# TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION

Southern Nevada Regional Professional Development Program

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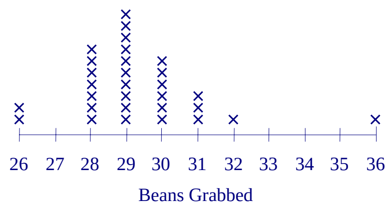
In the October 2003 issue of *Take It to the MAT*, we looked at one way to represent numerical data—the line plot. In this edition, we will ask some questions about the data using the line plot and look at another way to represent the data.

| Beans Grabbed | |
|---|---|
| Student | Beans |
| ALLAN | 32 |
| ANITA | 29 |
| ARNOLD | 36 |
| BILLY | 29 |
| CAROL | 29 |
| CARRIE | 30 |
| CHLOE | 28 |
| CONNIE | 26 |
| ELMER | 29 |
| GLENDA | 30 |
| HECTOR | 31 |
| JACK | 28 |
| JEFF | 26 |
| JIMMY | 29 |
| JOEL | 29 |
| JOSE | 29 |
| KELLY | 28 |
| LYNN | 31 |
| MELVIN | 31 |
| MIKE | 28 |
| NICOLE | 29 |
| PAMELA | 30 |
| ROBERTO | 29 |
| RONALD | 28 |
| SAM | 30 |
| SANDRA | 30 |
| SARAH | 28 |
| STANLEY | 30 |
| STEPH | 29 |
| TAMMY | 28 |

What questions might we ask students about our results? Perhaps, we could ask:

- How many students grabbed 26 beans?
- What was the largest number of beans grabbed?
- What quantity of beans was grabbed most often?




These questions require students to read the graph and little else. Perhaps we might ask some questions that require students to do a little more thinking or examine the data in greater depth.

- How many students grabbed beans?
- What is the range of beans grabbed?
- What is the *average* number of beans grabbed?

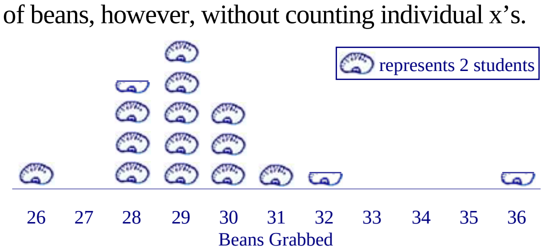
The next step is to ask questions that require students to make inferences or predictions. Also, students should be prompted to ask their own questions in the form of "wonderings." For example:

- If two more students grabbed beans, how many might they grab?
- Why didn't each student grab the same number of beans?
- Is there a relationship between hand size and the number of beans grabbed?

The last question would require students to gather more data, namely hand size. This would now require different ways to represent the data and prompt more questions.

The line plot is a nice "build-as-you-go" graph, where each student can mark his "x" after counting his beans. We can't quickly determine how many students grabbed a particular number of beans, however, without counting individual x's.

An alternative style of graph would be a *pictograph*, a type of bar graph that uses a picture or symbol to represent a particular number of students. In the pictograph above, one bean symbol represents two students. Thus, two students grabbed 26 beans, ten students grabbed 29 beans, and six students grabbed 30 beans. How many students grabbed 28 beans? 32 beans?




Since seven students grabbed 28 beans, and each symbol in the graph represents two students, we need $3\frac{1}{2}$ symbols to show 7 students. (Neat way to incorporate fractions into data analysis!) So, the half bean symbol at 36 means only one student grabbed 36 beans.

The pictograph does not eliminate the need to count, but just reduces how much counting we need to do. Preferably, we won't need to count at all. In this case, a student (or teacher) with a trained eye will not need to count "1, 2, …," but will see 5 symbols at 29 and three at 30. This is an important point in constructing a pictograph: create it in a way that the reader can quickly determine the number of symbols without a lot of counting. Imagine if we had 50 students that grabbed 29 beans and we made a pictograph with each symbol representing two students. A reader having to count 25 bean symbols in a pictograph is not much improvement over counting 50 x's in a line plot.