

<p>Cluster 4: Understanding Measurement as a Context to Compare Numbers</p>
<p>Duration: 3-4 weeks</p>
<p>Content Standards: <i>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.</i></p> <p>NC.1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.</p> <p>NC.1.MD.2 Measure lengths with non-standard units.</p> <ul style="list-style-type: none"> Express the length of an object as a whole number of non-standard length units. Measure by laying multiple copies of a shorter object (the length unit) end to end (iterating) with no gaps or overlaps. <p>NC.1.NBT.3 Compare two-digit numbers based on the value of the tens and ones digits, recording the results of comparison with the symbols, <, > and =.</p> <p>NC.1.OA.2 Represent and solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, by using objects, drawings, and equations with a symbol for the unknown number.</p> <p>NC.1.OA.7 Apply understanding of the equal sign to determine if equations involving addition and subtraction are true.</p> <p>NC.1.OA.8 Determine the unknown whole number in an addition or subtraction equation involving three whole numbers.</p>
<p>Mathematical Practices:</p> <ol style="list-style-type: none"> 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.
<p>What is the mathematics?</p> <ul style="list-style-type: none"> Students use linear measurement in non-standard units as a context for further exploring comparison situations (ex. Measuring the length of a desk in number of pencil lengths or height with links). Experience with non-standard units support students important measurement concepts such as using the same-size units, lining up units correctly (beginning measuring at zero/edge), and no gaps between units or overlapping units. Standard units like inches and centimeters are not introduced until second grade. Students begin by comparing the length of objects using a 3rd object as reference. Students then describe the comparison using 'greater than', 'less than' and 'equal to'. Ex: A child might compare the length of two playground slides using a string and share they found the length of the red slide greater than the length of the blue slide. To make measurement more precise, students begin to explore measurement using non-standard units such as paperclips, drinking straws, toothpicks, blocks, etc. Students should be provided with ample experiences to measure length in nonstandard

units in their own ways to establish a rationale for more precise measurement. For example, students might work in groups to measure the length of the classroom with pieces of construction paper. As groups work to measure the room, it is likely that students will leave gaps between the papers, have overlaps of paper and even turn the paper in different directions as they measure. As students share with the class their findings, student conversation should be drawn to the different lengths that were found and what might be causing the difference in measurement. This creates the context to discuss ways in which measuring can be made more accurate by laying objects of the same size end to end with no gaps or overlaps.

- As students are measuring and comparing the length of objects, the symbols for comparisons should be introduced. ($<$, $>$, and $=$)
- Measurement is used as a real-world context for introducing the addition of 3 whole numbers. Children should solve problems using objects and drawings and equations (Ex: After measuring the length of 3 pencils, students can add to find the total length of the three pencils). Choose non-standard units carefully so that the total measurement will be within the target number range for the students. For example, three brand new pencils are just over 20 inches, so you would choose a non-standard unit bigger than an inch to keep the total measure of three pencils within 20 (ex. Paper clips, links, crayons, rigatoni noodles, etc.). Offering students different non-standard units to measure naturally differentiates measurement activities by increasing or decreasing the number range needed and provides opportunity for rich discussion at the end of the task about why people got different numbers when they measured the same length.
- The associative property can be used to help make addition of three numbers easier. Addition at this time should still center around using concrete objects and drawings to find sums.
- As students collect measurements, they can record and analyze their data as a way to continue the work on NC.1.MD.4 from Cluster 1.

Important Considerations:

- In Cluster 3, students began comparing two-digit numbers. In this cluster, they continue this work in the context of measurement, providing additional time and opportunities for students to develop mastery of NC.1.NBT.3. Symbols for comparison are included at this time.
- Students should be exposed to a variety of non-standard tools of linear measurements such as pencils, noodles, paperclips, etc.
- While students use symbols for operations and comparisons in this cluster, introduction to symbols for the unknown number occurs in Cluster 8.