Davison Community Schools
ADVISORY CURRICULUM COUNCIL
Phase II, April 20, 2015

6th grade Math (5th Grade CAP)

Course Essential Questions:

- How do we multiply and divide ratios and rates?
- How does the location of numbers on the number line transfer to understanding how points are located on the coordinate plane?
- How are variables used to solve real-world problems?
- How do we collect, analyze, and interpret data to make sense of the world we live in?
- How does mathematics help us in finding patterns and relationships in the real-world?

MAJOR CLUSTERS	- areas of intensive focus, where students need fluent understanding and application of the core concepts.	*approximately 70%*
SUPPORTING CLUSTERS	- rethinking and linking; areas where some material is being covered, but in a way that applies core understandings.	*approximately 20%*
ADDITIONAL CLUSTERS	- expose students to other subjects, though at a distinct, level of depth and intensity.	*approximately 10%*

Tier 3 Vocabulary Words are highlighted in yellow

Phase II Curriculum

Unit: 1 Exponents, variables, and their properties

Essential Questions:

- How properties of operations used to prove equivalence?
- How are variables defined and used?
- What role does place value play in multi-digit operations?
- Why are variables used in equations? – What might a variable represent in a given situation?

Essential Understanding:

- There is a designated sequence to perform operations (Order of Operations).
- Variables can be used as unique unknown values or as quantities that vary.
- Multiplication and division are inverse operations for whole numbers, fractions and decimals.
- The relationship of the location of the digits and the value of the digits is part of understanding multi-digit operations.
- Operations on decimals and whole numbers are based upon place value relationships.
- Variables may be used to represent a specific number, or, in some situations, to represent all numbers in a specified set.

Curriculum Standards- DOK noted where applicable with Standards

6.EE.1 : Write and evaluate numerical expressions involving whole-number exponents. **(DOK 1)**

6.EE.2: Write, read, and evaluate expressions in which letters stand for numbers. **(DOK 1,2)**

a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 – y.

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.

6.EE.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 + 3*x*; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4*x* + 3*y*); apply properties of operations to *y* + *y* + *y* to produce the equivalent expression 3*y*. **(DOK 1,2)**

6.EE.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. **(DOK 1,2)**

6.NS.2(Required Fluency): Fluently divide multi-digit numbers using the standard algorithm. **(DOK 1)**

6.NS.3(Required Fluency) : Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **(DOK 1)**

MP-Make sense of problems and persevere in solving them
MP-Reason abstractly and quantitatively
MP-Construct viable arguments and critique the reasoning of others
MP-Model with mathematics
MP-Use appropriate tools strategically
MP-Attend to precision
MP-Look for and make use of structure
MP-Look for and express regularity in repeated reasoning

LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• Exponential notation is a way to express repeated products of the same number. • Standard algorithms for addition, subtraction, multiplication and division of multi-digit decimals • the parts of an expression using mathematical terms (sum, term, product, factor, quotient, and coefficient) • the parts of an expression are a single entity, even if not a monomial	• Write numerical expressions that have whole number exponents. (6.EE.1) • Evaluate numerical expressions that have whole number exponents and rational bases.(6.EE.1) • Write algebraic expressions to represent real life and mathematical situations. (6.EE.2) • Identify parts of an expression using appropriate terminology. (6.EE.2) • Given the value of a variable, students will evaluate the expression. (6.EE.2) • Use order of operations to evaluate expressions. (6.EE.2)

	● Apply properties of operations to write equivalent expressions. (6.EE.3) ● Write variable expressions when solving a mathematical problem or real-world problem, recognizing that a variable can represent an unknown number or any number in a specified set (6.EE.6) ● Divide multi-digit numbers fluently using the standard algorithm. (6.NS.2) ● Fluently add, subtract, multiply and divide decimals to solve problems. (6.NS.3)

Phase II Curriculum

Unit: 2 Statistics

Essential Questions:

- How do we analyze and interpret data sets?
- When is one data display better than another?
- How do mathematicians choose to display data in strategic ways?
- When is one statistical measure better than another?
- What makes a good statistical question?

