6th Grade
Mathematics Alignment—Common Core State Standards and CT Frameworks

NOTE: CCSS standards shown in blue do not equivalent CT standards.

CCSS Standards	CT Framework Grade Level Expectations
6.RP: Ratios and Proportional Relationships	
Understand ratio concepts and use ratio reasoning to solve problems	
6.RP.1: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For examples, "The ratio of wings to beaks in the bird house at the zoon was 2:1, because for every 2 wings there was 1 beak."	CT.5.2.1.9: Use models and pictures to identify and compare ratios and to represent ratios in equivalent fraction and decimal forms.
	CT.6.2.1.7: Use ratios and rates (involving different units) to compare quantities.
6.RP.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 relationships. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is ¾ cup of flour for each cup of sugar."	CT.6.2.1.7: Use ratios and rates (involving different units) to compare quantities.
	CT.6.2.2.11: Solve practical problems involving rates, ratios, percentages and proportionality.
	CT.7.2.2.10: Write ratios and proportions to solve problems in context involving rates, scale factors and percentages.
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. 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 laws being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 time 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.	--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. 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 laws being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 time 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.
	CT.6.1.2.2: Create tables of values and scatter plots from mathematical relationships and equations and vice versa to solve problems.

	CT.6.2.2.11: Solve practical problems involving rates, ratios, percentages and proportionality.
	CT.7.2.2.10: Write ratios and proportions to solve problems in context involving rates, scale factors and percentages.
	CT.8.2.2.8: Estimate reasonable answers and solve problems in context involving rational and common irrational numbers, ratios and percentages, including percentage of increase and decrease, and justify solutions in writing.
	CT.6.2.2.10: Estimate and find percentages of a number in context using benchmarks and number patterns and ratios to 100.
	CT.7.2.2.12: Solve percent problems in context using a variety of strategies, i.e., proportions or equations, including what percentage one number is of another and finding percentage increase and/or decrease.
	CT.8.2.2.10: Solve a variety of problems in context involving percents, including the following: percentage of a number; the percentage one number is of another number; the percentage of a missing amount; percentage increase/decrease.
	CT.6.3.3.9: Use ratios to convert between customary units of length, mass, capacity and time.
	CT.6.3.3.10: Use ratios and powers of 10 to convert between metric units.
	CT.7.3.3.11: Write and solve problems in context involving conversions of customary or metric units and units of time.
6.NS: The Number System	
Apply and extend previous understandings of multiplication and division to divide fractions by fractions	
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 relationships between multiplication and division to explain that (2/3) / (3/4) – 8/9 because ¾ of 8/9 is 2/3 (in general, *(a/b) / (c/d) – ad/bc).*	CT.6.2.2.15: Use the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	CT.6.2.2.19: Write and solve multistep problems in context involving addition, subtraction, multiplication, and division with whole numbers, fractions, decimals, money and simple percentages.
	CT.6.2.2.14: Examine the relationships between multiplication by a unit fraction and dividing by the fraction's denominator (e.g., ½ of $6 is the same as $6 / 2) and use this to solve problems.

	CT.6.2.2.16: Understand and defend in writing the magnitude of the result of multiplication or division problems involving fractions or decimals.
Compute fluently with multi-digit numbers and find common factors and multiples	
6.NS.2: Fluently divide multi-digit numbers using the standard algorithm.	CT.5.2.2.12: Develop and use strategies involving place value relationships, inverse operations and algebraic properties (commutative, associative and distributive) to simplify addition, subtraction and multiplication problems with 3-, 4-, and 5-digit numbers and money amounts and division by one-digit factors.
	CT.6.2.2.9: Develop, describe and use strategies for solving, simplifying and estimating multiplication and division problems involving large numbers, decimals and powers of 10.
	CT.6.2.2.19: Write and solve multistep problems in context involving addition, subtraction, multiplication and division with whole numbers, fractions, decimals, money and simple percentages.
6.NS.3: Fluently add, subtract, multiply and divide multi-digit decimals using the standard algorithm for each operation.	CT.5.2.2.16: Add and subtract fractions, decimals and mixed numbers using a variety of strategies (e.g., models, mental math, equivalence and substitution).
	CT.5.2.2.13: Multiply and divide decimals and money amounts by whole numbers.
	CT.6.2.2.9: Develop, describe and use strategies for solving, simplifying and estimating multiplication and division problems involving large numbers, decimals and powers of 10.
	CT.6.2.2.12: Add, subtract, multiply and divide by fractions and decimals in context.
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).	--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).
	CT.7.2.2.8: Apply the order of operations and algebraic properties (commutative, associative, distributive, inverse operations, and the additive and multiplicative identities) to write, simplify and solve problems including those with parentheses and exponents.

Apply and extend previous understandings of numbers to the system of rational numbers	
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.	CT.5.2.1.4: Investigate negative integers (values less than zero) using place value models, diagrams and number lines and represent negative integers in practical applications (e.g., temperatures, money and locations below sea level).
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. a. Recognize opposite signs of numbers as indicting 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 plan.	--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. a. Recognize opposite signs of numbers as indicting 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 plan.
	CT.5.2.1.4: Investigate negative integers (values less than zero) using place value models, diagrams and number lines; represent negative integers in practical applications such as temperatures, money and locations below sea level.
	CT.6.2.1.1: Locate and label whole numbers, fractions, decimals and positive and negative integers on number lines, scales, coordinate grids (all four quadrants) and measurement tools.
	CT .7.2.1.1: Compare and order rational numbers such as -2, 3/8, -3.15 or 0.8 in context and locate them on number lines, scales and coordinate grids.

