



Arizona's Draft Standards Mathematics

Kindergarten

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

Kindergarten Overview

Counting and Cardinality (CC)

- Know number names and the count sequence.
- Understand the relationship between numbers and quantities.
- Compare numbers and quantities.

Operations and Algebraic Thinking (OA)

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten (NBT)

- Work with numbers 11–19 to gain foundations for place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data (MD)

- Describe and compare measurable attributes.
- Classify objects and count the number of objects in each category.

Geometry (G)

- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

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.

Kindergarten: Critical Areas

In Kindergarten, instructional time should focus on two critical areas:

- 1. Represent, relate, and operate on whole numbers through 10, initially with sets of objects.**
- 2. Describe shapes and space.**

More learning time in Kindergarten should be devoted to quantity and number than to other topics.

(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 - 2 = 5$. (Kindergarten students should see addition and subtraction equations, and student writing of equations is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

(2) Students describe their physical world using geometric ideas (shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional and three-dimensional shapes presented in a variety of ways with different sizes or orientations. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

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.

Kindergarten: Mathematics Standards

Counting and Cardinality (CC)

K.CC.A	Know number names and the count sequence.
K.CC.A.1	Count to 100 by ones and by tens.
K.CC.A.2	Count forward beginning from a given number instead of having to begin at 1.
K.CC.A.3	Write numbers from 0–20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).
K.CC.B	Understand the relationship between numbers and quantities.
K.CC.B.4	Connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger.
K.CC.B.5	Count to answer questions about “how many?” when 20 or fewer objects are arranged in a line, a rectangular array, or a circle or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.
K.CC.C	Compare numbers and quantities.
K.CC.C.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group. (Include groups with up to ten objects.)
K.CC.C.7	Compare two numbers between 1 and 10 presented as written numerals.

Operations and Algebraic Thinking (OA)	
K.OA.A	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
K.OA.A.1	Represent addition and subtraction with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations.
K.OA.A.2	Use addition and subtraction through 10 to solve word problems involving multiple problem types (See Table 1), using a variety of strategies.
K.OA.A.3	Decompose numbers less than or equal to 10 into pairs in more than one way by using objects or drawings, and record each decomposition with a drawing or equation.
K.OA.A.4	For any number from 1 to 9, find the number that makes 10 when added to the given number by using objects or drawings, and record the answer with a drawing or equation.
K.OA.A.5	Fluently add and subtract through 5.
Number and Operations in Base Ten (NBT)	
K.NBT.A	Work with numbers 11-19 to gain foundations for place value.
K.NBT.A.1	Compose and decompose numbers from 11 to 19 into ten ones and additional ones by using objects or drawings and record each composition or decomposition with a drawing or equation.
K.NBT.B	Use place value understanding and properties of operations to add and subtract.
K.NBT.B.2	Demonstrate conceptual understanding of addition and subtraction through 10 using a variety of strategies.

Measurement and Data (MD)	
K.MD.A	Describe and compare measurable attributes.
K.MD.A.1	Describe several measurable attributes of a single object such as length and weight.
K.MD.A.2	Directly compare two objects with a measurable attribute in common, to see which object has “more of” or “less of” the attribute, and describe the difference.
K.MD.B	Classify objects and count the number of objects in each category.
K.MD.B.3	Classify objects or people into given categories; count the number in each category and sort the categories by count. (Note: limit category counts to be less than or equal to 10.)
Geometry (G)	
K.G.A	Identify and describe shapes.
K.G.A.1	Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
K.G.A.2	Correctly name shapes regardless of their orientation or overall size.
K.G.A.3	Identify shapes as two-dimensional (lying in a plane, flat) or three-dimensional (solid).
K.G.B	Analyze, compare, create, and compose shapes.
K.G.B.4	Analyze and compare two-dimensional and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities and differences.
K.G.B.5	Model shapes in the world by building and drawing shapes.
K.G.B.6	Compose simple shapes to form larger shapes.

Standards for Mathematical Practice (MP)	
K.MP	Standards for Mathematical Practices
K.MP.1	<p>Make sense of problems and persevere in solving them.</p> <p>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.</p>
K.MP.2	<p>Reason abstractly and quantitatively.</p> <p>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.</p>

K.MP.3	<p>Construct viable arguments and critique the reasoning of others.</p> <p>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.</p> <p>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.</p>
K.MP.4	<p>Model with mathematics.</p> <p>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.</p>

K.MP.5	<p>Use appropriate tools strategically.</p> <p>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.</p>
K.MP.6	<p>Attend to precision.</p> <p>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.</p>
K.MP.7	<p>Look for and make use of structure.</p> <p>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.</p>
K.MP.8	<p>Look for and express regularity in repeated reasoning.</p> <p>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.</p>