6th Grade Math Curriculum Maps

Grade: 6 Subject: Math	**Unit 1: Multiply and Divide Decimals**
Big Idea/Rationale	Students estimate, model, multiply, and divide decimals. They begin with multiplying and dividing by whole numbers and then multiply and divide decimals by decimals. Students use estimation to understand these operations, focus on place value, and verify that their final answers are correct. The emphasis is for students to become competent in their ability to multiply and divide decimals in real-world situations. ○ Multiply Decimals (Multi-Part Lesson 1) ○ Divide Decimals (Multi-Part Lesson 2) ○ Powers of 10 (Multi-Part Lesson 3)
Enduring Understanding	▪ The standard algorithms for multi-digit multiplication and division with whole and decimal numbers provide an efficient method for performing these computations. ▪ Place value patterns can be used to mentally multiply and divide decimals by 10, 100, 1000, etc. ▪ The product when multiplying two decimals less than one is less than either factor. ▪ Repeated multiplication of the same number can be represented as a base raised to an exponent. ▪ Using estimation allows you to judge the reasonableness of a product or quotient.
Essential Questions	▪ What kind of result do you expect when you multiply or divide a whole number by a decimal? ▪ How is multiplying a decimal by a decimal different than multiplying a decimal by a whole number? How is it similar? ▪ How is dividing decimals similar to and different from dividing whole numbers? ▪ How is placement of the decimal point determined when multiplying and dividing by powers of ten?
Content (Subject Matter)	*The student will be able to…* ▪ Estimate the product of decimals and judge the reasonableness of the results ▪ Use models to multiply a decimal by a whole number ▪ Estimate and find the product of decimals and whole numbers ▪ Use decimal models to multiply decimals ▪ Multiply decimals by decimals ▪ Estimate the quotient of decimals and judge the reasonableness of the results ▪ Divide decimals by whole numbers ▪ Use models to divide a decimal by a decimal ▪ Divide decimals by decimals ▪ Represent numbers using exponents ▪ Multiply decimals mentally by powers of ten ▪ Determine reasonable answers to solve problems

Standards	6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm. 6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. 6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents. 6.EE.A.2.B. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*.
Materials and Resources	Grid paper, rulers, 10-by-10 grids, number lines, base-ten blocks, calculators, square tiles, centimeter cubes, highlighters, index cards, student notebooks.
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Grade: 6 Subject: Math	**Unit 2: Multiply and Divide Fractions**
Big Idea/Rationale	When describing real-world quantities, fractions are important because many quantities cannot be described using whole numbers. In this chapter, students learn how to multiply and divide fractions. The emphasis is on understanding the concepts and procedures used to perform the operations. Students first use models to find products and quotients. This method allows students to understand how numerators and denominators are related to the operations of multiplication and division. Then students learn and apply the multiplication and division algorithms. By moving the concept to the abstract, students become proficient in multiplying and dividing fractions. ○ Multiply Fractions and Whole Numbers (Multi-Part Lesson 1) ○ Multiply Fractions (Multi-Part Lesson 2) ○ Divide Fractions (Multi-Part Lesson 3)
Enduring Understanding	▪ When you multiply two fractions that are less than one, the product is smaller than either fraction. ▪ Multiplying a whole number by a fraction involves division as well as multiplication. The product is a fraction of the whole number. ▪ There is an inverse relation between dividing fractions and multiplying fractions so these operations can be used to check the accuracy of your answers. ▪ Multiplication and division of fractions can be represented by visual models as well as equations.
Essential Questions	▪ What is the result when you multiply or divide a number by a fraction? ▪ How can rounding help you determine if the product of a whole number and a fraction is reasonable? ▪ How is multiplying two fractions similar to and different from adding two fractions? ▪ How is multiplying two fractions similar to and different from multiplying two whole numbers?
Content (Subject Matter)	*The student will be able to…* ▪ Use models to explore part of a number ▪ Estimate products of fractions using compatible numbers and rounding ▪ Multiply fractions and whole numbers ▪ Explain and justify the process of multiplying fractions and whole numbers ▪ Multiply fractions and whole numbers ▪ Solve problems by drawing a diagram ▪ Multiply fractions using models ▪ Multiply fractions ▪ Multiply whole numbers by mixed numbers ▪ Explain and justify the process of multiplying whole numbers and mixed numbers ▪ Multiply mixed numbers ▪ Divide fractions using models

