Ohio Mathematics

Grade 3

Adopted 2017

Standards for Mathematical Practice

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

Operations and Algebraic Thinking

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

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. (Note: These standards are written with the convention that a x b means a groups of b objects each; however, because of the commutative property, students may also interpret 5 x 7 as the total number of objects in 7 groups of 5 objects each). 3.OA.1
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 each. 3.OA.2
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. Drawings need not show details, but should show the mathematics in the problem. 3.OA.3
4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. 3.OA.4

B. Understand properties of multiplication and the relationship between multiplication and division. 3.OA.B

5. Apply properties of operations as strategies to multiply and divide. 3.OA.5

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6. Understand division as an unknown-factor problem. 3.OA.6

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

7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division, e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8, or properties of operations. Limit to division without remainders. By the end of Grade 3, know from memory all products of two one-digit numbers. 3.OA.7

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

8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter or a symbol, which stands for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. This standard is limited to problems posed with whole numbers and having whole-number answers. Students may use parentheses for clarification since algebraic order of operations is not expected. 3.OA.8
9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. 3.OA.9

Number and Operations in Base Ten

A. Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used. 3.NBT.A

1. Use place value understanding to round whole numbers to the nearest 10 or 100. 3.NBT.1
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. 3.NBT.2
3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90, e.g., 9 × 80, 5 × 60 using strategies based on place value and properties of operations. 3.NBT.3

Measurement and Data

A. Solve problems involving money, measurement, and estimation of intervals of time, liquid volumes, and masses of objects. 3.MD.A

1. Work with time and money. 3.MD.1
   a. Tell and write time to the nearest minute. Measure time intervals in minutes (within 90 minutes). Solve real-world problems involving addition and subtraction of time intervals (elapsed time) in minutes, e.g., by representing the problem on a number line diagram or clock. 3.MD.1.A
   b. Solve word problems by adding and subtracting within 1,000 dollars with dollars and cents with cents (not using dollars and cents simultaneously) using the $ and ¢ symbol appropriately (not including decimal notation). 3.MD.1.B

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2. Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers 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. Excludes multiplicative comparison problems involving notions of "times as much". 3.MD.2

B. Represent and interpret data. 3.MD.B

3. Create scaled picture graphs to represent a data set with several categories. Create scaled bar graphs to represent a data set with several categories. Solve two-step "how many more" and "how many less" problems using information presented in the scaled graphs. 3.MD.3
4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. 3.MD.4

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

5. Recognize area as an attribute of plane figures and understand concepts of area measurement. 3.MD.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.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.5.B
6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). 3.MD.6
7. Relate area to the operations of multiplication and addition. 3.MD.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.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, and represent whole-number products as rectangular areas in mathematical reasoning. 3.MD.7.B
   c. 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 (represent the distributive property with visual models including an area model). 3.MD.7.C
   d. Recognize area as additive. Find the area of figures composed of rectangles by decomposing into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems. 3.MD.7.D

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

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. 3.MD.8

Number and Operations — Fractions

A. Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. 3.NF.A

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. 3.NF.1
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.2
   a. 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. 3.NF.2.A
   b. Represent a fraction a/b (which may be greater than 1) 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. 3.NF.2.B
3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3
   a. Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line. 3.NF.3.A
   b. 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 a visual fraction model. 3.NF.3.B
   c. 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 of a number line diagram. 3.NF.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 conclusions, e.g., by using a visual fraction model. 3.NF.3.D

Geometry

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

1. Draw and describe triangles, quadrilaterals (rhombuses, rectangles, and squares), and polygons (up to 8 sides) based on the number of sides and the presence or absence of square corners (right angles). 3.G.1
2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. 3.G.2