Grade K Math Unit 1 - Counting and Cardinality

UNIT OVERVIEW

In Kindergarten, instructional focus should focus on two critical areas. This unit is connected to **Focus #1**, Representing and comparing whole numbers, initially with sets of objects. (See Connections for further explanation)

There are 3 clusters addressed within this unit:

a. Know number names and the count sequence. *

b. Count to tell the number of objects *

c. Compare numbers *

* (See Connections for further explanation)

STANDARDS

CC_Common Core State Standards - Mathematics (2010) - k
Domain K.CC Counting and Cardinality

Cluster Statement: Know number names and the count sequence.
Standard K.CC.1 Count to 100 by ones and by tens.
Standard K.CC.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
Standard K.CC.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).

Cluster Statement: Count to tell the number of objects.
Standard K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.
K.CC.4.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.
K.CC.4.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.
K.CC.4.c Understand that each successive number name refers to a quantity that is one larger.
Standard K.CC.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

Cluster Statement: Compare numbers.
Standard K.CC.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.
Standard K.CC.7 Compare two numbers between 1 and 10 presented as written numerals.

CONTENT ELABORATIONS

K.CC.1	The emphasis of this standard is on the counting sequence. When counting by ones, students need to understand that the next number in the sequence is one more. When counting by tens, the next number in the sequence is "ten more" (or one more group of ten). Students are to rote count by starting at one and count to 100. (They are only expected to master counting on the decade. This objective does not require recognition of numerals.) **MP.6, MP.7, MP.8** should be emphasized.

K.CC.2	The emphasis of this standard is on the counting sequence to 100. This standard asks for students to begin rote counting, forward counting in a sequence from a number other than one. **MP.6, MP.7, MP.8** should be emphasized.
K.CC.3	K.CC.3 asks for students to represent a set of objects with a written numeral. The number of objects being recorded should not be greater than 20. Students can record the quantity of a set by selecting a number card/tile (numeral recognition) or writing the numeral. Students can also create a set of objects based on the numeral presented. Students should be given multiple opportunities to count objects and recognize that a number represents a specific quantity. Once this is established, students begin to read and write numerals (numerals are the symbols for quantities). The emphasis should first be on quantity and then connecting quantities to the written symbols. **MP.2, MP.6, MP.7, MP.8** should be emphasized.
K.CC.4	**K.CC.4** asks students to count a set of objects and see sets and numerals in relationship to one another, rather than as isolated numbers of sets. These connections are higher-level skills that require students to analyze, to reason about, and to explain relationships between numbers and sets of objects. This standard should first be addressed using numbers 1-5 with teachers building to numbers 1-10 later. The expectation is that students are comfortable with these skills with the numbers 1-10 by the end of Kindergarten. **MP.2, MP.6, MP.7, MP.8** should be emphasized.
	K.CC.4a reflects the ideas that students implement correct counting procedures by pointing to one object at a time (one-to-one correspondence) using one counting word for each object (one-to-one touching/synchrony), while keeping track of objects that have and have not been counted. This is the foundation of counting. Conservation of number, (regardless of the arrangement of objects, the quantity remains the same) is a developmental milestone which some Kindergarten children will not have mastered. The goal of this objective is for students to be able to count a set of objects; regardless of the formation those objects are placed.
	K.CC.4b calls for students to answer the question —How many are there? by counting objects in a set and understanding that the last number stated when counting a set (…8, 9, 10) represents the total amount of objects: —There are 10 bears in this pile. (cardinality). It also requires students to understan that the same set counted three different times will end up being the same amount each time. The idea is to develop a purpose for counting as keeping track of objects is developed. Therefore, a student who moves each object as it is counted recognizes that there is a need to keep track in order to figure out the amount of objects present. Conservation of number, (regardless of the arrangement of objects, the quantity remains the same), conservation of number is a developmental milestone which some Kindergarten children will not have mastered. The goal of this objective is for students to be able to count a set of objects; regardless of the formation those objects are placed.
	K.CC.4c represents the concept of "one more" while counting a set of objects. Students are to make the connection that if a set of objects was increased by one more object then the number name for that set is to be increased by one as well. Students are asked to understand this concept with and without objects. This concept should be first taught with numbers 1-5 before building to numbers 1-10.
K.CC.5	**K.CC.5** addresses various counting strategies. From the research in early childhood mathematics, students go through a progression of four general ways to count. These counting strategies progress from least difficult to most difficult: 1) students move objects and count them as they move them, 2) students line up the objects and count them. 3) students have a scattered arrangement and they touch each object as they count and 4) students have a scattered arrangement and count them by visually scanning without touching them. Since the scattered arrangements are the most challenging, K.CC.5 calls for students to only count 10 objects in a scattered arrangement and count up to 20 objects in a line, rectangular array, or circle. Out of the 3 representations, a line is the easiest type of arrangement to count. Students should develop counting strategies to help them organize the counting process to avoid re-counting or skipping objects. **MP.2, MP.7, MP.8** should be emphasized.
K.CC.6	**K.CC.6** expects mastery of up to ten objects. Students can use matching strategies, counting strategies or equal shares to determine whether one group is greater than, less than, or equal to the number of objects in another group. **MP.2, MP.6, MP.7, MP.8** should be emphasized.