	▪ Divide fractions ▪ Justify procedures for dividing fractions ▪ Divide mixed numbers
Standards	6.NS.A.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*
Materials and Resources	Grid paper, rulers, 10-by-10 grids, calculators, fraction tiles, centimeter cubes, highlighters, index cards, student notebooks.
Notes	

Grade: 6 Subject: Math	**Unit 3: Ratios and Rates**
Big Idea/Rationale	Students learn to recognize and write ratios, rates, and unit rates. They gain the understanding that a ratio is a comparison of two quantities by division. They find equivalent ratios by multiplying or dividing both terms of the ratio by the same number and find unit rates by dividing the numerator by the denominator of a given rate. Bar diagrams and ratio tables enable students to see how multiplication and division are used to solve ratio and rate problems. Students apply their knowledge of ratios and rates to solve real-world problems. Learning to reason about the relationships between quantities help students become efficient problem solvers. ○ Ratio and Rates (Multi-Part Lesson 1) ○ Ratio Tables (Multi-Part Lesson 2) ○ Solve Ratio and Rate Problems (Multi-Part Lesson 3)
Enduring Understanding	▪ A ratio is a comparison of two quantities or measures where the comparison can be part to whole or part to part. ▪ Ratios can be expressed in different forms. ▪ A unit rate is a special ratio and can be determined using proportions. ▪ Ratios and rates can be used in ratio tables and graphs to solve problems in various contexts.
Essential Questions	▪ How are ratios, rates, and equivalent ratios used in the real world? ▪ How are fractions, ratios, and rates related? ▪ Describe a real-world situation when it would be helpful to find an equivalent rate. ▪ How are ratio tables like other tables? How are they different?
Content (Subject Matter)	*The student will be able to…* ▪ Explore ratios using models ▪ Express ratios and rates in fraction form ▪ Explore rates using models ▪ Determine unit rates ▪ Use ratio tables to represent and solve problems involving equivalent ratios ▪ Use technology to compare output/input ratios for functions ▪ Determine if two ratios are equivalent ▪ Explore solving ratio and rate problems using bar diagrams
Standards	6.RP.A.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* 6.RP.A.2. Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there*

	is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."[1] 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 6.RP.A.3.a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. 6.RP.A.3.b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* 6.RP.A.3.d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
Materials and Resources	Grid paper, rulers, 10-by-10 grids, calculators, two-color counters, pattern blocks, base-ten unit cubes, stopwatch, highlighters, index cards, student notebooks.
Notes	

Grade: 6 Subject: Math	**Unit 4: Fractions, Decimals, and Percents**
Big Idea/Rationale	Students build on their previous knowledge of fractions, decimals, and ratios and connect these ideas to percents. They use equivalent forms of fractions, decimals, and percents to solve problems. Students explore these relationships through the use of area models, bar models, and number lines. These models allow students to compare and order fractions, decimals, and percents. They apply these relationships to estimating and solving problems with percents. The ability to convert between fractions, decimals, and percents is critical as students become efficient problem solvers. ○ Fractions and Decimals (Multi-Part Lesson 1) ○ Percents (Multi-Part Lesson 2) ○ Compare and Order Fractions, Decimals, and Percents (Multi-Part Lesson 3) ○ Apply Percents (Multi-Part Lesson 4)
Enduring Understanding	▪ The same value can be represented as a fraction, decimal, and percent. ▪ Percent represents the part of 100. ▪ The relationship between fractions, decimals, and percent can be used to solve mathematical and real-world problems.
Essential Questions	▪ How can the relationship between fractions, decimals, and percents be used to solve mathematical and real-world problems? ▪ How are fractions and decimals similar? How are they different? ▪ How are percents related to fractions and decimals? ▪ Describe a real-world situation in which it is useful to compare fractions, decimals, and percents. ▪ How can fraction equivalents be helpful in estimating percents?
Content (Subject Matter)	*The student will be able to…* ▪ Write decimals as fractions or mixed numbers in simplest form. ▪ Write fractions as decimals ▪ Use models to illustrate the meaning of percents. ▪ Write percents as fractions. ▪ Write fractions as percents. ▪ Express percents as decimals and decimals as percents. ▪ Write percents greater than 100% and percents less than 1% as fractions and as decimals, and vice versa. ▪ Compare and order fractions. ▪ Compare and order fractions, decimals, and percents. ▪ Estimate fractional parts of a number using models. ▪ Estimate the percent of a number. ▪ Use percents to solve problems. ▪ Find the percent of a number using fractions and decimals. ▪ Solve problems by solving a simpler problem.
Standards	6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical

	problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 6.RP.A.3.c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
Materials and Resources	Grid paper, rulers, 10-by-10 grids, calculators, pattern blocks, number lines, highlighters, index cards, student notebooks.
Notes	

Grade: 6 Subject: Math	**Unit 5: Algebraic Expressions**
Big Idea/Rationale	This chapter focuses on mathematical expressions. Students evaluate numerical and algebraic expressions using the order of operations. Students then write algebraic expressions to represent real-world situations. Students apply the Commutative, Associative, Identity, and Distributive Properties to solve problems and to show that two expressions are equivalent. ○ Write and Evaluate Expressions (Multi-Part Lesson 1) ○ Properties (Multi-Part Lesson 2)
Enduring Understanding	▪ Verbal expressions can be translated into mathematical expressions in order to solve real-world problems. ▪ Following the order of operations allows everyone to get the same answer when simplifying the same expression. ▪ Two expressions are equivalent when they produce the same result regardless of the value substituted into then. ▪ The number line represents the set of all rational numbers.
Essential Questions	▪ What are mathematical expressions and how are they used to solve problems? ▪ Why is it important to have a set of rules, such as the order of operations, for simplifying or evaluating expressions? ▪ How do properties and number patterns assist in simplifying expressions?
Content (Subject Matter)	*The student will be able to…* ▪ Find the value of expressions using the order of operations ▪ Evaluate algebraic expressions ▪ Use models to write expressions ▪ Write verbal phrases as simple algebraic expressions ▪ Solve problems by acting them out ▪ Use the Commutative, Associative, and Identity Properties to simplify expressions ▪ Model the Distributive Property ▪ Use the Distributive Property to compute multiplication problems mentally and to rewrite algebraic expressions
Standards	6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents. 6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers. 6.EE.A.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y*. 6.EE.A.4. Identify when two expressions are equivalent (i.e., when the two

	expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*. 6.EE.B.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
Materials and Resources	Mimio software, blocks, dry-erase markers, colored pens, construction paper, scissors, toothpicks, counters, math tiles, algebra tiles, rulers, grid paper, index cards, student notebooks.
Notes	

Grade: 6 Subject: Math	**Unit 6: Equations**
Big Idea/Rationale	Students use their previous knowledge of writing algebraic expressions to write and solve one- and two-step linear equations. Students use a variety of methods, including models, diagrams, and properties, to solve addition, subtraction, multiplication, and division equations. Finally, students solve two-step equations by applying the reverse order of operations. The chapter builds the foundation for future work with functions and inequalities. ○ Addition and Subtraction Equations (Multi-Part Lesson 1) ○ Multiplication and Division Equations (Multi-Part Lesson 2) ○ Two-Step Equations (Multi-Part Lesson 3)
Enduring Understanding	▪ Positive and negative numbers can be used to represent quantities having opposite directions or values. ▪ Absolute value represents the distance a number is from zero on the number line. ▪ An equation is formed when equivalent expressions are set equal to each other. ▪ Inverse operations are used when solving equations.
Essential Questions	▪ What do you need to know in order to write and solve algebraic equations? ▪ How is solving equations similar to simplifying expressions? How is it different? ▪ Why is it necessary to multiply or divide by the same number on both sides of the equal sign when solving a multiplication or division equation? ▪ How is solving a two-step equation similar to working backward?
Content (Subject Matter)	*The student will be able to…* ▪ Solve equations by mental math and the guess, check and revise strategy. ▪ Solve problems by working backward. ▪ Solve addition equations using models. ▪ Solve and write addition equations. ▪ Solve subtraction equations using models. ▪ Solve and write subtraction equations. ▪ Solve multiplication equations using models. ▪ Solve and write multiplication equations. ▪ Solve division equations using models. ▪ Solve and write division equations. ▪ Solve two-step equations using models. ▪ Solve and write two-step equations.
Standards	6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents. 6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers. 6.EE.A.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the*

	expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y. 6.EE.B.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 6.EE.B.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. 6.EE.B.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
Materials and Resources	Mimio software, paper bags, play money, base ten cubes, number lines, cups, algebra tiles, number cubes, paper clips, rulers, construction paper , student notebooks.
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Grade: 6 Subject: Math	**Unit 7: Functions, Inequalities, and Integers**
Big Idea/Rationale	Students explore multiple representations of relations, functions, inequalities, and integers. Students learn to construct and interpret function tables, building the basis for graphing functions. They connect inequalities to equations as they learn to write and solve one and two-step inequalities. They will use integers to plot points in four quadrants of the coordinate plane. The interrelationships of these multiple forms of representations allow students to gain a deeper understanding of functions, inequalities, and integers. o Relations and Functions (Multi-Part Lesson 1) o Inequalities (Multi-Part Lesson 2) o Integers and the Coordinate Plane (Multi-Part Lesson 3)
Enduring Understanding	▪ The goal when solving an equation or inequality is to find the value from a specified set that makes the equation or inequality a true statement. ▪ Inequalities have infinitely many solutions and therefore must be represented on a number line. ▪ Inequalities are used to represent constraints or conditions in real-world or mathematical problems. ▪ Equations can be used to represent relations between independent and dependent variables. ▪ Signs of numbers in ordered pairs indicate locations in quadrants of the coordinate plane. ▪ Real-world and mathematical problems can be solved by graphing points in all four quadrants of the coordinate plane.
Essential Questions	▪ How do we use functions, inequalities, and integers to describe situations and solve problems? ▪ How are function tables related to the coordinate plane? ▪ How is solving an inequality similar to solving an equation? How is it different? ▪ What is the significance of absolute value?
Content (Subject Matter)	*The student will be able to…* ▪ Use ordered pairs to graph relations. ▪ Illustrate functions using technology. ▪ Complete function tables and find function rules. ▪ Extend and describe arithmetic sequences using algebraic expressions. ▪ Construct and analyze different verbal, tabular, graphical, and algebraic representations of functions. ▪ Use models to determine the truth of inequalities. ▪ Solve inequalities by using mental math and the guess, check, and revise strategy. ▪ Write and graph inequalities. ▪ Solve addition and subtraction inequalities. ▪ Solve one-step linear inequalities.

	▪ Write, solve, and graph two-step linear inequalities. ▪ Use a number line to explore the absolute value of an integer. ▪ Read and write integers, and find the absolute value of an integer. ▪ Locate and graph ordered pairs on a coordinate plane.
Standards	6.EE.B.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 6.EE.B.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x <$ c have infinitely many solutions; represent solutions of such inequalities on number line diagrams. 6.EE.C.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time. 6.NS.C.5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6.NS.C.6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. 6.NS.C.6.a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite. 6.NS.C.6.b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. 6.NS.C.6.c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. 6.NS.C.7.d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars*. 6.NS.C.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute

	value to find distances between points with the same first coordinate or the same second coordinate.
Materials and Resources	Grid paper, coordinate grids, rulers, calculators, two-color counters, number cubes, number lines, balances, centimeter cubes, spinners, highlighters, index cards, student notebooks.
Notes	

