

NEWSLETTER

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UNDERSTANDING LINE PLOTS: CONNECTING DATA, QUANTITIES, AND FREQUENCY

Distinguishing data values, frequencies, and the total number of observations.

In today's edition, we explore:

- **Values and frequencies:** what the position and the number of Xs represent
- **A books-read example:** the most frequent value, the greatest value, and the total
- **Student thinking:** questions that reveal students' interpretations

A line plot organizes numerical data along a number line. Each X represents one observation. Its position identifies the observed value, and the number of Xs above that value represents its frequency. When several observations have the same value, their Xs are stacked above that number.

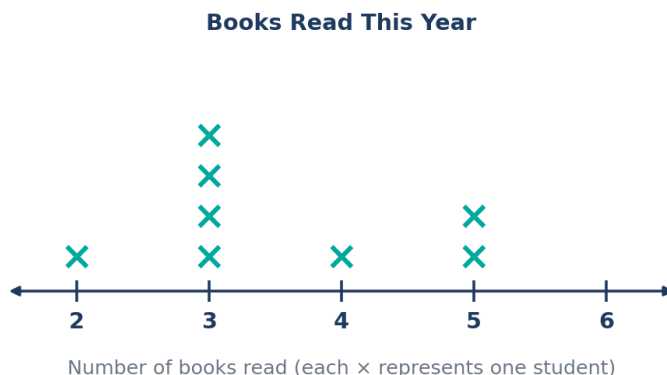
Students need to distinguish the value of an observation from how often that value occurs. They also need to understand the total number of observations and what empty positions on the number line represent.

Questions to Examine Student Thinking

1. **Identify the quantities.** Ask, "What does each X represent? What do the numbers on the axis represent?"
2. **Connect the representations.** Ask, "How do the original data, a frequency table, and a line plot show the same observations?"
3. **Examine student reasoning.** Ask students to explain the difference between the most frequent value and the greatest observed value. What does an empty position on the number line represent?

A Books-Read Example

Eight students reported how many books they read. One student read 2 books, four read 3 books, one read 4 books, and two read 5 books.



The most frequent value is 3 books. The greatest observed value is 5 books. The total number of students is 8. No X appears above 6, so no student read 6 books. The most frequent value, greatest observed value, and total number of observations describe different aspects of the data.

What Does the Research Say?

Research on graph comprehension emphasizes the importance of the task, the context, and the mathematical information represented (Friel et al., 2001). Lehrer and Schauble (2004) also examined how students developed ways to describe distributions as they measured and represented data.

Teachers can use these findings to plan instruction that connects data collection, numerical values, frequencies, and the interpretation of distributions.

Keep developing mathematical thinkers.

More Information

Read DMT Insight 29 and download the Companion at mathsuccess.io/dmtinsights.

To share a classroom example or a question, contact us at contact@dmtinstitute.com.

For more information on professional development and curricular resources, visit mathsuccess.io.


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