

Math 7

Course Description: Seventh grade instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples. Students engage with relevant mathematical contexts to make math meaningful. As students encounter challenging problems, and practice asking for help and a willingness to learn from others, they build the social emotional learning competencies of self-management, self awareness, relationship skills, and social awareness.

Grade: Seventh

Course Resources & Materials: DESMOS

Course Essential Questions:

- What do effective problem solvers do, and what do they do when they get stuck?
- How can I effectively explain my mathematical thinking and reasoning to others?
- What does it mean for two things to be proportionally related? How can you tell?
- How are percentages used to represent change?
- Which representations best help you make sense of certain mathematical scenarios?
- How can rational numbers be used to represent real world situations?
- Our world is really complex--how can we simulate parts of it to make better predictions?
- When is a sample *not* representative of a population?

Course Priority Standards:

7.RP.A.2a Determine when two quantities are in a proportional relationship

7.NS.A.3 Solve problems involving the four arithmetic operations with rational numbers

7.EE1.B.3b Assess the reasonableness of answers using mental computation and estimation strategies

7.GM.A.1 Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale

7.DSP.B.3 Analyze different data distributions using statistical measures

7.DSP.C.5a Determine probabilities of simple events

Course Enduring Understandings, Goals, & Objectives:

- Any proportional relationship can be represented by an equation.
- A proportional relationship is a collection of equivalent ratios.
- Addition, subtraction, multiplication, and division can be extended to rational numbers.
- Students will be able to simplify expressions and solve equations.
- The circumference of a circle is proportional to its diameter.
- We can estimate probabilities of outcomes of chance experiments.

Course Essential Vocabulary: absolute value, negative numbers, positive numbers, opposite, additive inverse, coordinate plane, quotient, common denominator, GCF, LCM, prime, prime factorization, rational, integer, whole numbers, natural numbers, mean, median, mode, range, inter quartile range, skew left, skew right, outliers, measures of center, statistical question, box plot, dot plot, histogram, frequency, frequency tables, distribution of data, intervals, scale, scaled copy, corresponding parts, scale factor, scale drawing, adjacent angles, complementary angles, supplementary angles, vertical angles, cross section

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, working with integers, engaging in problem solving activities, teaching routines and procedures, gathering baseline data, and administering benchmarking assessments.

Unit 1	Scale Drawing - Approximately 10 Days (Quarter 1) In this unit, students study scaled copies of pictures and plane figures, then apply what they have learned to scale drawings, such as maps and floor plans. They go on to draw their own scaled copies and notice how the size of a scale factors affects the lengths and area of the copy.
Unit 1 Big Ideas	• Scale drawings allow us to accurately represent sites, spaces, buildings and details to a smaller or more practical size than the original.
Unit 1 Essential Questions	• How do scale models help you make sense of the world around you? • What do effective problem solvers do, and what do they do when they get stuck? • How can I effectively explain my mathematical thinking and reasoning to others? • How can I make this problem easier?
Unit 1 Student Learning Goals	• Students will solve problems including scale drawings of real objects and geometric figures including actual lengths and areas from a scale drawing and reproducing the drawing at a different scale. • Students will use visual models to build conceptual understanding of scale factor by examining the relationships among corresponding parts, sides, and angles of scaled copies. • Students will measure precisely using rulers or informal measuring tools. • Students will draw scaled copies, ensuring that angle measures are unchanged and side lengths are changed by a common factor.
Unit Vocabulary	scale, scaled copy, corresponding parts, scale factor, scale drawing
Unit 1 Missouri Learning Standards	Priority Standard 7.GM.A.1: Draw and describe geometrical figures and describe the relationships between them. Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale.