Essential Understanding:

- Statistical questions and the answers account for variability in the data.
- The distribution of a data set is described by its center, spread, and overall shape.
- Measures of center for a numerical set of data are summaries of the values using a single number.
- Measures of variability describe the variation of the values in the data set using a single number.

Curriculum Standards- DOK noted where applicable with Standards

6.SP.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. **(DOK 1)**

6.SP.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. **(DOK 1,2)**

6.SP.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. **(DOK 1)**

6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box-plots. **(DOK 1,2)**

6.SP.5 Summarize numerical data sets in relation to their context, such as by: **(DOK 1,2,3)**

a) Reporting the number of observations.

b) Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

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.

d) 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.

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• Median, mode and mean are measures of center. • Range, Interquartile range and mean absolute deviation are measures of variability. • The distribution is the arrangement of the values in a data set. • that data has variability • examples of statistical questions • that a set of data has a distribution • that a set of data has a center • that a distribution is described by its shape • the measures of central tendency measures the set of data's center • the measures of variance measure the set of data's spread • the measure(s) of central tendency for a data set summarize the data set with a single number • the measure(s) of variation for a data set describe how its values vary with a single number • the components of dot plots, histograms, and box plots • how to find the median, quartile and interquartile range of a set of data • how to identify outliers • appropriate measures of central tendency in the context of the situation to represent data	• Identify statistical questions. (6.SP.1) • Determine if questions anticipate variability in the data related to the question and account for it in the answers. (6.SP.1) • Represent a set of data collected to answer a statistical question and describe it by its center, spread, and overall shape. (6.SP.2) • Represent and explain the difference between measures of center and measures of variability. (6.SP.3) • Display numerical data in plots on a number line. (6.SP.4) • Display numerical data in dot plots. (6.SP.4). • Display numerical data in histograms. (6.SP.4) • Display numerical data in box plots. (6.SP.4) • Use language to summarize numerical data sets in relation to their context. (6.SP.5) • Report the number of observations. (6.SP.5) • Describe the nature of the attribute under investigation. (6.SP.5) • Give quantitative measures of center and variability 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. (6.SP.5) • Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (6.SP.5)

Phase II Curriculum

Unit: 3 Rational Numbers

Essential Questions:

- How are positive and negative numbers used?
- How do rational numbers relate to integers?

Essential Understanding:

- Quantities having more or less than zero are described using positive and negative numbers.
- Number lines are visual models used to represent the density principle: between any two whole numbers are many rational numbers, including decimals and fractions.
- The rational numbers can extend to the left or to the right on the number line, with negative numbers going to the left of zero, and positive numbers going to the right of zero.

Curriculum Standards- DOK noted where applicable with Standards

6.NS.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. **(DOK 1,2)**

6.NS.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. **(DOK 1)**

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.
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.
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.7 Understand ordering and absolute value of rational numbers. **(DOK 1,2)**

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.
b) Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write -3°C > -7°C to express the fact that - 3°C is warmer than - 7°C.
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. For example, for an account balance of – 30 dollars, write $|-30| = 30$ to describe the size of the debt in dollars.

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.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. **(DOK 1,2)**

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• that with integer opposites, one is a positive number and negative number • two opposite numbers form a zero pair • a rational number has a specific location on the number line • where to find 0 on the number line • that numbers that are opposites are the same distance from zero, but on opposite sides of it • the signs of both numbers in an ordered pair indicate which quadrant of the coordinate plane it will be located in • that absolute value of a number is its distance from zero	• Identify an integer and its opposite and the directions they represent in real-world contexts. (6.NS.5) • Use integers to represent quantities in real-world situations (above/ below sea level) (6.NS.5) • Understand the meaning of 0 and where it fits into a situation(6.NS.5) • Represent and explain the value of a rational number as a point on a number line (6.NS.6) • Recognize that a number line can be both vertical and horizontal (6.NS.6) • Represent a number and its opposite equidistant from zero on a number line. (6.NS.6) • Identify that the opposite of the opposite of the number is itself. (6.NS.6) • Incorporate opposites on the number line or plot opposite points on a coordinate grid where x and y intersect at zero. (6.NS.6) • Represent signs of numbers in ordered pairs as locations in quadrants on the coordinate plane and explain the relationship between the location and the signs. (6.NS.6) • Represent and explain reflections of ordered pairs on a coordinate plane (6.NS.6) • Locate and position integers and other rational numbers on horizontal or vertical number lines (6.NS.6)

