Cluster 6: Exploring parts and wholes with joining and separating
***Duration**: 4 - 6 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.K.CC.6** Identify whether the number of objects, within 10, in one group is greater than, less than, or equal to the number of objects in another group, by using matching and counting strategies. **NC.K.OA.1** Represent addition and subtraction, within 10: ● Use a variety of representations such as objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, or expressions. ● Demonstrate understanding of addition and subtraction by making connections among representations. **NC.K.OA.2** Solve addition and subtraction word problems, within 10, using objects or drawings to represent the problem, when solving: ● Add to/Take From-Result Unknown ● Put Together/ Take Apart (Result Unknown and Two Addends Unknown) **NC.K.OA.3** Decompose numbers less than or equal to 10 into pairs in more than one way using objects or drawings, and record each decomposition by a drawing or expression. **NC.K.OA.4** For any number from 0 to 10, find the number that makes 10 when added to the given number using objects or drawings, and record the answer with a drawing or expression. **NC.K.OA.6** Recognize and combine groups with totals up to 5 (conceptual subitizing).
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?

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

Students determine the amount in a set either by counting, counting on/counting back, subitizing, or using other number relationships.

- Students, as they are ready, ***may*** begin to use symbols to represent conceptual language such as the = sign to represent "the same amount" as they construct equations, but they should not be required to do so. Children use number balances, bucket balances, and ten frames to explore these relationships.
- Students will likely use their fingers to keep track of addends, so it is beneficial for students to develop rapid visual recognition of the quantities 0-5 on their fingers. Teachers are encouraged to use addition and subtraction equations to model the situations. Students may begin to use equations but should not be required to.

Students continue to explore part-part-whole relationships to see that we can solve joining and separating word problems.

- Using the ability to determine an amount in a set (result unknown), students begin to explore the concept of symbols to represent this information. Children may use these symbols when explaining part-part-whole combinations of 3-10 and solve joining and separating problems. This builds from the work students began in Cluster 5 with composing and decomposing quantities of 5 and 10 as anchor numbers.
- Students develop an understanding of combining sets (result unknown) and represent addition with objects while creating a deeper understanding of the relationship between number and quantities (cardinality). This builds upon students' understanding that each successive number name refers to a quantity that is one greater in value than the previous one (inclusion). Students begin by modeling addition situations using concrete models and counting strategies to make sense of adding to and putting together.
- Students use numerous manipulatives (number balances, ten frames, rekenreks, two-color counters, connecting cubes, etc.) to continue to explore breaking a quantity into parts and examining whether the total amount is still the same (equal). For example: 5 is the same as 4 and 1. 5 is also the same as 3 and 2. 2 and 2 and 1 is the same as 5! The realization that a quantity, such as 5, can be broken apart and still be a total of 5 is the goal at this point of the year.

Important Considerations:

- Building from Cluster 5, students will continue to explore part-part-whole relationships to see that we can solve joining and separating word problems. Students' work in this Cluster making connections between composing/decomposing 10 and solving story problems will lay the foundation for their work with teen numbers in Cluster 7.
- Composing 10 and understanding addition and subtraction within 10 are combined here for students to make connections between making 10 and solving story problems.
- The concept of equality is critical in understanding part-part-whole relationships. The idea that 5 is the same as (or equal to) 3 and 2, 4 and 1, 5 and 0, 1 and 1 and 1 and 1 and 1, etc. helps children realize that numbers can be broken apart in a variety of ways and still stay the same amount.
- With the introduction of symbols, children build an understanding that the = sign does not mean, "an answer comes after me", but rather that there is a relationship between the left side of the equal sign and the right side of the equal sign. The + symbol is introduced as the "and" and the = sign is introduced as "the same as." Students represent part-part-wholes with drawings and labeling the parts with numerals. They might circle the numeral that represents the whole or put it at the top of the page. They also write using the vocabulary of number relationships (ex. 3 and 2

is 5; 5 is 4 and 1). When students are using this vocabulary freely, symbols can be introduced as the way mathematicians record the relationships. Students are expected to use symbols by the middle of the year in first grade, but some may be ready at the end of kindergarten to begin attaching the symbols with meaning.

- Geometry, measurement, and data can serve as the basis for joining and separating problems. (ex. When comparing lengths of yarn, students will now be able to say, ‘how many cubes longer?’ or ‘how many cubes shorter?’ When comparing shapes, students will now be able to state, ‘how many more sides on a square than a triangle?’)