Grade: 6 Subject: Math	**Unit 8: Properties of Triangles and Quadrilaterals**
Big Idea/Rationale	Students learn the properties to classify triangles and quadrilaterals. Students use line angle relationships to find the sum of the measures of the angles of triangles and quadrilaterals. Students use their previous knowledge of graphing points on a coordinate plane to graph an original image. Students learn that an original figure can be transformed to an image by a translation (slide), a rotation (turn), or reflection (flip). They use their knowledge of 90 degree 180 degree and 270 degree angles to transform an original figure to an image by rotating about a fixed point. They also learn about symmetry to find lines of symmetry in a figure and to reflect an original image over a line of reflection. ○ Lines And angles (Multi-Part Lesson 1) ○ Triangles (Multi-Part Lesson 2) ○ Polygons (Multi-Part Lesson 3) ○ Transformations (Multi-Part Lesson 4)
Enduring Understanding	▪ Geometric figures are classified based upon their properties. ▪ The sum of the angles in any triangle is 180°. ▪ Congruent figures have equal side lengths and angle measures. ▪ Similar figures have equal angle measures but proportional side lengths. ▪ Congruent figures remain congruent through transitions, reflections, and rotations.
Essential Questions	▪ What are some examples of geometric figures, such as line segments, planes, angles, triangles, and rectangles that are found in everyday life? ▪ What are some examples of angles that are found in nature? ▪ What are some examples of intersecting lines and parallel lines that are found in everyday life? ▪ What does it mean to say that two things are complimentary, such as two colors or two different types of skills? ▪ What does it mean to be assigned supplementary reading? ▪ What are some examples of triangles that are found in your home? ▪ When might knowing the relationship among the angles of a triangle be useful? ▪ How many different type of polygons can you find in the room? Describe them. ▪ How are transformations used in the real world?
Content (Subject Matter)	*The student will be able to…* ▪ Identify and label basic geometric figures. ▪ Measure and classify angles. ▪ Classify and apply angle relationships. ▪ Explore the relationship among the angles of a triangle. ▪ Classify triangles and find missing angle measures in triangles. ▪ Solve problems by drawing a diagram. ▪ Explore the relationship among the angles of different quadrilaterals. ▪ Classify quadrilaterals and find missing angle measures in quadrilaterals. ▪ Classify polygons and sum of the angle measures of a polygon.

	▪ Identify similar and congruent figures. ▪ Identify and apply slides, flips, and turns. ▪ Graph translations on a coordinate plane. ▪ Graph reflection s on a coordinate plane. ▪ Graph rotations on a coordinate plane. ▪ Draw a dilation.
Standards	6.NS.C.7.a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right*. 6.NS.C.7.b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3 ^{o}C > -7 ^{o}C to express the fact that -3 ^{o}C is warmer than -7 ^{o}C.* 6.G.A.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
Materials and Resources	Grid paper, rulers, 10-by-10 grids, calculators, base-ten blocks, centimeter cubes, number lines, two-color counters, patty paper, index cards, student notebooks.
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Grade: 6 Subject: Math	**Unit 9: Perimeter, Area, and Volume**
Big Idea/Rationale	This chapter focuses on geometric formulas. Students use relationships between figures to develop area formulas for parallelograms, triangles, trapezoids, and circles. Students also investigate the formula for circumference of a circle. Exploration focuses on developing an understanding pi as a ratio whose value is about 3.14 or 22/7. Students then apply their previous knowledge of area to find the area of composite figures. Through examination of models, students justify and use the formulas for volume and surface area of rectangular prisms. ○ Area (Multi-Part Lesson 1) ○ Circles (Multi-Part Lesson 2) ○ Composite Figures (Multi-Part Lesson 3) ○ Volume and Surface Area of Rectangular Prisms (Multi-Part Lesson 4)
Enduring Understanding	▪ A rectangle can be decomposed into two congruent triangles. Therefore, the area formula for a triangle is half the area formula for a rectangle. ▪ Perimeter represents the distance around a two-dimensional figure and area represents the space inside a two-dimensional figure. ▪ Volume represents the amount of space inside a three-dimensional figure and surface area represents the total area covered by the faces of a three-dimensional figure. ▪ Nets can be used to represent a three-dimensional object and used to calculate the surface area of these figures. ▪ There are many real-world applications of perimeter, area, volume, and surface area.
Essential Questions	▪ How is the area of a triangle related to the area of a parallelogram? ▪ What is the relationship between a circle's, radius, diameter, circumference, and area? ▪ How is finding the area of a composite figure similar to the problem solving strategy of solving a simpler problem? ▪ Compare and contrast the volume and surface area of a rectangular prism.
Content (Subject Matter)	*The student will be able to…* ▪ Find the areas and missing dimensions of parallelograms ▪ Find the areas and missing dimensions of triangles ▪ Find the area of trapezoids ▪ Describe the relationship between the diameter and circumference of a circle ▪ Estimate and find the circumference of circles ▪ Develop a formula for the area of a circle ▪ Find areas of circles ▪ Find the perimeter of a composite figure ▪ Find and estimate the area of an irregular figure by counting squares ▪ Find the areas of composite figures ▪ Find the volume of rectangular prisms ▪ Find the surface area of rectangular prisms using models and nets

