

Math 6

Course Description: There are four main areas of focus in 6th grade math: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

Grades: 6

Course Resources & Materials: DESMOS

Course Essential Questions:

- How does decomposing and composing help us find the area of polygons?
- How does understanding the area of polygons connect to finding the surface area of prisms?
- What does a ratio say about the relationship between quantities?
- How can graphs and tables help us see the relationship between values?
- How can the distributive property help me with computation?
- How do I know which mathematical operations to use?
- How do mathematical operations relate to each other?
- What conclusions can be drawn from data?
- What strategies can I use to understand and represent real situations using algebraic expressions and equations?

Course Priority Standards (5-10):

6.RP.A.1 Understand a ratio as a comparison of two quantities and represent these comparisons

6.RP.A.3b Solve unit rate problems

6.NS.A.1a Solve problems involving division of fractions by fractions.

6.NS.B.4b Use the distributive property property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers

6.NS.C.8 Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals and percentages (limited to terminating decimals and/or benchmark fractions of $\frac{1}{3}$ and $\frac{2}{3}$)

6.EE1.A.1 Describe the difference between an expression and an equation

6.EE1.B.6 Write and solve equations using variables to represent quantities, and understand the meaning of the variable in the context of the situation

6.GM.A.3d Construct polygons in the Cartesian coordinate plane

6.DSP.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.DSP.B.5d Analyze the choice of measures of center and variability based on the shape of the data distribution and/or the context of the data

Course Enduring Understandings, Goals, & Objectives (5-10):

- Area, surface area and volume have applications in real world situations.
- Relations between two quantities can often be expressed as ratios and can be explained using ratio language.
- Numbers in our world will appear as fractions and decimals and can be positive or negative.
- The equal sign is more than a prompt, it's also a way to indicate balance.
- There are two kinds of expressions - numerical and algebraic.
- Statistics is a powerful tool to seek answers to statistical questions and to understand data distributions and what inferences can be drawn about the data.
- Graphical representations of data, including dot plots, histograms, and frequency tables are useful to organize data.

Course Essential Vocabulary: formula, area, trapezoid, base, edge, face, height, net, parallelogram, polygon, polyhedron, prism, pyramid, quadrilateral, surface area, volume, ratio, equivalent ratio, double number line, per, unit rate, rate, proportion, part and total (as it relates to proportions), percent, percentage, sum, difference, product, quotient, numerator, denominator, proper fraction, improper fraction, mixed number, least common denominator (LCD), greatest common factor (GCF), reciprocal, expression, equation, variable, terms, constant, coefficient, simplify, distributive property, inverse operations, inequality, dependent variable, equivalent expressions, independent variable, solution, absolute value, coordinate plane, negative number, opposite, positive number, sign, solution, statistical question, population, variability, sample, measure of center, mean, median, mode, range, outlier, interquartile range, skewed left, skewed right, bell curve, dot plot, histogram, frequency, distribution of data, intervals, box plot

Building the Mathematical Community - Approximately 10 Days (Quarter 1)

Teachers will use the beginning of the school year to build their mathematical community. This includes frontloading mathematical concepts, engaging in problem solving activities, teaching routines and procedures, gathering baseline data, and administering benchmarking assessments.

Unit 1	Geometry - Approximately 20 Days (Quarter 1) In this unit, students will find areas of various polygons, which leads to discovering and using formulas. Students will then extend their reasoning about area to include shapes that are composed of rectangles and triangles, such as for trapezoids and various other quadrilaterals and special polygons. Students will work with three-dimensional solids, drawing nets and determining surface area given the net. Specifically, students will find the surface area of rectangular and triangular prisms, as well as the volume of rectangular prisms.
Unit 1 Big Ideas	• The area of irregular and regular polygons can be found by decomposing the polygon into rectangles and triangles. • Area, surface area and volume have applications in real world situations. • Dimension is a measure of the width, height, or length of a figure.
Unit 1 Essential Questions	• How can geometric relationships help us solve problems or make sense of shapes? • How does the area of a triangle relate to the area of a rectangle? • What does it mean when you say two shapes have the same area? • How does decomposing and composing help us find the area of polygons?
Unit 1 Student Learning Goals	• Students will calculate the area and perimeter of triangles and parallelograms. • Students will calculate the area of polygons and irregular figures by decomposing into rectangles and triangles. This includes trapezoids and special polygons (e.g. L or U-shaped polygons). • Students will connect polyhedra with nets that represent them. • Students will calculate the surface area of polyhedra made up of rectangles and triangles. • Students will use repeated reasoning to develop a formula for the area of a parallelogram and

