Arizona's Draft Standards
Mathematics

First Grade

ARIZONA DEPARTMENT OF EDUCATION
HIGH ACADEMIC STANDARDS FOR STUDENTS
Draft Standards for Public Comment

First Grade Overview

Operations and Algebraic Thinking (OA)

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract through 10.
- Work with addition and subtraction equations.

Number and Operations in Base Ten (NBT)

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data (MD)

- Measure lengths indirectly and by iterating length units.
- Work with time and money.
- Represent and interpret data.

Geometry (G)

- Reason with shapes and their attributes.

Standards for Mathematical Practices (MP)

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

First Grade: Critical Areas

In first grade, instructional time should focus on four critical areas:

1. Developing understanding of addition, subtraction, and strategies for addition and subtraction through 20.
2. Developing understanding of whole number relationships and place value, including grouping in tens and ones.
3. Developing understanding of linear measurement.
4. Reasoning about attributes of and composing and decomposing geometric shapes.

More learning time in 1st Grade should be devoted to working with whole numbers than to other topics.

(1) Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models, to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction. They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties to solve addition and subtraction problems through 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.

(2) Students develop, discuss, and use efficient, accurate, and flexible strategies to add within 100 and subtract multiples of 10. They compare whole numbers (through 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

(3) Students develop an understanding of the meaning and processes of measurement, including iteration (finding the length of an object with repeated equal-sized units) and for indirect measurement.

(4) Students compose and decompose plane or solid figures and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

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.

First Grade: Mathematics Standards	
Operations and Algebraic Thinking (OA)	
1.OA.A	**Represent and solve problems involving addition and subtraction.**
1.OA.A.1	Use addition and subtraction through 20 to solve word problems involving multiple problem types (see Table 1) using a variety of strategies.
1.OA.A.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20 using objects, drawings, and equations with a symbol for the unknown number to represent the problem. (See Table 1)
1.OA.B	**Understand and apply properties of operations and the relationship between addition and subtraction.**
1.OA.B.3	Apply properties of operations (commutative and associative properties of addition) as strategies to add and subtract through 20. (Students need not use formal terms for these properties.)
1.OA.B.4	Understand subtraction through 20 as an unknown-addend problem. (See Table 1)
1.OA.C	**Add and subtract through 10.**
1.OA.C.5	Fluently add and subtract through 10.
1.OA.D	**Work with addition and subtraction equations.**
1.OA.D.6	Understand the meaning of the equal sign, regardless of its placement within an equation, and determine if equations involving addition and subtraction are true or false.
1.OA.D.7	Determine the unknown whole number in any position in an addition or subtraction equation relating three whole numbers.

Number and Operations in Base Ten (NBT)	
1.NBT.A	**Extend the counting sequence.**
1.NBT.A.1	Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
1.NBT.B	**Understand place value.**
1.NBT.B.2	Understand that the two digits of a two-digit number represent groups of tens and some ones. Understand the following as special cases: a. 10 can be thought of as a group of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
1.NBT.B.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
1.NBT.C	**Use place value understanding and properties of operations to add and subtract.**
1.NBT.C.4	Add through 100 using models and/or strategies based on place value, properties of operations, and the relationship between addition and subtraction.
1.NBT.C.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
1.NBT.C.6	Add and subtract multiples of 10 through 100 using models and/or strategies based on place value, properties of operations, and the relationship between addition and subtraction.
1.NBT.C.7	Demonstrate understanding of addition and subtraction through 20 using a variety of place value strategies, properties of operations, and the relationship between addition and subtraction.

Measurement and Data (MD)	
1.MD.A	**Measure lengths indirectly and by iterating length units.**
1.MD.A.1	Order three objects by length. Compare the lengths of two objects indirectly by using a third object.
1.MD.A.2	Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
1.MD.B	**Work with time and money.**
1.MD.B.3	Tell and write time in hours and half-hours using analog and digital clocks.
1.MD.B.4	Identify coins by name and value (pennies, nickels, dimes and quarters).
1.MD.C	**Represent and interpret data.**
1.MD.C.5	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Geometry (G)	
1.G.A	**Reason with shapes and their attributes.**
1.G.A.1	Distinguish between defining attributes (open, closed, number of sides, vertices) versus non-defining attributes (color, orientation, size) for two-dimensional shapes; build and draw shapes to possess defining attributes.
1.G.A.2	Compose two-dimensional shapes or three-dimensional shapes to create a composite shape and compose new shapes from the composite shape.
1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves and fourths. Understand that decomposing into more equal shares creates smaller shares.
Standards for Mathematical Practice (MP)	
1.MP	**Standards for Mathematical Practice**
1.MP.1	Make sense of problems and persevere in solving them. Mathematically proficient students explain to themselves the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. While engaging in productive struggle to solve a problem, they continually ask themselves, “Does this make sense?" to monitor and evaluate their progress and change course if necessary. Once they have a solution, they look back at the problem to determine if the solution is reasonable and accurate. Mathematically proficient students check their solutions to problems using different methods, approaches, or representations. They also compare and understand different representations of problems and different solution pathways, both their own and those of others.

1.MP.2	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. Students can contextualize and decontextualize problems involving quantitative relationships. They contextualize quantities, operations, and expressions by describing a corresponding situation. They decontextualize a situation by representing it symbolically. As they manipulate the symbols, they can pause as needed to access the meaning of the numbers, the units, and the operations that the symbols represent. Mathematically proficient students know and flexibly use different properties of operations, numbers, and geometric objects and when appropriate they interpret their solution in terms of the context.
1.MP.3	Construct viable arguments and critique the reasoning of others. Mathematically proficient students construct mathematical arguments (explain the reasoning underlying a strategy, solution, or conjecture) using concrete, pictorial, or symbolic referents. Arguments may also rely on definitions, assumptions, previously established results, properties, or structures. Mathematically proficient students make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. Mathematically proficient students present their arguments in the form of representations, actions on those representations, and explanations in words (oral or written). Students critique others by affirming, questioning, or debating the reasoning of others. They can listen to or read the reasoning of others, decide whether it makes sense, ask questions to clarify or improve the reasoning, and validate or build on it. Mathematically proficient students can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.
1.MP.4	Model with mathematics. Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. When given a problem in a contextual situation, they identify the mathematical elements of a situation and create a mathematical model that represents those mathematical elements and the relationships among them. Mathematically proficient students use their model to analyze the relationships and draw conclusions. They interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

1.MP.5	Use appropriate tools strategically. Mathematically proficient students consider available tools when solving a mathematical problem. They choose tools that are relevant and useful to the problem at hand. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful; recognizing both the insight to be gained and their limitations. Students deepen their understanding of mathematical concepts when using tools to visualize, explore, compare, communicate, make and test predictions, and understand the thinking of others.
1.MP.6	Attend to precision. Mathematically proficient students clearly communicate to others and craft careful explanations to convey their reasoning. When making mathematical arguments about a solution, strategy, or conjecture, they describe mathematical relationships and connect their words clearly to their representations. Mathematically proficient students understand meanings of symbols used in mathematics, calculate accurately and efficiently, label quantities appropriately, and record their work clearly and concisely.
1.MP.7	Look for and make use of structure. Mathematically proficient students use structure and patterns to provide form and stability when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.
1.MP.8	Look for and express regularity in repeated reasoning. Mathematically proficient students look for and describe regularities as they solve multiple related problems. They formulate conjectures about what they notice and communicate observations with precision. While solving problems, students maintain oversight of the process and continually evaluate the reasonableness of their results. This informs and strengthens their understanding of the structure of mathematics which leads to fluency.