Arizona State Standards– 5th Grade Standards Placemat
Grade level content emphasis indicated by: Major Cluster; Supporting Cluster

1. Develop competency in dividing and fluency in multiplying whole numbers through the application of understanding of place value and properties of operations and multiplication and division.

Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They are fluent with multi-digit multiplication of whole numbers. Students are able to explain patterns associated with multiplication through application of their knowledge of place value such as each digit in the product represents 10 times as much as it represents in the place to its right and 100 of what it represents in the place to its left.

2. Develop understanding of operations by dividing and multiplication with decimals to tenths and hundredths and estimating by rounding.

Students apply their understanding of models for decimals, decimal notation, and properties of operations to add and subtract decimals to tenths. They develop fluency in these computations and make reasonable estimates (through rounding) of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (e.g., a finite decimal multiplied by an appropriate power of 10 is a whole number, to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths.

3. Develop understanding of multiplication of fractions and division of fractions in limited contexts (unit fractions divided by whole numbers and whole numbers divided by unit fractions).

Students apply their understanding of fractions and fraction models to multiply and divide fractions to efficiently and accurately add and subtract fractions with unlike denominators. Students use their understanding of fractions to make connections to their understanding of multiplication and division, and explain the ‘why’ of multiplying and dividing fractions. (Note: Division of fractions is limited to dividing unit fractions by whole numbers and whole numbers by unit fractions.)

Operations and Algebraic Thinking (OA)

5.OA.A.1: Use parentheses and brackets in numerical expressions, and evaluate expressions with these symbols (Order of Operations).

5.OA.A.2: 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(8+7)). Recognize that 3 x (2 + 4) is not equal to (3 x 2) + (3 x 4) because 3 x (2 + 4) is three times as large as 18, or 9; 2 x 3 + 5 because, without having to calculate the intended sum or product.

5.OA.B.3: 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 “double it and then 3”, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence).

5.OA.B.4: Generate a two-rule function that decomposes into prime factors.

Number and Operations in Base Ten (NBT)

5.NBT.A.1: Understand the place value system.

5.NBT.A.2: Understand the meaning of base-ten numerals and properties of operations. They are working with decimals. They understand and can explain the placement of the decimal point when multiplying or dividing. Students apply their understanding of addition and multiplication of whole numbers (NBT) to foundational understanding of volume (MD).

5.NBT.B: Perform operations with multi-digit whole numbers and with decimals to tenths.

5.NBT.B.5: Fluently multiply multi-digit whole numbers using a standard algorithm.

5.NBT.B.6: Apply and extend understanding of division to find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.

5.NBT.B.7: 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 addition and subtraction (MD).

5.NF.A: Use equivalent fractions to add and subtract fractions.

5.NF.A.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 like denominators (e.g., 2/3 + 5/4 = 8/12 + 15/12 = 23/12).

5.NF.A.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 + 3/4 = 5/8, because 2/5 < 1 and 3/4 < 1.

5.NF.B: Use previous understandings of multiplication and division to multiply and divide fractions.

5.NF.B.3: Interpret a fraction as the product of two fractions by interpreting the fraction as the result of multiplying the numerator by the whole number denominator (a/b x 4 = 4a/b). Solve word problems involving division of unit fractions by whole numbers, whole numbers by unit fractions, or by whole numbers and whole numbers by unit fractions (e.g., a whole number edge lengths to solve mathematical problems and in real-world contexts).

5.NF.B.4: Interpret the product of a fraction multiplied by a fraction (ab x c/d) using a visual fraction model and create a story context for this operation. For example, use a visual fraction model to show that 2/3 x 4/5 = 8/15, and create a story context for this equation. In general, (ab x c/d) = ac/bd.

5.NF.B.5: Interpret multiplication as scaling by a factor greater than one.

5.NF.B.6: Solve problems in real-world contexts involving multiplication of fractions, including mixed numbers, by using a variety of representations including equations and models.

5.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

5.NF.B.5: Interpret multiplication as scaling by a factor greater than one. Find equal groups that show an incorrect result 2/5 x 3 = 6/15, because 2/5 < 1 and 3 > 1.

5.NF.B.6: Solve problems in real-world contexts involving division of fractions, including mixed numbers, by using a variety of representations including equations and models.

5.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

5.NF.B.5: Interpret multiplication as scaling by a factor greater than one. Find equal groups that show an incorrect result 2/5 x 3 = 6/15, because 2/5 < 1 and 3 > 1.

5.NF.B.6: Solve problems in real-world contexts involving division of fractions, including mixed numbers, by using a variety of representations including equations and models.

Measurement and Data (MD)

5.MD.A: Convert among different-sized standard measurement units within a given measurement system.

5.MD.A.1: Convert among different-sized standard measurement units within a given measurement system. Use the same-sized standard measurement units to solve word problems involving information presented in line plots. For example, given different measured quantities of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers was redistributed equally.

5.MD.B: Represent and interpret data.

5.MD.B.2: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measured quantities of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers was redistributed equally.

5.MD.C: Geometric measurement. Understand concepts of volume and relate volume to multiplication and addition.

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

5.MD.C.3a: 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.

5.MD.C.3b: 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.