Grade 3 – Arkansas Mathematics Standards

Operations and Algebraic Thinking	**Represent and solve problems involving multiplication and division**
AR.Math.Content.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.
AR.Math.Content.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.
AR.Math.Content.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)
AR.Math.Content.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 = ?

Operations and Algebraic Thinking	**Understand properties of multiplication and the relationship between multiplication and division**
AR.Math.Content.3.OA.B.5	Apply 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). Note: Students are not required to use formal terms for these properties.
AR.Math.Content.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.

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Operations and Algebraic Thinking	**Multiply and divide within 100**
AR.Math.Content.3.OA.C.7	• Using *computational fluency*, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one know 40 ÷ 5 = 8) or properties of operations • By the end of Grade 3, automatically (*fact fluency*) recall all *products* of two one-digit numbers Note: *Computational fluency* is defined as a student's ability to efficiently and accurately solve a problem with some degree of flexibility with their strategies.

Operations and Algebraic Thinking	**Solve problems involving the four operations, and identify and explain patterns in arithmetic**
AR.Math.Content.3.OA.D.8	Solve two-step word problems using the four operations, and be able to: • Represent these problems using *equations* with a letter standing for 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 having 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).
AR.Math.Content.3.OA.D.9	Identify arithmetic patterns (including, but not limited to, 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.

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Number and Operations in Base Ten	**Use place value understanding and properties of operations to preform multi-digit arithmetic**
AR.Math.Content.3.NBT.A.1	Use *place value* understanding to round *whole numbers* to the nearest 10 or 100
AR.Math.Content.3.NBT.A.2	Using *computational fluency*, add and subtract within 1000 using strategies and *algorithms* based on *place value*, properties of operations, and the relationship between addition and subtraction Note: *Computational fluency* is defined as a student's ability to efficiently and accurately solve a problem with some degree of flexibility with their strategies.
AR.Math.Content.3.NBT.A.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
AR.Math.Content.3.NBT.A.4	Understand that the four digits of a four-digit number represent amounts of thousands, hundreds, tens, and ones (e.g., 7,706 can be portrayed in a variety of ways according to *place value* strategies) Understand the following as special cases: • 1,000 can be thought of as a group of ten hundreds---called a thousand • The numbers 1,000, 2,000, 3,000, 4,000, 5,000, 6,000, 7,000, 8,000, 9,000 refer to one, two, three, four, five, six, seven, eight, or nine thousands
AR.Math.Content.3.NBT.A.5	Read and write numbers to 10,000 using base-ten numerals, number names, and *expanded form(*s) For example: Using base-ten numerals "standard form" (347) Number name form (three-hundred forty seven) *Expanded form*(s) (300 + 40 + 7 = 3 × 100 + 4 × 10 + 7 × 1)
AR.Math.Content.3.NBT.A.6	Compare two four-digit numbers based on meanings of thousands, hundreds, tens, and ones digits using symbols (<, >, =) to record the results of comparisons

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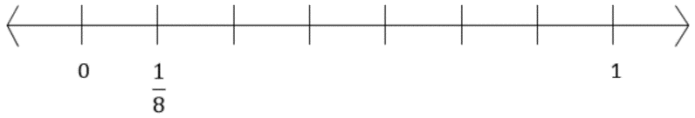
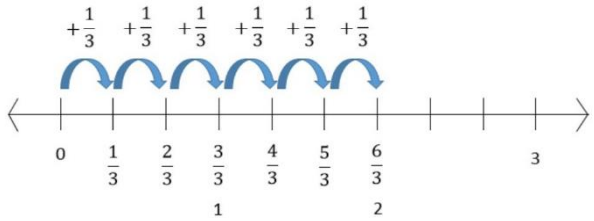
Number and Operations - Fractions	**Develop understanding of fractions as numbers**
AR.Math.Content.3.NF.A.1	• Understand a *fraction* 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts For example: *Unit fractions* are *fractions* with a *numerator* of 1 derived from a whole partitioned into equal parts and having 1 of those equal parts (1/4 is 1 part of 4 equal parts). • Understand a *fraction a*/*b* as the quantity formed by *a* parts of size 1/*b* For example: *Unit fractions* can be joined together to make non-unit fractions (¼ + ¼ + ¼ = ¾).
AR.Math.Content.3.NF.A.2	Understand a *fraction* as a number on the number line; represent *fractions* on a *number line diagram* • 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 Example:  • 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 Example: 

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AR.Math.Content.3.NF.A.3	Explain equivalence of *fractions* in special cases and compare *fractions* by reasoning about their size: • Understand two *fractions* as equivalent (equal) if they are the same size or the same point on a number line • Recognize and generate simple equivalent *fractions* (e.g., 1/2 = 2/4, 4/6 = 2/3) • Explain why the *fractions* are equivalent (e.g., by using a *visual fraction model*) • Express *whole numbers* as *fractions* and recognize *fractions* that are equivalent to *whole numbers* (e.g., 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*) • 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 symbols (>, =, <) and justify the conclusions (e.g., by using a *visual fraction model*)

Note: Grade 3 expectations in this domain are limited to *fractions* with *denominators* 2, 3, 4, 6, and 8.

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Measurement and Data	**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects**
AR.Math.Content.3.MD.A.1	• Tell time using the terms quarter and half as related to the hour (e.g., quarter-past 3:00, half-past 4:00, and quarter till 3:00) • 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*)
AR.Math.Content.3.MD.A.2	• Measure and estimate liquid volumes and masses of objects using standard units such as: grams (g), kilograms (kg), liters (l), gallons (gal), quarts (qt), pints (pt), and cups (c) • 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) Note: Conversions can be introduced but not assessed. Excludes compound units such as cubic centimeters and finding the geometric volume of a container. Excludes multiplicative comparison problems (problems involving notions of “times as much”).

Measurement and Data	**Represent and interpret data**
AR.Math.Content.3.MD.B.3	• Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories (e.g., Draw a bar graph in which each square in the bar graph might represent 5 pets) • Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled picture graphs and scaled bar graphs
AR.Math.Content.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

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Measurement and Data	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition**
AR.Math.Content.3.MD.C.5	Recognize area as an *attribute* of plane figures and understand concepts of area measurement: • 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. • 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
AR.Math.Content.3.MD.C.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units)
AR.Math.Content.3.MD.C.7	Relate area to the operations of multiplication and addition: • 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 • 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 • 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 area models to represent the distributive property in mathematical reasoning • 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

Measurement and Data	**Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures**
AR.Math.Content.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

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Geometry	**Reason with shapes and their attributes**
AR.Math.Content.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 (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 Note: An informal discussion of types of lines (parallel and perpendicular) and angles is needed; however, student assessment is not required. Note: Trapezoids will be defined to be a quadrilateral with at least one pair of opposite sides parallel, therefore all parallelograms are trapezoids.
AR.Math.Content.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.