Unit 1 Common Core State Standards	CCSS.MATH.CONTENT.7.G.A.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
	CCSS.MATH.CONTENT.7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Unit 1 Assessments	To be created in Implementation Year 1 (2022-23)
Curricular Resources Utilized in Unit 1	DESMOS

Unit 2	Proportional Relationships - Approximately 20 Days (Quarter 1) In this unit, students learn what a proportional relationship is, how it is represented, and what types of contexts can be modeled by proportional relationships.
Unit 2 Big Ideas	• A proportional relationship is a collection of equivalent ratios. • Any proportional relationship can be represented by an equation.
Unit 2 Essential Questions	• What does it mean for two things to be proportionally related? How can you tell? • What are the different ways you can represent proportional relationships? • How can I determine when two quantities are in a proportional relationship? • How can I relate the constant of proportionality to real world situations? • What does a specific point on the graph of a proportional relationship mean in real life context? • What do effective problem solvers do, and what do they do when they get stuck? • How can I effectively explain my mathematical thinking and reasoning to others? • How can I make this problem easier?
Unit 2 Student Learning Goals	• Students will represent proportional relationships using equations. • Students will write equations for the two ways a proportional relationship can be considered. • Students will compare proportional and nonproportional relationships, focusing on the structure of the equation for each.

	• Students will determine that proportional relationships are straight lines passing through the origin and categorize graphs as proportional or nonproportional. • Students will interpret graphs of proportional relationships and reason that graphs can be used to compare constants of proportionality. • Students will compute unit rates with complex fractions and with like or different units. • Students will determine when two quantities are in a proportional relationship. • Students will identify and or compute the constant of proportionality (unit rate). • Students will explain what a point on the graph of a proportional relationship means in terms of the situation. • Students will interpret the unit rate as the slope of the graph. • Students will derive and write the equations $y=mx + b$ (y-intercept, slope).
Unit 2 Vocabulary	rates, ratios, proportions, constant of proportionality
Unit 2 Missouri Learning Standards	Priority Standard 7.RP.A.2a: Analyze proportional relationships and use them to solve problems. Recognize and represent proportional relationships between quantities: a.Determine when two quantities are in a proportional relationship.
	Priority Standard 7.RP.A.2c: Analyze proportional relationships and use them to solve problems. Recognize and represent proportional relationships between quantities: c.Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.
	Priority Standard 7.RP.A.3: Analyze proportional relationships and use them to solve problems. Solve problems involving ratios, rates, percentages and proportional relationships.
Unit 3 Common Core State Standards	CCSS.MATH.CONTENT.7.RP.A.2.A Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
	CCSS.MATH.CONTENT.7.RP.A.2.B

	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
	CCSS.MATH.CONTENT.7.RP.A.2.C Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.
	CCSS.MATH.CONTENT.7.RP.A.2.D Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.
Unit 2 Assessments	To be developed in Implementation - Year 1 (2022-23)
Curricular Resources Utilized in Unit 2	DESMOS

Unit 3	Measuring Circles - Approximately 15 Days (Quarter 2) In this unit, students learn to use the term circle to mean the set of points that are equally distant from a point called the center. They gain an understanding of why the circumference of a circle is proportional to its diameter. Students use the relationships of circumference, radius, diameter, and area of a circle to determine lengths and areas, expressing these in terms of pi or using appropriate approximations of pi to express them numerically.
Unit 3 Big Ideas	Properties of circles can be used to find missing measurements.
Unit 3 Essential Questions	• How do we measure circles when all of our tools are straight? • How can squares help you measure the space inside circles? • How do the circumference, radius, diameter, area, and Pi relate? • How can I calculate circumference and area? • What do effective problem solvers do, and what do they do when they get stuck?

	• How can I effectively explain my mathematical thinking and reasoning to others? • How can I make this problem easier?
Unit 3 Student Learning Goals	• Students will develop a formal definition of a circle and describe and measure a circle using the radius and diameter. • Students will apply understanding of scaled figures and proportional relationships to explore the relationship between a square's perimeter and diagonal length. • Students will determine the perimeter of shapes composed of circular parts and solve for unknown lengths. • Students will develop a formula for the area of a circle. • Students will apply the area of a circle formula to solve problems involving the area of shapes composed by circular parts and polygons.
Unit 3 Vocabulary	radius, diameter, pi, circumference, area
Unit 3 Missouri Learning Standards	Priority Standard 7.RP.A.2a: Analyze proportional relationships and use them to solve problems. Recognize and represent proportional relationships between quantities: a.Determine when two quantities are in a proportional relationship.
	Priority Standard 7.RP.A.2c: Analyze proportional relationships and use them to solve problems. Recognize and represent proportional relationships between quantities: c.Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.
	Priority Standard 7.GM.A.1: Draw and describe geometrical figures and describe the relationships between them. Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale.
	Priority Standard 7.GM.A.4a: Draw and describe geometrical figures and describe the relationships between them. Understand the concepts of circles: a.Analyze the relationships among the circumference, the radius, the diameter, the area and Pi in a circle.

