

3rd Grade Essential Standards Justification

Essential Standards are individual standards selected to receive a greater proportion of questions on the AASA exams. The AASA exams, administered in grades three through eight, are developed based on a standards blueprint approved by the State Board of Education that includes individual standards grouped into clusters and identifies an allocation of questions for each cluster. The identified Essential Standards will receive the maximum number of questions allowed by the standards blueprint. Note that ALL standards will continue to be included in the test design of the annual state exams. ALL STANDARDS WILL BE ASSESSED. The identified Essential Standards are targeted for emphasis, indicating that these standards will have a higher proportion of the AASA when possible. The state assessment will retain the same length and duration. ALL STANDARDS remain valid and subject to inclusion in each year's AASA. *All justifications listed on this document were developed by a working group of Arizona math educators and leaders.*

Third Grade: Overview

1. [Extend understanding of place value of multi-digit numbers to 1000 and fluently add and subtract multi-digit numbers to 1000.](#)

Students generalize their understanding of place value through 1000 and the relative size of numbers in each place. They use their understanding of properties of operations to perform multi-digit addition and subtraction with multi-digit whole numbers less than or equal to 1000. They round multi-digit numbers to 10 or 100.

2. [Develop competency in multiplication and division and strategies for multiplication and division within 100, and develop understanding of the structure of rectangular arrays and of area.](#)

Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models as described in *Table 2*. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By working with arrays, students connect area to multiplication and justify using multiplication to determine the area. By the end of 3rd grade, students are fluent in multiplication and division within 100.

3. [Develop understanding of fractions as numbers, especially unit fractions.](#)

Students develop an understanding of fractions as numbers, beginning with unit fractions. Students understand that the size of a fractional part is relative to the size of the whole. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on recognizing equal numerators or denominators.

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

1. Extend understanding of place value of multi-digit numbers to 1000 and fluently add and subtract multi-digit numbers to 1000. Students generalize their understanding of place value through 1000 and the relative size of numbers in each place. They use their understanding of properties of operations to perform multi-digit addition and subtraction with multi-digit whole numbers less than or equal to 1000. They round multi-digit numbers to 10 or 100.		
Clusters Included		
3.NBT.A Use Place Value Understanding and Properties of Operations to Perform Multi-Digit Arithmetic		3.MD.8 Represent and Interpret Data
Coding	Standard	Justification
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.	• This is a year-long standard to develop strategies • Working to apply strategies from K-2 to larger numbers rather than replacing them with a standard algorithm
Additional standards that support the big ideas of the grade level.		
3.NBT.A.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	• This standard pairs best when utilized in the domains of Operations and Algebraic Thinking (OA) and Number and Operations in Base Ten (NBT).
3.MD.B.3	Create 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. See <i>Table 1</i>.	• The problem-solving component of this standard (e.g., one- and two-step word problems) is already covered by 3.OA.D.8, which focuses on solving two-step word problems using all four operations. • Integrating the graphing aspect as a context for word problems under 3.OA.D.8 could streamline instruction without losing rigor.

2. Develop competency in multiplication and division and strategies for multiplication and division within 100 and develop understanding of the structure of rectangular arrays and of area. Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models as described in *Table 2*. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By working with arrays, students connect area to multiplication and justify using multiplication to determine the area. By the end of 3rd grade, students are fluent in multiplication and division within 100.

Clusters Included

3.OA.A Represent and Solve Problems Involving Whole Number Multiplication and Division

3.OA.B Understand Properties of Multiplication and the Relationship Between Multiplication and Division

3.OA.C Multiply and Divide Within 100

3.MD.A Solve Problems Involving Measurement

3.OA.D Solve Problems Involving the Four Operations, and Identify and Explain Patterns in Arithmetic

3.NBT.A Use Place Value Understanding and Properties of Operations to Perform Multi-Digit Arithmetic

3.MD.C Represent and Interpret Data

Coding	Standard	Justification
3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities. See <i>Table 2</i> .	This standard helps students connect multiplication and division to real-world situations like grouping, measuring, and comparing. It builds problem-solving skills, supports fluency within 100, and lays the groundwork for more advanced math concepts in later grades.
3.MD.C.7.c	Use tiling to show 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.	This standard deepens students' understanding of area and multiplication by connecting geometric models to algebraic reasoning. Using tiling and area models helps students visualize the distributive property, reinforcing how numbers and operations work together. It builds a strong foundation for future work in algebra and supports flexible problem-solving strategies.

