

Cluster 1: Using Numbers to Explore Our Mathematical Community

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.1.NBT.1**
Count to 150, starting at any number less than 150.
- NC.1.NBT.2**
Understand that the two digits of a two-digit number represent amounts of tens and ones.
- Unitize by making a ten from a collection of ten ones.
 - Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
 - ~~Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens, with 0 ones.~~
- NC.1.NBT.7**
Read and write numerals, and represent a number of objects with a written numeral, ~~to 100~~ to 20.
- NC.1.MD.4**
Organize, represent, and interpret data with up to three categories.
- Ask and answer questions about the total number of data points.
 - Ask and answer questions about how many in each category.
 - Ask and answer questions about how many more or less are in one category than in another.

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?

- Consider the following elements when preparing for an effective math community:
 - 1.) Develop mathematicians with positive attitudes about **their** ability to **do** mathematics by:
 - Creating opportunities to develop an appreciation for mistakes
 - Seeing mistakes as opportunities to learn
 - Teaching students to take responsibility for their learning
 - 2.) Develop mathematicians who **respect others** by:
 - Demonstrating acceptance, appreciation, and curiosity for different ideas and approaches
 - Establishing procedures and norms for productive mathematical discourse
 - Considering various solution paths
 - 3.) Develop mathematicians with a **mindset for problem solving** by:
 - Encouraging student authority and autonomy when problem solving
 - Emphasizing questioning, understanding, and reasoning about math, **not** just doing math for the correct answer
 - Asking follow-up questions when students are both right and wrong
 - Allowing students to engage in **productive struggle**

- Students get to know each other by posing questions and collecting data about themselves and their surroundings (ex. how we get to school, lunch choice, color of shirt/pants). They analyze the data collected to describe how many in each category and how many more or less in one category than another.
- Students develop number sense by exploring how numbers are used in throughout the classroom and their world. These explorations help them make sense of why numbers are important-- to count and compare quantities, describe situations mathematically, and describe objects. These explorations also can informally introduce students to a variety of concepts that will be studied in later clusters.
- Through explorations, students reason through the need to use grouping as they start to use larger numbers (ex. During an inventory of the classroom, counting tables by ones is easy, but counting larger sets like number of blocks or books gets hard). These discussions serve as a foundation for place value in Cluster 3 as students begin to see the benefits of counting by groups for keeping track and describing higher counts. A hundreds board may be introduced as part of the discussion to help students begin to see patterns.
- Students in kindergarten have worked with numbers to 100 and can transition to counting to 150. They also count chorally by tens and look for patterns.
- Students solidify their reading and writing of numerals through 20.
- Students develop a deep conceptual understanding of the numbers 11-19 and a ten and some ones through counting, grouping, and modeling. Students should use a variety of models to show 11-19 as a ten and some ones (ex. ten frames, ten stick of cubes, rekenrek, group of ten objects banded together or in a cup). These models should be groupable and proportional so that student can easily compose and decompose one ten back into ten ones.

Important Considerations:

- Students have a natural curiosity about numbers in their world which can be used in building their number sense. Building on their interests when discussing the numbers they see around them, they explore through activities that will build a foundation for the rest of the year [ex. Inventories of classroom materials; numbers on clocks and thermometers; measuring height of class members in links or cubes, noting that Susan is taller than Bill but shorter than Kelly (NC.1.MD.1, NC.1.MD.2); folding paper into two or four sections to make a birthday card or do a writing activity (NC.1.G.3); drawing, describing and recording the number of shapes used when building various structures in the block center (NC.1.G.1, NC.1.G.2); keeping score in games; engaging in word problems incorporating the data collected (NC.1.OA.1).] While these standards are not the focus of the cluster, bringing out the mathematics in everyday experiences allows students to see that mathematics is everywhere and is useful.
- Even though students are not yet associating 10, 20, 30, 40, etc. with a number of tens, practice choral counting by tens and looking for patterns is important to build a foundation for base ten which is the focus of Cluster 3.