	Priority Standard 7.GM.A.4b: Draw and describe geometrical figures and describe the relationships between them. Understand the concepts of circles: b. Know and apply the formulas for circumference and area of circles to solve problems.
Unit 3 Common Core State Standards	CCSS.MATH.CONTENT.7.RP.A.2.A Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
	CCSS.MATH.CONTENT.7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
	CCSS.MATH.CONTENT.7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Unit 3 Assessments	To be developed in Implementation - Year 1 (2022-23)
Curricular Resources Utilized in Unit 3	DESMOS

Unit 4	Proportional Relationships & Percentages - Approximately 20 Days (Quarter 2) In this unit, students deepen their understanding of ratios and proportional relationships, using them to solve multi-step problems that are set in a wide variety of contexts that involve percentages. They consider situations for which percentages can be used to describe a change relative to some other amount.
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Unit 4 Big Ideas	• A proportion is a relationship of equality between two ratios. • In a proportion, the ratio of two quantities remains constant as the corresponding values of the quantities change. • In a percent proportion, one ratio represents a part to a whole comparison and the equivalent ratio part 100, represents the percent. • The constant of proportionality is also considered to be the unit rate.
Unit 4 Essential Questions	• How are percentages related to proportional relationships? • How are percentages used to represent change? • When is it most helpful to use percentages? • How can I determine when two quantities are in a proportional relationship? • How can I relate the constant of proportionality to real world situations? • How can I calculate and apply percent change? • What do effective problem solvers do, and what do they do when they get stuck? • How can I effectively explain my mathematical thinking and reasoning to others?
Unit 4 Student Learning Goals	• Students will compute unit rates with complex fractions and with like or different units. • Students will determine when two quantities are in a proportional relationship. • Students will identify and or compute the constant of proportionality (unit rate). • Students will explain what a point on the graph of a proportional relationship means in terms of the situation. • Students will recognize that the graph of any proportional relationship will pass through the origin. • Students will interpret the unit rate as the slope of the graph. • Students will compare two different proportional relationships. • Students will write the equations $y=mx + b$ (y-intercept, slope). • Students will understand that percentages are not whole numbers. • Students will model problems involving percent increase and decrease with tape diagrams and write expressions to represent the scenarios. • Students will use tape diagrams to make sense of problems involving percent increase and decrease to determine percent of change. • Students will connect proportional relationships and percent change scenarios in order to write equations. • Students will represent percent increase and decrease problems with equations, and use them to solve for various unknown values. • Students will apply percent reasoning to contexts involving money - specifically sales tax, tips, and simple interest.

	- Students will interpret and solve problems about real world situations involving proportional relationships and percent change. - Students will determine missing measurements in proportional relationships involving fractional quantities or percentages.
Unit 4 Vocabulary	percent, tax, tip, discount, simple interest
Unit 4 Missouri Learning Standards	Priority Standard 7.RP.A.2c: Analyze proportional relationships and use them to solve problems. Recognize and represent proportional relationships between quantities: c.Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.
	Priority Standard 7.RP.A.3: Analyze proportional relationships and use them to solve problems. Solve problems involving ratios, rates, percentages and proportional relationships.
	Priority Standard 7.EE1.A.1: Use properties of operations to generate equivalent expressions.: Apply properties of operations to simplify and to factor linear algebraic expressions with rational coefficients.
	Priority Standard 7.EE1.A.2: Use properties of operations to generate equivalent expressions.: Understand how to use equivalent expressions to clarify quantities in a problem.
Unit 4 Common Core State Standards	CCSS.MATH.CONTENT.7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
	CCSS.MATH.CONTENT.7.RP.A.2 Recognize and represent proportional relationships between quantities.
	CCSS.MATH.CONTENT.7.RP.A.3

