

Counting and Cardinality

Know number names and the counting sequence.

NC.K.CC.1 Know number names and recognize patterns in the counting sequence by:

- Counting to 100 by ones.
- Counting to 100 by tens.

Clarification

In this standard, students rote count by starting at one and counting to 100.

- When counting by ones, students need to understand that the next number in the sequence is one more.
- When students count by tens they are only expected to master counting on the decade (0, 10, 20, 30, 40 ...). Students need to understand that the next number in the sequence is “ten more” (or one more group of ten).

The focus of this standard is on using patterns in the number sequence to count. It does not require recognition of numerals or writing numerals.

Checking for Understanding

Start at 1 and count by ones.

Students should be able to count correctly to 100 by ones without skipping numbers, repeating numbers, or hesitating.

Start at 10 and count by tens.

Students should be able to count correctly to 100 by tens without skipping numbers, repeating numbers, or hesitating.

Know number names and the counting sequence.

NC.K.CC.2 Count forward beginning from a given number within the known sequence, instead of having to begin at 1.

Clarification

In this standard, students count forward within 100 from a number other than one without having to go back and start at one. This skill is a prerequisite skill for counting on when students begin to work with addition.

The standard does not require recognition of numerals or writing numerals. It is focused on the patterns in the number sequence.

Checking for Understanding

Start at 42 and count by ones until I tell you to stop.

Students should be able to count correctly starting at the given number without skipping numbers, repeating numbers or hesitating.

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Know number names and the counting sequence.

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.

Clarification

This standard calls for students to recognize and write numerals 0-20.

- When shown a set within 20, students record the quantity by selecting the appropriate number card/tile (numeral recognition) or writing the numeral.
- When given a numeral, students create a set of items to represent the numeral presented.

Due to variations in the development of students' fine motor and visual skills, reversal of numerals is anticipated and acceptable as long as it does not affect place value. While reversals should be pointed out to students and correct formation modeled in instruction, the emphasis of this standard is on the use of numerals to represent quantities rather than the correct handwriting formation of the actual numeral itself. While children may experiment with writing numbers beyond 20, this standard places emphasis on numbers 0-20.

Checking for Understanding

As the teacher says a number aloud, the student records the written numeral:



After counting a set of objects, student is asked to record the numeral that represents the quantity. The student records the written numeral "19".

After counting a set of objects, student is asked to select the number card that matches the quantity. The student selects "13" to represent the set.

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Count to tell the number of 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).

Clarification

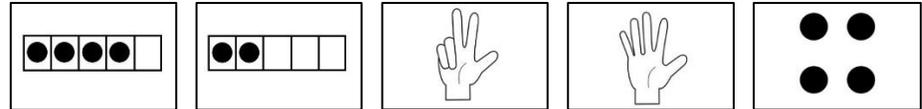
When given frequent opportunities to count sets of objects, students develop counting skills and discover the relationship between quantity and number.

- Students implement correct counting behaviors by moving or pointing to one object at a time (one-to-one correspondence) and using one counting word for every object (synchrony/ one-to-one tagging), while keeping track of objects that have and have not been counted. This is the foundation of counting.
- Students discover the cardinality principle by counting objects in a set and understanding that the last number stated (...8, 9, **10**) represents the total amount of objects: "There are **10** bears in this pile." Since an important goal for children is to count with meaning, it is important to have children answer the question, "How many?" after they count. Often, children who have not developed cardinality will count the amount again, not realizing that the **10** they stated means 10 objects in all.
- One-to-one correspondence and cardinality are higher-level skills, which require students to analyze, reason about, and explain relationships between numbers and sets of objects. The expectation is that students are proficient with these skills (with numbers 1-20) by the end of Kindergarten.
- When frequently shown small sets of items, students develop the ability to instantly recognize the quantity in a set without counting (perceptual subitizing). Most individuals can perceptually subitize up to sets of five. Perceptual subitizing is a crucial early skill. It strengthens students' ability to efficiently and flexibly determine "how many" when working with larger sets and supports work with composing and decomposing quantities. Perceptual subitizing is also a precursor to place value (e.g., groupings of tens) as it gives students the opportunity to see a collection of items as a unit, rather than individual items.
- There are two types of subitizing: perceptual and conceptual. This standard focuses on perceptual subitizing. See standard NC.K.OA.6 for information about conceptual subitizing.