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. Utilize understanding of the Order of Operations when there are no parentheses.	• This standard ensures students are exposed to all four mathematical operations—addition, subtraction, multiplication, and division—in two-step word problems. It helps students to not only master each operation individually but also understand how they interconnect and how to apply them in various contexts. • This is the first exposure to formal algebraic representation of an unknown quantity. • Problem types should reflect Table 1 & Table 2
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. Utilize understanding of the Order of Operations when there are no parentheses.	
Additional standards that support the big ideas of the grade level.		
3.OA.A.1	Interpret products of whole numbers as the total number of objects in equal groups (e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each).	
3.OA.A.2	Interpret whole number quotients of whole numbers (e.g., interpret $56 \div 8$ as the number of objects in each group when 56 objects are partitioned equally into 8 groups, or as a number of groups when 56 objects are partitioned into equal groups of 8 objects each). See Table 2.	
3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$. See Table 2.</i>	• By combining both standards, the focus is on the relationship between multiplication and division. (3.OA.A.4 & 3.OA.B.6). This allows for more coherent instruction that integrates the inverse relationship between multiplication and division rather than teaching them in isolation. • Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$. Understand division as an unknown-factor problem (e.g., find $32 \div 8$ by finding the number that makes 32 when multiplied by 8). Emphasizing the use of Table 2 problem types.</i>
3.OA.B.5	Apply properties of operations as strategies to multiply	• Note that students do not need to know the formal terms for

	and divide. Properties include commutative and associative properties of multiplication and the distributive property. (Students do not need to use the formal terms for these properties.)	the properties, and assessments should reflect that.
3.OA.B.6	Understand division as an unknown-factor problem (e.g., find $32 \div 8$ by finding the number that makes 32 when multiplied by 8).	This standard can be combined with 3.OA.A.4 for clarity of representing and solving problems involving whole number multiplication and division.
3.OA.C.7	Fluently multiply and divide within 100. By the end of Grade 3, know from memory all multiplication products through 10×10 and division quotients when both the quotient and divisor are less than or equal to 10.	This standard pairs best when utilized in the domains of Operations and Algebraic Thinking (OA) and Number and Operations in Base Ten (NBT).
3.OA.D.9	Identify patterns in the addition table and the multiplication table and explain them using properties of operations (e.g., observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends).	This standard should not be taught in isolation but should be wrapped into the fluency standards (3.NBT.A.2 for addition and subtraction and 3.OA.C.7 for multiplication and division).
3.OA.D.10	When solving problems, assess the reasonableness of answers using mental computation and estimation strategies, including rounding.	This standard should not be taught in isolation but should be wrapped into OA and NBT standards.
3.NBT.A.3	Multiply one-digit whole numbers by multiples of 10 in the range 10 to 90 using strategies based on place value and the properties of operations (e.g., 9×80, 5×60).	- This standard emphasizes using place value and the properties of operations, helping students understand the structure of our base-10 number system. - Mastery of this skill prepares students for multi-digit multiplication in Grade 4 (e.g., 34×56) by establishing strategies like decomposing numbers and recognizing patterns in place value. - Understanding how to multiply by multiples of 10 lays the groundwork for advanced arithmetic concepts, such as working with decimals (e.g., multiplying 0.5×20 in Grade 5) and scientific notation in later grades.
3.MD.A.2	Measure and estimate liquid volumes and masses of objects using metric units. (Excludes compound units such as cm^3 and finding the geometric volume of a	Measurement activities are flexible and can support broader instructional goals without isolating them as essential Grade

