

Cluster 1: Building a mathematical community while working with numbers within 20

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.2.MD.6

Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points and represent whole-number sums and differences, within 400 (only up to 20 at this point), on a number line diagram

NC.2.OA.2

Demonstrate fluency with addition and subtraction, within 20, using mental strategies.

NC.2.OA.3

Determine whether a group of objects, within 20, has an odd or even number of members by:

- Pairing objects, then counting them by 2s.
- Determining whether objects can be placed into two equal groups.
- Writing an equation to express an even number as a sum of two equal addends

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?

A priority for this cluster is to establish a foundation for all mathematical work by creating a positive and respectful climate for learning. The goal is for students feel safe to engage in discourse around mathematical topics. Such mathematical discourse can reveal understandings and misunderstandings, boost memory, promote deeper reasoning, foster language development, and support the development of social skills. This mathematical community will encourage learners to have a mathematical mindset in which they persevere and learn from mistakes.

- Students work through open-ended tasks, number talks, and patterning to promote mathematical mindset and build classroom community.
- Students learn mathematical routines and expectations for talking about math including sharing their own thinking, listening, and critiquing the reasoning of others.
- In first grade, students added and subtracted within 20, but only demonstrated fluency within ten. This cluster calls for students to build off of their first grade work as they develop fluency with addition and subtraction within 20 using mental strategies (make a ten, counting on, counting back, doubles, doubles +1, etc.).

- In this cluster, MD.6 is incorporated through the use of the number line. Students should understand that when using a number line the distance between the numbers is what is being “counted” (iteration), rather than counting the tick marks.
- Students pair objects and then count them by 2’s to explore concepts of even and odd. Through this process, they practice skip counting by 2’s.
- Students understand that even numbers can be shared fairly into two equal groups (ex. 8 is 4 and 4). Odd numbers will have one left over when sharing the number into two equal groups (ex. 9 is 4 and 4 with 1 left over).
- By exploring sharing of counters students discover which numbers are even and odd. They record these discoveries with equations (ex. $4 + 4 = 8$). They note these numbers on the number line and notice the pattern that every other number is even or odd.
- Grouping objects to determine if sets are odd or even connects to the “near doubles” mental math strategy (ex., If I know $4 + 4$, I can add one more to find $4 + 5$).

Important Considerations

- As with all standards, students are not expected to demonstrate mastery until the end of the year. At this point, students should begin working with mental math strategies, which will be practiced throughout the school year.
- Fluency does not simply mean memorization, but rather flexible, efficient, and accurate thinking using multiple strategies. A student demonstrating fluency uses a mixture of “just knowing” facts, using known patterns (ex., adding/subtracting 0), and efficiently employing strategies (ex, make a ten, doubles, compensation, using relationship between addition and subtraction).
- Students are working within 20 in this cluster, including on the number line.
- Students represent their thinking in multiple ways, including equations.
- Be careful to develop a robust understanding of even and odd rather than teaching students to look at the numeral in the ones place. Understanding that even numbers are those that can be shared fairly into two equal groups is an important foundational concept for divisibility in upper elementary grades.