MATHEMATICS | Third Grade

In grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than others based on the depth of ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade level allows depth and learning, which is carried out through the Standards for Mathematical Practice which are:

1. **Make sense of problems and preserve in solving them.**
2. **Reason abstractly and quantitatively.**
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
6. **Attend to precision.**
7. **Look for and make use of structure. (Deductive Reasoning)**
8. **Look for and express regularity in repeated reasoning. (Inductive Reasoning)**

The standards are taught in the following sequence.

Number and Operations-Base 10 **Topic 1** **Topic 2** **Topic 3** • Use place value understanding and properties of operations to perform multi-digit arithmetic.	• NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100. • NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. • NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (*e.g. 9 x 80, 5 x 60)* using strategies based on place value and properties of operations.

Operations and Algebraic Thinking **Topic 4** **Topic 5** **Topic 6** **Topic 7** **Topic 8**	
• Represent and solve problems involving multiplication and division.	• OA.1 Interpret products of whole numbers (*e.g. interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expresses ad 5 x 7).* • OA.2 Interpret whole-number quotients of whole numbers, (*e.g. interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8).* • OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, (*e.g. by using drawings and equations with a symbol for the unknown number to represent the problem).* • OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
• Understand properties of multiplication and the relationship between multiplication and division.	• OA.5 Apply properties of operations as strategies to multiply and divide. (*Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known - Commutative Property of Multiplication. 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30 - Associative Property of Multiplication. Knowing that 8 x 5 = 4 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56 - Distributive Property).* • OA.6 Understand division as an unknown-factor problem. (*For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8).*

• Multiply and divide within 100. • Solve problems involving the four operations, and identify and explain patterns in arithmetic.	• OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (*e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8)* or properties of operations. **By the end of Grade 3, know from memory all products of two one-digit numbers.** • OA.8 Solve two-step word problems using the four operations. 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. • OA. 9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. (*For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends).*
Numbers and Operations - Fractions **Topic 9** **Topic 10** • Develop understanding of fractions as numbers.	• NF.1 Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by a parts of size *1/b*. • NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. o NF.2a-Represent a fraction ***1/b*** on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into ***b*** equal parts. Recognize that each part has size ***1/b*** and that the endpoint of the part based at 0 locates the number

	1/b on the number line. o NF.2b -Represent a fraction ***a/b*** on a number line diagram by marking off ***a*** lengths ***1/b*** from 0. Recognize that the resulting interval has size ***a/b*** and that its endpoint locates the number ***a/b*** on the number line. • NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. o NF.3a-Understand two fractions are equivalent (equal) if they are the same size, or the same point on the number line. o NF.3b-Recognize and generate simple equivalent fractions, (*e.g., ½ = 2/4, 4/6 = 2/3).* Explain why the fractions are equivalent, (e.g., by using visual fractions models). o NF.3c- Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. (*Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point on a number line diagram).* o NF.3d-Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, <, and justify the conclusions, (*e.g., by using a visual fraction model).*

Geometry **Topic 11** • Reason with shapes and their attributes.	• G.1 Understand that shapes in different categories (*e.g., rhombuses, rectangles, and others)* may share attributes (*e.g.,having four sides),* and that the shared attributes can define a larger category (*e.g., quadrilaterals).* Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. • G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. (*For example, partition a shape into 4 parts with equal area, and describe the area of each part as ¼ of the area of the shape).*
Measurement and Data **Topic 12** **Topic 13** **Topic 14** **Topic 15** **Topic 16** • Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	• MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, (*e.g., by representing the problem on a number line diagram).* • MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply or divide to solve one-step word problems involving masses or volumes that are given in the same units, (*e.g., by using drawings, such as a beaker with a measurement scale, to represent the problem).*

• Represent and interpret data. • Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	• MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. (*For example, draw a bar graph in which each square in the bar graph might represent 5 pets).* • MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, and quarters. • MD. 5 Recognize area as an attribute of plane figures and understands concepts of area measurement. o MD.5a-A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. o MD.5b- A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
	• MD.6 Measure areas by counting the unit squares (square *cm*, square *m,* square *in*, square *ft*, and improvised units), • MD.7 Relate area to the operations of multiplication and addition. o MD.7a-Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. o MD.7b-Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number

• Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	products as rectangular areas in mathematical reasoning. o MD.7c-Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* + *c* is the sum of *a* × *b* and *a* × *c*. Use the area models to represent the distributive property in mathematical reasoning. o MD.7d- Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. • MD.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Resources: EnVisions Teacher Program Overview-Grade 3 pp 8,9,10-11
Pacing Guide referenced: p.14