	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
	CCSS.MATH.CONTENT.7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
	CCSS.MATH.CONTENT.7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
Unit 4 Assessments	To be developed in Implementation - Year 1 (2022-23)
Curricular Resources Utilized in Unit 4	DESMOS

Unit 5	Rational Number Arithmetic - Approximately 25 Days (Quarter 3) In this unit, students discover the need to work with both positive and negative values to describe the vastness of the world around them. Students interpret rational numbers in contexts (e.g., temperature, elevation, payments and debts, position, direction, speed and velocity) together with their sums, differences, products, and quotients.
Unit 5 Big Ideas	• Computation with positive and negative numbers is often necessary to determine relationships between quantities. • Relationships exist between positive and negative integers. • Applying number properties can simplify expressions. • Additive inverse and opposite quantities combine to make zero. • Operations can be used to solve problems and equations with both positive and negative numbers. • Algebraic representations can be used to generalize patterns and relationships.

Unit 5 Essential Questions	• How is solving problems with rational numbers the same or different from solving problems with only non-negative rational numbers? • How can rational numbers be used to represent real world situations? • How can change be best represented mathematically? • How do operations and signs affect numbers? • How do you represent addition or subtraction of rational numbers on a number line? • How is solving problems with rational numbers the same or different from solving problems with only non-negative rational numbers? • How can rational numbers be used to represent real world situations?
Unit 5 Student Learning Goals	• Students will add, subtract, multiply, and divide rational numbers. • Students will represent addition and subtraction on horizontal and vertical number lines. • Students will describe situations that have a number and its opposite with a sum of zero. • Students will understand subtraction of rational numbers as adding the additive inverse. • Students will determine the distance between two rational numbers on the number line as the absolute value of their difference. • Students will interpret sums, differences, products, and quotients of rational numbers by describing real world context. • Students will generate equivalent representation of rational numbers. • Students will explore adding rational numbers and generalize rules about the sign of the sum. • Students will subtract rational numbers to compare differences and notice that the order of subtraction changes the sign of the difference. • Students will formalize that the product of a positive and negative number is negative, by relating multiplication to repeated addition. • Students will perform all four operations with positive and negative numbers using a variety of strategies. • Students will reason about variable expressions involving adding, subtracting, multiplying, and dividing signed numbers. • Students will generalize patterns for the value of variable expressions. • Students will apply understanding of the distance formula, $d = rt$, to make observations about the rules for multiplying rational numbers. • Students will identify and create equivalent expressions involving positive, negative, and zero exponents. • Students will express and perform operations with very large or very small quantities using powers of ten and scientific notation. • Students will synthesize understandings of rational number arithmetic and interpreting negative quantities such as rates of change.

	Students will solve equations of the form $p + x = q$ and $px = q$ with rational values.
Unit 5 Vocabulary	rational numbers, sum, difference, absolute value, product, quotient, positive, negative, inverse
Unit 5 Missouri Learning Standards	Priority Standard 7.NS.A.1f: Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. Apply and extend previous understandings of numbers to add and subtract rational numbers: f. Interpret sums and differences of rational numbers.
	Priority Standard 7.NS.A.1c: Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. Describe situations and show that a number and its opposite have a sum of 0 (additive inverses).
	Priority Standard 7.NS.A.2b: Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. Apply and extend previous understandings of numbers to multiply and divide rational numbers: b. Determine that a number and its reciprocal have a product of 1 (multiplicative inverse).
	Priority Standard 7.NS.A.2f: Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. Apply and extend previous understandings of numbers to multiply and divide rational numbers: f. Interpret products and quotients of rational numbers by describing real-world contexts.
	Priority Standard 7.NS.A.3: Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. Solve problems involving the four arithmetic operations with rational numbers.
	Priority Standard 7.EE1.B.3b: Solve problems using numerical and algebraic expressions and equations. Solve multi-step problems posed with rational numbers: b. Assess the reasonableness of answers using mental computation and estimation strategies.
	Priority Standard

