

Data Mania

Reporting Category Probability and Statistics

Topic Exploring data collection and graphing

Primary SOL 3.17 The student will

b) construct a line plot, a picture graph, or a bar graph to represent the data.

Related SOL 3.17a, c

Materials

- Linking cubes of various colors
- Construction paper squares to match the colors of the cubes
- T-Shirt Pattern (attached)
- Scissors
- Crayons or markers
- Grid paper

Vocabulary

data, categories, survey, poll, bar graph, data points, increments, picture graph, scale, horizontal axis, vertical axis, key, title, labels, line plot, x axis, y axis

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Part I: T-shirt colors object graph, picture graph, and bar graph

1. Put a collection of linking cubes of various colors in an accessible place. Ask each student to select a cube that most closely matches the color of his/her shirt or top. Have students place their cubes on the matching colored paper squares that have been placed around the room. Ask students what the cubes represent. (Data about the colors of all the students' shirts—specifically, how many of each color) Ask how to organize this data by sorting. (Sort by colors) Point out that the sorted cubes can be used to display this data in a graph.
2. Construct an object graph with the cubes by placing them on the floor or taping them to the wall. Ask students to name the parts of a graph (title, labeled axes, key) and state why each part is important. Have student volunteers add these graph parts to the object graph.
3. Distribute scissors, crayons or markers, and copies of the T-Shirt Pattern. Have students color the shirt patterns to match their cubes and cut them out. Tape each T-shirt on the wall to construct a picture graph. Review the parts of a graph and why each part is important. Have student volunteers add these graph parts to the picture graph.
4. Discuss with the students the similarities and differences between the two graphs.
5. Distribute grid paper, and have students construct bar graphs from the T-shirt color data represented in the picture graph. Remind students to include the following parts:
 - Title identifying the data
 - Two axes with labels

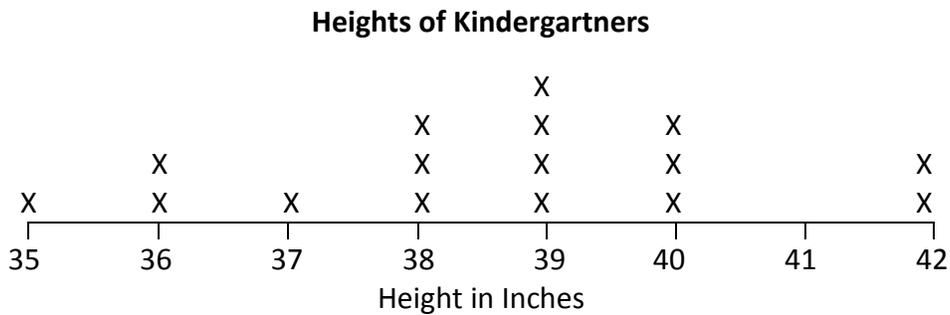
- Increments (appropriate equal increments marked on the axis that shows numerical data)
 - Spaces (equal spaces between the bars)
6. Discuss the similarities and differences between the three graphs, and record these on chart paper. Have students share their thoughts about which graph was easiest to construct and which one is easiest to read. Have them explain their reasoning.

Part II: Numerical line plot

7. Distribute sticky notes, and explain to students that they will investigate a question in order to gather data. How many people live in your home? Record data by having students write on the sticky notes their names and the number of people living in their homes.
8. Construct a number line that will include the least and greatest pieces of data (the smallest number and the largest number of people living in students’ homes). This number line needs to be displayed for all students to see and large enough so that the sticky notes will not overlap when put on the line. Have students place their sticky notes above the corresponding points on the number line.
9. Distribute grid paper, and ask students to use it to create a line plot that matches the sticky-note line plot. Instruct them to record each sticky note as one X on the line plot. Ask students what the title of the line plot should be, and have them add it.
10. Direct students to use the data on the line plot to construct a bar graph, including title, labeled axes, increments, and spaces.
11. Have students work in groups or pairs to discuss the similarities and differences of the two graphs. Ask groups to share at least one of their conclusions about the graphs.

Part III: Heights line plot

Below is an example of a line plot and sample questions that students could formulate about the data.



Each X represents one student.

- How many students are taller than 36 inches? (13)
- How many students are 39 inches tall? (4)
- How much taller is the tallest child than the shortest child? (7 inches)
- Which height is shared by the most students? (39 inches)
- Susie is the shortest student in the class. How tall is Susie? (35 inches)

Assessment

- **Questions**
 - How was the data represented in the graph? What questions could you ask based on the data in the graph?
 - What statements can you make that explain the data represented?
- **Journal/Writing Prompts**
 - Write at least two statements that detail information from your graph.
 - Create a survey question that you would like to ask the class. Create a table to record the data collected. Then, decide which type of graph you will use to display the data. Write at least two statements about the information that will be in your graph, and explain what the information will reveal about the group surveyed. Finally, write at least three questions to ask the class about your graph to check for understanding.

Strategies for Differentiation

- **Technology**
 - Break down the directions for each activity into smaller segments.
 - Complete each activity over a morning and an afternoon, or spread it out over several days.
 - Enlarge grid paper for students with visual or motor disabilities.
- **Multisensory**
 - Have students create a human graph based on their favorite colors or their eye colors.
- **Small-Group Learning**
 - Assign students to work in pairs to graph the number of candies of each color that are in a bag.
- **Vocabulary**
 - Be sure students know the following vocabulary: *data, key, grid, title, axes, increments, label, line, plot*.
 - Have students put the vocabulary words into a math glossary that includes the word, a picture, and the definition.
- **Student Organization of Content**
 - Display graphs around the classroom, and have students keep their individual graphs in binders or folders.

T-Shirt Pattern

