

Middle School - 6th Grade Math

North Boone CUSD 200

UNITS (7/7 SELECTED)

SUGGESTED DURATION

 Unit 1: Integers and Rational Numbers	<i>25 lessons</i>
 Unit 2: Number Operations	<i>26 lessons</i>
 Unit 3: Proportionality: Ratios & Rates	<i>29 lessons</i>
 Unit 4: Measurement & Data	<i>15 lessons</i>
 Unit 5: Equivalent Expressions	<i>22 lessons</i>
 Unit 6: Equations & Inequalities	<i>22 lessons</i>
 Unit 7: Geometry	<i>26 lessons</i>

Unit 1: Integers and Rational Numbers

Middle School - 6th Grade Math - Last Updated on June 4, 2019

STANDARDS

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.

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.7: Understand ordering and absolute value of rational numbers.

CCSS.Math.Content.6.NS.C.6c: 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.

CCSS.Math.Content.6.NS.C.7a: Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.

CCSS.Math.Content.6.NS.C.7b: Write, interpret, and explain statements of order for rational numbers in real-world contexts.

CCSS.Math.Content.6.NS.C.7c: 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.6a: 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.7d: Distinguish comparisons of absolute value from statements about order.

Unit 1: Integers and Rational Numbers

Middle School - 6th Grade Math - Last Updated on June 4, 2019

PRIORITY STANDARDS

6.NS.C.6	<p>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.</p> <p>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.</p> <p>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.</p>
6.NS.C.7	<p>Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.</p> <p>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.</p> <p>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.</p>

Unit 1: Integers and Rational Numbers

Middle School - 6th Grade Math - Last Updated on June 4, 2019

DESIRED RESULTS

Enduring Understandings	Essential Question(s)
<p>Integers and rational numbers are used to describe and report the value of many things in the real world.</p> <p>Many understandings of whole numbers and ordering of numbers can be extended to integers and rational numbers which include negative numbers. Order and absolute value of rational numbers is reasoned from visualizing their location on a number line.</p> <p>Factors and multiples are helpful in solving many mathematical and real world problems.</p>	<p>How can you use integers to solve real world problems?</p> <p>How can you use greatest common factors and least common multiples to solve real world problems?</p> <p>How can you use rational numbers to solve real world problems?</p>

Students will know (Knowledge):	Students will be able to do (Skills):
<ul style="list-style-type: none"> • Key concepts and vocabulary associated with integers, factors, multiples, and rational numbers, including: positive numbers, negative numbers, opposites, integers, inequality, absolute value, greatest common factor (GCF), least common multiple (LCM), rational number, Venn diagram • The opposite of the opposite of a number is the number itself, i.e., $-(-a) = a$ • Zero is its own opposite • Properties of absolute values: <ul style="list-style-type: none"> ◦ $a \geq 0$ if and only if $a = 0$ ◦ $ab = a b$ ◦ $a/b = a / b$, for $b \neq 0$ ◦ $-a = a$ • Positive integers are also known as the counting numbers or natural numbers • Negative rational numbers can be written three ways: $-\frac{3}{4} = \frac{-3}{4} = \frac{3}{-4}$	<ul style="list-style-type: none"> • Correctly use key concepts and vocabulary associated with integers, factors, multiples, and rational numbers in discussions and explanations of problem solving • Identify integers and their opposites • Compare and order integers and rational numbers • Create a number line to display given values • Find and use absolute value • Find and use the greatest common factor of two whole numbers • Find and use the least common multiple of two numbers • Classify rational numbers • Identify opposites and absolute value of rational numbers • Compare and order rational numbers

Unit 1: Integers and Rational Numbers

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Students will know (Knowledge):	Students will be able to do (Skills):
<ul style="list-style-type: none">• Given any two rational numbers a and b, exactly one of the following relationships must be true: $a < b$; $a > b$; $a = b$• Strategies to use for comparing and ordering fractions and decimals	

Unit 2: Number Operations

Middle School - 6th Grade Math - Last Updated on June 4, 2019

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.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.

