The Human Line Plot

Summary

Students will learn about collecting data and using charts and line plots to graph the data.

Materials

- 6' x 8' line plot numbered 0-8
- Markers/colored pencils
- Math journals

Additional Resources

Book

- *Navigating through Data Analysis and Probability in Grades 3-5*, by Peggy A. House; ISBN 0-87353-521-9

Background for Teachers

Many students encounter the line plot in their textbooks but do not understand what it means or how it can be used to show data. Line plots deal with amounts and not categories. The X's on a line plot do not all have the same value.

Intended Learning Outcomes

2. Become mathematical problem solvers.
4. Communicate mathematically.
5. Make mathematical connections.
6. Represent mathematical situations.

Instructional Procedures

Invitation to Learn

Conduct an informal survey of how many times each student has had stitches. After collecting the data, ask students to predict the most, least, and average amount of stitches the students have had. Draw a frequency table and line plot on the board to represent the data.

Instructional Procedures

- Set a paper line plot on the floor in front of the class.
- Have the class generate a question (purpose) that can be demonstrated on the line plot, such as "How many pets do you have?"
- Survey 15 students in the class for their answers. Have all the students record the data on a frequency chart in their journals.
- Have the 15 students come up and stand next to the line plot by the number that represents their answer.
- Have the rest of the students to look at the human line plot. Ask the following questions to the students who are not on the line plot:
  - How many students have 0 pets? 1 pet? 2 pets…8 or more pets?
  - What amount of pets is most frequent?
  - What is the range of this data?
  - How could we change the range? (Increase the highest amount of pets that you could have.)
  - What is the mode of this data?
  - What is the median of this data?
- Continue by showing the class that you can start at each end of the plot and remove people one

by one until you find the middle person standing. The number that person represents is the median.

Excuse the 15 students to sit down. Have the class come up with another question or purpose, such as "How many books a month do you read?"

Survey the rest of the class and have all the students record this information on a frequency chart in their math journals. Have the students that were surveyed come and stand next to the line plot by the number that represents their answer. Ask the class these questions:

- How many students have read 0 books? 1 book? 2 books? 8 or more books?
- How many books are most frequently read in a month?
- What is the range of the data?
- How could we change the range?
- What is the mode of the data?
- What is the median of the data?

Emphasize that each person by a different number represents a different value, and that in this case not all persons are equal. (If you have done the activity What Does Average Look Like, explain that the blocks in each tower had an equal value. Compare the people on the line plot who equal different values.)

Find the median of this data by showing the class that you can start at each end of the plot and remove people one by one until you find the middle person standing.

Excuse the students to return to their desks. Show the class a regular line plot with x's. Explain that each x represents a person that was on the human line plot. Compare this to the human line plot that they just created. Have the students draw a matching line plot for each frequency chart in their math journals.

Students work in groups to come up with their own survey, matching frequency chart, and line plot. They must also find the mode, median, and range for this data. Have them record the graphs in their math journals. Give each group time to present their data and charts to the class.

Extensions

Students who have a difficult time writing may dictate their explanations to the teacher or another person and have them record it in student's journal next to the illustrations.

Use the human line plot activity to help students plot data they have been working with in science such as heredity.

Students survey other classes and count the number of students in each class that can roll their tongue (heredity trait). After compiling all the data, create a frequency chart and matching line plot.

Family Connections

This is an opportunity for students to do a different kind of "Chore Chart." Have students collect data on how many hours they spend a day/week doing chores at home. Compile the data for the entire class on a frequency chart and then represent the data on a huge human line plot. Have the class calculate the mean, median, mode, and range for the data.

Students count the number of light switches that are in their house. During class, compile the information on a frequency chart and matching line plot.

Assessment Plan

Assess each student's math journal to see that the frequency charts and line plots have been drawn correctly. Each student is also responsible for including the data that their group compiled to share with the class. Students should be able to do this with 100% accuracy.

Bibliography

Research Basis

Lappan, G., Fey, J., Fitzgerald, W. Friel, S. & Phillips, E. (1996). *Data about us*. Connected Mathematics Project, Palo Alto, CA.
"The mode, median, and mean are kinds of averages that are a part of representations and statistics used to analyze data. Students need to understand each of these measures and how they are applied and calculated. This article examines two ways in which the concept of "mean" can be demonstrated.
Hitch, C. & Armstrong, G. (1994). Daily activities for data analysis. *Arithmetic Teacher. 41*(1) 242-245.
"Children develop mathematical concepts by seeing them in a variety of settings." For students to understand statistics and graphs, they need exposure to the process of collecting, organizing, and describing data. This article describes useful activities that help students understand and display data.

Authors

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