KINDERGARTEN MATHEMATICS

Overview:

Domains	Counting and Cardinality	Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
Clusters	• Know number names and the count sequence • Counting to tell the number of objects • Compare numbers	• Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from	• Work with numbers 11 – 19 to gain foundations for place value	• Describe and compare measurable attributes • Classify objects and count the number of objects in each category	• Identify and describe shapes • Analyze, compare, create and compose shapes
Mathematical Practices	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.	
Major Interdisciplinary Kindergarten Units	**English Language Arts: across the content areas** • Reading • Writing • Speaking & Listening • Language	**Indian Education for All Titles** • *Dancing With Cranes* by Ron Hall • *Good Luck Cat* by Joy Harjo • *Little Duck Sikihpsis* by Beth Cuthand	**Science** • Properties of Matter • Dinosaurs/Fossils • Observe and Describe Animals	**Social Studies** **Learning and Working Now and Long Ago** • Learning to Work Together • Exploring, Creating, and Communicating • Reaching Out to Times Past	

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

1. Representing and comparing whole numbers, initially with sets of objects
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 in kindergarten 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. Describing shapes and space
Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

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

Domain: Counting and Cardinality

K.CC

Cluster: Know number names and the count sequence.

1. Count to 100 by ones and by tens.
    - I can count to 100 by ones.
    - I can count to 100 by tens.

2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
    - I can count forward from any given number up to 100.

3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
    - I can write my numbers from 0 to 20.
    - I can write the number that names how many objects are in a group 0 to 20.

Cluster: Count to tell the number of objects.

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 from a variety of cultural contexts, including those of Montana American Indians.
    - I can count objects by touching and saying the correct number for each object.
    a. 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 from a variety of cultural content, including those of Montana American Indians.
    - I can name the number of objects in a group after counting.
    - I can explain the number of objects in a group does not change even when I start counting with a different object in that group or if the group has been mixed up.
    b. Understand that each successive number name refers to a quantity that is one larger.
    - I can name the number that is one more than the group shown.
    - I can recognize a group that is one more than the group shown.

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.
    - I can count scattered objects up to groups of 10.
    - I can count organized objects that are in a group up to 20.
    - I can count out the correct amount of objects, when given a number, to make a group up to 20.

Cluster: Compare numbers.

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. (Note: Include groups with up to ten objects.)
    - I can compare two groups (0 to 10) and identify which group is greater than, less than, or equal to.

7. Compare two numbers between 1 and 10 presented as written numerals.
    - I can compare two numbers from 0 to 10 and identify which is larger/smaller, more/less, greater than/less than.

Domain: Operations and Algebraic Thinking
K.OA
Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
1. Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Note: Drawings need not show details, but should show the mathematics in the problem—this applies wherever drawings are mentioned in the Standards.
    - I can use a variety of strategies to add (including fingers, objects, pictures, sounds, etc.).
    - I can use a variety of strategies to subtract (including fingers, objects, pictures, sounds, etc.).

2. Solve addition and subtraction word problems from a variety of cultural contexts, including those of Montana American Indians, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
    - I can solve a word problem using addition and subtraction.

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).
    - I can decompose a number from 1 to 10 and show it in different ways.

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.
    a. I can be given a number from 1 to 10, find the number to make 10, and show it in different ways.

5. Fluently add and subtract within 5.
    - I can fluently add and subtract any of the numbers 1 to 5.

Domain: Number and Operations in Base Ten
K.NBT
Cluster: Work with numbers 11-19 to gain foundations for place value.
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 (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
    - I can compose and decompose the numbers from 11 to 19 by showing how many tens and ones make a number.

Domain: Measurement and Data

K.MD

Cluster: Describe and compare measurable attributes.

1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
    - I can describe different ways to measure an object.

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.*
    - I can compare two objects by measurement and describe how they are different.

Cluster: Classify objects and count the number of objects in each category.

3. Classify objects from a variety of cultural contexts, including those of Montana American Indians, into given categories; count the numbers of objects in each category and sort the categories by count (Note: Limit category counts to be less than equal to 10.).
    - I can sort objects into groups so that each group has something the same (color, shape, size, etc.).
    - I can count the objects in a group and put the groups in order from least to greatest.

