standard 4 – Geometry</b>  <i>Students show an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.</i></p>	<p><b>Standard 4 – Geometry</b>  <i>Students identify, describe, and classify the properties of plane and solid geometric shapes and the relationships between them.</i></p>	<p><b>Standard 4 – Geometry</b>  <i>Students identify, describe, and classify the properties of plane and solid geometric shapes and the relationships between them.</i></p>
<p>4.4.1 Identify, describe, and draw rays, right angles, acute angles, obtuse angles and straight angles using appropriate mathematical tools and technology.            Example: Draw two rays that meet in an obtuse angle.</p> <p>4.4.2 Identify, describe and draw parallel, perpendicular, and oblique lines using appropriate mathematical tools and technology.            Example: Use the markings on the gymnasium floor to identify two lines that are parallel. Place a jump rope across the parallel lines and identify any obtuse angles created by the jump rope and the lines.</p> <p>4.4.3 Identify, describe and draw parallelograms*, rhombuses*, and trapezoids*, using appropriate mathematical tools and technology.            Example: Use a geoboard to make a parallelogram. How do you know it is a parallelogram?</p> <p>4.4.4 Identify congruent* quadrilaterals* and give reasons for congruence using sides, angles, parallels and perpendiculars.            Example: In a collection of</p>	<p>5.4.1 Measure, identify, and draw angles, perpendicular and parallel lines, rectangles, triangles, and circles by using appropriate tools (e.g., ruler, compass, protractor, appropriate technology, media tools).            Example: Draw a rectangle with sides 5 in and 3 in.</p> <p>5.4.2 Identify, describe, draw, and classify triangles as equilateral*, isosceles*, scalene*, right*, acute*, obtuse*, and equiangular*.            Example: Draw an isosceles right triangle.</p> <p>5.4.3 Identify congruent* triangles and justify your decisions by referring to sides and angles.            Example: In a collection of triangles, pick out those that are the same shape and size and explain your answers.</p> <p>5.4.4 Identify, describe, draw, and classify polygons*, such as pentagons and hexagons.            Example: In a collection of polygons, pick out those with the same number of sides.</p>	<p>6.4.1 Identify and draw vertical*, adjacent*, complementary, and supplementary* angles and describe these angle relationships.            Example: Draw two parallel lines with another line across them. Identify all pairs of supplementary angles.</p> <p>6.4.2 Use the properties of complementary, supplementary, and vertical angles to solve problems involving an unknown angle. Justify solutions.            Example: Find the size of the supplement to an angle that measures <math>122^\circ</math>. Explain how you obtain your answer.</p> <p>6.4.3 Draw quadrilaterals* and triangles from given information about them.            Example: Draw a quadrilateral with equal sides but no right angles.</p> <p>6.4.4 Understand that the sum of the interior angles of any triangle is <math>180^\circ</math> and that the sum of the interior angles of any quadrilateral is <math>360^\circ</math>. Use this information to solve problems.            Example: find the size of the third angle of a triangle with the angles of <math>73^\circ</math> and <math>49^\circ</math>.</p>