	7.EE.B.4a: Solve problems using numerical and algebraic expressions and equations. Write and/or solve linear equations and inequalities in one variable: a. Write and/or solve equations of the form $x+p = q$ and $px = q$ in which p and q are rational numbers.
	Priority Standard 8.EE.A.1: Work with radicals and integer exponents. Know and apply the properties of integer exponents to generate equivalent expressions.
Unit 5 Common Core State Standards	CCSS.MATH.CONTENT.7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
	CCSS.MATH.CONTENT.7.NS.A.1.A Describe situations in which opposite quantities combine to make 0.
	CCSS.MATH.CONTENT.7.NS.A.1.C Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
	CCSS.MATH.CONTENT.7.NS.A.1.D Apply properties of operations as strategies to add and subtract rational numbers.
	CCSS.MATH.CONTENT.7.NS.A.2.A Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
	CCSS.MATH.CONTENT.7.NS.A.2.B

	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
	CCSS.MATH.CONTENT.7.NS.A.2.C Apply properties of operations as strategies to multiply and divide rational numbers.
	CCSS.MATH.CONTENT.7.NS.A.2.D Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
	CCSS.MATH.CONTENT.7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.
	CCSS.MATH.CONTENT.7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
	CCSS.MATH.CONTENT.7.NS.A.1.B Understand $p + q$ as the number located a distance $ q $ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
	CCSS.MATH.CONTENT.7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
Unit 5 Assessments	To be created in Implementation - Year 1 (2022-23)
Curricular Resources Utilized in Unit 5	DESMOS

Unit 6	Expressions, Equations, and Inequalities - Approximately 25 Days (Quarter 3) In this unit, students simplify expressions, solve and graph equations and inequalities involving rational numbers.
Unit 6 Big Ideas	• Representation plays a large role in communicating mathematical ideas. • Solving equations with multiple steps – even with negative numbers and fractions – involves the same reasoning as solving simpler equations.
Unit 6 Essential Questions	• Which representations best help you make sense of certain mathematical scenarios? • Which strategies that worked for solving simple equations or inequalities can be put to use when solving more complex ones? • How can you increase your efficiency when solving mathematical problems?
Unit 6 Student Learning Goals	• Students will find unknown values on balanced hanger diagrams that model two-step equations. • Students will connect the Distributive Property with solving equations of the form $p(x + q) = r$, using hanger diagrams to assist. • Students will practice solving equations of the form $p(x + q) = r$, focusing on the structure of the equation to determine the most efficient solution method. • Students will build fluency in algebraic manipulation by solving a variety of equations. • Students will use tape diagrams and equations of the form $px + q = r$ and $p(x + q) = r$ to describe relationships in real-world scenarios. • Students will create tape diagrams, write equations, and solve real-world problems, focusing on equations of the form $p(x + q) = r$. • Students will decide which type of equation, $px + q = r$ or $p(x + q) = r$, describes the relationships in a real-world story problem. • Students will represent percent increase and decrease using tape diagrams and equations. • Students will solve inequalities of the forms $px + q < r$ and $p(x + q) < r$ by first writing and solving a related equation.

	• Students will interpret and solve inequalities that represent real-world situations, while making sense of quantities and their relationships in the problem. • Students will use the Distributive Property to expand and factor expressions that include subtraction and negative values. • Students will use the properties of operations to understand how like terms can be combined to write an equivalent expression with fewer terms. • Students will combine like terms to write equivalent expressions with fewer terms, now including negative coefficients and parentheses.
Unit 6 Vocabulary	equivalent equations, less than or equal to, solution to an inequality, expand, factor, like terms
Unit 6 Missouri Learning Standards	7.EE1.B.4: Solve problems using numerical and algebraic expressions and equations. Write and/or solve linear equations and inequalities in one variable: a. Write and/or solve equations of the form $x+p = q$ and $px = q$ in which p and q are rational numbers. Priority Standard 7.EE1.A.2: Use properties of operations to generate equivalent expressions. Understand how to use equivalent expressions to clarify quantities in a problem. Priority Standard 7.EE1.B.4B: Solve problems using numerical and algebraic expressions and equations. Write and/or solve linear equations and inequalities in one variable: b. Write and/or solve two-step equations of the form $px + q = r$ and $p(x + q) = r$, where p, q and r are rational numbers, and interpret the meaning of the solution in the context of the problem. Priority Standard 7.NS.A.1.C: Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. Apply and extend previous understandings of numbers to add and subtract rational numbers: c. Describe situations and show that a number and its opposite have a sum of 0 (additive inverses). Priority Standard

