

# TEACHER PRACTICES RELATED TO COMMON CORE STATE STANDARDS FOR MATHEMATICS

## Kindergarten Introduction

This document was developed for implementation in any program serving kindergarten children. Actual implementation of learning opportunities should ideally reflect a balance among teacher-guided, small-group, and independent activities. Also, mathematics content can be integrated across several domains. To ensure that all students achieve the standards, the kindergarten environment, instructional materials, and teaching strategies should be adapted to meet the needs of individual children. The needs and abilities of kindergarten learners are diverse, and teachers must use varied approaches to support each child's learning and development.

### Grade K Overview

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#### Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

#### Operations and Algebraic Thinking

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

#### Number and Operations in Base Ten

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

#### Measurement and Data

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

#### Geometry

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

## Kindergarten Counting & Cardinality

### **Kindergarten Learning Outcomes:**

#### **Children will:**

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
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).

### ***Kindergarten Teaching Practices:***

#### ***Effective Kindergarten teachers will:***

1. Encourage children to count to 100 through daily routines (e.g., games which involve counting played in small groups; “Let’s see if 100 steps will take us all the way to the playground.”). Model counting using decade words with and without picture cues (e.g., 10 dots on each card) and give opportunities for children to practice using decade words.
2. Ask children to finish the sequence when you start with a random number such as 5. For instance, use a stop sign or sign language for interrupted counting. Children stop counting when sign is held up and count on when sign is put down.
3. Plan activities where children are writing numbers for a purpose (e.g., while playing in the house area, the child/waiter writes 10 sandwiches on the order form for the number of children wanting sandwiches for lunch that day; children write on a clipboard the number of blocks it took to build their structure in the block area; during morning meeting, children record # of children, girls, or boys at school; have a weekly estimation activity and let students record their guesses).

### **Count to tell the number of objects.**

### **Kindergarten Learning Outcomes:**

#### **Children will:**

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
  - 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.
  - 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.
  - Understand that each successive number name refers to a quantity that is one larger.
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.

***Kindergarten Teaching Practices:***

***Effective Kindergarten teachers will:***

4. Encourage children to count the number of items in total (e.g., during outside time, children count the number of birds they see; during center time, a child counts the number of coins contained in the cash register drawer). Create situations where children are asked to assign a number to each item in a group of items and provide you with the total amount of items (e.g., count the number of children in class for the day; children grab a handful of counters/items from bag and count to determine how many counters were grabbed; a child determines how many leaves were collected for the science center).
5. Provide children with opportunities to look at a group of items to determine the quantity (e.g., children determine how many tomatoes they see in their class garden; while playing a game in a small group, children determine how many dots are on a side of a die; children are encouraged to look ahead in a game to determine how many spots they need to move to win).

**Compare numbers.**

**Kindergarten Learning Outcomes:**

**Children will:**

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.<sup>1</sup>

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

<sup>1</sup> Include groups with up to ten objects.

***Kindergarten Teaching Practices:***

***Effective Kindergarten Teachers will:***

6. Ask children to determine which group is larger, smaller or the same as another group (e.g., children are asked to sort the rocks collected on the playground by color, size and texture and then determine which group contains the most or least rocks).
7. Display written numerals from 1 to 10 and ask children if they can distinguish the quantity of a written numeral compared to another written numeral (e.g., “You have five buttons on your shirt and I have seven. Can you point to those numbers and tell me which is more?”; Using a deck of playing cards #s 2 – 10 give a pair of children 10 or more cards face down. Children turn one card over at a time. They identify the number and compare. The child with the larger number takes both cards).

<p style="text-align: center;"><b><u>Kindergarten</u></b> <b>Operations &amp; Algebraic Thinking</b></p>
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**Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.**

**Kindergarten Learning Outcomes:**

**Children will:**

1. Represent addition and subtraction with objects, fingers, mental images, drawings<sup>1</sup>, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
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  $5 = 4 + 1$ ).

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.
5. Fluently add and subtract within 5.