Domain: Geometry

K.G

Cluster: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

1. Describe objects, including those of Montana American Indians, 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*.
    - I can identify and describe objects using names of shapes.
    - I can describe the position of an object using positional words such as, *above, below, besides, in front of, behind,* and *next to*.

2. Correctly name shapes regardless of their orientations or overall size.
    - I can name the flat/ two-dimensional and solid/ three-dimensional shapes even if they are different sizes and have been moved around. (rotated, flipped, etc.)

3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
    - I can name the flat/ two-dimensional shapes.
    - I can name the solid/three-dimensional shapes.

Cluster: Analyze, compare, create, and compose shapes.

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).
    - I can explain and compare the parts of a flat/two-dimensional shape.
    - I can explain and compare the parts of a solid/three-dimensional shape.

5. Model shapes in the world from a variety of cultural contexts, including those of Montana American Indians, by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
    - I can create and draw flat/two-dimensional shapes and solid/three-dimensional shapes.

6. Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*
    - I can use simple shapes to compose larger shapes.

Standards	Explanations and Examples
Students are expected to:	**The Standards for Mathematical Practice describe ways in which students ought to engage with the subject matter as they grow in mathematical maturity and expertise.**
K.MP.1. Make sense of problems and persevere in solving them.	In Kindergarten, students begin to build the understanding that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Younger students may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" or they may try another strategy.
K.MP.2. Reason abstractly and quantitatively.	Younger students begin to recognize that a number represents a specific quantity. Then, they connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities.
K.MP.3. Construct viable arguments and critique the reasoning of others.	Younger students construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They also begin to develop their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.
K.MP.4. Model with mathematics.	In early grades, students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed.
K.MP.5. Use appropriate tools strategically.	Younger students begin to consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, kindergarteners may decide that it might be advantageous to use linking cubes to represent two quantities and then compare the two representations side-by-side.
K.MP.6. Attend to precision.	As kindergarteners begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning.
K.MP.7. Look for and make use of structure.	Younger students begin to discern a pattern or structure. For instance, students recognize the pattern that exists in the teen numbers; every teen number is written with a 1 (representing one ten) and ends with the digit that is first stated. They also recognize that $3 + 2 = 5$ and $2 + 3 = 5$.
K.MP.8. Look for and express regularity in repeated reasoning.	In the early grades, students notice repetitive actions in counting and computation, etc. For example, they may notice that the next number in a counting sequence is one more. When counting by tens, the next number in the sequence is "ten more" (or one more group of ten). In addition, students continually check their work by asking themselves, "Does this make sense?"

Standard	Kindergarten Vocabulary (bold indicates Montana Common Core Standards vocabulary)
K.CC.1	**count**, number, sequence, ones, tens
K.CC.2	**count,** number
K.CC.3	**count,** number, object, numeral
K.CC.4	**count**, number, pair, quantity
K.CC.5	**count**, number, scattered, organized, array, line
K.CC.6	number, compare, **greater than, less than, equal to,** matching, strategies
K.CC.7	number, compare, **greater than, less than, equal to**, larger/smaller, more/less, identify
K.OA.1	**addition, add, subtraction, subtract, expression, equation**
K.OA.2	**addition, add, subtraction, subtract**, solve, word problem
K.OA.3	**decompose, equation**
K.OA.4	**add, make 10, addend, equation**
K.OA.5	**add, subtract**
K.NBT.1	**compose, decompose, equation**
K.MD.1	measure, describe, different, length, weight, height, longer, shorter, taller, heavier, lighter, attribute
K.MD.2	compare, attribute, more, less
K.MD.3	same, sort, category, classify
K.G.1	**shapes,** square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere, position word, above, below, beside, in front of, behind, next to, between, under, over, by
K.G.2	**shapes,** square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere, 2-dimensional, 3-dimensional
K.G.3	**shapes**, square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere, 2-dimensional, 3-dimensional, solid, flat,
K.G.4	**shapes,** square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere, 2-**dimensional, 3-dimensional,** corners, sides, vertex, similarities
K.G.5	**shapes,** square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere, 2-dimensional, 3-dimensional
K.G.6	**shapes,** square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere, 2-dimensional, 3-dimensional, **compose**