	triangle.
Unit 1 Vocabulary	formula, area, trapezoid, base, edge, face, height, net, parallelogram, polygon, polyhedron, prism, pyramid, quadrilateral, surface area, volume
Unit 1 Missouri Learning Standards	6.GM.A.1: Solve problems involving area, surface area and volume. Find the area of polygons by composing or decomposing the shapes into rectangles or triangles.
Unit 1 Common Core State Standards	CCSS.MATH.CONTENT.6.EE.A.2.A Write expressions that record operations with numbers and with letters standing for numbers.
	CCSS.MATH.CONTENT.6.EE.A.2.C Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
Unit 1 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 1 Curricular Resources	DESMOS

Unit 2	Ratios - Approximately 20 Days (Quarter 1) In this unit, students will identify ratios as the relationship between two, or more, numbers. The unit will conclude with how we can visualize ratio relationships through tables or graphs and describe them with equations that allow us to find any values of interest.
Unit 2 Big Ideas	• Relations between two quantities can often be expressed as ratios and can be explained using ratio language. • Ratios apply to real life situations. • Math tools help solve complex problems.
Unit 2 Essential Questions	• What information do I get when I compare two numbers using a ratio? • What does a ratio say about the relationship between quantities? • How can ratios reflect fairness? • How can ratios help you estimate solutions to seemingly impossible real-world problems? • How do ratios relate to fractions? • How do ratios relate to division? • How do we determine equivalent ratios?
Unit 2 Student Learning Goals	• Students will use ratio language to describe a relationship between two quantities and identify equivalent ratios. • Students develop and use strategies to compare ratios. • Students will use tables, double number line diagrams and unit prices to solve problems with equivalent ratios. • Students will develop and use strategies to compare ratios in context. • Students will use unit rates, double number lines and tables of equivalent ratios to solve real-world problems. • Students develop and use strategies to compare ratios in context.
Unit 2 Vocabulary	ratio, equivalent ratio, independent variable, dependent variable, double number line, per, unit rate, table, tape diagram, unit price
Unit 2 Missouri Learning Standards	Priority Standard 6.RP.A.1: Understand and use ratios to solve problems. Understand a ratio as a comparison of two quantities and represent these comparisons.

	Priority Standard 6.RP.A.3a: Solve problems involving ratios and rates: a. Create tables of equivalent ratios, find missing values in the tables
	Priority Standard 6.RP.A.3b: Understand and use ratios to solve problems. Solve problems involving ratios and rates: b. Solve unit rate problems.
	Priority Standard 6.EE.I.C.9a: Represent and analyze quantitative relationships between dependent and independent variables. Identify and describe relationships between two variables that change in relationship to one another: a. Write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable.
	Priority Standard 6.EE.I.C.9b: Represent and analyze quantitative relationships between dependent and independent variables. Identify and describe relationships between two variables that change in relationship to one another: b. Analyze the relationship between the dependent and independent variables using graphs, tables and equations and relate these representations to each other.
Unit 2 Common Core State Standards	CCSS.MATH.CONTENT.6.RP.A.1 Understand the concept of a unit rate associated with a ratio, and describe the meaning of unit rate. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.

	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.6.RP.A.3.B Solve unit rate problems including those involving unit pricing and constant speed.
Unit 2 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 2 Curricular Resources	DESMOS

Unit 3	Rates and Percentages - Approximately 20 Days (Quarter 2) In this unit, students extend understandings of ratios to explore rates and percents. They will use ratio reasoning to determine unknown parts, wholes, and percentages, in the form of proportions.
Unit 3 Big Ideas	• A rate is a comparison of the measures of two different things or quantities • A ratio can also be a rate. • Percentages are ratios and are sometimes used to express ratios. • Ratio reasoning helps convert between units of measure. • Ratio reasoning can be used to find unknown values.
Unit 3 Essential Questions	• What is a percent? • How are decimals, fractions and percents related? • How do we find the percent of a number using various strategies? • How can we use decimal and fraction multiplication to help us find the percent of a number? • How can we use equivalent ratios to help us find missing parts? • How do we find missing totals and percentages?
Unit 3 Student	• Students will use ratio reasoning to convert between units of measurement. • Students will recognize and calculate two unit rates for the same ratio relationship.

