Math Grade 5
Performance Level Descriptors (PLDs)

Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
	The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Operations and Algebraic Thinking				
5.OA.A.1	Use parenthesis in numerical expressions and evaluate numeric expressions.	Evaluate numerical expressions with parentheses and brackets.	Use parentheses and brackets in numerical expressions, and evaluate expressions with these symbols (Order of Operations).	Use parentheses and brackets to create multiple numerical expressions equivalent to a given value.
5.OA.A.2	Identify simple expressions that record calculations with numbers, and identify numerical expressions without evaluating them.	Write simple expressions that record calculations with numbers, and identify numerical expressions without evaluating them.	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them (e.g., express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18,932 + 921) is three times as large as 18,932 + 921, without having to calculate the indicated sum or product).	Write simple expressions that record multi-step calculations with numbers, and interpret multi-step numerical expressions without evaluating them.
5.OA.B.3	Identify two numerical patterns using two given rules (e.g., identify terms in the resulting sequences). Identify the apparent relationships between corresponding terms. Identify ordered pairs consisting of corresponding terms from the two patterns.	Determine the missing values in two numerical patterns using two given rules (e.g., determine the missing terms in the resulting sequences). Identify the apparent relationships between corresponding terms. Identify ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.	Generate two numerical patterns using two given rules (e.g., generate terms in the resulting sequences). Identify and explain the 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 (e.g., 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 how the rules for two numerical patterns relate to the relationships between the corresponding terms in those patterns (e.g., given the rule "add 3" and the starting number 0, and given the rule "add 6" and the starting number 0, observe that the terms in one sequence are twice the corresponding terms in the other sequence, and recognize that "add 3" is twice "add 6").
5.OA.B.4	Identify prime numbers.	Understand prime numbers have only two factors and identify the prime factorization of numbers.	Understand primes have only two factors and decompose numbers into prime factors.	Explain how to decompose numbers into prime factors.

Number and Operations in Base Ten				
5.NBT.A.1	Identify which place value in a multi-digit number represents 10 times the value of a given place value, or identify which place value in a multi-digit number represents 1/10 the value of a given place value.	Given two multi-digit numbers, with a digit in different place values in each number, identify how many times the value of the digit is in one number compared to the other number (e.g. the value of the 4 in 29,143 is 1/100 times the value of the 4 in 74,851).	Apply concepts of place value, multiplication, and division to understand 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 it represents in the place to its left.	Apply concepts of place value, multiplication, and division to explain why a digit in one place represents ten times what it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.A.2	Identify patterns in the number of zeros of the product when multiplying a number by powers of 10, and identify patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.	Find patterns in the number of zeros of the product when multiplying a number by powers of 10, and find patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.	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.	Given a pattern in the number of zeros of the product when multiplying a number by powers of 10, or a pattern in the placement of the decimal point when multiplying or dividing a number by a power of 10, create a possible equation that represents the pattern and explain why there are multiple correct equations.
5.NBT.A.3	Read and write, decimals to tenths. a. Identify decimals to tenths using base-ten numerals and number names. b. Compare two decimals to tenths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Read, write, and compare decimals to hundredths. a. Identify decimals to hundredths using base-ten numerals, number names, and expanded form. b. Compare two decimals to hundredths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form. b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Read, write, and compare decimals to thousandths. a. Order multiple decimals to thousandths using base-ten numerals, number names, and expanded form. b. Compare more than two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
5.NBT.A.4	Use place value understanding to round decimals to the tenths place.	Use place value understanding to round decimals to the hundredths place.	Use place value understanding to round decimals to any place.	Explain how to use place value understanding to round decimals to any place.
5.NBT.B.5	Identify the product of two multi-digit whole numbers.	Calculate the product of two multi-digit whole numbers.	Fluently multiply multi-digit whole numbers using a standard algorithm.	Explain how to use a standard algorithm to multiply multi-digit whole numbers.
5.NBT.B.6	Apply understanding of division to identify whole-number quotients of whole numbers with up to three-digit dividends and two-digit divisors.	Apply understanding of division to identify whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.	Apply and extend understanding of division to find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.	Apply and extend understanding of division to find whole-number quotients of whole numbers with more than four-digit dividends and two-digit divisors.
5.NBT.B.7	Add and subtract decimals (without regrouping) to hundredths, connecting objects or drawings to strategies based on place value, properties of operations, and/or the relationship between operations.	Add, subtract, and multiply decimals to hundredths, connecting objects or drawings to strategies based on place value, properties of operations, and/or the relationship between operations.	Add, subtract, multiply, and divide decimals to hundredths, connecting objects or drawings to strategies based on place value, properties of operations, and/or the relationship between operations. Relate the strategy to a written form.	Add, subtract, multiply, and divide decimals to hundredths. Relate the strategy to a written form. Apply this to real-world context.

