Mathematics *Standards of Learning* for Virginia Public Schools 2023 Grade 3

The Grade 3 *Standards* place emphasis on developing an understanding of the concepts of multiplication and division. Students will recall with automaticity multiplication facts through 10×10 and the corresponding division facts and will use this knowledge to solve contextual problems with multiplication and division. Students will extend knowledge of place value to six-digit whole numbers. Concrete models and pictorial representations will be used to deepen understanding of fraction concepts, including comparing, composing, and decomposing. Students will use standard units (U.S. Customary and metric) to measure length, weight/mass, and liquid volume. Students will be introduced to solving contextual problems involving elapsed time. Properties of shapes will be explored, and students will identify polygons, combine and subdivide polygons, and name the resulting polygon(s). Students will engage with the data cycle using pictographs and bar graphs. The data cycle includes formulating questions to be explored with data; collecting or acquiring data; organizing and representing data; and analyzing data and communicating results. Students will work with a variety of growing patterns using various representations.

The use of appropriate technology and the interpretation of the results from applying technology tools must be an integral part of teaching, learning, and assessment. While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies to facilitate problem solving. However, facility in the use of technology shall not be regarded as a substitute for a student's understanding of quantitative and algebraic concepts or for proficiency in basic computations.

The acquisition of specialized mathematical vocabulary and language is crucial to a student's understanding and appreciation of the subject and fosters confidence in mathematics communication and problem solving.

Problem-solving is integrated throughout the content strands. The development of problem-solving skills is a major goal of the mathematics program at every grade level. The development of skills and problem-solving strategies must be integrated early and continuously into each student's mathematics education.

Number and Number Sense

3.NS.1 The student will use place value understanding to read, write, and determine the place and value of each digit in a whole number, up to six digits, with and without models.

Students will demonstrate the following Knowledge and Skills:

a) Read and write six-digit whole numbers in standard form, expanded form, and word form.

b) Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place and value of each digit in a six-digit whole number (e.g., in 165,724, the 5 represents 5 thousands and its value is 5,000).

c) Compose, decompose, and represent numbers up to 9,999 in multiple ways, according to place value (e.g., 256 can be 1 hundred, 14 tens, 16 ones, but also 25 tens, 6 ones), with and without models.

3.NS.2 The student will demonstrate an understanding of the base 10 system to compare and order whole numbers up to 9,999.

Students will demonstrate the following Knowledge and Skills:

a) Compare two whole numbers, each 9,999 or less, using symbols ($>, <, =, \neq$) and/or words (*greater than*, *less than*, *equal to*, *not equal to*), with and without models.
b) Order up to three whole numbers, each 9,999 or less, represented with and without models, from least to greatest and greatest to least.

3.NS.3 The student will use mathematical reasoning and justification to represent and compare fractions (proper and improper) and mixed numbers with denominators of 2, 3, 4, 5, 6, 8, and 10), including those in context.

Students will demonstrate the following Knowledge and Skills:

a) Represent, name, and write a given fraction (proper or improper) or mixed number with denominators of 2, 3, 4, 5, 6, 8, and 10 using:
  i) region/area models (e.g., pie pieces, pattern blocks, geoboards);
  ii) length models (e.g., paper fraction strips, fraction bars, rods, number lines); and
  iii) set models (e.g., chips, counters, cubes).
b) Identify a fraction represented by a model as the sum of unit fractions.
c) Use a model of a fraction greater than one to count the fractional parts to name and write it as an improper fraction and as a mixed number (e.g., $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{5}{4} = 1\frac{1}{4}$).
d) Compose and decompose fractions (proper and improper) with denominators of 2, 3, 4, 5, 6, 8, and 10 in multiple ways (e.g., $\frac{7}{4} = \frac{4}{4} + \frac{3}{4}$ or $\frac{4}{6} = \frac{3}{6} + \frac{1}{6} = \frac{2}{6} + \frac{2}{6}$) with models.
e) Compare a fraction, less than or equal to one, to the benchmarks of $0, \frac{1}{2},$ and 1 using area/region models, length models, and without models.
f) Compare two fractions (proper or improper) and/or mixed numbers with like numerators of 2, 3, 4, 5, 6, 8, and 10 (e.g., $\frac{2}{3} > \frac{2}{8}$) using words (*greater than, less than*, *equal to*) and/or symbols ($>, <, =$), using area/region models, length models, and without models.
g) Compare two fractions (proper or improper) and/or mixed numbers with like denominators of 2, 3, 4, 5, 6, 8, and 10 (e.g., $\frac{3}{6} < \frac{4}{6}$) using words (*greater than, less than*, *equal to*) and/or symbols ($>, <, =$), using area/region models, length models, and without models.
h) Represent equivalent fractions with denominators of 2, 3, 4, 5, 6, 8, or 10, using region/area models and length models.

