

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

- 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?

1. The teacher will ask each student what color shirt they are wearing. As each student responds, all students will record the response by creating a tally chart on a piece of paper.
2. Distribute grid paper, and have students construct bar graphs from the 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)
3. Tell students that another way to represent this data is by using a pictograph. Explain that a pictograph uses pictures or symbols to show the data. Explain that a pictograph includes a key because sometimes each picture or symbol represents more than one piece of data. For example, using the data collected about students' shirt colors, each symbol could represent two shirts. Have students discuss with a partner what happens when representing an even number and an odd number.
4. Show students the t-shirt pattern (attached) and tell them they will use this symbol to represent two shirts. Discuss what to do if one of the colors has an odd number of students. Give each student enough of the shirt symbols to create a pictograph of the data.
5. Have students construct pictographs from the shirt color data represented in their bar graph. Remind students to include the following parts:

- Title identifying the data
 - One axis with labels
 - T-shirt symbols
 - Key
6. Have students read and interpret the graphs. Ask students to share one or two similarities or differences between the bar graph and the pictograph. Have students write one or two statements that they observe about the graphs. Then have students write questions that can be answered using the graphs. Students make create questions 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?”
7. Extend students’ thinking by asking questions such as, “If we made these graphs tomorrow, would they look the same?” “If we surveyed a fourth grade class, would their graphs look the same as our class?” “How would the bar graph and pictograph look if we surveyed a baseball team at a baseball game?”

Assessment

- **Questions**
 - How was the data represented in the graph?
 - What questions could be answered using the data represented in the graph?
- **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 page is intended for classroom use for students as a visual aid to learning.

T-Shirt Pattern

