Cluster 3: Comparing Quantities with Counting and Spatial Relationships

Duration: 3-4 weeks

Content Standards:

This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.K.CC.1
Count to ~~100~~ 50 by ones and by tens.

NC.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.

NC.K.CC.4
Understand the relationship between numbers and quantities.

- 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).
- Recognize that the last number named tells the number of objects counted regardless of their arrangement (cardinality).
- State the number of objects in a group, of up to 5 objects, without counting the objects (perceptual subitizing).

NC.K.CC.5
Count to answer "How many?" in the following situations:

- Given a number from 1-20, count out that many objects.
- Given up to 20 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater.
- Given 20 objects arranged in a line, a rectangular array, and a circle, identify how many.
- Given 10 objects in a scattered arrangement, identify how many.

NC.K.CC.6
Identify whether the number of objects, within 10, in one group is greater than, less than, or equal to the number of objects in another group, by using matching and counting strategies.

NC.K.MD.2
Directly compare two objects with a measurable attribute in common, to see which object has "more of/less of" the attribut~~e~~ and describe the difference.

NC.K.G.1
Describe objects in the environment using names of shapes, and describe the relative positions of objects using positional terms.

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.

What is the mathematics?

Students continue to develop fluency in subitizing and counting through meaningful counting experiences that include spatial relationships. They begin to use numerals to identify and compare quantities up to 10.

The mathematical discourse established in Cluster 1 should continue to be embedded and utilized throughout each successive cluster.

Students compare quantities by:

- Counting a quantity in a set and comparing it to a quantity in another set (more, less, the same)
- Comparing a given set to 5 or 10 (Is it more than 5, less than 5, or the same as 5?)
- Comparing by matching objects (My tower of 8 cubes is taller than your tower of 3 cubes so there are more cubes.)

Students continue to develop the forward rote sequence through daily experiences. The target for this cluster is saying the forward rote sequence to 50 by ones and tens, but this number should not be a limit. Meaningful practice of the counting sequence should be part of daily activities in the classroom. This skill should be introduced at the beginning of the year and continued throughout the year. Listed below are general benchmarks for this standard.

- Beginning of the Year: Count to 20
- By the Middle of Year: Count to 50
- By the End of Year: Count to 100

Students continue to develop informal geometric language about shapes (both 2-D and 3-D) as part of their sorting and comparing. Shapes will be formalized in Cluster 4.

Important Considerations:

- In Cluster 1 students describe objects based on attributes. In Cluster 2, they counted objects. In this cluster students begin comparing quantities. Some students may still be solidifying counting concepts while others may have started comparing with counting at the end of Cluster 2.
- Providing experiences within rich measurement, data, and geometry tasks and centers allows for differentiation and deepening of understanding as students count and compare with many different representations and within many different contexts (Ex. Whose block tower is the tallest? Did we use more cylinders or cubes in our tower? Did more people get lunch in the cafeteria or bring lunch from home?). Through these contexts students continue to build on NC.K.MD.1 and NC.K.MD.3 from Clusters 1 and 2 and to informally build a foundation for NC.K.G.1 in Cluster 4.
- Continuing to work with spatial representations of numbers are essential to support students' development of subitizing and thinking in collections rather than counting by ones.
- Symbols for addition, subtraction, equals, greater than, and less than should not be introduced until the end of the year or even first grade. Instead use the words *more*, *less*, and *the same*. The purpose of symbols is to communicate relationships among numbers without context (ex. being able to say 3 + 4 = 7 or 4 > 3 does not rely on knowing what the things are that are being put together or compared). In Kindergarten, students work first to internalize these relationships in context (ex. three birds joining two birds on a branch; three hexagon pattern blocks and two triangles on my picture; a tower of four cubes is taller than a tower of three cubes). They describe the relationships with language (ex. 3 and 2 is 5; 4 is more than 3) and by labeling pictures (ex. In shake and spill with 5 two-color counters, color 3 red and label with three; color two yellow and label with 2).
- Students need time to explore the meaning of equals as "has the same value" rather than "the answer is coming" to avoid misconceptions about the equals sign that often persist into formal

high school algebra. When writing, students use the word “is” to denote equal (ex. 4 is 3 and 1).
- Students begin counting by ones up to 50 and begin work on counting by tens using ten frames.