<p>parallelograms, rhombuses, and trapezoids, pick out those that are the same shape and size and explain your decisions.</p> <p>4.4.5 Identify and draw lines of symmetry in polygons. Example: Draw a rectangle and then draw all its lines of symmetry.</p> <p>4.4.6 Construct cubes and prisms* and describe their attributes. Example: Make a 6-sided prism from construction paper.</p> <p>*parallelogram: a four-sided figure with both pairs of opposite sides parallel *rhombus: a parallelogram with all sides equal *trapezoid: a four-sided figure with one pair of opposite sides parallel *congruent: two figures that are the same shape and size *quadrilateral: a two-dimensional figure with four sides *prism: solid shape with fixed cross-section (right prism is a solid shape with two Parallel faces that are congruent polygons and other faces that are rectangles.</p>	<p>5.4.5 Identify and draw the radius and diameter of a circle and understand the relationship between the radius and diameter. Example: On a circle, draw a radius and a diameter and describe the differences and similarities between the two.</p> <p>5.4.6 Identify shapes that have reflectional and rotational symmetry*. Example: What kinds of symmetries have the letters M, N, and O?</p> <p>5.4.7 Understand that <math>90^\circ</math>, <math>180^\circ</math>, <math>270^\circ</math>, and <math>360^\circ</math> are associated with <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math>, <math>\frac{3}{4}</math>, and full turns, respectively. Example: Face the front of the room. Turn through four right angles. Which way are you now facing?</p> <p>5.4.8 Construct prisms* and pyramids using appropriate materials. Example: Make a square-based pyramid from construction paper.</p> <p>5.4.9 Given a picture of a three-dimensional object, build the object with blocks. Example: Given a picture of a house made of cubes and rectangular prisms, build the house.</p> <p>*equilateral triangle: all sides are congruent *isosceles triangle: at least two sides are congruent *scalene triangle: no sides are equal *right triangle: one angle measures 90 degrees</p>	<p>6.4.5 Identify and draw two-dimensional shapes that are similar*. Example: Draw a rectangle similar to a given rectangle, but twice the size.</p> <p>6.4.6 Draw the translation (slide) and reflection (flip) of shapes. Example: Draw a square and then slide it 3 inches horizontally across your page. Draw the new square in a different color.</p> <p>6.4.7 Visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids. Example: Draw a picture of an arrangement of rectangular blocks from the top, front, and right-hand side.</p> <p>*vertical angle: angles 1 and 3, or 2 and 4 *adjacent angles: angles 1 and 2 or 2 and 3, etc. *complementary angles: two angles whose sum is <math>90^\circ</math> *supplementary angles: two angles whose sum is <math>180^\circ</math> (angles 1 and 2) *quadrilateral: a two-dimensional figure with four sides *similar: figures that have the same shape but may not have the same size</p>
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\*acute triangle: all angles are less than 90 degrees

\*obtuse triangle: one angle is more than 90 degrees

\*equiangular triangle: all angles are of equal measure

\*congruent: two figures that are the same shape and size

\*polygon: two-dimensional shape with straight sides  
(e.g., triangle, rectangle, pentagon)

\*reflectional and rotational symmetry: letter M has reflectional symmetry in a line down the middle; letter N has rotational symmetry around its center

\*prism: solid shape with fixed cross-section (right prism is a solid shape with two parallel faces that are polygons and other faces that are rectangles)

<p><b>Standard 5 – Measurement</b></p> <p><i>Students understand perimeter and area, as well as measuring volume, capacity, time and money.</i></p>	<p><b>Standard 5 – Measurement</b></p> <p><i>Students understand and compute the areas and volumes of simple objects, as well as measuring weight, temperature, time, and money.</i></p>	<p><b>Standard 5 – Measurement</b></p> <p><i>Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems. They calculate with temperature and money, and choose appropriate units of measure in other areas.</i></p>
<p>4.5.1 Measure length to the nearest quarter-inch, eighth-inch, and millimeter.</p> <p>Example: Measure the width of a sheet of paper to the nearest millimeter.</p> <p>4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.</p> <p>Example: The shelf was 2 feet long. Jane shortened it by 8 inches. How long is the shelf now?</p> <p>4.5.3 Know and use formulas for finding the perimeters of rectangles and squares.</p> <p>Example: The length of a rectangle is 4 cm and its perimeter is 20 cm. What is the width of the rectangle?</p> <p>4.5.4 Know and use formulas for finding the areas of rectangles and squares.</p> <p>Example: Draw a rectangle 5 inches by 3 inches. Divide it into one-inch squares and count the squares to find its area. Can you see another way to find the area? Do this with other</p>	<p>5.5.1 Understand and apply the formulas for the area of a triangle, parallelogram, and trapezoid.</p> <p>Example: Find the area of a triangle with base 4 m and height 5 m.</p> <p>5.5.2 Solve problems involving perimeters and areas of rectangles, triangles, parallelograms, and trapezoids, using appropriate units.</p> <p>Example: A trapezoidal garden bed has parallel sides of lengths 14 m and 11 m and its width is 6 m. Find its area and the length of fencing needed to enclose it. Be sure to use correct units.</p> <p>5.5.3 Use formulas for the areas of rectangles and triangles to find the area of complex shapes by dividing them into basic shapes.</p> <p>Example: A square room of length 17 feet has a tiled fireplace area that is 6 feet long and 4 feet wide. You want to carpet the floor of the room, except the fireplace area. Find the area to be carpeted.</p> <p>5.5.4 Find the surface area and volume of rectangular solids using appropriate</p>	<p>6.5.1 Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles.</p> <p>Example: A triangular sheet of metal is about 1 foot across. Describe the units and tools you would use to measure its weight, its angles, and the length of its sides.</p> <p>6.5.2 Understand and use larger units for measuring length by comparing miles to yards and kilometers to meters.</p> <p>Example: How many meters are in a kilometer?</p> <p>6.5.3 Understand and use larger units for measuring area by comparing acres and square miles to square yards and square kilometers to square meters.</p> <p>Example: How many square meters are in a square kilometer?</p> <p>6.5.4 Understand the concept of the constant <math>\pi</math> as the ratio of the circumference to the diameter of a circle. Develop and use the formulas for the circumference and area of a circle.</p>

