Cluster 2: Using Data to Solve Problems
Duration: 1-2 weeks

Content Standards:
This list includes standards that will be addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. ***Please note that strikethroughs represent parts of standards that are addressed in a different cluster. Additionally, please note the recommendations in the Important Considerations section of this cluster.***   **NC.3.MD.3** Represent and interpret scaled picture and bar graphs: - Collect data by asking a question that yields data in up to four categories.   - Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided.   - Solve one and two-step "how many more" and "how many less" problems using information from these graphs   **Supporting Standards:** **NC.3.NBT.2** Add and subtract whole numbers up to and including 1,000.   - Use estimation strategies to assess reasonableness of answers.   - Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems.   - Use expanded form to decompose numbers and then find sums and differences.   **NC.3.OA. 8** Solve two-step word problems using addition, subtraction, ~~and multiplication,~~ representing problems using equations with a symbol for the unknown number.

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?
Data work in Grades K-5 builds foundations for the study of statistics and probability in Grades 6 and beyond. This work includes solving problems that involve addition, subtraction, and multiplication, thereby allowing students to strengthen and apply what they are learning in regard to computation.   Students will: - Ask questions that involve up to four categories and collect data.   - Represent the data in frequency table, picture graph, or bar graph.   - Interpret data displayed in a frequency table, picture graph, or bar graph.   - Use addition, subtraction, and multiplication to solve **one-step** "how many more" and "how many less" problems using information from these graphs.   - Use addition and subtraction to solve **two-step** "how many more" and "how many less" problems using information from these graphs.

- Share their thinking by communicating their reasoning and sharing their solutions.

This cluster allows students to work with the concept of scale that applies to their previous unit of working with equal groups. Students draw picture graphs in which each picture represents more than one object, and they draw bar graphs in which the height of a given bar in tick marks must be multiplied by the scale factor in order to yield the number of objects in the given category. This connects with the emphasis on multiplication in this grade.
- At the end of Grade 3, students can draw a scaled picture graph or a scaled bar graph to represent a data set with several categories (four or fewer categories).
- In students' work with data, context is important and provides meaning to the mathematics, allowing integration with science, social studies, health, and other subjects.

This cluster also includes an emphasis (as a supporting standard) on addition and subtraction within 1000. This focus provides students the opportunity to practice some of the skills they acquired in second grade when they were also expected to add and subtract within 1000. Additionally, their work with addition and subtraction will continue in the next cluster (Cluster 3). Therefore, by answering interpretive questions about data displays in Cluster 2, they can simultaneously practice and apply their addition and subtraction computational skills.

Important Considerations:
- Drawing a bar graph in which each square in the bar graph represents a number other than one (say, 5 students) allows opportunities to use concepts and strategies from the previous cluster focused on equal groups.
- In this cluster, students use addition and subtraction to solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. At this point in the year, the work with data and the connection to NC.3.NBT.2 includes smaller numbers within the standard and builds to numbers up to 1,000..