	7.EE.B.4c: Solve problems using numerical and algebraic expressions and equations. Write and/or solve linear equations and inequalities in one variable: c. Write, solve and/or graph inequalities of the form $px + q > r$ or $px + q < r$, where p, q and r are rational numbers.
	Priority Standard 8.EE.C.7a: Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations. Solve linear equations and inequalities with rational number coefficients, including equations and inequalities whose solutions require expanding expressions using the distributive property and combining like terms.
Unit 6 Common Core State Standards	CCSS.MATH.CONTENT.7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
	CCSS.MATH.CONTENT.7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
	CCSS.MATH.CONTENT.7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
	CCSS.MATH.CONTENT.7.EE.B.4.A Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
	CCSS.MATH.CONTENT.7.EE.B.4.B Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

Unit 6 Assessments	To be developed in Implementation - Year 1 (2022-23)
Curricular Resources Utilized in Unit 6	DESMOS

Unit 7	2D and 3D Geometry - Approximately 20 Days (Quarter 4) In this unit, students explore relationships among angles, lines, surfaces, and solids.
Unit 7 Big Ideas	• When two lines intersect, a pair of congruent vertical angles are created. • This angle relationship, along with complementary and supplementary angle relationships, can be used to determine missing angle measures in diagrams. • In any triangle, the sum of any two side lengths must be longer than the measure of the third side.
Unit 7 Essential Questions	• When do certain combinations of angles form special angles? • Given certain segments and angles, how many unique polygons can be made? • What shapes can be seen when you slice through solid figures?
Unit 7 Student Learning Goals	• Students will compose, decompose, and measure angles. • Students will find an unknown angle given the measure of a supplementary or complementary angle. • Students will calculate surface area and volume of three dimensional figures. • Students will find the measures of non-adjacent supplementary and complementary angles and draw conclusions about the angle relationships of polygons. • Students will write and solve equations of the form $px + q = r$ and $p(x + q) = r$ to represent angle relationships shown in diagrams. • Students will examine and compare sets of triangles that share three common angle measures or side lengths. • Students will use various tools to draw triangles, noticing that certain conditions determine how many unique triangles can be drawn. • Students will draw triangles given one angle and two side lengths, or three angles. • Students will calculate the volume of any right prism by multiplying the area of its base by its

	height. Students will determine fractions and decimal approximations for rational and irrational numbers.
Unit 7 Vocabulary	adjacent angles, complementary angles, supplementary angles, vertical angles, cross section, cube root, hypotenuse, irrational number, legs, rational number
Unit 7 Missouri Learning Standards	Priority Standard 7.GM.B.6a: Apply and extend previous understanding of angle measure, area and volume. Understand the relationship between area, surface area and volume: a.Find the area of triangles, quadrilaterals and other polygons composed of triangles and rectangles.
	Priority Standard 7.GM.B.6b: Apply and extend previous understanding of angle measure, area and volume. Understand the relationship between area, surface area and volume: b.Find the volume and surface area of prisms, pyramids and cylinders.
	Priority Standard 8.GM.B.6 Understand and apply the Pythagorean Theorem. Use models to demonstrate a proof of the Pythagorean Theorem and its converse.
	Priority Standard 8.GM.C.9a: Solve problems involving volumes of cones, pyramids and spheres. Understand the concepts of surface area and find surface area of pyramids.
	Priority Standard 8.GM.C.9b: Solve problems involving volumes of cones, pyramids and spheres. Understand the concepts of volume and find the volume of pyramids, cones and spheres.
Unit 7 Common Core State Standards	CCSS.MATH.CONTENT.7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
	CCSS.MATH.CONTENT.7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
	CCSS.MATH.CONTENT.7.G.A.2