<p>rectangles.</p> <p>4.5.5 Estimate and calculate the area of rectangular shapes by using appropriate units, such as square centimeter (cm<sup>2</sup>), square meter (m<sup>2</sup>), square inch (in<sup>2</sup>), or square yard (yd<sup>2</sup>).</p> <p>Example: Measure the length and width of a basketball court and find its area in suitable units.</p> <p>4.5.6 Understand that rectangles with the same area can have different perimeters and that rectangles with the same perimeter can have different areas.</p> <p>Example: Make a rectangle of area 12 units on a geoboard and find its perimeter. Can you make other rectangles with the same area? What are their perimeters?</p> <p>4.5.7 Find areas of shapes by dividing them into basic shapes such as rectangles and triangles.</p> <p>Example: Find the perimeter and area of your school building.</p> <p>4.5.8 Use volume and capacity as different ways of measuring the space inside a shape.</p> <p>Example: Use cubes to find the volume of a fish tank and a pint jug to find its capacity.</p>	<p>units.</p> <p>Example: Find the volume of a shoe box with length 30 cm, width 15 cm, and height 10 cm.</p> <p>5.5.5 Understand and use the smaller and larger units for measuring weight (ounce, gram, and ton) and their relationship to pounds and kilograms.</p> <p>Example: How many ounces are in a pound?</p> <p>5.5.6 Compare temperatures in Celsius and Fahrenheit, knowing that the freezing point of water is 0°C and 32°F and that the boiling point is 100°C and 212°F.</p> <p>Example: What is the Fahrenheit equivalent of 50°C? Explain your answer.</p> <p>5.5.7 Add and subtract with money in decimal notation.</p> <p>Example: You buy articles that cost \$3.45, \$6.99, and \$7.95. How much change will you receive from \$20?</p>	<p>Example: Measure the diameter and circumference of several circular objects. (Use string to find the circumference.) With a calculator, divide each circumference by its diameter. What do you notice about the results?</p> <p>6.5.5 Know common estimates of <math>\pi</math> (3.14, <math>\frac{22}{7}</math>) and use these values to estimate and calculate the circumference and the area of circles. Compare with actual measurements.</p> <p>Example: Find the area of a circle of radius 15 cm.</p> <p>6.5.6 Understand the concept of significant figures and round answers to an appropriate number of significant figures.</p> <p>Example: You measure the diameter of a circle as 2.47 m and use the approximation 3.14 for <math>\pi</math> to calculate the circumference. Is it reasonable to give 7.7558 m as your answer? Why or why not?</p> <p>6.5.7 Construct a cube and rectangular box from two-dimensional patterns and use these patterns to compute the surface area of these objects.</p> <p>Example: Find the total surface area of a shoe box with length 30 cm, width 15 cm, and height 10 cm.</p> <p>6.5.8 Use strategies to find the surface area and volume of right prisms* and cylinders using appropriate units.</p> <p>Example: Find the volume of a</p>
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<p>4.5.9 Add time intervals involving hours and minutes.</p> <p>Example: During the school week, you have 5 recess periods of 15 minutes. Find how long that is in hours and minutes.</p> <p>4.5.10 Determine the amount of change from a purchase.</p> <p>Example: You buy a chocolate bar priced at \$1.75. How much change do you get if you pay for it with a five-dollar bill?</p>		<p>cylindrical can 15 cm high and with a diameter of 8 cm.</p> <p>6.5.9 Use a formula to convert temperatures between Celsius and Fahrenheit.</p> <p>Example: What is the Celsius equivalent of 100°F? Explain your method.</p> <p>6.5.10 Add, subtract, multiply, and divide with money in decimal notation.</p> <p>Example: Share \$7.25 among five people.</p> <p>*right prism: a three-dimensional shape with two congruent ends that are polygons and all other faces are rectangles</p>
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<p><b>Standard 6 – Data Analysis and Probability</b></p> <p><i>Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings. They show outcomes for simple probability situations.</i></p>	<p><b>Standard 6 – Data Analysis and Probability</b></p> <p><i>Students collect, display, analyze, compare, and interpret data sets. They use the results of probability experiments to predict future events.</i></p>	<p><b>Standard 6 – Data Analysis and Probability</b></p> <p><i>Students compute and analyze statistical measures for data sets. They determine theoretical and experimental probabilities and use them to make predictions about events.</i></p>
<p>4.6.1 Represent data on a number line and in tables, including frequency tables.</p> <p>Example: The students in your class are growing plants in various parts of the classroom. Plan a survey to measure the height of each plant in centimeters on a certain day. Record your survey results on a line plot.</p> <p>4.6.2 Interpret data graphs to answer questions about a situation.</p> <p>Example: The line plot below shows the heights of fast-growing plants reported by third-grade students. Describe any patterns that you can see in the data using the words “most,” “few,” and “none.”</p> <p>4.6.3 Summarize and display the results of probability experiments in a clear and organized way.</p> <p>Example: roll a number cube 36 times and keep a tally of the number of times that 1, 2, 3, 4, 5, and 6 appear. Draw a bar graph to show your results.</p>	<p>5.6.1 Explain which types of displays are appropriate for various sets of data.</p> <p>Example: Conduct a survey to find the favorite movies of the students in your class. Decide whether to use a bar, line, or picture graph to display the data. Explain your answer.</p> <p>5.6.2 Find the mean*, median*, mode*, and range* of a set of data and describe what each does, and does not, tell about the data set.</p> <p>Example: Find the mean, median, and mode of a set of test results and describe how well each represents the data.</p> <p>5.6.3 Understand that probability can take any value between 0 and 1, events that are not going to occur have probability 0, events certain to occur have probability 1, and more likely events have a high probability than less likely events.</p> <p>Example: What is the probability of rolling a 7 with a number cube?</p>	<p>6.6.1 Organize and display single-variable data in appropriate graphs and stem-and-leaf plots*, and explain which types of graphs are appropriate for various data sets. Make frequency tables for numerical data, grouping the data in different ways to investigate how different groupings describe the data. Understand and find relative and cumulative frequency for a data set. Use histograms of the data and of the relative frequency distribution, and a broken line graph for cumulative frequency, to interpret the data.</p> <p>Example: A bag contains pens in three colors. Nine students each draw a pen from the bag without looking, then record the results in the frequency table shown. Complete the column showing relative frequency.</p> <p>6.6.2 Compare the mean*, median*, and mode* for a set of data and explain which measure is most appropriate in a given context.</p> <p>6.6.3 Show all possible outcomes for compound events in an organized way and find the theoretical probability of each outcome.</p>