3.NS.4 The student will solve problems, including those in context, that involve counting, comparing, representing, and making change for money amounts up to $5.00.

Students will demonstrate the following Knowledge and Skills:

a) Determine the value of a collection of bills and coins whose total is $5.00 or less.
b) Construct a set of bills and coins to total a given amount of money whose value is $5.00 or less.
c) Compare the values of two sets of coins or two sets of bills and coins, up to $5.00, with words (*greater than, less than, equal to)* and/or symbols ($>, <, =$) using concrete or pictorial models.
d) Solve contextual problems to make change from $5.00 or less by using counting on or counting back strategies with concrete or pictorial models.

Computation and Estimation

3.CE.1 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction with whole numbers where addends and minuends do not exceed 1,000.

Students will demonstrate the following Knowledge and Skills:

a) Determine and justify whether an estimate or an exact answer is appropriate when solving single-step and multistep contextual problems involving addition and subtraction, where addends and minuends do not exceed 1,000.

b) Apply strategies (e.g., rounding to the nearest 10 or 100, using compatible numbers, using other number relationships) to estimate a solution for single-step or multistep addition or subtraction problems, including those in context, where addends or minuends do not exceed 1,000.

c) Apply strategies (e.g., place value, properties of addition, other number relationships) and algorithms, including the standard algorithm, to determine the sum or difference of two whole numbers where addends and minuends do not exceed 1,000.

d) Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal (e.g., $256 - 13 = 220 + 23$; $457 + 100 \neq 557 + 100$).

e) Represent, solve, and justify solutions to single-step and multistep contextual problems involving addition and subtraction with whole numbers where addends and minuends do not exceed 1,000.

3.CE.2 The student will recall with automaticity multiplication and division facts through 10×10; and represent, solve, and justify solutions to single-step contextual problems using multiplication and division with whole numbers.

Students will demonstrate the following Knowledge and Skills:

a) Represent multiplication and division of whole numbers through 10×10, including in a contextual situation, using a variety of approaches and models (e.g., repeated addition/subtraction, equal-sized groups/sharing, arrays, equal jumps on a number line, using multiples to skip count).

b) Use inverse relationships to write the related facts connected to a given model for multiplication and division of whole numbers through 10×10.

c) Apply strategies (e.g., place value, the properties of multiplication and/or addition) when multiplying and dividing whole numbers.

d) Demonstrate fluency with multiplication facts through 10×10 by applying reasoning strategies (e.g., doubling, add-a-group, subtract-a-group, near squares, and inverse relationships).

e) Represent, solve, and justify solutions to single-step contextual problems that involve multiplication and division of whole numbers through 10×10.

f) Recall with automaticity the multiplication facts through 10×10 and the corresponding division facts.

g) Create an equation to represent the mathematical relationship between equivalent expressions using multiplication and/or division facts through 10×10 (e.g., $4 \times 3 = 14 - 2$, $35 \div 5 = 1 \times 7$).

Measurement and Geometry

3.MG.1 **The student will reason mathematically using standard units (U.S. Customary and metric) with appropriate tools to estimate and measure objects by length, weight/mass, and liquid volume to the nearest half or whole unit.**

Students will demonstrate the following Knowledge and Skills:

a) Justify whether an estimate or an exact measurement is needed for a contextual situation and choose an appropriate unit.

b) Estimate and measure:

   i) length of an object to the nearest U.S. Customary unit ($\frac{1}{2}$ inch, inch, foot, yard) and metric unit (centimeter, meter);

   ii) weight/mass of an object to the nearest U.S. Customary unit (pound) and metric unit (kilogram); and

   iii) liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and metric unit (liter).

c) Compare estimates of length, weight/mass, or liquid volume with the actual measurements.

