Grade 5 Math Curriculum Benchmarks

Operations and Algebraic Reasoning

Term	Writes, interprets, and evaluates numerical expressions OA.1, OA.2
1	Write and interpret simple expressions with no more than two operations and interpret numerical expressions without evaluating them. Use and evaluate one set of symbols in an expression.
2	Write and interpret expressions using whole numbers and all four operations, and interpret numerical expressions without evaluating them. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. (Understand Order of Operations.)
3	Write and interpret simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them, including interpreting use of variables. Ex: “Krista makes d dollars per hour. Aimee makes twice as much as Krista. How much does Aimee make per hour?” Express as 2 x d. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. (Understand Order of Operations.)
Term	**Analyzes patterns and relationships OA.3**
1	NA
2	Graph ordered pairs on a coordinate grid. Form ordered pairs from data represented in a table.

3	Create two numerical patterns using two given rules. Identify relationship between corresponding terms and form ordered pairs and graph on the coordinate plane. Ex: Given the rule 'add 3' and starting with 0 and 'add 6' starting with 0, generate terms in the resulting sequences and observe that the terms in one sequence are twice the corresponding term s in the other. Explain informally why this is so.

Number and Operations in Base Ten

Term	**Understands the place value system** NBT. 1, 2, 3, 4
1	Use place value understanding to write whole numbers in expanded form and identify the value of digits in a given whole number. Correctly multiply whole numbers by powers of 10 and describe the patterns in the number of zeros. Recognize that in a multi-digit number, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left
2	Use place value understanding to write whole numbers and decimals in expanded form and identify the value of digits in a given number. Recognize that in a multi-digit number, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left. Correctly multiply whole numbers by powers of 10 and describe the patterns in the number of zeros. Represent decimals through thousandths by shading grids. Read and write decimals to the thousandths with no placeholder zeros. Use grids or other tools to round decimals to the nearest tenth or hundredth in cases where rounding only effects one digit.

3	Use place value understanding to write whole numbers and decimals in expanded form and identify the value of digits in a given number. Recognize that in a multi-digit number, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left. 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 decimal points when a decimal is multiplied or divided by a power of 10. Ex: "Which direction does the decimal point move? How many places did you move it?" $12.5 \div 10^3$ Read, write, and compare decimals to the thousandths using base-ten numerals, number names, and expanded form. Use place value understanding to round decimals to any place.

Term	**Performs operations with multi-digit whole numbers and with decimals to hundredths.** NBT.5. NBT.6, NBT.7
1	Fluently multiply multi-digit whole numbers using the US traditional algorithm. Use the partial quotients algorithm with up to 3-digit dividends and 1-digit or simple 2-digit divisors.
2	Fluently multiply multi-digit whole numbers using the US traditional algorithm. Use the partial quotients algorithm with up to 4-digit dividends and 1-digit or 2-digit divisors. Interpret remainders and explain reasoning. Complete area model to represent solutions to division problems.

	Use grids to add and subtract decimals. Use algorithms to add and subtract decimals through tenths with regrouping and through hundredths without regrouping.
3	Fluently multiply multi-digit whole numbers using the US traditional algorithm. Find whole number quotients of whole numbers with up to 4-digit dividends and 2-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. Add, subtract, multiply, and divide decimals to the hundredths using manipulatives, drawings, or place value strategies. Relate strategy to a written method and explain the reasoning used.

Term	Demonstrates fluent recall of addition, subtraction, multiplication, and division facts A rating of 4 is not available for this standard
1	Demonstrates fluent recall of addition and subtraction facts to 20 Demonstrates fluent recall of multiplication facts and related division facts through 12 x 12
2	Demonstrates fluent recall of addition and subtraction facts to 20 Demonstrates fluent recall of multiplication facts and related division facts through 12 x 12
3	Demonstrates fluent recall of addition and subtraction facts to 20 Demonstrates fluent recall of multiplication facts and related division facts through 12 x 12

Number and Operations-Fractions

Term	Solves real world problems with fractions NF.2
1	NA
2	Use tools or visual models to solve word problems involving addition and subtraction of fractions and mixed numbers with like denominators. 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** + **1**/**2** = **3**/**7**, by observing that **3**/**7** < **1**/**2**.*
3	Solve word problems involving addition and subtraction of fractions (and mixed numbers) 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** + **1**/**2** = **3**/**7**, by observing that **3**/**7** < **1**/**2**.*

Term	Uses equivalent fractions as a strategy to add or subtract fractions. NF.1
1	NA
2	Use tools and visual models to add fractions or mixed numbers with unlike denominators when only one fraction needs to be replaced with an equivalent fraction. (Ex. ⅓ + ⅝).
3	Add and subtract fractions and mixed numbers with unlike denominators.

Term	**Applies understanding of multiplication and division when multiplying and dividing fractions** NF.3, NF.4, NF.5, NF.6, NF.7
1	NA
2	Interpret a fraction as division of the numerator by the denominator (a/b= a÷b) Use tools and visual models to solve fraction-of problems involving a unit fraction and a whole number. Find the area of a rectangle with one fractional side length by tiling it with unit squares and counting full and partial squares or using addition. Use models to solve problems involving division of a unit fraction by a whole number. Use fraction multiplication to check the quotient of a division problem involving division of a unit fraction by a whole number.
3	Interpret a fraction as division of the numerator by the denominator (a/b= a÷b). Multiply a fraction or a whole number by a fraction, including finding area of a rectangle with fractional sides. Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. Ex: 4 x ½ = 2. AND Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number. Ex 4 x 5/2= 10. Solve real-world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent the problem. Apply and extend previous understanding of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

The Number System

Term	Use Positive and Negative Integers to Describe Quantities MA.1
1	NA
2	NA
3	Use positive and negative integers to describe quantities such as temperature above/below zero, elevation above/below sea level, or credit/debit.