<sup>1</sup> Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

### ***Kindergarten Teaching Practices:***

#### ***Effective Kindergarten teachers will:***

1. Provide children with opportunities to add and subtract items in their environment (e.g., in the house area, two friends playing restaurant add the cost of the lunch bill; have children listen to the number of chimes they hear outside and have them produce either more or less chimes with instruments, and have them explain how many they have added or subtracted to get the amount decided upon).
2. Foster adding and subtracting throughout the day by solving word problems that relate to life experiences (e.g., Ask the children to determine how many seats will be needed on the bus if their classroom as well as the class next door would all partake in the field trip. Tallies would be recorded to represent the number of people).
3. Encourage children to determine what two numbers would total a selected number totaling 10 or less. (e.g., Show children a set containing 1 – 10 objects. Count set together. Have children close their eyes while you remove some objects and hide them behind your back. Have children open their eyes and identify how many objects are left and how many are missing. Bring objects back to confirm answers.)
4. Provide children with time to think of numbers that would add up to 10 by having them use objects or drawings to perform the calculation (e.g., a child made a pizza pie out of clay and cut eight slices and then cut two of those slices in order to get 10 slices for his friends).
5. Ask questions throughout the day that foster sample addition and subtraction (e.g., “You have two crayons in your box and Alice has three so how many crayons do you have in total? Do you have enough so each of your dolls has a crayon?”; “There are 4 children at the computers. There are only 3 computers. How many children should leave this center? Yes 1, 4 take away 1 is 3.”)

## Kindergarten Number & Operations in Base Ten

**Work with numbers 11-19 to gain foundations for place value.**

**Kindergarten Learning Outcomes:**

**Children will:**

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.

***Kindergarten Teaching Practices:***

***Effective Kindergarten teachers will:***

1. Provide opportunities for children to discuss the meaning of a composition or decomposition problem (e.g., “What does  $19 = 10 + 9$  mean, one group of 10 and 9 ones, can you draw something to represent this problem...?”; Demonstrate 10 and 4 ones make 14, one group of 10 and 4 ones. Let one child hold up 10 fingers and another child hold up 4; Use calendar math to represent 10’s and 1’s daily.)

## Kindergarten Measurement and Data

**Describe and compare measurable attributes.**

**Kindergarten Learning Outcomes:**

**Children will:**

1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single 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.*

***Kindergarten Teaching Practices:***

***Effective Kindergarten teachers will:***

1. Provide opportunities for children to measure objects (e.g., Children are asked in a small group to measure out three cups of flour, one teaspoon of salt, etc. for the bread recipe. Once the bread is baked the children are asked to figure out how wide they should slice the bread so there is a piece for everyone; a child uses a ruler to determine the height of the plant grown in the classroom).
2. Encourage children to measure and compare two objects (e.g., “Which container can hold more water for watering the plants in the classroom?”; Have children measure and compare buildings in block center or unifix cubes; Have children weigh different items on balance and compare. “Which side needs more or less to make them the same? Why?”).

**Classify objects and count the number of objects in each category.**

**Kindergarten Learning Outcomes:**

**Children will:**

3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.<sup>1</sup>

<sup>1</sup> Limit category counts to be less than or equal to 10

***Kindergarten Teaching Practices:***

***Effective Kindergarten teachers will:***

3. Ask children to classify within the daily routine (e.g., A child is responsible for creating a chart each day with the different lunch options listed. The child asks his/her classmates what they prefer for lunch so it can be charted. The various lunch options are then sorted by the largest amount of preferences to the least; Question of the day. What is your favorite jellybean? Students write name under favorite jellybean. Columns are counted, recorded and compared.)

**Kindergarten**  
**Geometry**

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

**Kindergarten Learning Outcomes:**

**Children will:**

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*.
2. Correctly name shapes regardless of their orientations or overall size.
3. Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).

***Kindergarten Teaching Practices:***

***Effective Kindergarten teachers will:***

1. Encourage children to use positional words by asking them to describe where objects are located in the environment (e.g., have children map out the classroom with a drawing and ask them to describe where certain items are in relation to other items in the drawing; identify shapes in the drawing; create an obstacle course and have children crawl under, step over, walk on, walk around, crawl inside and so on...).
2. Ask children to name shapes in the environment (e.g., windows are rectangles; the column in front of the school is a cylinder; Take a class walk looking for shapes in the environment. Take photos and let children explain the position and shape in photo or take a clip board and draw shapes that are found).
3. Encourage children to explore shapes in the environment and identify two-dimensional and three-dimensional shapes (e.g., ask children which block shapes would roll down the ramp that was created in the block area).

**Analyze, compare, create, and compose shapes.**

**Kindergarten Learning Outcomes:**

**Children will:**

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).



5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
6. Compose simple shapes to form larger shapes. (e.g., “Can you join these two triangles with full sides touching to make a rectangle?”).

***Kindergarten Teaching Practices:***

***Effective kindergarten teachers will:***

4. Have children explore two-dimensional and three-dimensional shapes through the use of pictures and various manipulatives and question the dimensionality of the shape (e.g., “Is this can of beans two or three dimensional? How do you know? What’s the name of the three dimensional shape?”).
5. Model the construction of shapes with various tools to encourage children to do the same (e.g., a group of children are given playdough and asked to create as many shapes as they can).
6. Provide children with materials they can manipulate to make various shapes (e.g., children are given tangrams and asked to create various shapes and identify them; children nibble crackers at snack time into various shapes).

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