Lesson #7: Interpreting Graphs

Objectives

Students will be able to...

- Recognize the different types and components of graphs.

- Use various strategies in the interpretation of information presented visually.

- Use data analysis/statistics to generalize about occupational safety in differing fields.

- Recognize terms that are commonly used in the analysis of data and statistics.

Common Core Standards

Problem Solving Critical Thinking 5.1, 5.3 & 6.0
RSIT 11-12.2
RLST 11-12.2
Communications 2.1, 2.4

Materials

Interpreting Graphs Notes
Interpreting Graphs Worksheet

Lesson Sequence

- Review Interpreting graphs notes. Introduce graphs, their usefulness in conveying information, and the importance of being able to use them in the world or work. Introduce the components of a graph and the vocabulary needed in order to understand the purpose of the graphs. Answer any questions the students may have. (15-20 minutes)

- Divide students into 7 groups and assign a graph to each group from the interpreting graph notes. Each group will answer questions for their graph on the Interpreting Graphs Worksheet. Students will present information about their graph to the class. (30-35 minutes)

Assessment

Students should understand their graph while presenting to the class. Students should be able to answer any questions asked regarding their graph. Use student's responses to the interpreting graph worksheet to see if they have an understanding.

Accommodations/Modifications

Check for understanding
Highlight important information for students within their notes packet

Interpreting Graphs Notes

Graphs are picture representatives for 1 or more sets of information and how these visually relate to one another. There are many types of charts and graphs of varied complexity. For almost any numerical data set, there is a graph type that is appropriate for representing it. Graphs help you present data in a meaningful way. It is one thing to see a data listed on a page and it's another to understand the details and trends of the data. A lot of the time sets of data involve values in the millions or billions. This is far too many to print out in a magazine or journal article. Using a graph can help depict data and a well-made graph conveys information in a more interesting way.

Parts of a Graph (Vocabulary)

title	The title of the line graph tells us what the graph is about.
labels	The horizontal label across the bottom and the vertical label along the side tells us what kinds of facts are listed. • x-axis - the x-axis runs horizontally (flat), and has numbers representing different time periods or names of things being compared. • y-axis - the y-axis runs vertically (up and down) and has numbers for what is being measured. The y-axis usually starts counting at 0 and can be divided into as many equal parts as you want to.
scales	The horizontal scale across the bottom and the vertical scale along the side tell us how much or how many.
points	The points or dots on the graph show us the facts.
lines	The lines connecting the points give estimates of the values between the points.

Types of Graphs

Line Graph:
A line graph is used to display comparisons between 2 variables. Line graphs involve an x-axis horizontally and a y-axis vertically on a grid. Dot-connected and grid-plotted lines are what comprise a line graph. These lines monitor and compare various data sets. Usually, the x-axis represents time measurements while the y-axis is a representative of measure or percentage of quantity. For this reason, a line graph is used often for tracking variables of one or more subjects in time.

Graph 1: Line Graph

Distance Recorded
During Sprint Race

Distance (Feet)