Learning Goals	• Students will use unit rates to solve problems involving tables of equivalent ratios. • Students will make connections between percentages, ratios, and rates. • Students will use ratio reasoning to determine unknown parts, wholes, and percentages.
Unit 3 Vocabulary	rate, proportion, part and total (as it relates to proportions), percent, percentage
Unit 3 Missouri Learning Standards	Priority Standard 6.RP.A.3c: Understand and use ratios to solve problems. Solve problems involving ratios and rates: c. Solve percent problems.
	Priority Standard 6.RP.A.3b: Understand and use ratios to solve problems. Solve problems involving ratios and rates: b. Solve unit rate problems.
	Priority Standard 6.RP.A.3d: Understand and use ratios to solve problems. Solve problems involving ratios and rates: d. Convert measurement units within and between two systems of measurement
	Priority Standard 6.NS.C.8: Apply and extend previous understandings of numbers to the system of rational numbers. Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals and percentages.
Unit 3 Common Core State Standards	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.6.RP.A.3.D Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
	CCSS.MATH.CONTENT.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.

	CCSS.MATH.CONTENT.6.RP.A.3.B Solve unit rate problems including those involving unit pricing and constant speed.
	CCSS.MATH.CONTENT.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.
Unit 3 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 3 Curricular Resources	DESMOS

Unit 4	Fractions - Approximately 20 Days (Quarter 2) In this unit, students will develop multiple strategies for dividing fractions and mixed numbers, applying those strategies to solve problems about areas and volumes with fractional dimensions.
Unit 4 Big Ideas	• Numbers in our world will appear as fractions and decimals and can be positive or negative. • Computational fluency includes understanding the meaning and the appropriate use of numerical operations. • Mathematical operations are connected. • Division and fractions are connected and can have different symbols to represent the same idea. • Using number sense and estimation will help evaluate the reasonableness of an answer.
Unit 4 Essential Questions	• How do I know which mathematical operations to use? • What conversions can be used to solve problems with fractions and mixed numbers to arrive at a solution? • What kind of models can I use to show solutions to word problems involving fractions? • How can dividing by the same fraction be interpreted in two different ways? • How is dividing by a fraction related to multiplying fractions? • What does it mean when a quantity represents a fractional number of equal-sized groups?

	• How can the multiplication of fractions be used to find the area of a polygon with fractional side lengths? • How can the multiplication of fractions be used to find the surface area and volume of prisms with fractional dimensions? • How do operations affect numbers?
Unit 4 Student Learning Goals	• Students will use any of the four operations to solve problems in context. • Students will multiply fractions and mixed numbers using a variety of strategies. • Students will interpret and create diagrams that represent dividing whole numbers by fractions. • Students will use a variety of strategies to calculate quotients of fractions. • Students will solve problems that involve dividing fractions and mixed numbers. • Students will determine the LCM and GCF of two numbers.
Unit 4 Vocabulary	sum, difference, product, quotient, numerator, denominator, proper fraction, improper fraction, mixed number, least common denominator (LCD), greatest common factor (GCF), reciprocal
Unit 4 Missouri Learning Standards	Priority Standard 6.NS.A.1a: Apply and extend previous understandings of multiplication and division to divide fractions by fractions. Compute and interpret quotients of positive fractions: a. Solve problems involving division of fractions by fractions.
	Priority Standard 6.GM.A: Solve problems involving area, surface area and volume.
	Priority Standard 6.NS.C.8: Apply and extend previous understandings of numbers to the system of rational numbers. Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals and Percents.
Unit 4 Common Core State Standards	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
Unit 4 Assessments	To be developed in Implementation - Year 1
Unit 4 Curricular Resources	DESMOS

Unit 5	Decimals - Approximately 20 Days (Quarter 3) In this unit, students will extend algorithms for addition, subtraction, and multiplication to solve problems with decimals. Students learn to use the standard algorithm for long division to increase efficiency when dividing. This will then be used to explore the division of decimals by decimals.
Unit 5 Big Ideas	• Numbers in our world will appear as fractions and decimals and can be positive or negative. • Multiplication and division of powers of 10 to change the value of the number by moving (shifting) the decimal point. • Converting numbers to fractions or decimals to make them more friendly. • Decimals and Percents are connected
Unit 5 Guiding & Essential Questions	• How do mathematical operations relate to each other? • How do I know which mathematical operations to use? • How do I know which computational method (mental math, estimation, paper/pencil, calculator, etc) to use? • How do I find the common characteristics among similar problems to be a more efficient problem solver? • What kind of models can I use to show solutions to word problems involving decimals? • How is the multiplication of decimals used to find the area of a polygon with decimal side lengths? • How can base ten units be composed and decomposed?

