Grade 6 Math

Major Content	Mathematical Practices
Connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems	Make sense of problems and persevere in solving them
Completing understanding of division of fractions	Reason abstractly and quantitatively
Extending the notion of number to the system of rational numbers, which includes negative numbers	Construct viable arguments and critique the reasoning of others
Writing, interpreting, and using expressions and equations	Model with mathematics
Required Fluencies	Use appropriate tools strategically
Multi-Digit Division	Attend to precision
Multi-Digit Decimal Operations	Look for and make use of structure
Fraction Division	Look for and express regularity in repeated reasoning
Major Content	
Supporting Content	
Additional Content	

Unit 1 Area and Surface Area

Essential Learning	Standards
In this unit, students learn to find areas of polygons by decomposing, rearranging, and composing shapes. They learn to understand and use the terms "base" and "height," and find areas of parallelograms and triangles. Students approximate areas of non-polygonal regions by polygonal regions. They represent polyhedra with nets and find their surface areas.	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.GA.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.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.
	6..EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.
	6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.
	6.EE.A.2.C Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Unit 2 Introducing Ratios

Essential Learning	Standards
In this unit, students learn to understand and use the terms "ratio," "rate," "equivalent ratios," "per," "at this rate," "constant speed," and "constant rate," and to recognize when two ratios are or are not equivalent. They represent ratios as expressions, and represent equivalent ratios with double number line diagrams, tape diagrams, and tables.	6.RP Understand ratio concepts and use ratio reasoning to solve problems. 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. 6.RP.A.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. 6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 6.RP.A.3.A Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. 6.RP.A.3.B Solve unit rate problems including those involving unit pricing and constant speed.

Unit 3 Unit Rates and Percentages

Essential Learning	Standards
In this unit, students learn to understand and use the terms "unit rate," "speed," "pace," "percent," and "percentage," and recognize that equivalent ratios have equal unit rates. They represent percentages with tables, tape diagrams, and double number line diagrams, and as expressions.	6.RP.A.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. 6.RP.A.3.B Solve unit rate problems including those involving unit pricing and constant speed. 6.RP.A.3.C Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. 6.RP.A.3.D Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

expressions.	

Unit 4 Dividing Fractions	
Essential Learning	**Standards**
In this unit, students examine how the relative sizes of numerator and denominator affect the size of their quotient when numerator or denominator (or both) is a fraction. They compute quotients of fractions. They solve problems involving lengths and areas of figures with fractions and volume of prisms.	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.2 Fluently divide multi-digit numbers using the standard algorithm.
	6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
	6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.
	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). Reason about and solve one-variable equations and inequalities.
	6GA.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Unit 5 Arithmetic in Base Ten Decimals	
Essential Learning	**Standards**
In this unit, students compute sums, differences, products, and quotients of multi-digit whole numbers and decimals, using efficient algorithms. They use calculations with whole numbers and decimals to solve problems set in real-world contexts.	6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.
	6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
	6.EE.A.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).

Unit 6 Expressions and Equations	
Essential Learning	**Standards**
In this unit, students learn to understand and use the terms "variable," "coefficient," "solution," "equivalent expressions," "exponent," "independent variable," and "dependent variable." They begin to write coefficients next to variables without a multiplication symbol. They examine values that make a given linear equation true or false, and what it means for a number to be a solution to an equation. They represent linear expressions with tape diagrams and use the diagrams to identify values of variables for which two linear expressions are equal. They use the distributive property to write equivalent expressions.	6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.
	6..EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.
	6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.
	6.EE.A.2.A Write expressions that record operations with numbers and with letters standing for numbers.
	6.EE.A.2.B Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entit
	6.EE.A.2.C Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
	6.EE.A.3 Apply the properties of operations to generate equivalent expressions.
	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). Reason about and solve one-variable equations and inequalities.
	6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
	6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
	6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.
	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 7 Rational Numbers	
Essential Learning	**Standards**
	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.