Time (Seconds)
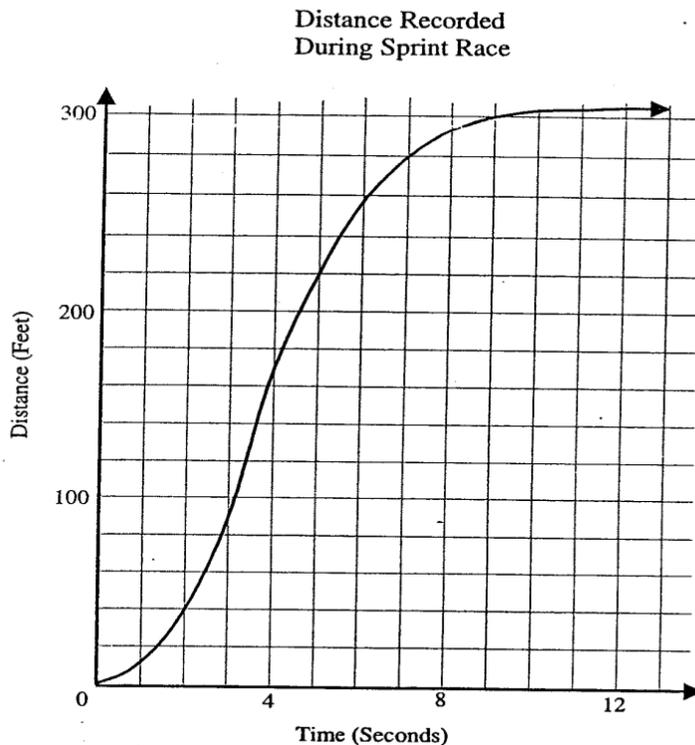
Line graphs are very precise; they also are good at showing trends or patterns. What do you know about running a sprint? At the beginning, runners have a burst of speed and cover a lot of distance, and towards the end of the race, the speed tapers off. So, runners don't travel as far in one second at the end of the race as they did at the beginning.
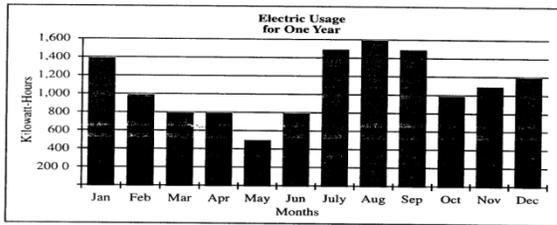
**Does the graph illustrate that?**

Bar graph:
Use bars to show data. A bar graph can be horizontal or vertical. Each axis is labeled with either a categorical or a numerical variable. The bars' heights are scaled according to their values and the bars can be compared to each other.
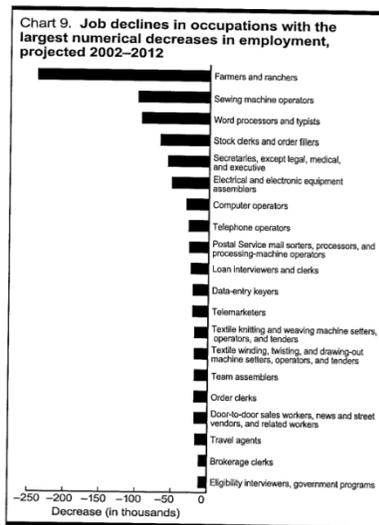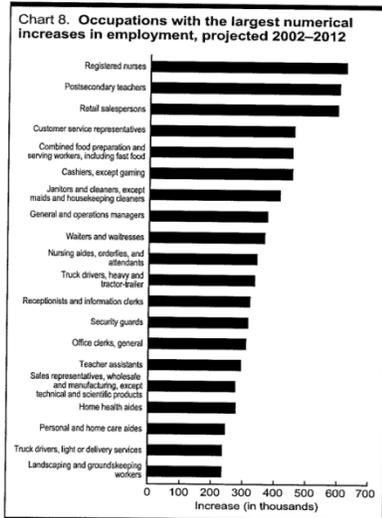
Graph 5: Double

Graph 2: Vertical Bar Graph

In bar **graph 2** data is arranged in columns. Bar graphs are used to compare several values at different times, among different groups of people.
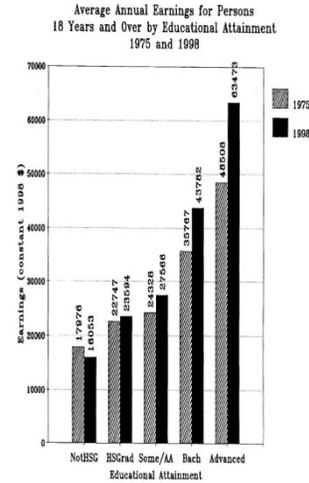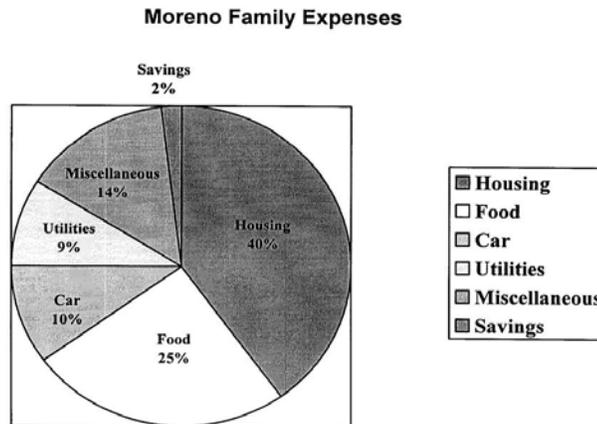
Graphs 3 and 4: Horizontal Bar Graphs