3.MG.2 **The student will use multiple representations to estimate and solve problems, including those in context, involving area and perimeter (in both U.S. Customary and metric units).**

Students will demonstrate the following Knowledge and Skills:

a) Solve problems, including those in context, involving area:

   i) describe and give examples of area as a measurement in contextual situations; and

   ii) estimate and determine the area of a given surface by counting the number of square units, describe the measurement (using the number and unit) and justify the measurement.

b) Solve problems, including those in context, involving perimeter:

   i) describe and give examples of perimeter as a measurement in contextual situations;

   ii) estimate and measure the distance around a polygon (with no more than six sides) to determine the perimeter and justify the measurement; and

   iii) given the lengths of all sides of a polygon (with no more than six sides), determine its perimeter and justify the measurement.

3.MG.3 **The student will demonstrate an understanding of the concept of time to the nearest minute and solve single-step contextual problems involving elapsed time in one-hour increments within a 12-hour period.**

Students will demonstrate the following Knowledge and Skills:

a) Tell and write time to the nearest minute, using analog and digital clocks.

b) Match a written time (e.g., 4:38, 7:09, 12:51) to the time shown on analog and digital clocks to the nearest minute.

c) Solve single-step contextual problems involving elapsed time in one-hour increments, within a 12-hour period (within a.m. or within p.m.) when given:

   i) the starting time and the ending time, determine the amount of time that has elapsed;

ii) the starting time and amount of elapsed time in one-hour increments, determine the ending time; or

iii) the ending time and the amount of elapsed time in one-hour increments, determine the starting time.

3.MG.4 The student will identify, describe, classify, compare, combine, and subdivide polygons.

Students will demonstrate the following Knowledge and Skills:

a) Describe a polygon as a closed plane figure composed of at least three line segments that do not cross.

b) Classify figures as polygons or not polygons and justify reasoning.

c) Identify and describe triangles, quadrilaterals, pentagons, hexagons, and octagons in various orientations, with and without contexts.

d) Identify and name examples of polygons (triangles, quadrilaterals, pentagons, hexagons, octagons) in the environment.

e) Classify and compare polygons (triangles, quadrilaterals, pentagons, hexagons, octagons).

f) Combine no more than three polygons, where each has three or four sides, and name the resulting polygon (triangles, quadrilaterals, pentagons, hexagons, octagons).

g) Subdivide a three-sided or four-sided polygon into no more than three parts and name the resulting polygons.

Probability and Statistics

3.PS.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on pictographs and bar graphs.

Students will demonstrate the following Knowledge and Skills:

a) Formulate questions that require the collection or acquisition of data.

b) Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 30 or fewer data points for no more than eight categories) using various methods (e.g., polls, observations, tallies).

c) Organize and represent a data set using pictographs that include an appropriate title, labeled axes, and key. Each pictograph symbol should represent 1, 2, 5 or 10 data points.

d) Organize and represent a data set using bar graphs with a title and labeled axes, with and without the use of technology tools. Determine and use an appropriate scale (increments limited to multiples of 1, 2, 5 or 10).

e) Analyze data represented in pictographs and bar graphs, and communicate results orally and in writing:

i) describe the categories of data and the data as a whole (e.g., data were collected on preferred ways to cook or prepare eggs - scrambled, fried, hard boiled, and egg salad);

ii) identify parts of the data that have special characteristics, including categories with the greatest, the least, or the same (e.g., most students prefer scrambled eggs);

iii) make inferences about data represented in pictographs and bar graphs;

iv) use characteristics of the data to draw conclusions about the data and make predictions based on the data (e.g., it is unlikely that a third grader would like hard boiled eggs); and

    v) solve one- and two-step addition and subtraction problems using data from pictographs and bar graphs.

Patterns, Functions, and Algebra

3.PFA.1 The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition and subtraction of whole numbers), including those in context, using various representations.

Students will demonstrate the following Knowledge and Skills:

a) Identify and describe increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines).

b) Analyze an increasing or decreasing pattern and generalize the change to extend the pattern or identify missing terms using various representations.

c) Solve contextual problems that involve identifying, describing, and extending patterns.

d) Create increasing and decreasing patterns using objects, pictures, numbers, and number lines.

e) Investigate and explain the connection between two different representations of the same increasing or decreasing pattern.