# 3rd Grade Mathematics

| Missouri Learning Standards: Grade-Level Expectations for Mathematics<br>(Adopted April 2016 for implementation in the 2016 – 2017 school year, assessed beginning in the 2017 – 2018 school year.) | | Missouri Learning Standards: Mathematics<br>(Adopted 2010, transitioning out, assessed through the 2016 – 2017 school year.) | |
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| **Code** | **Adopted Standards** | **Code** | **Current MLS** |
| **3.NBT.A** | **Use place value understanding and properties of operations to perform multi-digit arithmetic.** | | |
| **3.NBT.A.1** | Round whole numbers to the nearest 10 or 100. | **3.NBT.A.1** | Use place value understanding to round whole numbers to the nearest 10 or 100. |
| **3.NBT.A.2** | Read, write and identify whole numbers within 100,000 using base ten numerals, number names and expanded form. | | |
| **3.NBT.A.3** | Demonstrate fluency with addition and subtraction within 1000. | **3.NBT.A.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. |
| **3.NBT.A.4** | Multiply whole numbers by multiples of 10 in the range 10-90. | **3.NBT.A.3** | Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., $9 \times 80$, $5 \times 60$) using strategies based on place value and properties of operations. |
| **3.NF.A** | **Develop understanding of fractions as numbers.** | | |
| **3.NF.A.1** | Understand a unit fraction as the quantity formed by one part when a whole is partitioned into equal parts. | **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.A.2** | Understand that when a whole is partitioned equally, a fraction can be used to represent a portion of the whole.<br>a. Describe the numerator as representing the number of pieces being considered.<br>b. Describe the denominator as the number of pieces that make the whole. | | |
| **3.NF.A.3** | Represent fractions on a number line.<br>a. Understand the whole is the interval from 0 to 1.<br>b. Understand the whole is partitioned into equal parts.<br>c. Understand a fraction represents the endpoint of the length a given number of partitions from 0. | **3.NF.A.2** | Understand a fraction as a number on the number line; represent fractions on a number line diagram.<br>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.<br>b. 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. |
| **3.NF.A.4** | Demonstrate that two fractions are equivalent if they are the same size, or the same point on a number line. | **3.NF.A.3** | Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.<br>a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.<br>b. Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$. Explain why the fractions are equivalent, |
| **3.NF.A.5** | Recognize and generate equivalent fractions using visual models, and justify why the fractions are equivalent. | | |
| **3.NF.A.6** | Compare two fractions with the same numerator or denominator using the symbols >, = or <, and justify the solution. | | |

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| **3.NF.A.7** | Explain why fraction comparisons are only valid when the two fractions refer to the same whole. | | e.g., by using a visual fraction model.<br>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*.<br>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.RA.A** | **Represent and solve problems involving multiplication and division.** | | |
| **3.RA.A.1** | Interpret products of whole numbers. | **3.OA.A.1** | Interpret products of whole numbers, e.g., interpret 5 × 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 expressed as 5 × 7*. |
| **3.RA.A.2** | Interpret quotients of whole numbers. | **3.OA.A.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. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8*. |
| **3.RA.A.3** | Describe in words or drawings a problem that illustrates a multiplication or division situation. | **3.OA.A.1** | Interpret products of whole numbers, e.g., interpret 5 × 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 expressed as 5 × 7*. |
| | | **3.OA.A.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. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8*. |
| **3.RA.A.4** | Use multiplication and division within 100 to solve problems. | **3.OA.A.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. |

