CONSTRUCTING TASK: THE DATA STATION

Adapted from North Carolina's Core Essentials Mathematics Program

APPROXIMATE TIME: 3-5 Days

STANDARDS FOR MATHEMATICAL CONTENT:

MCC.3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

MCC.3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units – whole numbers, halves, or quarters.

STANDARDS FOR MATHEMATICAL PRACTICE

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.

BACKGROUND

Students should have opportunities reading and solving problems using scaled graphs before being asked to draw one. The following graphs all use five as the scale interval, but students should experience different intervals to further develop their understanding of scale graphs and number facts. While exploring data concepts, students should **P**ose a question, **C**ollect data, **A**nalyze data, and **I**nterpret data (PCAI). Students should be graphing data that is relevant to their lives
Example:

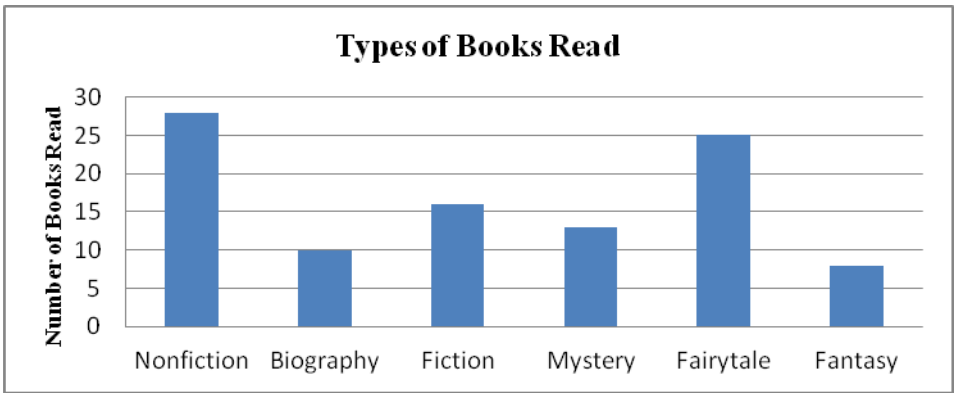
Pose a question: Student should come up with a question. What is the typical genre read in our class?

Collect and organize data: student survey

> Pictographs: Scaled pictographs include symbols that represent multiple units. Below is an example of a pictograph with symbols that represent multiple units. Graphs should include a title, categories, category label, key, and data. How many more books did Juan read than Nancy?

Number of Books Read	
Nancy	
Juan	
	= 5 books

Single Bar Graphs: Students use both horizontal and vertical bar graphs. Bar graphs include a title, scale, scale label, categories, category label, and data.



Analyze and Interpret data:

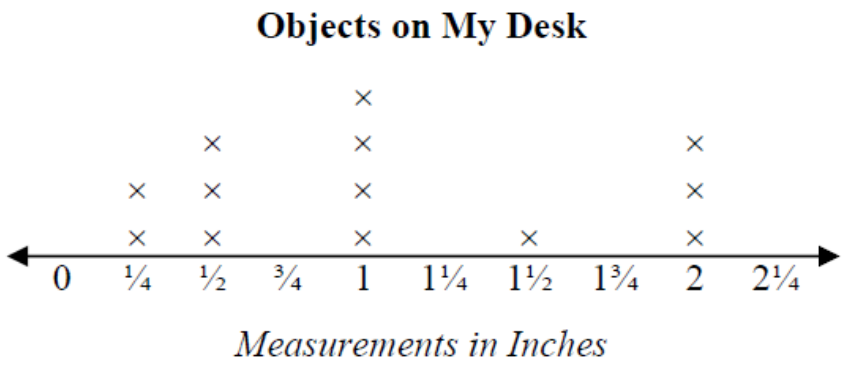
- How many more nonfiction books where read than fantasy books?
- Did more people read biography and mystery books or fiction and fantasy books?
- About how many books in all genres were read?
- Using the data from the graphs, what type of book was read more often than a mystery but less often than a fairytale?
- What interval was used for this scale?
- What can we say about types of books read? What is a typical type of book read?

Return to Contents

Students in second grade measured length in whole units using both metric and U.S. customary systems. It is important to review with students how to read and use a standard ruler including details about halves and quarter marks on the ruler. Students should connect their understanding of fractions to measuring to one-half and one-quarter inch. Third graders need many opportunities measuring the length of various objects in their environment.

This standard provides a context for students to work with fractions by measuring objects to a quarter of an inch.

Example:
Measure objects in your desk to the nearest ½ or ¼ of an inch, display data collected on a line plot. How many objects measured ¼? ½? etc. …



ESSENTIAL QUESTIONS

- How are tables, bar graphs, and line plot graphs useful ways to display data?
- How can you use graphs to answer a question?
- How can surveys be used to collect data?
- How can surveys be used to gather information?
- How can data displayed in tables and graphs be used to inform?

MATERIALS

- Math Journals (or paper)
- Connecting Cubes
- Newspapers
- Pennies
- Droppers
- Lima Beans
- Manipulatives/cut outs (to help students create models for their problems)

GROUPING

Students may be grouped individually, in pairs, or in small groups at the teacher's discretion.

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

PART I (Whole group activity)
Allow students to collect the sizes of shoes worn by their classmates. As a class (perhaps on chart paper), make a table to organize the data. Have a class discussion that allows the class to think critically about the relationship between data collection, analysis, and representation. Some sample points for the students to ponder are:

- How can we organize our data?
- What type of graph should we choose to display the information? Why?
- Is there another way we can represent this data?

- What does a graph tell us about data?
- What kinds of questions can we ask about the graphs we just created?

PART II (Small group activity)

Allow students to work in small groups to complete this task.

How many connecting cubes can you fit along the side of your shoe?

- Working in small groups, display your data on an appropriate graph.
- Discuss what your data means. Create questions about your findings that can be answered using your graph.
- *Challenge:* Try to represent this data using a different type of graph. Talk about how your new graph differs from your first one.

PART III (Partner activity)

Allow students to work in small groups to complete this task.

Penny Power!

- With a partner, predict the number of drops of water that will fit on a penny.
- Share your prediction with your partner.
- Establish rules for dropping water on the penny.
- Use a dropper to find out how many drops of water will fit on the penny.
- Construct a graph to display your data.
- Compare your graph with the graph of another group.
- Write about the similarities and differences.

DIFFERENTIATION

Extension Activities

- How much sleep?
  - Collect data for the number of hours your classmates sleep each night.
  - Make a line plot graph to illustrate.
  - Compare your graphs with others.
  - Do most students sleep more than nine hours? How do you know?
- Weather Watcher!
  - Over a two week period, look at the weather data in the newspaper.
  - Compare the high and low temperatures in your town/city to the high and low in the city of your choice.
  - Make two line plots to compare these.
  - What statements can you make about the data?

Intervention Activities

- Explore Data!

- Cut out examples of graphs from the newspapers.
- What information is being shown?
- How would you classify these data displays?

- ...And the Survey Says!
  - Choose a question and survey at least twelve classmates. Collect your data and make graphs. Don't forget labels! When finished your teacher will ask you questions about your data and graphs.
    1. Which of these pets do you prefer?
       - Cat
       - Bird
       - Hamster
       - Dog
    2. Which sport do you like best?
       - Basketball
       - Swimming
       - Soccer
       - Football
    3. Which is your favorite fast food restaurant?
       - McDonald's
       - Burger King
       - Wendy's
       - Chick Fil A