Standards for Mathematical Practice in Kindergarten

The Common Core State Standards for Mathematical Practice are expected to be integrated into every mathematics lesson for all students Grades K-12. Below are a few examples of how these Practices may be integrated into tasks that students complete.

Practice	Explanation and Examples
1. **Make Sense and Persevere in Solving Problems.**	Mathematically proficient students in Kindergarten begin to develop effective dispositions toward problem solving. In rich settings in which informal and formal possibilities for solving problems are numerous, young children develop the ability to focus attention, test hypotheses, take reasonable risks, remain flexible, try alternatives, exhibit self-regulation, and persevere (Copley, 2010). Using both verbal and nonverbal means, kindergarten students begin to explain to themselves and others the meaning of a problem, look for ways to solve it, and determine if their thinking makes sense or if another strategy is needed. As the teacher uses thoughtful questioning and provides opportunities for students to share thinking, kindergarten students begin to reason as they become more conscious of what they know and how they solve problems.
2. **Reason abstractly and quantitatively.**	Mathematically proficient students in Kindergarten begin to use numerals to represent specific amount (quantity). For example, a student may write the numeral "11" to represent an amount of objects counted, select the correct number card "17" to follow "16" on the calendar, or build a pile of counters depending on the number drawn. In addition, kindergarten students begin to draw pictures, manipulate objects, use diagrams or charts, etc. to express quantitative ideas such as a joining situation (Mary has 3 bears. Juanita gave her 1 more bear. How many bears does Mary have altogether?), or a separating situation (Mary had 5 bears. She gave some to Juanita. Now she has 3 bears. How many bears did Mary give Juanita?). Using the language developed through numerous joining and separating scenarios, kindergarten students begin to understand how symbols (+, -, =) are used to represent quantitative ideas in a written format.
3. **Construct viable arguments and critique the reasoning of others.**	In Kindergarten, mathematically proficient students begin to clearly express, explain, organize and consolidate their math thinking using both verbal and written representations. Through opportunities that encourage exploration, discovery, and discussion, kindergarten students begin to learn how to express opinions, become skillful at listening to others, describe their reasoning and respond to others' thinking and reasoning. They begin to develop the ability to reason and analyze situations as they consider questions such as, "Are you sure…?" , "Do you think that would happen all the time…?", and "I wonder why…?"
4. **Model with mathematics.**	Mathematically proficient students in Kindergarten begin to experiment with representing real-life problem situations in multiple ways such as with numbers, words (mathematical language), drawings, objects, acting out, charts, lists, and number sentences. For example, when making toothpick designs to represent the various combinations of the number "5", the student writes the numerals for the various parts (such as "4" and "1") or selects a number sentence that represents that particular situation (such as 5 = 4 + 1)*.

	*According to CCSS, "Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten in encouraged, but it is not required". However, please note that it is not until First Grade when "Understand the meaning of the equal sign" is an expectation (1.OA.7).
5. Use appropriate tools strategically.	In Kindergarten, mathematically proficient students begin to explore various tools and use them to investigate mathematical concepts. Through multiple opportunities to examine materials, they experiment and use both concrete materials (e.g. 3- dimensional solids, connecting cubes, ten frames, number balances) and technological materials (e.g., virtual manipulatives, calculators, interactive websites) to explore mathematical concepts. Based on these experiences, they become able to decide which tools may be helpful to use depending on the problem or task. For example, when solving the problem, "There are 4 dogs in the park. 3 more dogs show up in the park. How many dogs are in the park?", students may decide to act it out using counters and a story mat; draw a picture; or use a handful of cubes.
6. **Attend to precision**	Mathematically proficient students in Kindergarten begin to express their ideas and reasoning using words. As their mathematical vocabulary increases due to exposure, modeling, and practice, kindergarteners become more precise in their communication, calculations, and measurements. In all types of mathematical tasks, students begin to describe their actions and strategies more clearly, understand and use grade-level appropriate vocabulary accurately, and begin to give precise explanations and reasoning regarding their process of finding solutions. For example, a student may use color words (such as blue, green, light blue) and descriptive words (such as small, big, rough, smooth) to accurately describe how a collection of buttons is sorted.
7. **Look for and make use of structure**	Mathematically proficient students in Kindergarten begin to look for patterns and structures in the number system and other areas of mathematics. For example, when searching for triangles around the room, kindergarteners begin to notice that some triangles are larger than others or come in different colors- yet they are all triangles. While exploring the part-whole relationships of a number using a number balance, students begin to realize that 5 can be broken down into sub-parts, such as 4 and 1 or 4 and 2, and still remain a total of 5.
8. **Look for and express regularity in repeated reasoning.**	In Kindergarten, mathematically proficient students begin to notice repetitive actions in geometry, counting, comparing, etc. For example, a kindergartener may notice that as the number of sides increase on a shape, a new shape is created (triangle has 3 sides, a rectangle has 4 sides, a pentagon has 5 sides, a hexagon has 6 sides). When counting out loud to 100, kindergartners may recognize the pattern 1-9 being repeated for each decade (e.g., Seventy-ONE, Seventy-TWO, Seventy- THREE… Eighty-ONE, Eighty-TWO, Eighty-THREE…). When joining one more cube to a pile, the child may realize that the new amount is the next number in the count sequence.

