## Candy Bar Graphs

Summary
These activities require students to create different types of graphs.
Main Core Tie
Mathematics Grade 6
Strand: STATISTICS AND PROBABILITY (6.SP) Standard 6.SP. 5

## Additional Core Ties

Mathematics Grade 6
Strand: STATISTICS AND PROBABILITY (6.SP) Standard 6.SP. 1
Mathematics Grade 6
Strand: STATISTICS AND PROBABILITY (6.SP) Standard 6.SP. 4
Group Size
Small Groups
Materials
24 Hour Circle Graphs

- What Have I Done for the Past 24 Hours? Colored pencils/crayons
Candy Bar Graphs
Candy bars
Moon Graphs Moon phase of student's birth
String
Additional Resources
Books
Navigating Through Data Analysis in Grades 6-8, by Bright, Brewer, McClain, and Mooney; ISBN 0-87353-547-2


## Background for Teachers

In sixth grade, students should know a variety of different graphs, as well as being introduced to scatter plots (or scatterplots) and circle graphs (or pie charts). Stem-and-leaf plots, bar graphs, line graphs, and line plots should have been introduced in previous grades. All graphs and plots require appropriate labels and titles. Here is a brief summary and examples of some of the graphs students should be comfortable with reading and creating:
LINE PLOT: A line plot is a quick way to arrange data. The values of data are listed on the horizontal axis, and an $X$ is placed above the axis to represent one item.
Height of Sixth Graders in Ms. Stout's Class


BAR GRAPH: A bar graph is one of the most commonly used and easy to read graphs. Bar graphs
show frequency of defined data values in a set of data. The length of the bar shows the frequency of the data for that item. Bars may be drawn horizontally or vertically and should be the same width to avoid confusion. Stacked bar graphs and double (or triple, quadruple, etc.) bar graphs compare additional sets of data within the same graph. Below is an example of a triple bar graph.
CIRCLE GRAPH: Also known as a pie chart, this graph is partitioned in different segments equaling one hundred percent. This graph is great for comparing data within a set and is very visual.
STEM-AND-LEAF PLOT: Also known as a stem plot, this graph separates the tens place from the ones place (or hundreds and tens from ones). This is minimizes confusion for the viewer because there are less digits; also, it creates a graph to show the frequency of numbers within the tens digits. The tens digits are the stems and the ones digits are the leaves. Each leaf represents one of the pieces of data.
To make reading the graph simpler, the leaves should be in numerical order. A back-to-back stem plot can be used to compare two sets of data.
LINE GRAPH: This graph type is great for showing data over time. The time is shown on the horizontal axis and the other data is on the vertical axis. The points are plotted based on the correlation of the time and the data. The points are connected together by line segments. This creates a visual way of seeing the data change over periods of time. The scale of the vertical axis can greatly change the way the information looks.
SCATTER PLOT: This graph consists of a grid using Cartesian coordinates to graph points. The two points are determined by the two characteristics of the data. After the coordinates are graphed, the viewer can determine whether or not the two characteristics correlate (are related). A scatter plot is an excellent way to show whether or not the two measurements correlate.

Intended Learning Outcomes
6. Represent mathematical ideas in a variety of ways.

## Instructional Procedures

Invitation to Learn
24 Hour Circle Graphs
Ask students what they did yesterday. Have students write a list of what they have done for the past 24 hours. Make sure they keep things pretty general (for example, if they watched television, they don't need to provide each show they watched). Students will make a rough estimate of how long each activity took and round to the nearest half-hour.
When students have created a list that equals exactly 24 hours, they will create a circle graph (or pie chart) representing their data. You may use the worksheet What Have I Done for the Past 24 Hours?, which has 24 wedges, one for each hour. Students will color the appropriate wedges to represent each activity. They will also create a key (or legend) describing what each color represents.
Instructional Procedures

## Candy Bar Graphs

Tell the students the different types of candy bars you will be using. Students will gather data about the favorite candy bar of every student in the class (including themselves). Let the class determine the most efficient way to collect the data. For example; ask everyone individually, or conduct a class poll. Each student will record the data.
Place students in groups of four. Each student will be in charge of one of the candy bars.
Students in the group will compare their data (it should be the same). After verifying the ratio (e.g. 5 out of 25) of their candy bar, they will find the equivalent percentage.

Inform students the length of one miniature candy bar is equal to $20 \%$. Therefore (5) miniature candy bars is equal to, or the same as $100 \%$. They will need to cut (or bite!) until only their
approximate percentage is left.
Have each student that has charge over a certain candy bar hold up the length that represents the percentage. Repeat with each type of candy bar. If the students figured correctly, their lengths will match.
On poster paper or graph paper, each group will draw an $X$ and $Y$ axis and label the $X$ axis with the names of the candy bars, and the Y axis with the percentages. Also remind them to title the graph. They will then create a bar graph with the candy bars actually being the bars. You may have them glue the candy bars on, or draw an outline of the candy bars.
Next, have each student create a bar graph for their favorite miniature candy bar. The candy bar company would want to use this graph to try to sell the candy bar on an advertisement. Stress to them that changing the scale can influence the appearance of the data display (Math Standard V:1d).
Moon Graphs
Begin by posing the situation: A hospital has contacted the school and would like to know if a certain old wives' tale (or urban legend) is true. They would like our class to determine if more babies are born on a full moon than any other moon phase. Let students predict whether or not they think that statement is valid and why.
Each student will find out which moon phase they were born on by visiting the website http://tycho.usno.navy.mil/vphase.html. Ideally, they will print out their phase and have it to reference during the activity.
Move desks or go to an open space (outside, gym, or hallway). Create human graphs of the data. You may want to start out with standing in the middle with students lined up around you according to their moon phase. Students should be able to see quickly whether or not that old wives' tale is true for your class. This can lead into a discussion about validity of small amounts of data. Would your findings hold true if 1,000 people were polled? The state of Utah? The United States? The world?
Bar graphs, stacked bar graphs, double bar graphs, and line plots are simple graphs to make as a group. Circle graphs would require string to separate groups. Try to determine percentages before making that graph. Line graphs could also be created with string.

## Extensions

## Curriculum Extensions/Adaptations/Integration

To extend the candy bar graphs, students could find the exact percentage by using a ruler.

## Assessment Plan

To assess the ability to put information into a circle graph, students will take the data collected from the Candy Bar Graphs activity and create a circle graph.
After writing the moon phase data on the board, have students create a variety of graphs on paper.

## Bibliography

## Research Basis

Blakemore, C. L. (2003). Movement is essential to learning. JOPERD: The Journal of Physical Education, Recreation \& Dance, 74(9), 22-26.
This article strongly asserts that student learning is greatly enhanced by movement. Studies have shown that students learn and remember better through physical activity. A variety of movements, such as cross-lateral exercises, are suggested. However, any type of movement will improve student learning.

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