6.NS.7: Understand ordering and absolute value of rational numbers: 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 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.	Understand ordering and absolute value of rational numbers: 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 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.
	CT.6.2.1.2: Compare and order whole numbers, fractions, decimals and positive and negative integers in context using number lines and scales.
	CT .7.2.1.1: Compare and order rational numbers such as -2, 3/8, -3.15 or 0.8 in context and locate them on number lines, scales and coordinate grids.
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.	--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: Expressions and Equations	
Apply and extend previous understandings of arithmetic to algebraic expressions	
6.EE.1: Write and evaluate numerical expressions involving whole-number exponents.	--Write and evaluate numerical expressions involving whole-number exponents.

6.EE.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. 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. 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). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = ½.	CT.5.1.2.3: Represent and describe mathematical relationships using variables or symbols in expressions, equations and inequalities. CT.6.1.2.4: Write expressions, formulas, equations or inequalities using symbols or variables to denote a pattern or represent a contextual situation. CT.5.1.3.5: Replace variables or symbols in algebraic expressions with given values and evaluate or simplify the expression (e.g., If ___ = 5, find the value of 4 x ___ + 7). CT.6.1.3.5: Evaluate algebraic expressions and formulas using substitution. CT.7.1.3.7: Evaluate and simplify algebraic expressions, equations and formulas using algebraic properties (e.g., commutative, associative, distributive, inverse operations, and the additive and multiplicative identities) and the order of operations.
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 $6 + 3x$.	CT.7.1.3.7: Evaluate and simplify algebraic expressions, equations and formulas using algebraic properties (i.e., commutative, associative, distributive, inverse operations, and the additive and multiplicative identities) and the order of operations. CT.8.3.1.2: Write and solve multistep equations using various algebraic methods, including the distributive property such as 3(x + 2 = 10), combining like terms such as 3x + 2x – 15, and properties of equality and justify the solutions.
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 they name the same number regardless of which number y stands for.	--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 they name the same number regardless of which number y stands for.
Reason about and solve one-variable equations and inequalities	
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 substitution to determine whether a given number in a specified set makes an equation or inequality true.	CT.6.1.3.6: Write, model and solve one-step equations using mental math, tables, substitution and concrete models that demonstrate equivalence and justify the solution.

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.	CT.5.1.2.3: Represent and describe mathematical relationships using variables or symbols in expressions, equations and inequalities.
	CT.5.1.3.6: Model, write and solve one-step equations by using appropriate concrete materials that model equivalence. For examples: If 4 x □ = 36, then □ equals 9.
	CT.6.1.2.4: Write expressions, formulas, equations or inequalities using symbols or variables to denote a pattern or represent a contextual situation.
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.	CT.5.1.2.3: Represent and describe mathematical relationships using variables or symbols in expressions, equations and inequalities.
	CT.5.1.3.6: Model, write and solve one-step equations by using appropriate concrete materials that model equivalence. For examples: If 4 x □ = 36, then □ equals 9.
	CT.6.1.2.4: Write expressions, formulas, equations or inequalities using symbols or variables to denote a pattern or represent a contextual situation.
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.	--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.
	CT.6.1.2.4: Write expressions, formulas, equations or inequalities using symbols or variables to denote a pattern or represent a contextual situation.
	CT.7.1.3.8: Solve real-world problems using a variety of algebraic methods including tables, graphs, equations and inequalities.
Represent and analyze quantitative relationships between dependent and independent variables	
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.	CT.5.1.2.4: Describe how a change in one variable relates to a change in a second variable in context. For example: If a recipe requires two cups of flour for eight servings, the flour must be doubled for 16 servings or increased by one-half for 12 servings.
	CT.6.1.2.2: Create tables of values and scatterplots from mathematical relationships and equations and vice versa to solve problems.
	CT.7.1.1.2: Identify and describe in writing the independent and dependent variables in a mathematical situation (e.g., age vs. height of children).

6.G: Geometry	
Solve real-world and mathematical problems involving area, surface area, and volume.	
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.	CT.6.3.1.4: Use rectangles as basic shapes to model and develop formulas for finding the area of triangles, parallelograms and trapezoids.
	CT.6.3.3.8: Select and use appropriate strategies, tools and units to estimate and solve measurement problems involving length, perimeter, area, volume, capacity, mass and weight.
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 $V = lwh$ and $v = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	CT.6.3.2.6: Use and describe concrete strategies for finding the volume of rectangular solids and cylinders.
	CT.6.3.3.8: Select and use appropriate strategies, tools and units to estimate and solve measurement problems involving length, perimeter, area, volume, capacity, mass and weight.
	CT.7.3.3.9: Develop and use formulas to determine volumes of geometric solids (rectangular prisms and cylinders).
6.G.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinate 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.	--Draw polygons in the coordinate plane given coordinates for the vertices; use coordinate 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.
	CT.7.3.1.3: Draw the result of transformations on polygons on coordinate planes including translations, rotations, reflections and dilations (reductions and enlargements).
6.G.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.	CT.7.3.2.6: Identify and/or draw two-dimensional representations of three-dimensional geometric solids using nets, cross-sections, front, side and top views to solve problems.
	CT.7.3.2.7: Use two-dimensional representations of rectangular prisms, pyramids and cylinders to determine surface area.
6.SP: Statistics and Probability	
Develop understanding of statistical variability	
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 questions, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.	--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 questions, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

	CT.7.4.1: Formulate questions and design studies such as surveys, experiments, and research using published sources and the Internet to collect and analyze data.
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.	CT.6.4.2.3: Describe the shape of numerical data sets using measures of spread (range) and central tendency (mean, median, mode) and outliers.
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.	--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.
Summarize and describe distributions	
6.SP.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	--Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP 5: Summarize data sets in relation to their context, such as by: 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.	--Summarize data sets in relation to their context, such as by: 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.