	● Locate and position integers and other rational numbers on a coordinate plane. (6.NS.6) ● Identify the absolute value of a number as the distance from zero (6.NS.7) ● Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. (6.NS.7) ● Use inequalities to order integers relative to their position on the number line(6.NS.7) ● Write statements of order for rational numbers in real-world contexts. (6.NS.7) ● Interpret statements of order for rational numbers in real-world contexts. (6.NS.7) ● Explain statements of order for rational numbers in real-world contexts. (6.NS.7) ● Represent the absolute value of a rational number as the distance from zero and recognize the symbol $\lvert x \rvert$. (6.NS.7) ● Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. (6.NS.7) ● Distinguish comparisons of absolute value from statements about order. (Compare rational numbers using absolute value in real-world situations. For negative numbers, as the absolute values increases, the value of the number decreases.) (6.NS.7) ● Solve real-world problems by graphing points in all four quadrants of the coordinate plane (6.NS.8) ● Use coordinates to find distances between points with the same first coordinate or the same second coordinate. (6.NS.8) ● Use absolute value to find distances between points with the same first coordinate or the same second coordinate. (6.NS.8)

Unit: 4 Expressions, Equations and Inequalities

Essential Questions:

- What is equivalence?
- How properties of operations used to prove equivalence?
- How does the structure of equations help us solve equations?
- How does the substitution process help in solving problems?
- Why are variables used in equations? – What might a variable represent in a given situation?
- How are equalities represented and solved?
- How can algebraic expressions and equations be used to model, analyze and solve real world and math situations?

Essential Understanding:

- Properties of operations are used to determine if expressions are equivalent.
- Solving equations is a reasoning process and follows established procedures based on properties.
- Substitution is used to determine whether a given number in a set makes an equation or inequality true.
- Variables may be used to represent a specific number, or, in some situations, to represent all numbers in a specified set.
- When one expression has a different value than a related expression, an inequality provides a way to show that relationship between the expressions: the value of one expression is greater than (or greater than or equal to) the value of the other expression instead of being equal.
- Inequalities may have infinite solutions and there are methods for determining if an inequality has infinite solutions using graphs and equations
- Solutions of inequalities can be represented on a number line.
- Graphs and equations represent relationships between variables.

Curriculum Standards- DOK noted where applicable with Standards

6.EE.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. **(DOK 1,2)**

6.EE.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 the name the same number regardless of which number y stands for. **(DOK 1)**

6.EE.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 and explain substitution in order to determine whether a given number in a specified set makes an equation or inequality true. **(DOK 1)**

6.EE.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. **(DOK 1,2)**

6.EE.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. **(DOK 1,2)**

6.EE.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. **(DOK 1,2)**

6.EE.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. **(DOK 1,2,3)**

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• when two expressions are equivalent • that solving an equation or inequality is a process of answering “which values from a specified set, if any, make the equation or inequality true?” • the solutions of an equation or inequality are the values that make the equation or inequality true • to use substitution to determine whether a given number in a specified set makes an equation or inequality true • a variable can represent an unknown number or, depending on the purpose at hand, any number in a specified set • inverse operations • how inverse operations can be used in solving one-variable equations • that inequalities of the form x>c or x<c have infinitely many solutions • the what independent and dependent variables are	• Apply properties of operations to write equivalent expressions. (6.EE.3) • Identify when two expressions are equivalent. (6.EE.4) • Prove (using various strategies) that two equations are equivalent no matter what number is substituted. (6.EE.4) • Recognize that solving an equation or inequality is a process of answering a question: which values from a specified set, if any, make the equation or inequality true? (6.EE.5) • Determine whether a given number in a specified set makes an equation or inequality true with substitution. (6.EE.5) • Write variable expressions when solving a mathematical problem or real-world problem, recognizing that a variable can represent an unknown number or any number in a specified set (6.EE.6) • Solve real-world and mathematical problems by writing and solving equations of the form x +

