Iowa Mathematics

Grade 3

Operations and Algebraic Thinking 3.OA

1 Represent and solve problems involving multiplication and division. 3.OA.A

1. Interpret products of whole numbers. For example, interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each; describe a context in which a total number of objects can be expressed as 5 × 7. 3.OA.A.1
2. Interpret whole-number quotients of whole numbers as the number of groups or the number in each group in situations of equal groups. For example, describe a context involving equal groups of objects in which the number of groups or the number in each group can be expressed as 56 ÷ 8. 3.OA.A.2
3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, with unknowns in all positions. For example, by using drawings and equations with a symbol for the unknown number to represent the problem. 3.OA.A.3
4. Be able to represent a word problem by writing an equation with a symbol for the unknown whole number and determine the unknown whole number in a multiplication or division equation relating to three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × □ = 48, 5 = □ ÷ 3, 6 × 6 = □. 3.OA.A.4

2 Use properties of operations and the relationship between multiplication and division. 3.OA.B

1. Use properties of operations as strategies to multiply and divide. For example, if 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) 3.OA.B.5
2. Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding (or remembering) the number that makes 32 when multiplied by 8 (□ × 8 = 32). 3.OA.B.6

3 Multiply and divide within 100. 3.OA.C

1. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. For example, knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8. By the end of Grade 3, flexibly, efficiently, and accurately find all products of two one-digit numbers. Note: Fluency of this standard is critical by the end of grade level. 3.OA.C.7

4 **Solve problems involving the four operations, and identify and explain patterns in arithmetic.** 3.OA.D

1 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. Note: this standard is limited to problems posed with whole numbers and have whole number answers; students should know how to perform operations in conventional order when there are no parentheses to specify a particular order (Order of Operations). 3.OA.D.8

2 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. 3.OA.D.9

Number and Operations in Base Ten 3.NBT

1 **Use place value understanding and properties of operations to perform multidigit arithmetic.** 3.NBT.A

2 Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. For example, 412 - 13 =412 -12 -1 = 400 -1 =399; 505+70 = 575. Note: Fluency of this standard is critical by the end of grade level. 3.NBT.A.2

1 Round whole numbers to the nearest 10 or 100 within the range of 0–1,000. For example, rounding 643 to the nearest 10 would be 640; to the nearest 100 would be 600. 3.NBT.A.1

3 Use place value and properties of operations to multiply onedigit whole numbers by multiples of 10 in the range 10–90. For example, 9 × 80, 5 × 60. 3.NBT.A.3

Number and Operations - Fractions 3.NF

1. **Understand fractions as numbers.** 3.NF.A
   1. Understand a fraction 1 bb as the quantity formed by 1 part when a whole is partitioned into bb equal parts; understand a fraction aa bb as the quantity formed by a part of size 1 bb . 3.NF.A.1
   2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.A.2
      a. Represent a fraction 1 bb on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into bb equal parts. Recognize that each part has size 1 bb and that the endpoint of the part based at 0 locates the number 1 bb on the number line. 3.NF.A.2.A
      b. Represent a fraction aa bb on a number line diagram by marking off aa lengths 1 bb from 0. Recognize that the resulting interval has size aa bb and that its endpoint locates the number aa bb on the number line. 3.NF.A.2.B
   3. Explain equivalence of fractions in special cases and compare fractions by reasoning about their size. 3.NF.A.3
      a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. 3.NF.A.3.A
      b. Recognize and generate simple equivalent fractions. For example, 1 2 = 2 4 , 4 6 = 2 3 . Explain why the fractions are equivalent. For example, by using a visual fraction model. 3.NF.A.3.B
      c. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. For example, express 3 in the form 3 = 3 1 ; recognize that 6 1 = 6; locate 4 4 and 1 at the same point of a number line diagram. 3.NF.A.3.C
      d. 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 >, =, or <, and justify the conclusion. For example, by using a visual fraction model. 3.NF.A.3.D

Measurement and Data 3.MD

1. **Solve problems with time and measured quantities.** 3.MD.A
   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. For example, by representing the problem on a number line. 3.MD.A.1
   2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l) (Excludes compound units such as cubic centimeters and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve onestep word problems involving measured quantities (masses and liquid volumes). Excludes multiplicative comparison problems involving notions of "times as much"; problems do not require unit conversion. 3.MD.A.2

2 **Represent and Interpret Data.** 3.MD.B

1 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. 3.MD.B.3

2 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, or quarters. 3.MD.B.4

3 **Geometric measurement: understand concepts of area and relate area to multiplication and to addition.** 3.MD.C

1 Recognize area as an attribute of plane figures and understand concepts of area measurement. 3.MD.C.5

a 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. 3.MD.C.5.A

b 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. 3.MD.C.5.B

2 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). 3.MD.C.6

3 Relate area to the operations of multiplication and addition. 3.MD.C.7

a 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. 3.MD.C.7.A

b Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems. 3.MD.C.7.B

c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths aa and $bb + cc$ is the sum of $aa \times bb$ and $aa \times cc$. Use area models to represent the distributive property in mathematical reasoning. 3.MD.C.7.C

d Recognize area as additive. Find areas of figures that can be decomposed into non-overlapping rectangles and add the areas of the non-overlapping parts, applying this technique to solve real world problems. 3.MD.C.7.D

2 **Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.** 3.MD.D

1 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. 3.MD.D.8

Geometry 3.G

1 Reason with shapes and their attributes. 3.G.A

1. Understand that shapes in different categories (for example, rhombuses, rectangles, and others) may share attributes (for example, having four sides), and that the shared attributes can define a larger category (for example, quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. 3.G.A.1
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 1 4 of the area of the shape. 3.G.A.2