Kindergarten – Summary of Revisions and Planning Guidance - Arizona *Mathematics Standards - Adopted in 2016*

Additions to Kindergarten

- **K.NBT.B** –Cluster B: Use place value understanding and properties of operations to add and subtract.
- **K.NBT.B.2** – Demonstrate understanding of addition and subtraction within 10 using place value.

Deletions from Kindergarten

- **K.G** - **Geometry Domain** - Specific shapes removed from the domain and are in individual standards when needed.

Parameter Changes/Clarifications

K.CC.A.2	Specific example of what this may sound like is included to provide clarity.
K.CC.C.7	Expanded comparisons from 1 to 10 to include 0 to 10.
K.OA.A.1	The strategies listed were replaced with the word "concretely" to remove instructional limits.
K.OA.A.2	Reference to Table 1 is included.
K.OA.A.3	The e.g. is restated to include: using fingers, objects, symbols, tally marks, drawings, or expression.
K.OA.A.4	The e.g. is restated to include: using fingers, objects, symbols, tally marks, drawings, or equation.
K.NBT.B	**NEW CLUSTER**
K.NBT.B.2	**NEW STANDARD**
K.MD.A.1	Removed the redundancy in the standard for clarity.
K.G.A	Specific shapes were removed from the cluster and put with the appropriate standard of K.G.A.2.

Fluency Expectations

K	**K.OA.A.5** Fluently add and subtract within 5.
1st	**1.OA.C.6 -** Fluently add and subtract within 10.
2nd	**2.OA.B.2 -** Fluently add and subtract within 20. By the end of 2nd grade, know from memory all sums of two one-digit numbers. **2.NBT.B.5 -** Fluently add and subtract within 100.

Fluency Definition

Fluency standard instruction should begin at the beginning of the year and continue throughout the school year.

Wherever the word *fluently* appears in a content standard, the word includes ***efficiently, accurately, flexibly,*** *and* ***appropriately***. Being fluent means that students are able to choose flexibly among methods and strategies to solve contextual and mathematical problems, they understand and are able to explain their approaches, and they are able to produce accurate answers efficiently.

- **Efficiency**—carries out easily, keeps track of sub-problems, and makes use of intermediate results to solve the problem.
- **Accuracy**—reliably produces the correct answer.
- **Flexibility**—knows more than one approach, chooses a viable strategy, and uses one method to solve and another method to double-check.
- **Appropriately**—knows when to apply a particular procedure.

Defining Standards, Curriculum and Instruction

Standards – What a student needs to know, understand, and be able to do by the end of each grade. Standards build across grade levels in a progression of increasing understanding and through a range of cognitive demand levels. Standards are adopted at the state level by the State Board of Education.

Curriculum – The resources used for teaching and learning the standards. Curricula are adopted at a local level by districts and schools.

Instruction – The methods used by teachers to teach their students. Instructional techniques are employed by individual teachers in response to the needs of the students in their classes to help them progress through the curriculum in order to master the standards.

Kindergarten Content Emphasis	
Counting and Cardinality (CC)	
●	Know number names and the count sequence.
●	Count to tell the number of objects.
●	Compare numbers.
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 measureable attributes
▲	Classify objects and count the number of objects in categories
Geometry (G)	
▲	Identify and describe shapes
▲	Analyze, compare, create and compose shapes
● - Major Content ▲ - Supporting Content	

Major Content (●) from the content emphasis section should account for approximately 70% of instructional time. The majority of learning time in Kindergarten should focus on quantity and number.

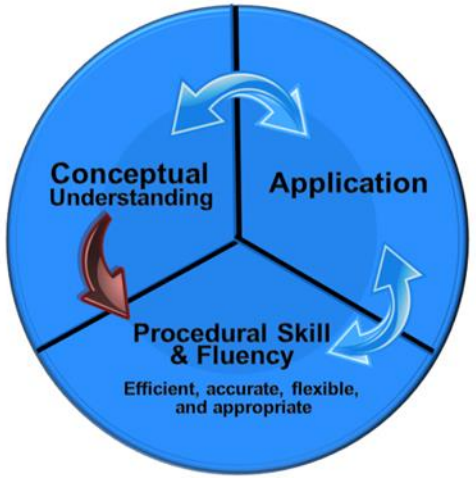
Standards that reference Table 1 in Kindergarten		
K.OA.A.1	**K.0A.A.2**	**K.NBT.B.2**

The Standards for Mathematical Practice

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.