	<p>5.6.4 Express outcomes of experimental probability situations verbally and numerically (e.g., 3 out of 4, <math>\frac{3}{4}</math>).</p> <p>Example: What is the probability of rolling an odd number with a number cube?</p> <p>*mean: the average obtained by adding the values of and dividing by the number of values</p> <p>*median: the value that divides a set of data written in order of size into two equal parts</p> <p>*mode: the most common value in a set of data</p> <p>*range: the difference between the largest and smallest number</p>	<p>Example: A box contains four cards with the numbers 1 through 4 written on them. Show a list of all the possible outcomes if you draw two cards from the box without looking. What is the theoretical probability that you will draw the numbers one and two? Explain your answer.</p> <p>6.6.4 Use data to estimate the probability of future events.</p> <p>Example: Teams A and B have played each other 3 times this season and Team A has won twice. When they play again, what is the probability of Team B winning? How accurate do you think this estimate is?</p> <p>6.6.5 Understand and represent probabilities as ratios, measures of relative frequency, decimals between 00 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable.</p> <p>Example: the weather forecast says that the chance of rain today is 30%. Should you carry an umbrella? Explain your answer.</p> <p>*stem-and-leaf plot: see diagram in the first example</p> <p>*mean: the average obtained by adding the values and dividing by the number of values</p> <p>*median: the value that divides a set of data (written in order of size) into two equal parts</p> <p>*mode: the most common value in a set of data</p>
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<b>Standard 6 – Problem Solving</b> <i>Students make decisions about how to set up a problem.</i>	<b>Standard 7 – Problem Solving</b> <i>Students make decisions about how to set up a problem.</i>	<b>Standard 7 – Problem Solving</b>
<p><b>Students make decisions about how to approach problems and communicate their ideas.</b></p> <p>4.7.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.</p> <p>Example: Solve the problem: “Find a relationship between the number of faces, edges, and vertices of a solid shape with flat surfaces.” Try two or three shapes and look for patterns.</p> <p>4.7.2 Decide when and how to break a problem into simpler parts.</p> <p>Example: In the first example, find what happens to cubes and rectangular solids.</p>	<p><b>Students make decisions about how to approach problems and communicate their ideas.</b></p> <p>5.7.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.</p> <p>Example: Solve the problem: “When you flip a coin 3 times, you can get 3 heads, 3 tails, 2 heads, and 1 tail, or 1 head and 2 tails. Find the probability of each of these combinations.” Notice that the case of 3 heads and the case of 3 tails are similar. Notice that the case of 2 heads and 1 tail and the case of 1 head and 2 tails are similar.</p> <p>5.7.2 Decide when and how to break a problem into simpler parts.</p> <p>Example: In the first example, decide to look at the case of 3 heads and the case of 2 heads and 1 tail.</p>	<p><b>Students make decisions about how to approach problems and communicate their ideas.</b></p> <p>6.7.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.</p> <p>Example: Solve the problem: “Develop a method for finding all the prime numbers up to 100.” Notice that any numbers that 4, 6, 8, ... divide into also divide exactly by 2, and so you do not need to test 4, 6, 8, ...</p> <p>6.7.2 Make and justify mathematical conjectures based on a general description of a mathematical question or problem.</p> <p>Example: In the first example, decide that you need to test only the prime numbers as divisors, and explain it in the same way as for 4, 6, 8, ....</p> <p>6.7.3 Decide when and how to break a problem into simpler parts.</p> <p>Example: In the first example, decide to find first those numbers not divisible by 2.</p>

