5th Grade
Mathematics Alignment—Common Core State Standards and CT Frameworks

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

CCSS Standards	CT Framework Grade Level Expectations
5.OA: Operations and Algebraic Thinking	
Write and interpret numerical expressions	
5.OA.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	CT.5.1.2.3: Represent and describe mathematical relationships using variables or symbols in expressions, equations and inequalities.
5.OA.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculations "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	--Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculations "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.
	CT.5.1.3.6: Model, write and solve one-step equations by using appropriate concrete materials that model equivalence (e.g., if 4 x ___ = 36, then ___ equals 9).
Analyze patterns and relationships	
5.OA.3: Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.	CT.5.1.1.2: Analyze patterns and data to make generalizations, make predictions and to identify trends.
	CT.5.3.2.5: Use an *x*, *y* coordinate system to plot points, to estimate the distance between points and to determine the horizontal or vertical distance between two points.
5.NBT: Number and Operations in Base Ten	
Understand the place value system	
5.NBT.1: Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what is represents in the place to its left.	--Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what is represents in the place to its left.
	CT.5.1.2.3: Construct and use models, number patterns and pictorial representations to extend place value concepts and patterns to decimals (e.g., 0.1 is one-tenth of one and 0.01 is one one-hundredth of one and one-tenth of 0.1).

5.NBT.2: Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote power of 10.	CT.6.2.2.8: Understand place value and patterns in place value when multiplying and dividing decimals by powers of 10.
	CT.6.2.2.9: Develop, describe and use strategies for solving, simplifying and estimating multiplication and division problems involving large numbers, decimals and power of 10.
	CT.7.2.2.13: Compare the magnitude of and compute with whole numbers expressed as positive powers of 10.
5.NBT.3: Read, write and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form (e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, = and < symbols to record these results of comparisons.	CT.6.2.1.3: Represent and compare whole numbers (to a billion) and decimals (to thousandths) in expanded notation.
	CT.6.2.1.2: Compare and order whole numbers, fractions, decimals and positive and negative integers in context using number lines and scales.
5.NBT.4: Use place value understanding to round decimals to any place.	CT.5.2.1.1: Compare, order and round whole numbers to 1,000,000 using number patterns, number lines and diagrams.
Perform operations with multi-digit whole numbers and with decimals to hundredths	
5.NBT.5: Fluently multiply multi-digit whole numbers using the standard algorithm.	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.7.2.2: Apply a variety of strategies to write and solve problems involving addition, subtraction, multiplication and division of positive rational numbers, including whole number [, fractions and decimals].
5.NBT.6: Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	--Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
	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.7.2.2: Apply a variety of strategies to write and solve problems involving addition, subtraction, multiplication and division of positive rational numbers, including whole numbers, fractions and decimals.

5.NBT.7: Add, subtract, multiply and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	--Add, subtract, multiply and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
	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.7.2.2.9: Apply a variety of strategies to write and solve problems involving addition, subtraction, multiplication and division of positive rational numbers, including whole numbers, fractions, and decimals.
5.NF: Number and Operations - Fractions	
Use equivalent fractions as a strategy to add and subtract fractions.	
5.NF.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with line denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12 (in general, a/b + c/d = (ad + bc)/bd).	--Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with line denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12 (in general, a/b + c/d = (ad + bc)/bd).
5.NF.2: Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators (e.g., by using visual fraction models or equations to represent the problem). Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + ½ = 3/7, by observing that 3/7 < ½.	--Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators (e.g., by using visual fraction models or equations to represent the problem). Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + ½ = 3/7, by observing that 3/7 < ½.
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
5.NF.3: Interpret a fraction as division of the numerator by the denominator (a/b = a / b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers (e.g., by using visual fraction models or equations to represent the problem). For example, interpret ¾ as the result of dividing 3 by 4, noting that ¾ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size ¾. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	--Interpret a fraction as division of the numerator by the denominator (a/b = a / b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers (e.g., by using visual fraction models or equations to represent the problem). For example, interpret ¾ as the result of dividing 3 by 4, noting that ¾ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size ¾. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?

	CT.5.2.1.8: Write division problems in fraction form and round the fraction form to estimate an answer to a division problem.
5.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the produce (a/b) x q as *a* parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a x q / b*. For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15 (in general, (a/b) x (c/d) = ac/bd). b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	--Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the produce (a/b) x q as *a* parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a x q / b*. For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15 (in general, (a/b) x (c/d) = ac/bd). b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
	CT.6.2.2.15: Use the inverse relationships between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	CT.5.3.1.2: Develop formulas for finding the perimeter and area of squares, rectangles and triangles and use them to solve problems.
5.NF.5: Interpret multiplication as scaling (resizing) by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence *a/b = (n x a)/(n x b)* to the effect of multiplying *a/b* by 1.	--Interpret multiplication as scaling (resizing) by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence *a/b = (n x a)/(n x b)* to the effect of multiplying *a/b* by 1.
	CT.6.2.2.15: Use the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	CT.6.2.2.14: Examine the relationships between multiplication by a unit fraction and division by the fraction's denominator, and use this to solve problems. For example, ½ of $6 is the same as $6 / 2.