● to use variables to represent two or more quantities in a real-world problem that change in relationship to one another	p = q and px = q for cases in which p, q and x are all nonnegative rational numbers. (6.EE.7) ● Write an inequality of the form x > c or x < c to represent a constraint or condition in a mathematical problem or a real-world problem. (6.EE.8) ● Recognize that inequalities of the form x > c or x < c have infinitely many solutions. (6.EE.8) ● Represent solutions of inequalities on number line diagrams. (6.EE.8) ● Define independent and dependent variables. (6.EE.9) ● Use variables to represent two quantities in a real-world problem that change in relationship to one another. (6.EE.9) ● 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. (6.EE.9) ● Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (6.EE.9)

Phase II Curriculum

Unit: 5 Fractions and Decimals

Essential Questions:

- How is division related to realistic situations and to other operations?
- What role does place value play in multi-digit operations?
- How can division be represented and interpreted?

Essential Understanding:

- The two types of division – quotative (partitive) and measurement are applied to fractions and decimals as well as to whole numbers.
- Multiplication and division are inverse operations for whole numbers, fractions and decimals.
- The relationship of the location of the digits and the value of the digits is part of understanding multi-digit operations.
- Division of fractions by fractions can be represented using multiple formats (manipulates, diagrams, real-life situations, equations).
- Operations on decimals and whole numbers are based upon place value relationships.

Curriculum Standards- DOK noted where applicable with Standards

6.NS.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 length3/4 mi and area 1/2 square mi? **(DOK 1,2)**

6.NS.3 (Required Fluency) Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **(DOK 1)**

6.NS.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. For example, express 36 + 8 as 4 (9 + 2).**(DOK 1)**

6.NS.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.**(DOK 1)**

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.EE.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.**(DOK 1,2)**

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• Standard algorithms for addition, subtraction, multiplication and division of multi-digit decimals • how division of fractions relates to multiplication of fractions • a rational number has a specific location on the number line • where to find 0 on the number line • that numbers that are opposites are the same distance from zero, but on opposite sides of it • the signs of both numbers in an ordered pair indicate which quadrant of the coordinate plane it will be located in	• Compute quotients of fractions divided by fractions. (6.NS.1) • Explain the meaning of a quotient determined by division of fractions, using visual fraction models, equations, real-life situations, and language. (6.NS.1) • Fluently add, subtract, multiply and divide decimals to solve problems. (6.NS.3) • Identify the factors of any whole number less than or equal to 100. (6.NS.4) • Determine the Greatest Common Factor of two or more whole numbers less than or equal to 100. (6.NS.4) • Identify the multiples of two whole numbers less than or equal to 12 and determine the Least Common Multiple. (6.NS.4) • 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. (6.NS.4) • Locate and position integers and other rational numbers on horizontal or vertical number lines (6.NS.6) • Locate and position integers and other rational numbers on a coordinate plane. (6.NS.6) • 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. (6.EE.7)

Phase II Curriculum

Unit: 6 Ratios, Rates, and Proportions

Essential Questions:	**Essential Understanding:**
● When is it useful to be able to relate one quantity to another? ● How are ratios and rates similar and different? ● What is the connection between a ratio and a fraction?	● A ratio expresses the comparison between two quantities. Special types of ratios are rates, unit rates, measurement conversions, and percents. ● A ratio or a rate expresses the relationship between two quantities. Ratio and rate language is used to describe a relationship between two quantities (including unit rates.) ● A rate is a type of ratio that represents a measure, quantity, or frequency, typically one measured against a different type of measure, quantity, or frequency. ● Ratio and rate reasoning can be applied to many different types of mathematical and real-life problems (rate and unit rate problems, scaling, unit pricing, statistical analysis, etc.).