Kindergarten Critical Areas

The Critical Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction.

The Critical Areas for Kindergarten can be found on page 9 in the *Common Core State Standards for Mathematics*.

1. Representing, relating, and operating on 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.

Counting and Cardinality

• Know number names and the count sequence.

Count to 100 by ones and tens

Student Friendly/"I Can" statements	Resources	A
1. Recite numbers from 0 – 100, increasing by ones. 2. Recite numbers from 0 – 100, increasing by tens.	http://nlvm.usu.edu	

Count forward beginning from a given number within the known sequence (instead of having to begin at 1

Student Friendly/"I Can" statements	Resources	A
1. Count by ones, starting at one. 2. Count by ones, starting at a number other than one.		

Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 represent

Student Friendly/"I Can" statements	Resources	A
1. Write numbers from 0 – 20. 2. Count, with 1-1 correspondence, up to 10 objects. 3. Demonstrate, when shown a written number from 0 – 20, how many objects are represented by that number. 4. Represent the number of objects with a written number.		

• Count to tell the number of objects.

Understand the relationship between numbers and quantities; connect counting to cardinality.

Student Friendly/"I Can" statements	Resources	A
1. Count objects saying the number name in standard order.	http://nlvm.usu.edu	

When counting objects, say the number names in standard order, pairing each object with one and only or number name with one and only one object.

Student Friendly/"I Can" statements	Resources	A
1. When given a group of objects, will count using 1:1 correspondence. 2. When given a number, will present that number of objects to represent the number.		

Understand the last number name said tells the number of objects counted. The number of objects is the s arrangement or the order in which they were counted.

Student Friendly/"I Can" statements	Resources	A
1. Understand the last number named is the number of objects counted.		

Understand that each successive number name refers to a quantity that is one larger.

Student Friendly/"I Can" statements	Resources	A
1. Understand that each successive number name is one larger.		

Count to answer "how many?" questions about as many as 20 things arranged in a line, in a rectangular ar as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

Student Friendly/"I Can" statements	Resources	A
1. Count up to 20 objects that have been arranged in a line, rectangular array, or circle 2. Count as many as 10 items in a scattered configuration 3. Match each object with one and only one number name and each number with one and only one object 4. Conclude that the last number of the counted sequence signifies the quantity of the counted collection. 5. Given a number from 1-20, count out that many objects.		

• Compare numbers.

Identify whether the number of objects in one group is greater than, less than, or equal to the number of o
e.g. by using matching and counting strategies.

Student Friendly/"I Can" statements	Resources	A
1. Describe greater than, less than, or equal to. 2. Determine whether a group of 10 or fewer objects is greater than, less than, or equal to another group of 10 or fewer objects.	http://nlvm.usu.edu	

Compare two numbers between 1 and 10 presented as written numerals.

Student Friendly/"I Can" statements	Resources	A
1. Know the quantity of each numeral. 2. Determine whether a written number is greater than, less than, or equal to another written number.		

Operations and Algebraic Thinking

• Understand addition as putting together and adding to, and understand subtraction as t
taking from.

Represent addition and subtraction with objects, fingers, mental images, drawings, sounds *(e.g., claps)*, act
explanations, expressions, or equations.

Student Friendly/"I Can" statements	Resources	A
1. Know adding is putting together parts to make the whole. 2. Know subtracting is taking apart or taking away from the whole to find the other part. 3. Know the symbols (+, -, =) and the words (plus, minus, equal) for adding and subtracting. 4. Analyze addition or subtraction problem to determine whether to 'put together' or 'take apart'. 5. Model an addition/subtraction problem given a real-life story. 6. Represent addition and subtraction with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations in multiple ways, *e.g., 2+3=5, 5=2+3, ||+||| =||||, and vertically.* (Writing equations in kindergarten is not required but encouraged.)	http://nlvm.usu.edu	

Solve addition and subtraction word problems, and add and subtract within 10, *e.g., by using objects or dr*
problem.

Student Friendly/"I Can" statements	Resources	A
1. Add and subtract within 10 (Maximum sum and minuend is 10). 2. Solve addition and subtraction word problems within 10. 3. Use objects/drawings to represent an addition and subtraction word problem.		

Decompose numbers less than or equal to 10 into pairs in more than one way, *e.g., by using objects or dra*
decomposition by a drawing or equation *(e.g., 5 = 2 + 3 and 5 = 4 + 1).*

Student Friendly/"I Can" statements	Resources	A
1. Solve addition number sentences within 10. 2. Decompose numbers less than or equal		

to 10 into pairs in more than one way. 3. Use objects or drawings then record each composition by a drawing or writing an equation.		

For any number from 1 to 9, find the number that makes 10 when added to the given number, *e.g., by usi*
and record the answer with a drawing or equation.