Checking for Understanding

Student is given a tray of buttons and asked to count the set. After counting, the teacher says, "How many buttons are in this set?" Then, the teacher rearranges the buttons (without adding to or taking from the set). The student is asked, "How many buttons are in the set now?"

Student is shown a "quick image" card for 2-3 seconds and asked to tell "how many" without counting. Student instantly recognizes the quantity and states the number (perceptual subitizing). Steps are repeated with additional cards.



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Count to tell the number of objects.

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.

Clarification

When counting to answer “how many”, students employ two big understandings from NC.K.CC.4: one-to-one correspondence and cardinality. They say one number for each item counted (one-to-one correspondence) and know the last number counted tells the quantity of the set (cardinality).

- This standard asks that students are both counters and producers.
 - **Producer:** When given a number, a student counts out a set of objects or draw a picture to match.
 - **Counter:** When given a set of objects or drawings, a student counts to determine “how many”.
- After numerous experiences with counting objects, along with the developmental understanding that a group of objects counted multiple times will remain the same amount, students recognize the need for keeping track in order to determine “how many”. Some arrangements, such as a line or rectangular array, are easier to count. However, they may limit students’ flexibility with developing meaningful tracking strategies, so providing multiple arrangements help children learn how to keep track. Since scattered arrangements are the most challenging, this standard specifies that students only count up to 10 objects in a scattered arrangement and count up to 20 objects in a line, rectangular array, or circle. Depending on the amount of objects to be counted, and students’ confidence with counting a set of objects, students may move the objects as they count each, point to each object as counted, look without touching when counting, or use a combination of these strategies.
- An important component of this standard is that of naming the next successive number when an object is added to a set, which is based on the idea of inclusion. Inclusion is the understanding that numbers build by exactly one each time and that they nest within each other by this amount. A set of three objects is nested within a set of 4 objects; within this same set of 4 objects is also a set of two objects and a set of one. Using this understanding, if a student has four objects and wants to have 5 objects, the student is able to add one more—knowing that four is within, or a sub-part of, 5 (rather than removing all 4 objects and starting over to make a new set of 5). This concept is critical for the later development of part/whole relationships.

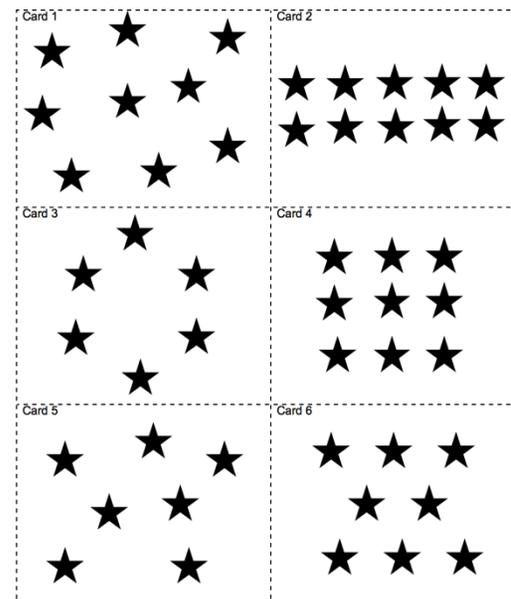
Checking for Understanding

“Producing a Set” Task:

- Teacher places a bowl of objects on table and asks student to count out a set of 15 objects.
- Student removes 15 objects from the bowl and places them on the table while counting aloud.
- Teacher adds one more object to the set of 15, and asks, “How many are there now?”

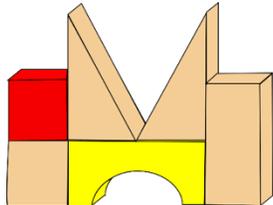
Rather than re-counting the entire set, the student says the next number in the counting sequence... 16.

“Counting a Set” Task: Given a set of cards, students count the quantity of stars in each arrangement.