5.NF.6: Solve real world problems involving multiplication of fractions and mixed numbers (e.g., by using visual fraction models or equations to represent the problem).	CT.5.2.2.17: Construct and use models and pictorial representations to multiply common fractions and mixed numbers by whole numbers.
	CT.6.2.2.12: Add, subtract, multiply and divide by fractions and decimals in context.
	CT.7.2.2: Apply a variety of strategies to write and solve problems involving addition, subtraction, multiplication and division of positive rational numbers, including whole numbers, fractions and decimals.
5.NF.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) / 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) / 4 =1/12 because (1/12) x 4 = 1/3. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 / (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 / (1/5) = 20 because 20 x (1/5) = 4. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions (e.g., by using visual fraction models and equations to represent the problem). For example, how much chocolate will each person get if 3 people share ½ lb. of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?	--Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) / 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) / 4 =1/12 because (1/12) x 4 = 1/3. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 / (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 / (1/5) = 20 because 20 x (1/5) = 4. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions (e.g., by using visual fraction models and equations to represent the problem). For example, how much chocolate will each person get if 3 people share ½ lb. of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?
	CT.6.2.2.15: Use the inverse relationships between multiplication and division to make sense of procedures for multiplying and dividing fraction.
	CT.6.2.2.14: Examine the relationships between multiplication by a unit fraction and dividing by the fraction's denominator, and use this to solve problems.
	CT.7.2.2: Apply a variety of strategies to write and solve problems involving addition, subtraction, multiplication and division of positive rational numbers, including whole numbers, fractions and decimals.

5.MD: Measurement and Data	
Convert like measurement units within a given measurement system	
5.MD.1: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m) and use these conversions in solving multi-step, real world problems.	CT.5.3.3.10: Solve length problems involving conversions of measure within the customary (inches, feet, yards and miles) or metric systems (millimeters, centimeters, meters and kilometers).
	CT 5.3.3.7: Use calendars and clocks to plan and sequence events and to solve problems involving the conversion of measures of time and elapsed time using days, hours, minutes and seconds.
	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.
Represent and interpret data	
5.MD.2: Make a line plot to display a data set of measurements in fractions of a unit (1/2, ¼, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	--Make a line plot to display a data set of measurements in fractions of a unit (1/2, ¼, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition	
5.MD.3: Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.	CT.5.3.3.9: Use cubic inch or cubic centimeter models to find the volume of rectangular solids.
5.MD.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	CT.5.3.3.9: Use cubic inch or cubic centimeter models to find the volume of rectangular solids.
	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.

5.MD.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and how that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes (e.g., to represent the associative property of multiplication). b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures compose of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and how that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes (e.g., to represent the associative property of multiplication). b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures compose of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
	CT.5.3.3.8: Estimate and measure to solve a variety of problems that involve angles, length, area, weight, mass, temperature, capacity and volume in either metric or customary units; explain the reasoning used orally and in writing.
	CT.5.3.3.9: Use cubic inch or cubic centimeter models to find the volume of rectangular solids.
	CT.6.3.2.6: Use and describe concrete strategies for finding the volume of rectangular solids and cylinders.
	CT.7.3.3.9: Develop and use formulas to determine volumes of geometric solids (rectangular prisms 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

5.G: Geometry	
Graph points on the coordinate plane to solve real-world and mathematical problems.	
5.G.1: Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged by coincide with the 0 on each line and a given point in the plan located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	CT.5.3.2.5: Use an *x, y* coordinate system to plot points, to estimate the distance between points and to determine the horizontal or vertical distance between two points.
5.G.2: Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	CT.4.3.2.4: Draw and interpret simple maps with ordered pairs of numbers and/or letters in quadrant one of an *x, y* coordinate system and find possible paths between two points.
	CT.5.3.2.5: Use an *x, y* coordinate system o plot points, to estimate the distance between points and to determine the horizontal or vertical distance between two points.
Classify two-dimensional figures into categories based on their properties	
5.G.3: Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	--Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
	CT.5.3.1.3: Use the attributes of parallel sides, perpendicular sides, congruent sides/angles, number and length of sides or faces and number and kinds of angles (right, acute or obtuse) to describe, classify and sort polygons and solids (cube, prism, pyramid and sphere).
	CT.6.3.1.1: Classify sets and subsets of polygons using the relationships of the sides (length, parallel and perpendicular) and angles (types and measures).
5.G.4: Classify two-dimensional figures in a hierarchy based on properties; classify two-dimensional figures in a hierarchy based on properties.	--Classify two-dimensional figures in a hierarchy based on properties; classify two-dimensional figures in a hierarchy based on properties.
	CT.5.3.1.3: Use the attributes of parallel sides, perpendicular sides, congruent sides/angles, number and length of sides or faces and number and kinds of angles (right, acute or obtuse) to describe, classify and sort polygons and solids (cube, prism, pyramid and sphere).

	CT.6.3.1.1: Classify sets and subsets of polygons using the relationships of the sides (length, parallel and perpendicular) and angles (types and measures).
The following CT standard(s) are not matched to the CCSS and should not be addressed by instruction at this level.	
	5.4.1.2: Compare different representations of the same data set and evaluate how well each kind of display represents the features of the data.