

Data Mania

- Strand:** Probability and Statistics
- Topic:** Exploring data collection and graphing
- Primary SOL:** 3.15 The student will
- a) collect, organize, and represent data in pictographs or bar graphs; and
 - b) read and interpret data represented in pictographs and bar graphs.

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

analyze, bar graph, categories, data, data points, horizontal axis, increments, interpret, key, labels, pictograph, poll, scale, survey, vertical axis, title, x axis, y axis

Student/Teacher Actions: What should students be doing? What should teachers be doing?

Part I: T-shirt Colors Object Graph, Pictograph, 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 students would 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 the T-Shirt Pattern. Have students color the shirt patterns to match their cubes and cut them out. Tape each T-shirt to the wall to construct a pictograph. 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. Have students read and interpret the graphs. Ask students to share one or two similarities or differences between the three graphs. Then have students write two or three statements that they observe about the graphs. Students may write observations about the graphs that may take multiple steps to solve. For example, “How many more red and blue shirts is our class wearing than yellow shirts?”

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.
- **Other Assessments**
 - Display a graph with a missing title or axis label. Ask students to identify the missing information and provide a good name or title for the missing information.
 - Show a graph and ask how the data might change if more students are surveyed with the questions the graph is representing.

Extensions and Connections (for all students)

- Give students a graph that has been constructed with no more than 30 data points and less than eight categories. Have students create single- and multi-step problems based on the information displayed in the graph.
- Create a weekly class graph. Ask students a question early in the week and have them display their answer in the graph. During the week, students may make observations about the graph or ask other students questions about the graph. The teacher can ask higher-level questions based on the displayed data.
- Use a gallery walk of the graphs to discuss the similarities and the differences.

Strategies for Differentiation

- 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*.
 - Have students put the vocabulary words into a mathematics 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.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

T-Shirt Pattern