	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
	CCSS.MATH.CONTENT.7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
	CCSS.MATH.CONTENT.7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
	CCSS.MATH.CONTENT.7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Unit 7 Assessments	To be developed in Implementation - Year 1 (2022-23)
Unit 7 Curricular Resources	DESMOS

Unit 8	Data, Statistics, and Probability - Pacing 15 days (Quarter 4) In this unit, students encounter how to quantify the chances of something happening. Though the future is unwritten, probability and statistics help us make better predictions and thus better decisions. Students develop the knowledge and language to describe the probability of single-step and multi-step chance events. When chance events grow more complex, they learn how to represent sample spaces in tables, tree diagrams, and lists — and to design and use simulations.
Unit 8 Big Ideas	Modeling real world experiments through trials and simulations are used to predict the probability of a given event.
Unit 8 Essential Questions	- What do effective problem solvers do, and what do they do when they get stuck? - How can I effectively explain my mathematical thinking and reasoning to others? - How can I make this problem easier? - When faced with more than one possibility, how can we figure out which thing is more likely to happen? - Our world is really complex--how can we simulate parts of it to make better predictions? - When is a sample not representative of a population?
Unit 8 Student Learning Goals	- Students will use data from multiple samples to draw inferences about a population and investigate variability in estimates of the characteristic of interest. - Students will analyze different data distributions of statistical measures. - Students will compare the numerical measures of center, measures of frequency, and measures of variability from two random samples to draw inferences about the population. - Students will investigate the probability of chance events between zero and one. - Students will predict outcomes using theoretical probability. - Students will perform experiments that model theoretical probability. - Students will compare and explain theoretical and experimental probabilities. - Students will find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. - Students will compare and explain differences between data displays. - Students will calculate percents. - Students will determine probability of unknown events by comparing the results of repeated experiments and the expected probability. - Students will explain the purpose of sampling and which methods of obtaining a sample tend to produce representative samples.

Unit 8 Vocabulary	mean, median, mode, range, inter quartile range, skew left, skew right, outliers, measures of center, statistical question, box plot, dot plot, histogram, frequency, frequency tables, distribution of data, intervals
Unit 8 Missouri Learning Standards	Priority Standard 7.DSP.A.1b: Use random sampling to draw inferences about a population: Understand that statistics can be used to gain information about a population by examining a sample of the population.: b.Understand that generalizations from a sample are valid only if the sample is representative of the population.
	Priority Standard 7.DSP.B.3: Draw informal comparative inferences about two populations. Analyze different data distributions using statistical measures.
	Priority Standard 7.DSP.C.5b: Develop, use and evaluate probability models.: Investigate the probability of chance events.: b.Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.
	Priority Standard 7.DSP.C.5a: Develop, use and evaluate probability models. Investigate the probability of chance events: a.Determine probabilities of simple events.
Unit 8 Common Core State Standards	CCSS.MATH.CONTENT.7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
	CCSS.MATH.CONTENT.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For
	CCSS.MATH.CONTENT.7.SP.B.3

	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
	CCSS.MATH.CONTENT.7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
	CCSS.MATH.CONTENT.7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
	CCSS.MATH.CONTENT.7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
	CCSS.MATH.CONTENT.7.SP.C.7.A Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
	CCSS.MATH.CONTENT.7.SP.C.7.B Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
	CCSS.MATH.CONTENT.7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
	CCSS.MATH.CONTENT.7.SP.C.8.A Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

	CCSS.MATH.CONTENT.7.SP.C.8.B Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
	CCSS.MATH.CONTENT.7.SP.C.8.C Design and use a simulation to generate frequencies for compound events.
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Curricular Resources Utilized in Unit 8	DESMOS