PRIORITY STANDARDS

6.NS.A.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Unit 2: Number Operations

Middle School - 6th Grade Math - Last Updated on June 4, 2019

DESIRED RESULTS

Enduring Understandings	Essential Question(s)
<p>The meanings of fractions, multiplication, and division along with the relationship between multiplication and division for the basis for understanding and explaining the procedures for dividing fractions.</p> <p>Fluency with addition, subtraction, multiplication, and division of rational numbers is an essential skill for efficient and effective problem solving.</p>	<p>How can you use operations with fractions to solve real-world problems?</p> <p>How can you use operations with decimals to solve real-world problems?</p>

Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• Key concepts and vocabulary associated with number operations, including: reciprocals, order of operations• The reciprocal of a fraction can be found by interchanging the numerator and denominator• To divide two fractions, the dividend is multiplied by the reciprocal of the divisor, i.e., where b, c, and d are nonzero, $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$• To multiply two decimals, multiply as if the numbers are whole numbers and place the decimal point in the product by finding the total number of decimal places in the factors.• How fraction division equations relate to the real world	<ul style="list-style-type: none">• Correctly use key concepts and vocabulary associated with number operations in discussions and explanations of problem solving• Use the GCF and LCM when adding, subtracting, and multiplying fractions• Transform a division equation into a multiplication equation• Model fraction division• Divide fractions, mixed numbers, multi-digit whole numbers, and decimals• Solve word problems involving more than one fraction operation• Add and subtract decimals• Multiply decimals• Solve problems involving multiplication and division of fractions and decimals

Unit 3: Proportionality: Ratios & Rates

Middle School - 6th Grade Math - Last Updated on June 4, 2019

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: 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.3a: 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.3b: Solve unit rate problems including those involving unit pricing and constant speed.

CCSS.Math.Content.6.RP.A.3c: 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.3d: Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

PRIORITY STANDARDS

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.
6.RP.A.3	<p>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.</p> <p>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.</p> <p>b. Solve unit rate problems including those involving unit pricing and constant speed.</p> <p>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.</p> <p>d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p>

Unit 3: Proportionality: Ratios & Rates

Middle School - 6th Grade Math - Last Updated on June 4, 2019

DESIRED RESULTS

Enduring Understandings	Essential Question(s)
The scope of problems for which multiplication and division can be used to solve is expanded by connecting and understanding ratios, rates, and fractions.	How can you use ratios and rates to solve real-world problems? How can you use ratios and rates to solve real-world problems? How can you use percents to solve real-world problems?

Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• Key concepts and vocabulary associated with proportionality, ratios, and rates, including: equivalent ratios, ratio, rate, unit rate, proportion, scale, scale drawing, conversion factor, percent• How to identify the percent, the part, and the whole in a variety of problem solving situations	<ul style="list-style-type: none">• Correctly use key concepts and vocabulary associated with proportionality, ratios, and rates in discussions and explanations of problem solving• Use ratios to compare two quantities• Use rates to compare quantities• Use ratios and rates to make comparisons and predictions• Represent real-world problems involving ratios and rates with tables and graphs• Solve problems with proportions• Convert units within a measurement system• Use ratios and proportions to convert measurements• Write a ratio as a percent• Write equivalent percents, fractions, and decimals• Use percents to solve problems

Unit 4: Measurement & Data

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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: Summarize numerical data sets in relation to their context, such as by:

CCSS.Math.Content.6.SP.B.5a: Reporting the number of observations.

CCSS.Math.Content.6.SP.B.5b: Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

CCSS.Math.Content.6.SP.B.5c: 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.5d: 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.

PRIORITY STANDARDS

6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
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Unit 4: Measurement & Data

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DESIRED RESULTS

Enduring Understandings	Essential Question(s)
<p>Measures of center and variability are useful for summarizing data and distinguishing among different sets of data.</p> <p>Additionally, descriptions and summaries of numerical data sets typically include identifying clusters, peaks, gaps, and symmetry within the context in which the data was collected.</p> <p>Mean, median, and mode are measures of center, each providing slightly different perspectives on a data set. The clearest understanding of a data set is generally obtained when all three measures of center are considered as a group.</p> <p>Outliers and interval size can have a great effect on descriptions and summaries of numerical data sets.</p>	<p>How can you solve real-world problems by displaying, analyzing, and summarizing data?</p>

Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• Key concepts and vocabulary associated with measurement and data, including: mean, measure of center, median, mean absolute deviation (MAD), measure of variability, box plot, interquartile range (IQR), lower quartile, measure of spread, range, upper quartile, dot plot, outliers, statistical question, histogram• How the mean is useful and not useful as a measure of center<ul style="list-style-type: none">◦ every data value is taken into account◦ calculation is easy◦ helps describe normally distributed data sets◦ outliers have large effect	<ul style="list-style-type: none">• Correctly use key concepts and vocabulary associated with measurement and data in discussions and explanations of problem solving• Use measures of center to describe a data set• Determine and use the mean absolute deviation of a set of data points• Use a box plot and measures of spread to describe a data set• Summarize and display numeric data• Display data in a histogram

Unit 4: Measurement & Data

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Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• How the median is useful and not useful as a measure of center<ul style="list-style-type: none">◦ calculation is easy◦ helps describe data sets that are not normally distributed◦ outliers have less effect• How the mode is useful and not useful as a measure of center<ul style="list-style-type: none">◦ useful when frequency of data values is important or when data clusters around multiple values◦ can be used with non-numerical data• What the vertical segments and 'whiskers' of a box plot depict	

Unit 5: Equivalent Expressions

Middle School - 6th Grade Math - Last Updated on June 4, 2019

STANDARDS

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.2a: Write expressions that record operations with numbers and with letters standing for numbers.