Number and Operations - Fractions				
5.NF.A.1	Identify the sum or difference of fractions with unlike denominators.	Identify the sum or difference of fractions with unlike denominators (including mixed numbers).	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 like denominators (e.g., 2/3 + 5/4 = 8/12 + 15/12 = 23/12).	Explain how to find the sum or difference of 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 like
5.NF.A.2	Identify the solution to word problems involving addition and subtraction of fractions referring to the same whole, by using visual models to represent the problem. Use benchmark fractions and number sense of fractions to identify an estimate.	Identify the solution to word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations, and visual models to represent the problem. Use benchmark fractions and number sense of fractions to identify an estimate and assess the reasonableness of answers.	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations, and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers (e.g., recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2).	Create word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. Explain how to estimate mentally and assess the reasonableness of answers.
5.NF.B.3	Identify a fraction that results from dividing the whole number numerator by the whole number denominator. Identify the solution to word problems involving division of whole numbers leading to answers in the form of fractions.	Determine the fraction that results from dividing the whole number numerator by the whole number denominator. Identify the solution to word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.	Interpret a fraction as the number that results from dividing the whole number numerator by the whole number denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people, each person has a share of size 3/4. 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?*	Explain the meaning of a fraction as the number that results from dividing the whole number numerator by the whole number denominator, and why multiplying a fraction by the denominator results in the numerator. Create word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.

5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number and a fraction by a fraction. a. Identify the product (a/b) x q as a parts of a partition of q into b equal parts using a visual fraction model. b. Identify the product of a fraction multiplied by a fraction (a/b) x (c/d) as (ac /bd) using a visual fraction model. c. Identify the area of a rectangle with fractional side lengths that has been tiled with unit squares of the appropriate unit fraction side lengths. Identify the product of fractional side lengths to find areas of rectangles.	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number and a fraction by a fraction. a. Identify the product (a/b) x q as a parts of a partition of q into b equal parts. b. Identify the product of a fraction multiplied by a fraction (a/b) x (c/d) as ac /bd . Identify the correct story context for a given equation in the form (a /b) x (c /d) = ac /bd . c. Find the area of a rectangle with fractional side lengths that has been tiled with unit squares of the appropriate unit fraction side lengths. Identify the product of fractional side lengths to find areas of rectangles. Recognize that fraction products are rectangular areas.	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number and a fraction by a fraction. a. Interpret the product (a/b) x q as a parts of a partition of q into b equal parts. *For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation.* b. Interpret the product of a fraction multiplied by a fraction (a/b) x (c/d). Use a visual fraction model and create a story context for this equation. *For example, use a visual fraction model to show (2/3) x (4/5) = 8/15, and create a story context for this equation.* In general, (a/b) x (c/d) = ac/bd . c. 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 by a whole number and a fraction by a fraction. a. Explain why the product (a/b) x q is a parts of a partition of q into b equal parts, and create a word problem for an equation given in the form (a /b) x q . b. Explain why the product of a fraction multiplied by a fraction (a/b) x (c/d) is the product of the numerators divided by the product of the denominators ac /bd . Create a story context for an given equation in the form (a/b) x (c/d) = ac/bd . c. Given a rectangle with fractional side lengths, explain how tiling the rectangle with unit squares of the appropriate fractional side lengths and calculating the sum of area of those tiles is the same as multiplying the side lengths of the rectangle. Explain the connection between the product of two fractions and the area of a rectangle with side lengths equal to those fractions.
5.NF.B.5	Interpret multiplication as scaling (resizing), by: a. Identifying how the size of the product relates to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication, given a visual model. b. Identifying that multiplying a given number by a fraction greater than 1 results in a product greater than the given number; identifying that multiplying a given number by a fraction less than 1 results in a product smaller than the given number.	Interpret multiplication as scaling (resizing), by: a. Identifying how the size of the product relates to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication, given a visual model. b. Identifying that multiplying a given number by a fraction greater than 1 results in a product greater than the given number; identifying that multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and identifying that multiplying a given fraction by a fraction equal to 1 results in an equivalent fraction.	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; 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. Explaining how the size of a product compares to the size of one factor on the basis of the size of the other factor. b. Demonstrating how multiplying a given number by a fraction greater than 1 results in a product greater than the given number; demonstrating how multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and demonstrating how the principle of fraction equivalence a /b = (n x a)/(n x b) relates to the effect of multiplying a /b by 1.

5.NF.B.6	Identify the solutions to problems in real-world contexts involving multiplication of fractions, by using visual models.	Identify the solutions to problems in real-world contexts involving multiplication of fractions, by using a variety of representations including equations and models.	Solve problems in real-world contexts involving multiplication of fractions, including mixed numbers, by using a variety of representations including equations and models.	Create problems in real-world contexts involving multiplication of fractions, including mixed numbers, given a representation such as an equation or a model.
5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Identify the quotient of a unit fraction by a non-zero whole number. b. Identify the quotient of a whole number by a unit fraction. c. Identify the solutions to problems in real-world context involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, using visual models.	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Compute the quotient of a unit fraction by a non-zero whole number. b. Compute the quotient of a whole number by a unit fraction. c. Identify the solutions to problems in real-world context involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, using a variety of representations.	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. Use the relationship between multiplication and division to justify conclusions. 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 justify conclusions (e.g., 4 ÷ (1/5) = 20 because 20 x (1/5) = 4). c. Solve problems in real-world context involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, using a variety of representations.	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Use the relationship between multiplication and division to explain how to divide a unit fraction by a non-zero whole number. b. Use the relationship between multiplication and division to explain how to divide a whole number by a unit fraction. c. Create problems in real-world context involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions.