Standards	6.G.A.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.A.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 6.G.A.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
Materials and Resources	Mimio software, grid paper, scissors, masking tape, rulers, tape measures, yardsticks, geoboards, geobands, rulers, calculators, coordinate grids, paper plates, centimeter cubes, boxes, empty cereal boxes, markers, and colored pencils.
Notes	

Grade: 6 Subject: Math	**Unit 10: Volume and Surface Area**
Big Idea/Rationale	Students explore volume of prisms, pyramids, cylinders, and cones, and the surface area of cylinders. Through the use of diagrams and nets, they related the dimensions of solids to their faces, bases, and curved surfaces to justify formulas for volume and surface area. Students then apply the formulas to solve real-world problems dealing with the volume and surface area of three-dimensional figures, including composite shapes. Problems that involve areas and volumes, calling on students to find areas or volumes from lengths or to find lengths from volumes or areas and lengths, area especially appropriate. These problems extend the students' work in grade 5 on area and volume and provide a context for a plying new work with equations. ○ Volume of Prisms and Pyramids (Multi-Part Lesson 1) ○ Volume of Cones and Cylinders (Multi-Part Lesson 2) ○ Surface Area of Cylinders (Multi-Part Lesson 3) ○ Three-Dimensional Composite Figures (Multi-Part Lesson 4)
Enduring Understandings	▪ Polygons and three-dimensional figures can be decomposed making it easier to calculate area, surface area, or volume. ▪ Nets can be used to represent a three-dimensional object and used to calculate the surface area of these figures in the context of solving real-world problems.
Essential Questions	▪ Why is it important to know how to find the volume and surface area of three-dimensional figures? ▪ How is the volume of a triangular prism related to the volume of a rectangular prism? ▪ How is the volume of a cylinder related to the volume of a cone? ▪ Compare and contrast the surface area and volume of cylinders. ▪ How is finding the volume of a composite figure different than finding the surface area of a composite figure? How is it similar?
Content (Subject Matter)	*The student will be able to…* ▪ Find the volume of prisms ▪ Find the volume of pyramids ▪ Find the volume of cylinders ▪ Find the volume of cones ▪ Solve problems by drawing a diagram ▪ Find the surface area of cylinders ▪ Find the volume and surface area of composite figures
Standards	6.G.A.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.A.4. Represent three-dimensional figures using nets made up of rectangles