Student Friendly/"I Can" statements	Resources	A
1. Know that two numbers can be added together to make ten 2. Using materials or representations, find the number that makes 10 when added to the given number for any number from 1 to 9, and record the answer using materials, representations, or equations.		

Fluently add and subtract within 5.

Student Friendly/"I Can" statements	Resources	A
1. Fluently with speed and accuracy add and subtract within 5.		Timed facts tests

Number and Operations in Base Ten

• Work with numbers 11–19 to gain foundations for place value.

Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objec
record each composition or decomposition by a drawing or equation *(e.g., 18 = 10 + 8);* understand that th
composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Student Friendly/"I Can" statements	Resources	A
1. Know that a (spoken) number (11-19) represents a quantity. 2. Understand that numbers 11-19 are composed of 10 ones and one, two, three, four, five, six, seven, eight, or nine ones. 3. Represent compositions or decompositions by a drawing or equation. 4. Compose numbers 11-19 into ten ones and some further ones using objects and drawings. 5. Decompose numbers 11-19 into ten ones and some further ones using objects and drawings.	http://nlvm.usu.edu	

Measurement and Data

• Describe and compare measurable attributes.

Describe measurable attributes of objects, such as length or weight. Describe several measurable attribute

Student Friendly/"I Can" statements	Resources	A
1. Understand the meaning of attribute. 2. Identify one attribute of an object. 3. Identify attributes of various objects. 4. Identify multiple attributes of a single object.	http://nlvm.usu.edu	

Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"
describe the difference. *For example, directly compare the heights of two children and describe one child a*

Student Friendly/"I Can" statements	Resources	A
1. Know the meaning of the following words: more/less, taller/shorter, etc. 2. Know that two objects can be compared using a particular attribute. 3. Compare two objects and determine which has more and which has less of the measureable attribute to describe the difference.		

• Classify objects and count the number of objects in categories.

Classify objects into given categories; count the numbers of objects in each category and sort the categorie

Student Friendly/"I Can" statements	Resources	A
1. Recognize non-measurable attributes such as shape, color 2. Recognize measurable attributes such as length, weight, height 3. Know what classify means 4. Know what sorting means 5. Know that a category is the group that an object belongs to according to a particular, selected attribute 6. Understand one to one correspondence with ten or less objects. Note: This target being included here depends on the ordering and grouping of content standards from Counting and Cardinality. 7. Classify objects into categories by particular attributes 8. Count objects in a given group. Note: This is addressed in another content standard.	http://nlvm.usu.edu	

	K.CC.5. It is important to integrate standards to assist students with making connections and building deeper understanding. 9. Sort objects into categories then determine the order by number of objects in each category (limit category counts to be less than or equal to ten) For example, if m&m's are categorized by the attribute of color, then are "sorted" or ordered by the number in each group (there are more red than green, the blue group has fewer than the green.)		

Geometry

• Identify and describe shapes.

Describe objects in the environment using names of shapes, and describe the relative positions of these ob
above, below, beside, in front of, behind, and next to.

Student Friendly/"I Can" statements	Resources	A
1. Identify objects. 2. Name objects. 3. Identify objects as 2- or 3- dimensional. 4. Describe positions such as *above, below, beside, in front of, behind, and next to*. 5. Determine the relative position of the 2-dimensional or 3-dimensional shapes within the environment, using the appropriate positional words.	http://nlvm.usu.edu	

Correctly name shapes regardless of their orientations or overall size.

Student Friendly/"I Can" statements	Resources	A
1. Know that size does not affect the name of the shape. 2. Know that orientation does not affect the name of the shape		

Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

Student Friendly/"I Can" statements	Resources	A
1. Identify 2-dimensional shapes as lying in a plane and flat 2. Identify 3-dimensional shapes as a solid		

• Analyze, compare, create, and compose shapes.

Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informa
their similarities, differences, parts *(e.g., number of sides and vertices/"corners") and other attributes (e.g.,*
length).

Student Friendly/"I Can" statements	Resources	A
1. Identify and count number of sides, vertices/"corners", and other attributes of shapes 2. Describe similarities of various two- and three-dimensional shapes 3. Describe differences of various two- and three-dimensional shapes 4. Analyze and compare two-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, and other attributes (e.g. having sides of equal length). 5. Analyze and compare 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). 6. Create shapes. 7. Make larger shapes from simple shapes.		

Model shapes in the world by building shapes from components *(e.g. sticks and clay balls)* and drawing sha

Student Friendly/"I Can" statements	Resources	A
1. Recognize and identify (square, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, spheres) 2. Identify shapes in the real world 3. Analyze the attributes of real world objects to identify shapes. 4. Construct shapes from components (e.g., sticks and clay balls) 5. Draw shapes		

Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full side*
rectangle?"

Student Friendly/"I Can" statements	Resources	A
1. Identify simple shapes (squares, triangles, rectangles, hexagons) 2. Analyze how to put simple shapes together to compose a new or larger shape. 3. Compose a new or larger shape using more than one simple shape.		