Curriculum Standards- DOK noted where applicable with Standards

6.RP.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.” **(DOK 1,2)**

6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠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.” **(DOK 1,2)**

6.RP.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. **(DOK 1,2)**

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.
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?
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.
d) Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• A ratio compares two related quantities. • Ratios can be represented in a variety of formats including each, to, per, for each, %, 1/5, etc. • A percent is a type of ratio that compares a quantity to 100. • A unit rate is the ratio of two measurements in which the second term is 1. • When it is appropriate to use ratios/rates to solve mathematical or real life problems. • Mathematical strategies for solving problems involving ratios and rates, including tables, tape diagrams, double line diagrams, equations, equivalent fractions, graphs, etc	• Use ratio language to describe a ratio relationship between two quantities. (6.RP.1) • Represent a ratio relationship between two quantities using manipulatives and/or pictures, symbols and real-life situations. (a to b, a:b, or a/b) (6.RP.1) • Represent unit rate associated with ratios using visuals, charts, symbols, real-life situations and rate language. (6.RP.2) • Use ratio and rate reasoning to solve real-world and mathematical problems. (6.RP.3) • Make and interpret tables of equivalent ratios. (6.RP.3) • Plot pairs of values of the quantities being compared on the coordinate plane. (6.RP.3) • Use multiple representations such as tape diagrams, double number line diagrams, or equations to solve rate and ratio problems. (6.RP.3) • Solve unit rate problems (including unit pricing and constant speed). (6.RP.3) • Solve percent problems, including finding a percent of a quantity as a rate per 100 and finding the whole, given the part and the percent. (6.RP.3)

Phase II Curriculum

Unit: 7 Geometry

Essential Questions:

- What is the relationship between the dimensions of a figure and its volume?
- How do ordered pairs on coordinate graphs help define relationships?
- What models are helpful for understanding and quantifying the volume of rectangular prisms?
- How does what we measure influence how we measure?
- How can space be defined through numbers and measurement?
- How does investigating figures help us build our understanding of mathematics?
- What is the relationship between 2-dimensional shapes, 3-dimensional shapes and our world?

Essential Understanding:

- Graphing objects in a four quadrant graph can provide ways to measure distances and identify that shapes have specific properties
- Volume of a rectangular prism can be determined by multiplying the length, width and height dimensions when the dimensions are fractional lengths.
- Geometry and spatial sense offer ways to envision, to interpret and to reflect on the world around us.
- Area, volume and surface area are measurements that relate to each other and apply to objects and events in our real life experiences.
- Properties of 2-dimensional shapes are used in solving problems involving 3-dimensional shapes.
- The value of numbers and application of properties are used to solve problems about our world.

Curriculum Standards- DOK noted where applicable with Standards

6.G.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. **(DOK 1,2)**

6.G.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. Supporting Standards: Solve real-world and mathematical problems involving area, surface area, and volume. **(DOK 1,2)**

6.G.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. **(DOK 1,2)**

6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles. Use the nets to find surface areas of these figures. Apply these techniques in the context of solving real-world and mathematical problems. **(DOK 1,2)**

6.EE.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. **(DOK 1,2)**

MP-Make sense of problems and persevere in solving them
MP-Reason abstractly and quantitatively
MP-Construct viable arguments and critique the reasoning of others
MP-Model with mathematics
MP-Use appropriate tools strategically
MP-Attend to precision
MP-Look for and make use of structure
MP-Look for and express regularity in repeated reasoning

LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
● Formula for volume of a right rectangular prism. ● Procedures for finding surface area of pyramids and prisms.	● Given irregular figures, students will be able to divide the shape into triangles and rectangles (6.G.1) ● Given a polygon, students will find the area using the decomposing shapes. (6.G.1) ● Given a polygon students will calculate the area by decomposing into composite figures (triangles and rectangles). (6.G.1) ● 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. (6.G.2) ● Calculate the volume of a right rectangular prism. (6.G.2) ● Apply the formula to solve real world mathematical problems involving volume with fractional edge lengths. (6.G.2) ● Represent 3D figures using nets of triangles and rectangles. (6.G.4) ● Solve real world problems involving surface areas using nets. (6.G.4) ● Calculate the volume of a right rectangular prism. (6.G.2) ● Apply the formula to solve real world mathematical problems involving volume with fractional edge lengths. (6.G.2) ● 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. (6.EE.7)