	and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
Materials and Resources	Mimio software, grid paper, scissors, masking tape, rulers, tape measures, yardsticks, geosolids, rulers, calculators, coordinate grids, centimeter cubes, boxes, whiteboards, mimio vote clickers, markers, and colored pencils.
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Grade: 6 Subject: Math	**Unit 11: Analyze Data and Graphs**
Big Idea/Rationale	Give a set of data, students determine the mean, median, and mode. They use measures of central tendency to describe the center of a data set. Students also determine the range, a measure of variability, for the data set. Students learn to construct and analyze frequency tables, histograms, and circle graphs. Students choose appropriate measures of central tendency and appropriate displays to summarize and display data. ○ Measures of Central Tendency (Multi-Part Lesson 1) ○ Data Displays (Multi-Part Lesson 2) ○ Circle Graphs (Multi-Part Lesson 3) ○ Use Statistics (Multi-Part Lesson 4)
Enduring Understandings	▪ Measures of central tendency are used to describe data sets. ▪ Data can be represented in many forms including on a number line, dot plots, histograms, and box plots. ▪ Data collected can be represented on graphs to show the shape of the distribution of the data. ▪ Distribution is an arrangement of the values of a data set. ▪ Data can be summarized making it possible to draw valid conclusions.
Essential Questions	▪ How can we use data to become more informed about the world around us? ▪ How are measures of central tendency helpful in describing a data set? ▪ How are tables helpful in solving problems? ▪ How can circle graphs be used to analyze data? ▪ How can misleading statistics affect actual data?
Content (Subject Matter)	*The student will be able to…* ▪ Find the mean of a data set. ▪ Use a spreadsheet to find the mean. ▪ Find and interpret the median, mode, and range of a set of data. ▪ Display and interpret data in box-and-whisker plots. ▪ Choose an appropriate measure of central tendency. ▪ Identify outliers. ▪ Make and interpret frequency tables. ▪ Display and analyze data in a stem-and-leaf plot. ▪ Collect, organize, analyze, and display data to solve problems with histograms, and use these data displays to show frequency distribution. ▪ Construct circle graphs. ▪ Select an appropriate display for a set of data. ▪ Solve a problem by collecting, organizing, displaying, and interpreting data. ▪ Recognize when statistics and graphs are misleading. ▪ Use logical reasoning to solve problems.
Standards	6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example,*

	"How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages. 6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 6.SP.A.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. 6.SP.B.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. 6.SP.B.5. Summarize numerical data sets in relation to their context, such as by: 6.SP.B.5.a. Reporting the number of observations. 6.SP.B.5.b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. 6.SP.B.5.c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
Materials and Resources	Mimio software, grid paper, scissors, masking tape, rulers, tape measures, yardsticks, rulers, calculators, coordinate grids, centimeter cubes, boxes, whiteboards, markers, and colored pencils.
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Grade: 6 Subject: Math	**Unit 12: Probability**
Big Idea/Rationale	Students begin by learning the difference between experimental and theoretical probability, and conducting experiments to compare the two. They also learn to determine the number of outcomes in a variety of ways. Students will complete activities to help them find the probability of independent and dependent events. Students will also analyze data to identify bias and make predictions. ○ Probability (Multi-Part Lesson 1) ○ Independent and Dependent Events (Multi-Part Lesson 2) ○ Collect Data (Multi-Part Lesson 3)
Enduring Understanding	▪ Modeling real-world experiments through trials and simulations is used to predict the probability of a given event. ▪ If we had the probability of every event in a sample space, the sum will equal one. ▪ Probability is a number between 0 and 1 and represents the likelihood of an event occurring. ▪ Probabilities of compound events can be found using organized lists, tables, tree diagrams, and simulation. ▪ A valid sample of a population can be used to make judgments about the entire population.
Essential Questions	▪ What is probability and where have you encountered it in your everyday life? ▪ What are some real-world situations in which you would need to count outcomes or find the probability of an event? ▪ What are some real-world examples of independent events and dependent events? ▪ How is probability used to make predictions?
Content (Subject Matter)	*The student will be able to…* ▪ Find and interpret the probability of a simple event. ▪ Compare experimental to theoretical probability. ▪ Construct sample spaces using tree diagrams or lists. ▪ Use probability to decide whether a game is fair or unfair. ▪ Use the Fundamental Counting Principle to count outcomes and find probabilities. ▪ Explore and find the probability of independent events. ▪ Explore and find the probability of dependent events. ▪ Predict the actions of a larger group using a sample. ▪ Determine if samples are biased. ▪ Solve problems by acting them out.
Standards	6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages*.

	6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 6.SP.A.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. 6.SP.B.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. 6.SP.B.5. Summarize numerical data sets in relation to their context, such as by: 6.SP.B.5.a. Reporting the number of observations. 6.SP.B.5.b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. 6.SP.B.5.c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
Materials and Resources	Grid paper, coordinate grids, rulers, calculators, centimeter cubes, number cubes, construction paper, compass, tape, highlighters, index cards, student notebooks.
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