	• What is similar and different about using related whole-number expressions when multiplying versus dividing decimals? • How does the standard algorithm for division and powers of ten help me divide decimals by decimals?
Unit 5 Student Learning Goals	• Students will add and subtract multi-digit decimals using a variety of strategies. • Students will multiply and divide multi-digit decimals using a variety of strategies. • Students will divide multi-digit numbers with and without remainders using long division. • Students will use decimal operations to solve problems in context. • Students will determine the LCM and GCF of two numbers.
Unit 5 Vocabulary	common factor, common multiple, greatest common factor, least common multiple, divisor, dividend, quotient, sum, product, difference
Unit 5 Missouri Learning Standards	Priority Standard 6.NS.B.4b: Compute with non-negative multi-digit numbers, and find common factors and multiples. Find common factors and multiples: b. Use the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers.
Unit 5 Common Core State Standards	CCSS.MATH.CONTENT.6.RP.A.3.B Solve unit rate problems including those involving unit pricing and constant speed.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.
	CCSS.MATH.CONTENT.6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
	CCSS.MATH.CONTENT.6.NS.B.4

	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
Unit 5 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 5 Curricular Resources	DESMOS

Unit 6	Expressions and Equations - Approximately 20 Days (Quarter 3) In this unit, students will explore how to turn mathematical statements into variable expressions and equations. With variable expressions, students will combine like terms to simplify them. With equations, students will solve them using algebraic reasoning. The unit culminates with graphing and solving variable inequalities.
Unit 6 Big Ideas	• The equal sign is more than a prompt, it's also a way to indicate balance. • There is a relationship between dependent and independent variables. • Algebra is everywhere. • Patterns and relationships can be expressed verbally, graphically, numerically and symbolically. • Algebraic representation can be used to generalize patterns and relationships.
Unit 6 Essential Questions	• What does it mean for an equation to be true? • What does it mean for two expressions to be equal? Equivalent? Is there a difference? • How do expressions differ from equations? • How can we tell if two expressions are equivalent? • What strategies can I use to understand and represent real situations using algebraic expressions and equations? • How is an equation like a balance? How can the idea of balance help me solve an equation? • How do inverse operations allow us to solve equations algebraically? • How can patterns, relations, and functions be used as tools to best describe and help explain real life situations?

	• How can graphs and tables help us see the relationship between values? • How do equations with two variables (x and y) help us find any value in a table or graph?
Unit 6 Student Learning Goals	• Students will write expressions and equations given a mathematical sentence. • Students will be able to describe a variable expression or equation as a mathematical sentence. • Students will identify parts of an expression and equation. • Students will identify like terms. • Students will be able to combine like terms to simplify an expression, including using the distributive property. • Students will use inverse operations to solve one-step equations algebraically. • Students will identify various inequality statements, including less than or equal to and greater than or equal to. • Students will graph the solution set of an inequality on a number line. • Students will be able to solve one-step inequalities using inverse operations. • Students will be able to graph the solution of one-step inequalities. • Students will evaluate numerical and variable expressions with whole number exponents. • Students will write equivalent expressions by adding, subtracting, expanding, and factoring. • Students will use tape diagrams to represent equations and situations in context to determine unknown values. • Students will solve equations in the form $px + q = r$ and $p(x + q) = r$. • Students will use the distributive property to write equivalent expressions with variables. • Students will write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. • Students will analyze the relationship between independent and dependent variables using graphs, tables, and equations.
Unit 6 Vocabulary	expression, equation, variable, terms, constant, coefficient, simplify, distributive property, like terms, inverse operations, algebraically, inequality, dependent variable, equivalent expressions, independent variable, solution
Unit 6 Missouri Learning Standards	Priority Standard 6.EE1.A.1: Apply and extend previous understandings of arithmetic to algebraic expressions. Describe the difference between an expression and an equation.
	Priority Standard

