

Numbers in a Name

Reporting Category Probability and Statistics

Topic Constructing, analyzing, comparing, and contrasting histograms

Primary SOL 7.11 The student, given data for a practical situation, will
a) construct and analyze histograms; and
b) compare and contrast histograms with other types of graphs presenting data from the same data set.

Materials

- Sticky notes
- Chart paper
- Markers
- Calculators

Vocabulary

line plot, circle graph, stem-and-leaf plot, measures of central tendency, range, frequency table
(earlier grades)

histogram, frequency distribution, comparison, prediction, inference (7.11)

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

1. Give each student a sticky note and ask them to write the total number of letters in their first and last names. Ask students to think about how this data could be organized once it is collected from each student. Discuss ideas as a class.
2. Try to organize the data based on the suggestions that have been given. Discuss the pros and cons of each suggestion. Ask students if grouping the data would be helpful. Introduce students to the grouped frequency table, and be sure to discuss the importance of consecutive equal intervals.

Sample grouped frequency table

Number of Letters in First and Last Name	Tally	Frequency	Cumulative Frequency
5–10			
11–16			
17–22			

3. Ask students to make observations from the grouped frequency table, including what information is displayed and what is not.
4. Ask students to determine what type of graph they can make from a grouped frequency table. Introduce students to a histogram—a form of bar graph in which the categories are consecutive and at equal intervals and the height of each bar is determined by the frequency of each interval. Make a histogram from the numbers in first/last name data. Be sure to point out the important parts.

5. Ask students to analyze the information in the histogram and make inferences, conjectures, and predictions. (Sample questions: If another student gets added to our class, where do you predict their name would fall in our histogram? What could happen to our histogram if we asked this same question in another country? In a different era in history? In another culture?)
6. Place students in small groups, and distribute chart paper and markers. Have some groups display the first/last name data in a line plot; some groups, a circle graph; and some, a stem-and-leaf plot. Have calculators or computers available for the circle graph group(s). Be prepared to review how to construct these graphs as needed.
7. Have each small group analyze their graph by making three observation statements on the same piece of paper as the graph.
8. Have each small group present their graph and observation statements to the class. Compare and contrast each graph to the original histogram. You may want to use Venn diagrams for this.

Assessment

- **Questions**
 - How is a histogram different from a line plot? Circle graph? Stem-and-leaf plot?
 - What types of data are most appropriate to display in a histogram? Give specific examples.
- **Journal/Writing Prompts**
 - Describe how to create a grouped frequency table and a histogram from a set of data.
 - Explain what information a histogram can show and what it cannot show.
 - Explain how a histogram differs from other bar graphs.
- **Other**
 - Have students create a survey question, collect data, and display the data in a histogram, line plot, circle graph, and stem-and-leaf plot. Students should also analyze and interpret the data.
 - Give students the following scenario and ask them to create a histogram that could represent it:
Jack's repair shop opens at 9:00 AM and closes at 5:00 PM. One day, Jack kept track of the number of customers in his shop each hour and recorded the information in a histogram. He noticed the range of customers was thirty, and the average number of customers in the store each hour was ten.

Extensions and Connections (for all students)

- Graph data using a graphing calculator

Strategies for Differentiation

- Use the jigsaw strategy to have students compare and contrast histograms with line plots, circle graphs, and stem-and-leaf plots.
- Prior to the lesson, review how to make frequency tables and bar graphs.
- Prior to the lesson, set up circle graphs that have been designed based on your class data for students to complete.