In a double line graph (**graph 5),** two sets of data are represented at the same time. This may seem to make things a bit more complicated to read, but a double line graph offers the advantage of a quick clear visual comparison of 2 or more items that gives you a sense of which is greater or less.

Graphs 3 and 4 are a more complicated graph. In this case the bars are arranged in order of greatest to least projected growth, by going to the left of zero, as on a number line.
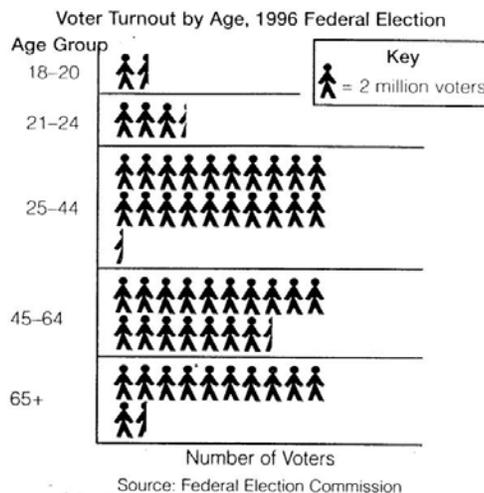
Circle graph, pie charts:
Sometimes called a circle graph, pie charts represent the parts of a whole. Each 'section' or 'slice of the pie is a data percentage. From biggest to smallest, segments are arranged in a clockwise formation. This way, the pie chart features easy-to-compare subjects presented in a neat, easy-to-understand way.

Moreno Family Expenses

Savings
2%

Miscellaneous
14%

Utilities
9%

Housing
40%

Car
10%

Food
25%

- Housing
- Food
- Car
- Utilities
- Miscellaneous
- Savings

Pictograms/Pictograph:
A pictogram is a special type of bar graph. Instead of using an axis with numbers, it uses pictures to represent several items. For example, you could use a pictogram for the data above about ages, with an image of a person to show the number of people in each category.

Voter Turnout by Age, 1996 Federal Election

Age Group

18–20

21–24

25–44

45–64

65+

Key

= 2 million voters

Number of Voters

Source: Federal Election Commission

Interpreting graphs worksheet

Directions: For each of the graphs assigned to your group, write your answers in the spaces provided.

1. What type of graph is it?

    _____

2. What is the title of the graph?

    _____

3. What information is presented on the horizontal axis?

    _____

4. What units are used (for example; feet, seconds, degrees-Fahrenheit, price in dollars, months, millions of people, etc.)?

    _____

5. What information is presented on the vertical axis?

    _____

6. What units are used?

    _____

7. What is the scale on each axis (what increments are indicated on the horizontal and vertical axes)?

    _____

8. If there is a legend or key, what does it tell you?

    _____

9. In your own words, what information is being presented?

    _____

    _____

10. In your own words, what information is being compared?

_____

_____

11. Do you see any trends?

_____

12. As you move from left to right, are there any patterns that emerge?

_____

_____

_____

_____

13. In your own words, summarize the information presented in the graph. (Examples: This graph shows that over 3 decades, sales increased dramatically from the first to the second decade but dropped again during the third decade.

_____

_____

_____

_____

_____

_____