<b>Students use strategies, skills, and concepts in finding and communicating solutions to problems.</b>	<b>Students use strategies, skills, and concepts in finding and communicating solutions to problems.</b>	<b>Students use strategies, skills, and concepts in finding and communicating solutions to problems.</b>
<p>4.7.3 Apply strategies and results from simpler problems to solve more complex problems.</p> <p>Example: In the first example, use your method for cubes and rectangular solids to find what happens to other prisms and to pyramids.</p> <p>4.7.4 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, tools, and models to solve problems, justify arguments, and make conjectures.</p> <p>Example: In the first example, make a table to help you explain your results to another student.</p> <p>4.7.5 Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.</p> <p>Example: In the first example, explain what happens with all the shapes that you tried.</p> <p>4.7.6 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.</p> <p>Example: You are telling a friend the time of a TV program. How accurate should you be: to the nearest day, hour, minute, or</p>	<p>5.7.3 Apply strategies and results from simpler problems to solve more complex problems.</p> <p>Example: In the first example, begin with the situation where you flip the coin twice.</p> <p>5.7.4 Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.</p> <p>Example: In the first example, make a table or tree diagram to show another student what is happening.</p> <p>5.7.5 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.</p> <p>Example: You are buying a piece of plastic to cover the floor of your bedroom before you paint the room. How accurate should you be: to the nearest inch, foot, or yard? Explain your answer.</p>	<p>6.7.4 Apply strategies and results from simpler problems to solve more complex problems.</p> <p>Example: In the first example, begin by finding all the prime numbers up to 10.</p> <p>6.7.5 Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.</p> <p>Example: In the first example, use a hundreds chart to cross off all multiples of 2 (except 2), then all multiples of 3 (except 3), then all multiples of 5 (except 5), etc. Explain why you are doing this.</p> <p>6.7.6 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.</p> <p>Example: Calculate the perimeter of a rectangular field that needs to be fenced. How accurate should you be: to the nearest kilometer, meter, centimeter, or millimeter? Explain your answer.</p>