	6.EE1.A.2d: Apply and extend previous understandings of arithmetic to algebraic expressions. Create and evaluate expressions involving variables and whole number exponents: d. Write and evaluate algebraic expressions.
	Priority Standard 6.EE1.A.2e: Apply and extend previous understandings of arithmetic to algebraic expressions. Create and evaluate expressions involving variables and whole number exponents: e. Understand the meaning of the variable in the context of the situation.
	Priority Standard 6.EE1.A.3: Apply and extend previous understandings of arithmetic to algebraic expressions. Identify and generate equivalent algebraic expressions using mathematical properties.
	6.EE1.B.4: Reason about and solve one-variable equations and inequalities. Use substitution to determine whether a given number in a specified set makes a one-variable equation or inequality true.
	Priority Standard 6.EE1.B.5: Reason about and solve one-variable equations and inequalities. Understand that if any solutions exist, the solution set for an equation or inequality consists of values that make the equation or inequality true.
	Priority Standard 6.EE1.B.6: Reason about and solve one-variable equations and inequalities. Write and solve equations using variables to represent quantities, and understand the meaning of the variable in the context of the situation.
	Priority Standard 6.EE1.C.9a: Represent and analyze quantitative relationships between dependent and independent variables. Write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable.
	Priority Standard

	6.EE1.C.9b: Represent and analyze quantitative relationships between dependent and independent variables. Analyze the relationship between the dependent and independent variables using graphs, tables and equations and relate these representations to each other.
Unit 6 Common Core State Standards	CCSS.MATH.CONTENT.6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.
	CCSS.MATH.CONTENT.6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.
	CCSS.MATH.CONTENT.6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.
	CCSS.MATH.CONTENT.6.EE.A.2.C Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
	CCSS.MATH.CONTENT.6.EE.A.3 Apply the properties of operations to generate equivalent expressions.

	CCSS.MATH.CONTENT.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).
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
Unit 6 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 6 Curricular Resources	DESMOS

Unit 7	Rational Numbers - Approximately 20 Days (Quarter 4) In this unit, students explore positive and negative numbers in several contexts: on a number line, represented as inequalities, and in the coordinate plane.
Unit 7 Big Ideas	• Negative numbers are used to represent quantities that are less than zero such as temperatures, elevation, scores in games or sports, and loss of income in business. • Absolute value is useful in ordering and graphing positive and negative numbers. • Positive and negative numbers are often used to solve problems in everyday life. • Rational numbers are points on a number line. • Numbers in ordered pairs indicate locations in quadrants of the coordinate plane. • Integers represent positive and negative situations.
Unit 7 Guiding & Essential Questions	• What does it mean for a value to be less than zero? • How can a number be closer to zero and have a greater value? • How can two objects move the same distance, but end up in different places? • How do I use integers to represent real-world quantities? • How do I compare and order rational numbers? When are negative numbers used and why are they important? • How do we graph on the coordinate plane using ordered pairs? • What does the absolute value tell us?
Unit 7 Student Learning Goal(s)	• Students will describe locations on the number line using positive and negative numbers. • Students will compare and order positive and negative numbers and absolute values. • Students will represent inequalities using symbols, words, and graphs. • Students will identify solutions to inequalities. • Students will solve problems by graphing points with positive and negative coordinates. • Students will draw polygons given coordinates for the vertices.
Unit 7 Vocabulary	absolute value, coordinate plane, negative number, opposite, positive number, sign, solution to an inequality, quadrants (first, second, third and fourth)
Unit 7 Missouri Learning Standards	Priority Standard 6.NS.C.6c: Apply and extend previous understandings of numbers to the system of rational numbers. Locate a rational number as a point on the number line: c. Understand that a number and its opposite (additive inverse) are located on opposite sides of zero on the number line.

	Priority Standard 6.NS.C.7: Apply and extend previous understandings of numbers to the system of rational numbers. Understand that the absolute value of a rational number is its distance from 0 on the number line.
	Priority Standard 6.NS.C.8: Apply and extend previous understandings of numbers to the system of rational numbers. Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals and percentages (limited to terminating decimals and/or benchmark fractions of $\frac{1}{3}$ and $\frac{2}{3}$).
	Priority Standard 6.EE1.B.5: Reason about and solve one-variable equations and inequalities. Understand that if any solutions exist, the solution set for an equation or inequality consists of values that make the equation or inequality true.
	Priority Standard 6.EE1.B.6: Reason about and solve one-variable equations and inequalities. Write and solve equations using variables to represent quantities, and understand the meaning of the variable in the context of the situation.
	Priority Standard 6.GM.A.3a: Solve problems involving area, surface area and volume. Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane: a. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the Cartesian coordinate plane.
	Priority Standard 6.GM.A.3b: Solve problems involving area, surface area and volume. Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane: b. Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
	Priority Standard 6.GM.A.3c: Solve problems involving area, surface area and volume. Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane: c. Find distances between points with the same first coordinate or the same second coordinate.
	Priority Standard 6.GM.A.3d: Solve problems involving area, surface area and volume. Solve problems by graphing

