Washington Mathematics

Grade 5

Standards for Mathematical Practice

1 **Make sense of problems and persevere in solving them.** 1

2 **Reason abstractly and quantitatively.** 2

3 **Construct viable arguments and critique the reasoning of others.** 3

4 **Model with mathematics.** 4

5 **Use appropriate tools strategically.** 5

6 **Attend to precision.** 6

7 **Look for and make use of structure.** 7

8 **Look for and express regularity in repeated reasoning.** 8

Operations and Algebraic Thinking

A Write and interpret numerical expressions.

1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. 5.OA.A.1

2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “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. 5.OA.A.2

B Analyze patterns and relationships.

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. 5.OA.B.3

Numbers and Operations in Base Ten

A Understand the place value system.

1. 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 of what it represents in the place to its left. 5.NBT.A.1
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 powers of 10. 5.NBT.A.2
3. Read, write, and compare decimals to thousandths. 5.NBT.A.3
4. Use place value understanding of decimals to generate estimates to any place using a variety of estimation strategies. 5.NBT.A.4

B Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Flexibly, .efficiently and accurately multiply multi-digit whole numbers using strategies or algorithms. 5.NBT.B.5
6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using strategies based on place value and connected to the relationship between multiplication and division including rectangular arrays, partial quotients, and/or area models. 5.NBT.B.6
7. Flexibly, efficiently, and accurately 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. 5.NBT.B.7

Numbers and Operations—Fractions

A Use equivalent fractions as a strategy to add and subtract fractions.

1. Add and subtract fractions with unlike denominators (including mixed numbers) using flexible and efficient strategies, including replacing given fractions with equivalent fractions with like denominators. Justify using visual models (e.g., tape diagrams or number lines) and equations. 5.NF.A.1
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. 5.NF.A.2

B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

3 Interpret a fraction as division, where a quantity (the numerator) is divided into equal parts (the denominator). Flexibly and efficiently 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. Assess the reasonableness of answers using mental and estimation strategies. 5.NF.B.3

4 Apply and extend previous understandings of multiplication to flexibly, efficiently, and accurately multiply a fraction or whole number by a fraction. 5.NF.B.4

5 Interpret multiplication as scaling (resizing) by estimating whether a product will be larger or smaller than a given factor based on the size of the other factor, without performing the indicated multiplication. 5.NF.B.5

6 Flexibly and efficiently solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. Assess the reasonableness of answers using mental and estimation strategies. 5.NF.B.6

7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions using visual fraction models and equations to represent the problem. 5.NF.B.7

Measurement and Data

A Convert like measurement units within a given measurement system.

1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert to), and use these conversions in solving multi-step, real world problems. Assess the reasonableness of answers using mental and estimation strategies. 5.MD.A.1

B Represent and Interpret Data.

2 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 problems involving information presented in line plots. 5.MD.B.2

C Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. 5.MD.C.3

4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units 5.MD.C.4

5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. 5.MD.C.5

Geometry

A Graph points on the coordinate plane to solve real-world and mathematical problems.

1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane 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., -axis and -coordinate, -axis and -coordinate). 5.G.A.1

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. 5.G.A.2

B Classify two-dimensional figures into categories based on their properties.

3 Demonstrate understanding that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. 5.G.B.3

4 Classify two-dimensional figures in a hierarchy based on properties. 5.G.B.4

Data Science

Formulate statistical investigative questions.

1 Generate data-based questions of interest to the students, generate ideas based on the questions, and refine the question as necessary. Pose statistical questions that can compare two variables withing a group, setting, or situation. 5.DS.1

Collect data/ consider data.

2 Determine strategies for collecting and considering data in a variety of ways including with the use of technology. Understand that data may contain errors (missing values, etc.) and decisions have to be made on how to account for or resolve these issues. 5.DS.2

Analyze the data.

3 Critically analyze data visualizations, including tables, bar graphs, line plots, or spreadsheets to support a claim related to the investigative question. Compare and contrast different data visualizations to determine which transparently communicate results and interpretations. 5.DS.3

Interpret results.

4 Interpret and communicate results, describing difference between groups, with teacher guidance. Make a statement(s) about the data collected to support the answer to the investigative question. Describe the difference between two groups with different conditions. 5.DS.4