	container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units. Excludes multiplicative comparison problems (problems involving notions of “times as much”). See <i>Table 2</i> .	3 content.
3.MD.C.5	Understand area as an attribute of plane figures and understand concepts of area measurement.	• Mastery of these standards is essential for future success in mathematics. It connects directly to Grade 4 standards involving area models for multiplication and division (e.g., 4.MD.A), and it supports Grade 5 geometry and algebraic thinking related to the coordinate plane and volume. • Area and perimeter are foundational concepts, critical to the progression that bridges arithmetic and geometry. Understanding these concepts helps students develop spatial reasoning and apply operations like multiplication and addition in meaningful, real-world contexts.
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.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 (e.g., square cm, square m, square in, square ft, and improvised units).	
3.MD.C.7	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.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.C.7.d	Understand that rectilinear figures can be decomposed into non-overlapping rectangles and that the sum of the areas of these rectangles is identical to the area of the original rectilinear figure. Apply this technique to solve problems in real-world contexts.	

3.MD.C.8	Solve real-world and mathematical problems involving perimeters of plane figures and areas of rectangles, including finding the perimeter given the side lengths, finding an unknown side length. Represent rectangles with the same perimeter and different areas or with the same area and different perimeters.	
3.MD.A.1b	Solve word problems involving money through \$20.00, using symbols \$, ".", ¢.	• This standard should not be taught in isolation but should be wrapped into the fluency standards (3.NBT.A.2 for addition and subtraction and 3.OA.C.7 for multiplication and division)

3. Develop understanding of fractions as numbers, especially unit fractions. Students develop an understanding of fractions as numbers, beginning with unit fractions. Students understand that the size of a fractional part is relative to the size of the whole. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on recognizing equal numerators or denominators.

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3.NBT.A Use Place Value Understanding and Properties of Operations to Perform Multi-Digit Arithmetic

3.MD.C Represent and Interpret Data

Coding	Standard	Justification
3.NF.A.2.b	Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Understand that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line including values greater than 1.	- Fractions are a cornerstone of middle school math, including proportional reasoning, algebra, and geometry. - Struggling with fractions is one of the most significant barriers to success in higher-level math, making mastery of the 3.NF.A cluster is non-negotiable.
3.NF.A.3.a	Understand two fractions as equivalent if they have the same relative size compared to 1 whole.	Attends to unit fractions as a number and focuses on the importance of their equivalence.
3.NF.A.3.d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Understand that comparisons are valid only when the two fractions refer to the same whole. Record results of comparisons with the symbols $>$, $=$, or $<$, and justify	- The emphasis should be on reasoning about their size. - Encompasses comparison, the whole, and reasoning strategies

	conclusions.	
Additional standards that support the big ideas of the grade level.		
3.NF.A.1	Understand a fraction ($1/b$) as the quantity formed by one 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.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. Understand that each part has size $1/b$ and that the end point of the part based at 0 locates the number $1/b$ on the number line.	
3.NF.A.2.c	Understand a fraction $1/b$ as a special type of fraction that can be referred to as a unit fraction (e.g. $1/2$, $1/4$).	This is embedded in 3.NF.A.2.b
3.NF.A.3.b	Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent.	
3.NF.A.3.c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	
3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch to the nearest quarter-inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	Line plots and measurement activities are flexible and can support broader instructional goals without isolating them as essential Grade 3 content.
3.G.A.2	Partition shapes into b parts with equal areas. Express the area of each part as a unit fraction $1/b$ of the whole. (Grade 3 expectations are limited to fractions with denominators $b = 2,3,4,6,8$.)	This standard should not be taught in isolation, but should be wrapped into the domain of Number and Operations-Fractions (NF)
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,	This standard should not be taught in isolation

	rectangles, and squares as examples of quadrilaterals, and draw examples, quadrilaterals that do not belong to any of these subcategories.	
3.MD.A.1a	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., representing the problem on a number line diagram).	