	points in all four quadrants of the Cartesian coordinate plane: d. Construct polygons in the Cartesian coordinate plane.
Unit 7 Common Core State Standards	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.6.NS.C.7 Understand ordering and absolute value of rational numbers.
	CCSS.MATH.CONTENT.6.NS.C.7.A Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
	CCSS.MATH.CONTENT.6.NS.C.7.B Write, interpret, and explain statements of order for rational numbers in real-world contexts.

	CCSS.MATH.CONTENT.6.NS.C.7.C Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
	CCSS.MATH.CONTENT.6.NS.C.7.D Distinguish comparisons of absolute value from statements about order.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.
Unit 7 Assessments	To be developed in Implementation - Year 1 (2022-23)

Unit 7 Curricular Resources	DESMOS
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Unit 8	Statistics and Graphing - Approximately 20 Days (Quarter 4) This unit focuses on statistical questioning and representing the collected data using measures of center. Students will be able to calculate all three measures of center, as well as the range of the data. Additionally, students will be able to identify which measure of center is the best representation for the given data. Students will focus on visual representations of data through dot plots, histograms and box plots and explore the overall shape of the data and its relation to the measures of center.
Unit 8 Big Ideas	• Statistics is the collection and analysis of data. • Statistics is a powerful tool to seek answers to statistical questions and to understand data distributions and what inferences can be drawn about the data. • Graphical representations of data, including dot plots, histograms, and frequency tables are useful to organize data. • When making decisions about data, it is valuable to consider both measures of center and measures of variation. • The results of statistical investigation can be used to support or refute an argument.
Unit 8 Essential Questions	• How can we recognize when a question is statistical and when it is not? • How can we determine the most accurate representation of the data? • How can we decide which measure of center best describes the data? • What conclusions can be drawn from data? • How can the collection, organization, interpretation, and display of data be used to answer questions and solve real world problems? • How is data used in the real world?
Unit 8 Student Learning Goals	• Students will be able to determine a statistical question. • Students will understand that a sample is a subset of a population. • Students will find the mean, median, mode, and range of a set of data. • Students will be able to determine how outliers help select the best measure of center for the given data.

	• Students will describe the data distribution from a graph (skew). • Students will explain how the shape of the data set affects its mean and median. • Students will read and create dot plots. • Students will read and create histograms. • Students will read and create box plots. • Students will informally describe and compare data sets. • Students will calculate the mean absolute deviation. • Students will compare and contrast the mean and median as measures of center. • Students will calculate the quartiles, interquartile range (IQR), and range of a data set. • Students will create box plots to visualize data. • Students will use median and IQR to describe and compare data sets.
Unit 8 Vocabulary	statistical question, population, variability, sample, measure of center, mean, median, mode, range, interquartile range, skewed left, skewed right, bell curve, outlier, dot plot, histogram, frequency, frequency table, distribution of data, intervals, box plot, quartiles (lower and upper), extremes (lower and upper)
Unit 8 Missouri Learning Standards	Priority Standard 6.DSP.A.2: Develop understanding of statistical variability: 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.
	Priority Standard 6.DSP.B.5d: Summarize and describe distributions.: Summarize numerical data sets in relation to the context.: d.Analyze the choice of measures of center and variability based on the shape of the data distribution and/or the context of the data.
Unit 8 Common Core State Standards	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.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.

	CCSS.MATH.CONTENT.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.
	CCSS.MATH.CONTENT.6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
	CCSS.MATH.CONTENT.6.SP.B.5.A Summarize numerical data sets in relation to their context, such as by reporting the number of observations.
	CCSS.MATH.CONTENT.6.SP.B.5.B Summarize numerical data sets in relation to their context by describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
	CCSS.MATH.CONTENT.6.SP.B.5.C Summarize numerical data sets in relation to their context by 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.
	CCSS.MATH.CONTENT.6.SP.B.5.D Summarize numerical data sets in relation to their context by relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
Unit 8 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 8 Curricular Resources	DESMOS