

<b>Cluster 2: Understanding the Relationship between Numbers and Quantities</b>
<b>Duration:</b> 5-6 weeks
<p><b>Content Standards:</b>  <b>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.</b></p> <p><b>NC.K.CC.1</b>            Know number names and recognize patterns in the counting sequence by:           <ul style="list-style-type: none"> <li>● Counting <del>100 by ones</del>. Rote sequence to 20.</li> <li>● <del>Counting to 100 by tens</del>.</li> </ul> </p> <p><b>NC.K.CC.2</b>            Count forward beginning from a given number within the known sequence, instead of having to begin at 1.</p> <p><b>NC.K.CC.3</b>            Write numbers from <del>0 to 20</del> (0-5 and then 6-10). Represent a number of objects with a written numeral <del>0-20</del> (0-5 and then 6-10), with 0 representing a count of no objects.</p> <p><b>NC.K.CC.4</b>            Understand the relationship between numbers and quantities.           <ul style="list-style-type: none"> <li>● 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).</li> <li>● Recognize that the last number named tells the number of objects counted regardless of their arrangement (cardinality).</li> <li>● State the number of objects in a group, of up to 5 objects, without counting the objects (perceptual subitizing).</li> </ul> </p> <p><b>NC.K.CC.5</b>            Count to answer “How many?” in the following situations:           <ul style="list-style-type: none"> <li>● Given a number from <del>1-20</del> (1-10), count out that many objects.</li> <li>● Given up to <del>20</del> 10 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater.</li> <li>● Given <del>20</del> 10 objects arranged in a line, a rectangular array, and a circle, identify how many.</li> <li>● Given <del>40</del> 5 objects in a scattered arrangement, identify how many.</li> </ul> </p> <p><b>NC.K.MD.1</b>            Describe measurable attributes of objects; and describe several different measurable attributes of a single object</p> <p><b>NC.K.MD.3</b>            Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.</p> <p><b>NC.K.G.3</b>            Identify squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres as two-dimensional or three-dimensional.</p>
<p><b>Mathematical Practices:</b></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others</li> </ol> <p><b>4. Model with mathematics</b></p>

- 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?**

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

Students learn key concepts related to counting including:

- Forward rote number sequence
- One-to-one Correspondence
- Cardinality
- Keeping Track
- Concept of Zero

Students perceptually subitize the number of objects in a group of up to five objects.

- Perceptual Subitizing is the ability to “recognize” a small number of objects and know how many there are without counting (for example, recognizing the pattern arrangement on dice instantly without having to count the dots).
- Subitizing is a tool for building a sense of quantities and thinking in units other than one which facilitates computation and an understanding of additive and multiplicative reasoning.
- Subitizing is a fundamental skill in the development of students’ understanding of number and determines a student’s success in mathematics. Subitizing is initially introduced in at the beginning of kindergarten and will continue to be integrated all year.

**Important Considerations:**

- Cluster 2 continues the work of Cluster 1 by having students continue to describe and sort objects by attributes, but now students count the objects sorted (ex. How many are red? How many are blue? How many cylinders in your tower? How many cones?) Include two- and three-dimensional shapes in this sorting as students continue to use geometric language informally during centers and tasks (NC.K.G.1 can be considered a supporting standard in this cluster. This standard will be address formally in Cluster 4).
- In Cluster 3 students will compare the objects in their sorting (ex. Did you use more hexagons or squares on your pattern block puzzle?), but as students count, sort, play games, they may start to use terms like *more*, *less*, and *the same* in their conversations.
- Number ranges listed in the standards (rote counting to 100 and understanding relationships between numbers and quantities to 20) are goals to be mastered by the end of the year. At this time of year, students are focused first on the numbers 0-5 and then 6-10.
- Note that depending on experience, some students will come in already knowing these number ranges while others may need substantial time on 0-5. Many activities can be differentiated simply by changing the number ranges so that all students can move forward from the point at which you assess them during your observations in Cluster 1.
- Counting and perceptual subitizing should be taught concurrently, not linearly as listed above. Instead, as students have ongoing experiences with dot cards, pips on dice, pips on dominoes, rekenreks, holding up fingers, five frames, etc., they gain a sense of “three”-ness or “four”-ness, and no longer need to count by ones within 5.
- When working on counting objects to 10, work should first focus on counting a collection of given objects to determine how many. It is often useful to use geometric shapes as collections as a way to continue exposing students to geometric vocabulary and attributes. Next students should work to produce a collection of a given quantity. Students will work to relate the oral

word, set of objects/image, and symbol, connecting one representation to another in any direction.

- The target for this cluster is saying the forward rote sequence to 20 by ones, 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