MATHEMATICAL IDEAS & CONCEPTS:

- Interpret multiplicative comparisons
- Use the four operations with whole numbers to solve problems, including multi-step problems and problems involving measurement
- Generalize place value understanding for multi-digit whole numbers
- Understand fraction equivalence
- Classify shapes by properties

ESSENTIAL QUESTIONS:

1. *How can I compare numbers using multiplication?*
2. *What strategies can I use to solve multi-step problems?*
3. *How can I use place value to multiply and divide whole numbers?*
4. *How do I know when fractions are equivalent?*
5. *How can I classify two-dimensional figures?*

STANDARDS:

Aligned to Essential Questions; Big Idea/Concept Standard (★) with supporting standards (➔) connected below

Notes in gray font are from the AR Mathematics standards; RPS instructional pacing notes are in red font

EQ 1: How can I compare numbers using multiplication?

★ **4.OA.A.2** *Q1 Focus: Interpretation of comparison situations (see note below 4.OA.A.1)*

- Multiply or divide to solve word problems involving multiplicative comparison
- Use drawings and *equations* with a letter for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison

In second grade, comparison problems are addition/subtraction situations that ask questions such as "how many more?" and "how many less?" This standard moves from that idea to multiplication problems that have the phrases such as "as much as" and "times as long".

➔ **4.OA.A.1** *Interpretation includes verbal or oral discussion of the situation where students create situations to match the multiplication equation as a comparison situation*

- Interpret a multiplication equation as a comparison (e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5)
- Represent verbal statements of multiplicative comparisons as multiplication *equations*

EQ 2: What strategies can I use to solve multi-step problems?

Note: Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.

★ **4.OA.A.3**

- Solve multistep word problems posed with *whole numbers* and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using *equations* with a letter standing for the unknown quantity
- Assess the reasonableness of answers using mental computation and estimation strategies including rounding

➔ **4.NBT.A.3** Use *place value* understanding to round multi-digit *whole numbers* to any place

★ **4.NBT.B.4** Add and subtract multi-digit *whole numbers* with *computational fluency* using a standard *algorithm* *Fluency is the end of year expectation; students should be exposed to a variety of base-ten strategies prior to expectation of fluent use of a base-ten strategy/recording system.*

Notes 4.NBT.B.4:

- *Computational fluency is defined as a student's ability to efficiently and accurately solve a problem with some degree of flexibility with their strategies.*
- *A standard algorithm can be viewed as, but should not be limited to, the traditional recording system.*
- *A standard algorithm denotes any valid base-ten strategy.*

EQ 3: How can I use place value to multiply and divide whole numbers?

Note: Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.

★ **4.NBT.B.5** *Note: 4.NBT.B.5 Properties of operations need to be referenced.*

- Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on *place value* and the properties of operations
- Illustrate and explain the calculation by using *equations*, *rectangular arrays*, and area models

★ **4.NBT.B.6** *Formal assessment begins Q2* *Note: 4.NBT.B.6 Properties of operations need to be referenced.*

- Find whole-number *quotients* and remainders with up to four-digit *dividends* and one-digit *divisors*, using strategies based on *place value*, the properties of operations, and the relationship between multiplication and division Illustrate and explain the calculation by using *equations*, *rectangular arrays*, and area models *Explore how to solve division problems using multiplication and notate their thinking*

➔ **4.NBT.A.1** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example:* Recognize that 700 ÷ 70 = 10 or 700 =10x70 by applying concepts of *place value* and division.

➔ **4.NBT.A.2**

- Read and write multi-digit *whole numbers* using base-ten numerals, number names, and *expanded form*
- Compare two multi-digit numbers based on meanings of the digits in each place, using symbols (>, =, <) to record the results of comparisons

EQ 4: How do I know when fractions are equivalent?

Note: Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

When performing operations with fractions at this grade level, the use of visual models to represent fractions is considered a proficient practice.

End of year expectation includes using visual fraction models and/or equations.

★ **4.NF.A.1**

- By using *visual fraction models*, explain why a *fraction* a/b is equivalent to a *fraction* $(n \times a)/(n \times b)$ with attention to how the number and size of the parts differ even though the two *fractions* themselves are the same size
- Use this principle to recognize and generate equivalent *fractions.* *For example:* 1/5 is equivalent to (2x1) / (2x5)

➔ **4.MD.C.5** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: *Formal assessment begins Q3* *Note: 4.MD.C.5 Use the degree symbol (e.g., 360°).*

- An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the *fraction* of the circular arc between the points where the two rays intersect the circle
- An angle that turns through 1/360 of a circle is called a "*one-degree angle*," and can be used to measure angles
- An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degree.

Concepts of angle measure in this quarter pertain to ideas about equivalency of angle/turn and fraction of the circle. Ex: ¼ turn of a circle = 90/360 = 90°

EQ 5: How can I classify two-dimensional figures?

★ **4.G.A.2** *Q1 focus on general classification schemes and categories of 2-D shapes*

- Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size
- Recognize right triangles as a category and identify right triangles

➔ **4.G.A.1** *Q1 focus: identification of these attributes in two-dimensional figures. Drawing and measurement of these attributes will occur in 3rd & 4th quarter.*

- Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines
- Identify these in two-dimensional figures *Q1 focus*

Additional Standards:

➔ **4.OA.B.4**

- Find all factor pairs for a whole number in the range 1-100
- Recognize that a whole number is a multiple of each of its *factors*
- Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number
- Determine whether a given whole number in the range 1-100 is prime or composite

➔ **4.MD.A.2** *Note: 4.MD.A.2 This is a standard that may be addressed throughout the year focusing on different context.*

- Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money including the ability to make change; including problems involving simple *fractions* or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.
- Represent measurement quantities using diagrams such as *number line diagrams* that feature a measurement scale.