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| **3.RA.A.5** | Determine the unknown number in a multiplication or division equation relating three whole numbers. | **3.OA.A.4** | Determine the unknown whole number in a multiplication or division equation relating 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.RA.B** | **Understand properties of multiplication and the relationship between multiplication and division.** | | |
| **3.RA.B.6** | Apply properties of operations as strategies to multiply and divide. | **3.OA.B.5** | Apply properties of operations as strategies to multiply and divide. *Examples: 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.6** | Understand division as an unknown-factor problem. *For example, find 32÷8 by finding the number that makes 32 when multiplied by 8.* |
| **3.RA.C** | **Multiply and divide within 100.** | | |
| **3.RA.C.7** | Multiply and divide with numbers and results within 100 using strategies such as the relationship between multiplication and division or properties of operations. Know all products of two one-digit numbers. | **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. By the end of Grade 3, know from memory all products of two one-digit numbers. |
| **3.RA.C.8** | Demonstrate fluency with products within 100. | | |
| **3.RA.D** | **Use the four operations to solve word problems.** | | |
| **3.RA.D.9** | Write and solve two-step problems involving variables using any of the four operations. | **3.OA.D.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. |
| **3.RA.D.10** | Interpret the reasonableness of answers using mental computation and estimation strategies including rounding. | | |
| **3.RA.E** | **Identify and explain arithmetic patterns.** | | |
| **3.RA.E.11** | Identify arithmetic patterns and explain the patterns using properties of operations. | **3.OA.D.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*. |
| **3.GM.A** | **Reason with shapes and their attributes.** | | |
| **3.GM.A.1** | Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category. | **3.G.A.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 |

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| **3.GM.A.2** | Distinguish rhombuses and rectangles as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to these subcategories. | | (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. |
| **3.GM.A.3** | Partition shapes into parts with equal areas, and express the area of each part as a unit fraction of the whole. | **3.G.A.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.GM.B** | **Solve problems involving the measurement of time, liquid volumes and weights of objects.** | | |
| **3.GM.B.4** | Tell and write time to the nearest minute. | **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, e.g., by representing the problem on a number line diagram. |
| **3.GM.B.5** | Estimate time intervals in minutes. | | |
| **3.GM.B.6** | Solve problems involving addition and subtraction of minutes. | | |
| **3.GM.B.7** | Measure or estimate length, liquid volume and weight of objects. | **3.MD.A.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. |
| **3.GM.B.8** | Use the four operations to solve problems involving lengths, liquid volumes or weights given in the same units. | | |
| **3.GM.C** | **Understand concepts of area.** | | |
| **3.GM.C.9** | Calculate area by using unit squares to cover a plane figure with no gaps or overlaps. | **3.MD.C.5** | Recognize area as an attribute of plane figures and understand concepts of area measurement.<br>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.<br>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.6** | Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). |
| **3.GM.C.10** | Label area measurements with squared units. | **3.MD.C.6** | Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). |
| **3.GM.C.11** | Demonstrate that tiling a rectangle to find the area and multiplying the side lengths result in the same value. | **3.MD.C.7** | Relate area to the operations of multiplication and addition.<br>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.GM.C.12** | Multiply whole-number side lengths to solve problems involving the area of rectangles. | | |

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| **3.GM.C.13** | Find rectangular arrangements that can be formed for a given area. | | 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.<br>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 $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.<br>d. 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. |
| **3.GM.C.14** | Decompose a rectangle into smaller rectangles to find the area of the original rectangle. | | |
| **3.GM.D** | **Understand concepts of perimeter.** | | |
| **3.GM.D.15** | Solve problems involving perimeters of polygons. | **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.GM.D.16** | Understand that rectangles can have equal perimeters but different areas, or rectangles can have equal areas but different perimeters. | | |
| **3.DS.A** | **Represent and analyze data.** | | |
| **3.DS.A.1** | Create frequency tables, scaled picture graphs and bar graphs to represent a data set with several categories. | **3.MD.B.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*. |
| **3.DS.A.2** | Solve one- and two-step problems using information presented in bar and/or picture graphs. | | |
| **3.DS.A.3** | Create a line plot to represent data. | **3.MD.B.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, or quarters. |
| **3.DS.A.4** | Use data shown in a line plot to answer questions. | | |