TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION

Southern Nevada Regional Professional Development Program
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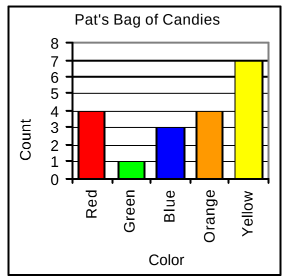
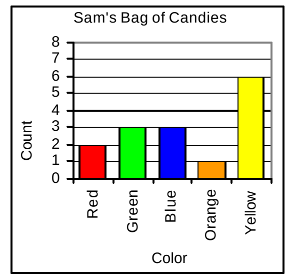
In the past four issues of *Take It to the MAT*, we examined the creation of several types of graphs to display data. Bar graphs, picture graphs, and circle graphs were explored and common mistakes that students make in their creation were addressed. Now that the graphs are made, let's look at some questions and extentions that we can do with the graphs in this final issue of the 2002–2003 school year.

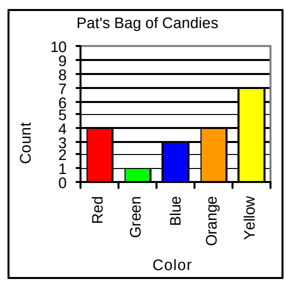
In a particular classroom, Pat and Sam have created bar graphs displaying how many of each color of candy were in their respective bags. Their graphs are shown at right.

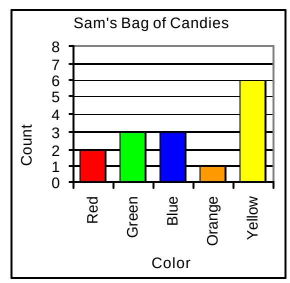




- Who has more red candies?
- Who has the most of any one color?
- Of which colors do Pat and Sam have the same number of candies?
- Which student has the most of any one color? What color and how many?
- Who has the most *total* candies?

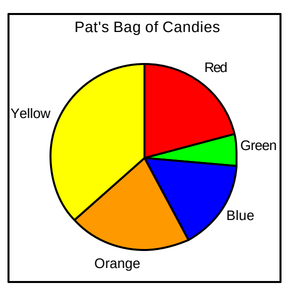
All of these questions can be routinely answered from the graphs. It's clear that they each have the same number of blue candies and that Pat has the most of any color—yellow. But what about the second pair of bar graphs?

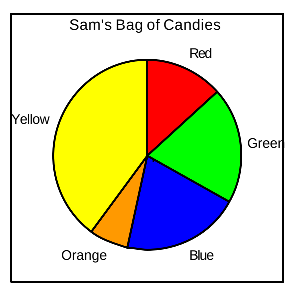




In the second pair of graphs, one may think Sam has the most of one color or more blue candies than Pat. After all, the yellow and blue bars in Sam's graph are taller than Pat's. Both of these conclusions are wrong, however. If one only looks at the heights of the bars and does not take into account the vertical scale, erroneous conclusions may be reached. Within a single graph, comparison is easy—taller bars mean more candies. Between two graphs, the vertical scale must be a factor in making comparisons.

What about circle graphs? Here are Pat's and Sam's circle graphs. Let's answer the same questions as before.





The only question we can answer is of which color each has the most—yellow for both students. And we can't even tell from the graph how *many*, only that it's somewhere between one-third and one-half for each. Students making comparisons may be inclined to say that Sam has more yellow candies than Pat because Sam's yellow section is larger. This would be wrong. Circle graphs show a comparison of *part to whole*. Sam has a greater *percentage* of yellow than Pat. One may say that the yellow is a *larger portion of the whole bag* in Sam's case. But, we cannot say which student has *more* yellow candies without knowing how many total candies there are. The circle graph does not tell us that.

Comparing different types of graphs will enable students to become more critical thinkers. Graph comprehension can then move from reading the data to reading between the data to reading beyond the data.