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Measurement and Data

Describe and compare measurable attributes. NC.K.MD.1 Describe measurable attributes of objects; and describe several different measurable attributes of a single object.	
Clarification	Checking for Understanding
<p>This standard calls for students to describe an object’s measurable attributes such as length, weight, and size. Students will use words such as heavy/light, long/short, and big/small to describe these attributes. Additionally, students will describe a single object using more than one measurable attribute. For example, a student may describe a shoe with one attribute, “My shoe is heavy!”, or more than one attribute, “This shoe is heavy! It’s also really long.”</p> <p>Initially, students may have undifferentiated views about the size of objects; a student may believe that an object is “bigger” or “smaller” based on a single attribute. For example, a student may state that one book is bigger than another because it is longer. In reality, the other book may be wider and heavier. Through experiences and conversations, students will learn to discriminate and name these specific measurable attributes.</p> <p>Kindergarten students are not expected to measure objects with standard or non-standard units.</p>	<p>Show student a feather and a heavy book (e.g., dictionary). Allow student to examine each object. Say: Tell me about the weight of the paperclip. Tell me about the weight of the book.</p> <p>Student: <i>The feather is light. It’s easy to lift. The book is heavy. I need my muscles to lift it.</i></p> <hr/> <p>Example: Display two block towers. Say: We’ve been using measurement words to describe objects in our classroom. Use some measurement words to tell me about this tower (point to bigger tower).</p> <p>Student A: <i>This tower is tall and big.</i></p> <p>Student B: <i>That tower is long, and it looks heavy!</i></p> <div style="text-align: right;">  </div>

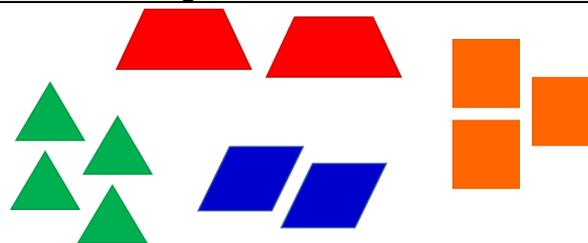
Classify objects and count the number of objects in each category. NC.K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	
Clarification	Checking for Understanding
<p>This standard calls for students to identify similarities and differences between objects, such as size, color, shape. Using the identified criteria, students will sort the objects into categories. Students will count the number of objects in each category. The sets in each category should be limited to less than or equal to 10.</p> <p>Students will sort (or group) each of the sets by the amount in each set. Like amounts are grouped together, but not necessarily ordered.</p> <div style="background-color: #e1eef6; padding: 5px; margin-top: 10px;"> <p>For example: A student separates buttons into different piles based on color (all the blue buttons are in one pile, all the orange buttons are in a different pile, etc.).</p> <p>Then the student counts the number of buttons in each pile: blue (5), green (4), orange (3), purple (4).</p> <p>Finally, the student organizes the groups by the quantity. “I</p> </div>	<p>Give the student a set of pattern blocks. Can you sort the pattern blocks?</p> <p><i>Possible response:</i></p> <p><i>A student chooses to sort the pattern blocks by putting all of the hexagons in one pile and non-hexagons in a different pile. “I put the hexagons together and there were 6 of them. I put the triangles, trapezoids, and rhombuses together. There were 3 triangles, 2 trapezoids, and 2 rhombuses so there were 7 in that pile. There were 13 objects total.”</i></p> <hr/> <p>Provide student with a set of pattern blocks. Say: Here is a set of blocks. Sort these blocks into groups. Tell me how you sorted them.</p> <p>Student A: <i>I put the colors together. I put the green shapes here, the blue shapes here, the red shapes here, and the orange shapes over here.</i></p>

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

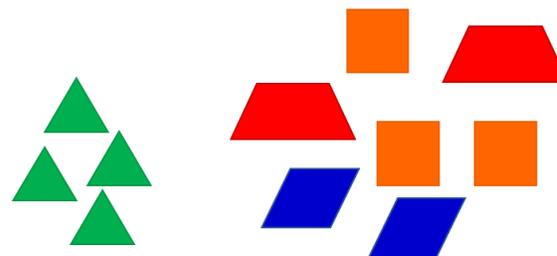
NC.K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Clarification

Checking for Understanding



Student B: *I put the shapes with 3 points in one group, and the shapes with 4 points in the other group.*



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Geometry

Identify and describe shapes.

NC.K.G.3 Identify squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres as two-dimensional or three-dimensional.

Clarification

In this standard, students identify, analyze, sort, describe, and compare shapes that are two-dimensional and three-dimensional. Students should be able to differentiate between shapes that are flat (2 dimensional) or solid (3 dimensional) and use the terms two-dimensional and three-dimensional as they discuss the properties of various shapes. Students should be able to sort two- and three-dimensional shapes and explain how the shapes are sorted.

Checking for Understanding

Sort these figures in two categories: two-dimensional and three-dimensional.