Measurement and Data

Term	Converts like measurement units within a given measurement system MD.1
1	Perform one-step unit conversion within the same measurement system. Use conversions to solve real-world problems when necessary conversions are identified.
2	Perform one-step and multi-step unit conversion within the same measurement system. Use conversions to solve real-world problems when necessary conversions are identified.
3	Convert among different sized standard measurement units within a given measurement system and use these conversions in solving multi-step real world word problems.

Term	Represents and interprets data using line plots MD.2
1	NA

2	NA
3	Make a line plot to display a data set of measurements in fractions of unit (½ , ¼ , ⅛). Solve problems involving information presented in line plots. Ex: Redistribute data on a line plot to show equal quantities.

Term	**Understands volume, and relates to multiplication and addition** MD.3, MD.4, MD.5
1	Recognize volume as an attribute of open, 3-dimensional figures. Find volume by counting unit cubes, including partially packed prisms when the dimensions of the prism are clearly shown. Apply the volume formula to find the volume of a right rectangular prism. Find the volume of figures composed of right rectangular prisms. (Understand that when figures are composed of two or more right rectangular prisms the area can be found by adding the volumes of individual parts.)
2	Recognize volume as an attribute of open, 3-dimensional figures. Find volume by counting unit cubes, including partially packed prisms when the dimensions of the prism are clearly shown. Apply the volume formula to find the volume of a right rectangular prism. Find the volume of figures composed of right rectangular prisms. (Understand that when figures are composed of two or more right rectangular prisms the area can be found by adding the volumes of individual parts.)

3	Understand concept of volume and find volume of a given rectangular prism using the formulas V= l x w x h and V = B (area base) x h. Measure volumes by counting unit cubes (ex: cubic cm, cubic ft., or improvised units). Recognize volume as additive: find volumes of solid figures composed of two non-overlapping right rectangular prisms.

Geometry

Term	**Graphs points on the coordinate plane to solve real-world and mathematical problems** G.1, G.2
1	NA
2	Understand that an ordered pair of numbers identifies an exact location on a coordinate grid. Use coordinates to graph points and to name graphed points in the first quadrant of the coordinate plane. Plot points to represent given information.
3	Identify and graph coordinates on the coordinate plane. Represent real-world and mathematical problems by graphing in the first quadrant and interpret coordinate values of points in context of the situation. Ex: Graphing points from input/output table with missing values.

Term	**Classifies two-dimensional figures into categories based on their properties.** **G.3, G.4**
1	NA

2	NA
3	Classify 2-dimensional figures in a hierarchy based on properties Understand that attributes belonging to a category of 2-dimensional figures also belong to all subcategories of that category. Ex: all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

Mathematical Practice

Grades are based on application of math practices within units covered each term. Listed below are examples of the use of mathematical practice. Practice and evidence are embedded in the lessons. Like the content standards, Mathematical Practices are scored by term. If a student is meeting the expectations of each lesson's mathematical practice, he/she is meeting the term expectations or benchmarks.

Term	MAKES SENSE OF PROBLEMS AND PERSEVERES IN SOLVING THEM SMP.1, SMP.2, SMP.7, SMP.8
1 2 3	• Students look for meaning in a problem and look for efficient ways to solve it. They ask themselves, "Does this make sense?" "What is the most efficient way to solve the problem?" Can I solve this problem a different way?" • Students contextualize and decontextualize problems. They take real-world problems and write/solve equations based on the problem. They take equations and generate real-world situations to match. Ex: There are $2\ ^{2}/_{3}$ yards of rope in the shed. If I need $4^{1}/_{6}$ yards for a project, how much more rope do I need? Decontextualize: $4^{1}/_{6} - 2\ ^{2}/_{3} = 1\ ½$. Contextualize: I need 1 ½ more yards of rope. • Students use properties of operations as strategies to add, subtract, multiply or divide with whole numbers, fractions, and/or decimals. They examine numerical patterns and relate them to a rule or graphical representation. • Students use repeated reasoning to understand algorithms and generalize about patterns.

Term	MODELS AND EXPLAINS USING TOOLS SMP.4, SMP.5, SMP.3, SMP.6
1 2 3	• Students ask, and can explain questions such as: “How did you get that?” and “Why is that true?” • Students construct arguments and represent problem situations in multiple ways including using numbers, using words with mathematically accurate language, drawing pictures, using objects, making a chart, list or graph, creating equations, etc… They should be able to use all of these representations as needed. • Students evaluate the utility of these representations to determine which are most useful and efficient to solve problems. • Students efficiently use appropriate tools (including estimation) when solving problems. Ex: Students may use unit cubes to fill a rectangular prism and then use a ruler to measure the dimensions. They use graph paper to accurately create graphs and solve problems or make predictions from real world data. • Students use clear and precise language (oral and written), organize their work, and are accurate.