Measurement and Data				
5.MD.A.1	Identify equivalent, different-sized standard measurement units within a given measurement system, and use these conversions in solving one-step, real-world problems.	Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving two-step, real-world problems.	Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems.	Create multi-step, real-world problems that require converting among different-sized standard measurement units within a given measurement system.
5.MD.B.2	Identify a line plot that displays a data set of measurements in fractions of a unit (1/2, 1/4). Use operations on fractions for this grade to identify solutions to one-step problems involving information presented in line plots.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4). Use operations on fractions for this grade to solve one- or two-step problems involving information presented in line plots.	Make a line plot to display a data set of measurements in fractions of a unit (1/8, 1/2, 3/4). 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. Use operations on fractions for this grade to solve multi-step problems involving information presented in line plots.
5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. Identify a “unit cube,” and know that it can be used to measure volume. b. Match the number of unit cubes it takes to pack a solid figure without gaps or overlaps to the volume of the figure.	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. Define a “unit cube” and "one cubic unit." b. Identify that a solid figure which can be packed without gaps or overlaps using *n* unit cubes, and thus has a volume of *n* cubic units.	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.	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. Explain why a cube with side length 1 unit, called a “unit cube,” and why it is said to have “one cubic unit” of volume. b. Explain why 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.
5.MD.C.4	Identify volumes by counting unit cubes.	Measure volumes by counting unit cubes.	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	Look for patterns in measuring volumes of prisms by counting unit cubes. Fluently use cubic cm, cubic in, cubic ft, and improvised units.

5.MD.C.5	Relate volume to the operations of multiplication and addition and solve mathematical problems and problems in real-world contexts involving volume. a. Identify the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, or by multiplying the edge lengths. b. Understand and use the formula $V = l \times w \times h$ for rectangular prisms to identify volumes of right rectangular prisms with whole-number edge lengths. c. Understand volume as additive. Identify volumes of solid figures composed of two non-overlapping right rectangular prisms.	Relate volume to the operations of multiplication and addition and solve mathematical problems and problems in real-world contexts involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, or by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. b. Understand and use the formulas $V = l \times w \times h$ and $V = B \times h$, where in this case B is the area of the base ($B = l \times w$), for rectangular prisms to identify volumes of right rectangular prisms with whole-number edge lengths to solve mathematical problems. c. Understand volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms, applying this technique to solve mathematical	Relate volume to the operations of multiplication and addition and solve mathematical problems and problems in real-world contexts involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show 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. Understand and use the formulas $V = l \times w \times h$ and $V = B \times h$, where in this case B is the area of the base ($B = l \times w$), for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths to solve mathematical problems and problems in real-world contexts. c. Understand volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms, applying this technique to solve mathematical problems and problems in real-world contexts.	Relate volume to the operations of multiplication and addition and solve mathematical problems and problems in real-world contexts involving volume. a. Explain why the volume of a right rectangular prism can be calculated by multiplying the edge lengths, and explain why this is equivalent to 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. Create problems in real-world contexts that require understanding and using the formulas $V = l \times w \times h$ and $V = B \times h$. c. Understand volume as additive. Find volumes of solid figures composed of more than two non-overlapping right rectangular prisms, applying this technique to solve mathematical problems and problems in real-world contexts.

Geometry				
5.G.A.1	Identify the axes and the origin (0 , 0) of a coordinate system. Identify the *x* - and *y*- coordinates of an ordered pair.	Describe a coordinate system as having 2 axes that intersect at the origin (0 , 0). Identify an ordered pair and the *x* - and *y* -coordinates of an ordered pair.	Understand and describe a coordinate system as perpendicular number lines, called axes, that intersect at the origin (0 , 0). Identify a given point in the first quadrant of the coordinate plane using an ordered pair of numbers, called coordinates. Understand that the first number (*x*) indicates the distance traveled on the horizontal axis, and the second number (*y*) indicates the distance traveled on the vertical axis.	Understand and describe a coordinate system. Identify points in the coordinate plane using coordinates. Explain that the *x* -coordinate indicates the distance traveled on the horizontal axis, and the *y* -coordinate indicates the distance traveled on the vertical axis.
5.G.A.2	Identify points graphed in the first quadrant of the coordinate plane.	Graph points in the first quadrant of the coordinate plane, and identify the coordinate values of points in the context of the situation.	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.	Create real-world and mathematical problems that can be solved by graphing points in the first quadrant of the coordinate plane. Explain the meaning of the coordinate values of points in the context of the situation.
5.G.B.3	Identify attributes belonging to a category of two-dimensional figures.	Recognize that attributes belonging to a category of two-dimensional figures also belong to a subcategory of that category.	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.	Explain why attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
5.G.B.4	Identify two-dimensional figures based on properties limited to sides and angles.	Classify two-dimensional figures based on properties limited to sides and angles.	Classify two-dimensional figures in a hierarchy based on properties.	Draw or construct two-dimensional figures based on properties or classifications.