In this unit, students interpret signed numbers in contexts (e.g., temperature above or below zero, elevation above or below sea level). They understand and use the terms "positive number," "negative number," "rational number," "opposite," "sign," "absolute value," "a solution to an inequality," "less than," "greater than," and the corresponding symbols. In this unit, students are introduced to signed numbers and plot points in all four quadrants of the coordinate plane for the first time. They work with simple inequalities in one variable and learn to understand and use "common factor," "greatest common factor," "common multiple," and "least common multiple."	6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
	6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
	6.NS.C.6.A Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite.
	6.NS.C.6.B Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
	6.NS.C.6.C Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
	6.NS.C.7 Understand ordering and absolute value of rational numbers.
	6.NS.C.7.A Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
	6.NS.C.7.B Write, interpret, and explain statements of order for rational numbers in real-world contexts.
	6.NS.C.7.C Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
	6.NS.C.7.D Distinguish comparisons of absolute value from statements about order.
	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.B.8 Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Unit 8 Data Sets and Distributions

Essential Learning	Standards
In this unit, students learn about populations and study variables associated with a population. They understand and use the terms "numerical data," "categorical data," "survey" (as noun and verb), "statistical question," "variability," "distribution," and "frequency." They make and interpret histograms, bar graphs, tables of frequencies, and box plots. They describe distributions (shown on graphical displays) using terms such as "symmetrical," "peaks," "gaps," and "clusters." They work with measures of center—understanding and using the terms "mean," "average," and "median." They work with measures of variability—understanding and using the terms "range," "mean absolute deviation (or MAD)," "quartile," and "interquartile range" or IQR. They interpret measurements of center and variability in contexts.	6SP Develop understanding of statistical variability.
	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.
	6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
	6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
	6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
	6.SP.B.5 Summarize numerical data sets in relation to their context.
	6.SP.B.5 Reporting the number of observations.
	6.SP.B.5.B Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
	6.SP.B.5.C Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
	6.SP.B.5.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.

Social and Emotional Standards		ISTE Standards	
Self Awareness and Self Management	SEL.6.1A.4 Describe strategies for dealing with upsetting situations (examples include disappointment, loss, separation).	**Empowered Learner**	Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
	SEL.6.1A.6 Use I statements to describe how you feel, why you feel that way, and what you might like to change.	**Creative Communicator**	Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
	SEL.6.1B.2 Identify personal strengths and weaknesses and the effect they have on your choices.		
	SEL.6.1B.4 Make a plan with action steps and timeframes to achieve your goal.	**Computational**	Students develop and employ strategies for understanding and solving problems in ways that

	SEL.6.1B.6 Evaluate your success and analyze what you might have done differently.	**Thinker**	leverage the power of technological methods to develop and test solutions.
Social-Awareness and Relationship Skills	SEL.6.2A.1 Identify and practice reflective listening skills through discussion and role-play.	**Knowledge Constructor**	Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
	SEL.6.2A.6 Predict how one's own behavior might affect the feelings of others.		
	SEL.6.2A.7 Interpret non-verbal communication cues.	**Digital Citizen**	Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.
	SEL.6.2B.2 Identify ways to overcome misunderstanding among various social and cultural groups.		
	SEL.6.2B.6 Demonstrate respect for members of various ethnic and religious groups.	**Global Collaborator**	Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.
	SEL.6.2C.1 Recognize the difference between positive and negative relationships.		Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
	SEL.6.2D.4 Analyze different approaches to dealing with conflict (examples include avoidance, compliance, negotiation).	**Innovative Designer**	Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
	SEL.6.2D.7 Use verbal and non-verbal strategies to resolve group conflict.		
Responsible Decision-Making	SEL.6.3A.1 Recognize that an individual is responsible for his/her behavior.		
	SEL.6.3A.4 Analyze the needs of others in planning how work or sharing goods should be divided (examples include those with handicaps, those who are disadvantaged, and those with special abilities).		