The Arizona Mathematics Standards now include narratives for each of the 8 Mathematical Practices

Balance of Rigor in the Math Classroom



"Tasks that ask students to perform a memorized procedure in a routine manner lead to one type of opportunity for student thinking; tasks that require students to think conceptually and that stimulate students to make connections lead to a different set of opportunities for student thinking."
(Stein & Smith, 1998)

Adopted 2010		Adopted 2016		
Counting and Cardinality (CC)		**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** **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 within the known sequence (instead of having to begin at 1).		**K.CC.A.2**	Count forward from a given number other than one, within the known sequence (e.g., "Starting at the number 5, count up to 11.").
	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.A.3**	Write numbers from 0 to 20. Represent a number of objects with a written numeral 0 to 20 (with 0 representing a count of no objects).
K.CC.B	**Count to tell the number of objects.**			
	K.CC.B.4. Understand the relationship between numbers and quantities; 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** **Count to tell the number of objects**	**K.CC.B.4**	Understand the relationship between numbers and quantities; 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 (one to one correspondence). 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 (cardinality). c. Understand that each successive number name refers to a quantity that is one larger (hierarchical inclusion).
	K.CC.B.5. Count to answer "how many?" questions about as many as 20 things 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.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 to 20, count out that many objects.

K.CC.C	**Compare numbers.**			
	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, e.g., by using matching and counting strategies. (Include groups with up to ten objects)	**K.CC.C** **Compare Numbers**	**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.		**K.CC.C.7**	Compare two numbers between 0 and 10 presented as written numerals.
Operations and Algebraic Thinking (OA)		**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.0A.A.1. Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Drawings need not show details, but should show the mathematics in the problems. This applies wherever drawings are mentioned in the Standards.)	**K.OA.A** **Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.**	**K.0A.A.1**	Represent addition and subtraction concretely. *See Table 1.*
	K.0A.A.2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.		**K.0A.A.2**	Solve addition and subtraction word problems and add and subtract within 10. *See Table 1.*
	K.0A.A.3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).		**K.0A.A.3**	Decompose numbers less than or equal to 10 into pairs in more than one way (e.g., using fingers, objects, symbols, tally marks, drawings, expressions).
	K.0A.A.4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.		**K.0A.A.4**	For any number from 1 to 9, find the number that makes 10 when added to the given number (e.g., using fingers, objects, symbols, tally marks, drawings, or equation).
	K.0A.A.5. Fluently add and subtract within 5.		**K.0A.A.5**	Fluently add and subtract within 5.

Number and Operations in Base Ten (NBT)		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 some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	**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, drawings and/or equations. Understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones (e.g., 18 = 10 + 8).
		K.NBT.B **Use place value understanding and properties of operations to add and subtract.**	**K.NBT.B.2**	Demonstrate understanding of addition and subtraction within 10 using place value. *See Table 1.*
Measurement and Data (MD)		**Measurement and Data (MD)**		
K.MD.A	**Describe and compare measurable attributes.**			
	K.MD.A.1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	**K.MD.A** **Describe and compare measurable attributes.**	**K.MD.A.1**	Describe measurable attributes of a single object (e.g. length and weight).
	K.MD.A.2. Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*		**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 (e.g., directly compare the length of 10 cubes to a pencil and describe one as longer or shorter).
K.MD.B	**Classify objects and count the number of objects in each category.**			
	K.MD.B.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10).	**K.MD.B** **Classify objects and count the number of objects in categories.**	**K.MD.B.3**	Classify objects 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)		Geometry (G)		
K.G.A	**Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).**			
	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** **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 orientations or overall size.		**K.G.A.2**	Correctly name shapes regardless of their orientation or overall size (e.g., circle, triangle, square, rectangle, rhombus, trapezoid, hexagon, cube, cone, cylinder, sphere).
	K.G.A.3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").		**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- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).	**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, differences, parts (e.g., number of sides and vertices/corners), and other attributes (e.g. having sides of equal length).
	K.G.B.5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.		**K.G.B.5**	Model shapes in the world by building shapes from components (e.g., use sticks and clay balls) and drawing shapes.
	K.G.B.6. Compose simple shapes to form larger shapes. For example*, "Can you join these two triangles with full sides touching to make a rectangle?"*		**K.G.B.6**	Use simple shapes to form composite shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

Standards for Mathematical Practice

K.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.

K.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.

K.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 or questioning 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.

K.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.

K.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.

K.MP.6 Attend to precision.
Mathematically proficient students clearly communicate to others using appropriate mathematical terminology, and craft explanations that 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.

K.MP.7 Look for and make use of structure.
Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts 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.

K.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.