<p>second?</p> <p>4.7.7 Know and use appropriate methods for estimating results of whole-number computations.</p> <p>Example: You buy 2 CDs for \$15.95 each. The cashier tells you that will be \$49.90. Does that surprise you?</p> <p>4.7.8 Make precise calculations and check the validity of the results in the context of the problem.</p> <p>Example: The buses you use for a school trip hold 55 people each. How many buses will you need to seat 180 people?</p>	<p>5.7.6 Know and apply appropriate methods for estimating results of rational-number computations.</p> <p>Example: Will <math>7 \times 18</math> be smaller or larger than 100? Explain your answer.</p> <p>5.7.7 Make precise calculations and check the validity of the results in the context of the problem.</p> <p>Example: A recipe calls for <math>\frac{3}{8}</math> of a cup of sugar. You plan to double the recipe for a party and you have only one cup of sugar in the house. Decide whether you have enough sugar and explain how you know.</p>	<p>6.7.7 Select and apply appropriate methods for estimating results of rational-number computations.</p> <p>Example: Measure the length and height of the walls of a room to find the total area. Estimate an answer by imagining meter squares covering the walls.</p> <p>6.7.8 Use graphing to estimate solutions and check the estimates with analytic approaches.</p> <p>Example: use a graphing calculator to estimate the coordinates of the point where the straight line <math>y = 8x - 3</math> crosses the <math>x</math>-axis. Confirm your answer by checking it in the equation.</p> <p>6.7.9 Make precise calculations and check the validity of the results in the context of the problem.</p> <p>Example: In the first example, check whether some of the numbers not crossed out are in fact primes.</p>
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<p><b>Students determine when a solution is complete and reasonable and move beyond a particular problem by generalizing to other situations.</b></p> <p>4.7.9 Decide whether a solution is reasonable in the context of the original situation. Example: In the last example, would an answer of 3.27 surprise you?</p> <p>4.7.10 Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems. Example: Change the first example so that you look at shapes with curved surfaces.</p>	<p><b>Students determine when a solution is complete and reasonable and move beyond a particular problem by generalizing to other situations.</b></p> <p>5.7.8 Decide whether a solution is reasonable in the context of the original situation. Example: In the first example about flipping a coin, check that your probabilities add to 1.</p> <p>5.7.9 Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems. Example: Find the probability of each of the combinations when you flip a coin 4 times.</p>	<p><b>Students determine when a solution is complete and reasonable and move beyond a particular problem by generalizing to other situations.</b></p> <p>6.7.10 Decide whether a solution is reasonable in the context of the original situation. Example: In the first example, decide whether your method was a good one – did it find all the prime numbers efficiently?</p> <p>6.7.11 Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems Example: Use a hundreds chart to find all the numbers that are multiples of both 2 and 3.</p>
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