UNIT VOCABULARY

count	eight	seventeen
number	nine	eighteen
one	ten	ninteen

two	eleven	twenty
three	twelve	zero
four	thirteen	equal to
five	fourteen	greater than
six	fifteen	less than
seven	sixteen	ordinal number

BIG IDEAS

ENDURING UNDERSTANDINGS

Number Properties

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Count with understanding and recognize "how many" in a set of objects.
- Develop a sense of whole numbers and represent and use them in flexible ways.
- Develop understanding of the relative magnitude and position of whole numbers.
- Use multiple models to develop initial understandings of the base-ten number system.
- Connect number words and numerals to the quantities they represent, using various physical models and representation
- Counting tells how many things are in a set.
- The last number word, when counting, names the quantity in a set.
- A number can be represented by a set of objects, then by a word, and finally by a numeral.
- Numbers are related to each other through a variety of relationships. For example, 6 is one more than 5, and is 4 less than 10.
- Counting can be a way to gather information.

Coins are not explicitly taught in kindergarten, but the connections to patterns and skip counting should be made. Coins can be used as a manipulative for patterns, skip counting and counting.

ESSENTIALS QUESTIONS

Choose a few questions based on the needs of your students

- How do we show how many?
- What do numbers tell me?
- How can I show numbers beyond 10?

CONNECTIONS

Critical Focus #1 in Kindergarten requires students to use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting 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 take away.

* These clusters are connected to ***Classify objects and count the number of objects in each category*** **(K.MD)**, and to ***Add and subtract within 20*** **(1.OA)** and ***Extend the counting sequence*** **(1.NBT)**

Standards for Mathematical Practice (SMP)

MP.1 Make sense of problems and persevere in solving them
MP.2 Reason abstractly and quantitatively
MP.3 Construct viable arguments and critique the reasoning of others
MP.4 Model with mathematics
MP.5 Use appropriate tools strategically
MP.6 Attend to precision
MP.7 Look for and make use of structure (Deductive reasoning)
MP.8 Look for and express regularity in repeated reasoning (Inductive Reasoning)

Know number names and the count sequence

	CONTENT	SKILLS
K.CC.1 **K.CC.2**	Count by ones to 100	Count by ones to 100 1. when counting by ones, understand that the next number in the sequence is one more 2. count numbers 0-10 3. count forward from a number other than one up to 10 4. count numbers 1-20 5. count forward from a number other than one up to 20 6. count numbers 1-50 7. count forward from a number other than one up to 50 8. count numbers 1-100 9. count forward from a number other than one up to 100 10. Recognize and state the patterns that exist when counting orally from 1-100
K.CC.1	Count by tens to 100	Count by tens to 100 1. when counting by tens, understand that the next number in the sequence is ten more 2. count by ten; on the decade

K.CC.3	Represent and write numbers to 20	Represent and write numbers to 20 1. count up to 10 objects in many settings and situations 2. recognize, identify and read written numerals to 10 3. match numerals to given sets of objects to 10 4. write numerals to represent counted objects to 10 5. represent 0 as a count of objects 6. count up to 20 objects in many settings and situations 7. recognize the teen numbers as one group of ten and extra ones 8. recognize, identify and read written numerals to 20 9. match numerals to given sets of objects to 20 10. write numerals to represent counted objects to 20
	Count to tell the number of objects	
K.CC.4	Understand the relationship between numbers and quantities; connect counting to cardinality	Understand the relationship between numbers and quantities; connect counting to cardinality 1. implement correct counting procedures by pointing to one object at a time (one-to-one correspondence) 2. use one counting word for each object (one-to-one touching/synchrony) 3. keep track of objects that have and have not been counted 4. understand that the last number stated when counting a set represents the total amount of objects
K.CC.5	Count to answer “how many?” questions about as many as 10 things arranged in a line, a rectangular array, or a circle, or in a scattered configuration.	Count to answer “how many?” questions about as many as 10 things arranged in a line, a rectangular array, or a circle, or in a scattered configuration. 1. Count up to 10 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 1-10, count out that many objects. 6. Repeat skills above (#1-5) counting up to 20 objects.
	Compare numbers	
	CONTENT	**SKILLS**
K.CC.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.	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group. 1. Describe greater than, less than, or equal to. 2. Understand the equal sign means 'the same as'. 3. Determine whether a group of 10 or fewer objects is greater than, less than, or equal to another group of 10 or fewer objects.
K.CC.7	Compare two numbers between 1 and 10 presented as written numerals.	Compare two numbers between 1 and 10 presented as written numerals. 1. Know the quantity of each numeral. 2. Determine whether a written number is greater than, less than, or equal to another written number.
	UNIT RESOURCES	

McGraw-Hill, **My Math**, Chapters 1-3
Number Talks by Sherry Parrish
Georgia Math Frameworks, Grade Kindergarten Unit 2
Common Core Model Curriculum
Debbie Diller Math Work Stations
Manipulatives – including, but not exclusively: pattern blocks, snap cubes, counting disks, counting bears, a variety of counters, buttons, base ten blocks, dot dice, numeral dice, spinners, number cards, five and ten frames, dominoes