CCSS.Math.Content.6.EE.A.2b: 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.

CCSS.Math.Content.6.EE.A.2c: 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.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.

PRIORITY STANDARDS

6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. 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. 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).
6.EE.A.3	Apply the properties of operations to generate equivalent expressions.

Unit 5: Equivalent Expressions

Middle School - 6th Grade Math - Last Updated on June 4, 2019

DESIRED RESULTS

Enduring Understandings	Essential Question(s)
<p>Fluency in the computational skills associated with exponents, prime factorization, and order of operations are essential tools for maintaining accuracy throughout the problem solving process.</p> <p>Variables are used in mathematical expressions to represent unknown quantities in a real-world or mathematical problem. Numbers are used for known quantities along with variables to develop expressions and equations that correspond to situations described in problems.</p> <p>Expressions in different forms can be equivalent. The properties of operations are used to rewrite expressions in equivalent forms</p>	<p>How can you generate equivalent numerical expressions and use them to solve real-world problems?</p> <p>How can you generate equivalent algebraic expressions and use them to solve real-world problems?</p>

Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• Key concepts and vocabulary associated with equivalent expressions, including: base, exponent, power, algebraic expression, constant, variable, evaluating• The value of any nonzero number raised to the power of 0 is 1• The order of operations are:<ul style="list-style-type: none">◦ perform operations in parentheses◦ find the value of numbers with exponents◦ multiply or divide from left to right◦ add or subtract from left to right• These properties of operations can be used to identify or create equivalent expressions:<ul style="list-style-type: none">◦ Commutative Properties of Addition ($a+b=b+a$) and Multiplication ($a\cdot b=b\cdot a$)	<ul style="list-style-type: none">• Correctly use key concepts and vocabulary associated with equivalent expressions in discussions and explanations of problem solving• Use exponents to represent numbers• Write the prime factorization of a number• Use the order of operations to simplify expressions with exponents• Model and write algebraic expressions• Use the order of operations to evaluate algebraic expressions• Identify and write equivalent expressions• Determine if two expressions are equivalent

Unit 5: Equivalent Expressions

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Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">◦ Associative Properties of Addition [$(a+b)+c = a+(b+c)$] and Multiplication [$(a\cdot b)\cdot c = a\cdot(b\cdot c)$]◦ Distributive Property [$a(b\pm c) = a\cdot b \pm a\cdot c$]◦ Identity Properties of Addition ($a+0=a$) and Multiplication ($a\cdot 1=a$)	

Unit 6: Equations & Inequalities

Middle School - 6th Grade Math - Last Updated on June 4, 2019

STANDARDS

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.6b: 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.6c: 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.

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.

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.

Unit 6: Equations & Inequalities

Middle School - 6th Grade Math - Last Updated on June 4, 2019

PRIORITY STANDARDS

6.NS.C.6	<p>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.</p> <p>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.</p> <p>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.</p>
6.NS.C.8	<p>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.</p>
6.EE.B.7	<p>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.</p>
6.EE.B.8	<p>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.</p>

Unit 6: Equations & Inequalities

Middle School - 6th Grade Math - Last Updated on June 4, 2019

DESIRED RESULTS

Enduring Understandings	Essential Question(s)
<p>An equation is like a scale that is perfectly balanced. The same quantity can be added to or subtracted from both sides of the scale and preserve the balance.</p> <p>Similarly, multiplying or dividing each side of an equation by the same nonzero number produces a new equation that has the same solution(s) as the original.</p> <p>Studying the relationship between two quantities or variables is fundamental to algebra. In many relationships, one variable (called the dependent variable) depends on the other (called the independent variable).</p> <p>Equations are used to describe relationships between quantities.</p> <p>The solutions of an equation are the values of the variables that make the equation true.</p> <p>In transitioning from arithmetic to algebra, fluency in converting among multiple representations of algebraic relationships (such as equations, graphs, tables of values, or sets of ordered pairs) is important.</p> <p>A key idea of algebra is that the graph of an equation is exactly the set of ordered pairs that are solutions of the equation.</p>	<p>How do you use equations and relationships to solve real-world problems?</p> <p>How can you use relationships in two variables to solve real-world problems?</p>

Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• Key concepts and vocabulary associated with equations and inequalities, including: equation, solution, solution of an inequality, axes, coordinate	<ul style="list-style-type: none">• Correctly use key concepts and vocabulary associated with equations and inequalities in discussions and explanations of problem solving

Unit 6: Equations & Inequalities

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Students will know (Knowledge):	Students will be able to (Skills):
<p>plane, coordinates, ordered pair, origin, quadrants, x-axis, x-coordinate, y-axis, y-coordinate, dependent variable, independent variable</p> <ul style="list-style-type: none">• An equation may have no solutions, one solution, more than one solution, or infinitely many solutions• The same number can be subtracted from both sides of an equation, and the two sides will remain equal (Subtraction Property of Equality)• The same number can be added to both sides of an equation, and the two sides will remain equal (Addition Property of Equality)• Both sides of an equation can be divided by the same nonzero number, and the two sides will remain equal (Division Property of Equality)• Both sides of an equation can be multiplied by the same number, and the two sides will remain equal (Multiplication Property of Equality)	<ul style="list-style-type: none">• Write equations and determine whether a number is a solution of an equation• Identify parts of equations and expressions using mathematical terms• Model solving an addition equation• Solve equations that contain addition or subtraction• Model solving a multiplication equation• Solve equations that contain multiplication or division• Use inequalities to represent real-world constraints or conditions• Locate and name points in the coordinate plane• Locate rational ordered pairs in the coordinate plane• Identify independent and dependent quantities from tables and graphs• Use an equation to show a relationship between two variables• Use verbal descriptions, tables, and graphs to represent algebraic relationships

Unit 7: Geometry

Middle School - 6th Grade Math - Last Updated on June 4, 2019

STANDARDS

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.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.

CCSS.Math.Content.6.G.A.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

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.

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.6b: 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.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.A.2: Write, read, and evaluate expressions in which letters stand for numbers.

CCSS.Math.Content.6.EE.A.2c: 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.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.

Unit 7: Geometry

Middle School - 6th Grade Math - Last Updated on June 4, 2019

PRIORITY STANDARDS

6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
6.NS.C.6	<p>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.</p> <p>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.</p>
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.
6.EE.A.2	<p>Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>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).</p>
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.

Unit 7: Geometry

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DESIRED RESULTS

Enduring Understandings	Essential Question(s)
<p>The meaning of area is founded in the unit square. The area of a two-dimensional figure is the number of non-overlapping unit squares needed to cover the figure.</p> <p>Distance is always a positive number.</p> <p>Nets are a tool for visualizing three-dimensional figures. However, nets are generally not unique.</p> <p>The meaning of volume is founded in the unit cube. The volume of a three-dimensional figure is the number of non-overlapping unit cubes needed to fill the figure.</p> <p>Areas, surface areas, and volumes of complex figures are found by decomposing them into pieces whose area, surface area, or volume are easily determined</p>	<p>How can you find the area of an irregular polygon using area formulas?</p> <p>What steps might you take to solve a polygon problem given the coordinates of its vertices?</p> <p>How can a model help you to solve surface area and volume problems?</p>

Students will know (Knowledge):	Students will be able to (Skills):
<ul style="list-style-type: none">• Key concepts and vocabulary associated with geometry, including: rhombus, polygon, vertex, net, prism, pyramid, surface area, bases• The area of a parallelogram is the product of its base and its height ($A = bh$)• The area of a trapezoid is half its height multiplied by the sum of the lengths of its two bases ($A = \frac{1}{2}h(b_1 + b_2)$)• The area of a rhombus is half of the product of its two diagonals ($A = \frac{1}{2}d_1d_2$)• The area of a triangle is half the product of its base and its height ($A = \frac{1}{2}bh$)• The volume of a rectangular prism is the product of the height of the prism and the area of the prism's base ($V = Bh$)	<ul style="list-style-type: none">• Correctly use key concepts and vocabulary associated with geometry in discussions and explanations of problem solving• Find the areas of parallelograms, rhombuses, and trapezoids• Find the area of a triangle• Use equations to solve problems about area of rectangles, parallelograms, trapezoids, and triangles• Find the area of a polygon by breaking it into simpler shapes• Use absolute value to find the distance between two points with the same x- or y-coordinates• Solve problems by drawing polygons in the coordinate plane• Use nets to find surface areas

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Students will know (Knowledge):	Students will be able to (Skills):
	<ul style="list-style-type: none">• Find the volume of a rectangular prism• Write equations to solve problems involving volume of rectangular prisms