# Basic Graphing Rules

1. First decide where the information will be graphed. The horizontal axis (x-axis) is used for the quantity that can be controlled or adjusted. This is called the *independent variable.* The vertical axis (y-axis) is used for the quantity that responds to the changes in the quantity on the x-axis. This is called the *dependent variable.*

Graph Title

Key – if needed

Dependent
(include units)

Y -axis

Independent
(include units)

X axis
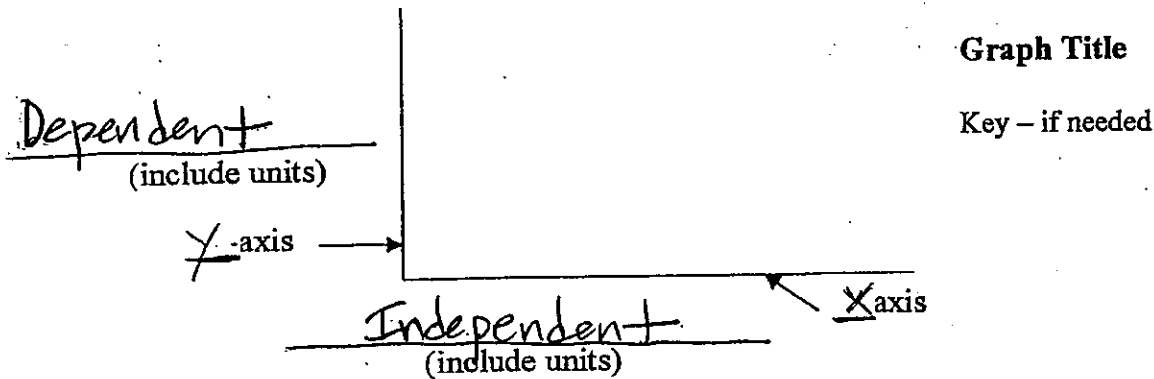
2. Choose the scale so the graph becomes large enough to fill most of the available space on the paper.

3. Each regularly spaced division on the graph paper should equal some convenient, constant value. In general, each interval should have a value that can be easily divided visually such as 1, 2, 5, or 10, not 3, 6, 7, or 9.

4. An axis does not need to start at zero, particularly if the plotted values cluster in a narrow range not near zero.

5. Label each axis with the quantity and unit being graphed. For example and axis might be labeled "Mass, grams".

6. Plot each point. If you plot more than one curve on the same graph, use a different color or geometric shape to distinguish each set of data.

7. For an XY graph, draw a smooth line that lies as close as possible to most of the points. Do not draw a line that connects one point to the next one as in a dot-to-dot drawing. If the curve appears to be straight, draw one continuous line with a ruler.

8. Title your graph with an informative title.

9. Remember there are many kinds of graphs. The type chosen depends on the characteristics of the data to be displayed.
   a) Pie charts – show the relationship of parts to the whole.
   b) Bar graphs – compare values in a category or between categories. Bar graphs can be useful to study trends over time. Multiple bar graphs compare relationships of closely related data sets.
   c) Line graphs – are another way to show the relationship between two variables.
   d) XY-plot (also called a scatterplot) – demonstrates a mathematical relationship between two variables. This type of graph is especially useful in scientific work. Frequently it is difficult to decide if a graph is a line graph or an XY-plot. XY-plots determine a mathematical relationship.

Which graph do I make?

The first step to making a graph is deciding which type of graph would be the best way to illustrate your data. Here are the three major types of graphs that you will be using in this class, and the best times in which to use them.

1) Bar Graph

Birthday of Students by Month
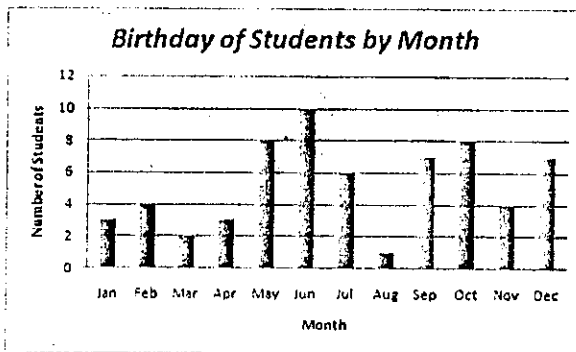
- shows the relationship between words and numbers
- data is organized into labeled categories
- data is limited to those categories; no "in-between" values

2) Line Graph

Average Daily Temperature for January 1-7 in Degrees Fahrenheit
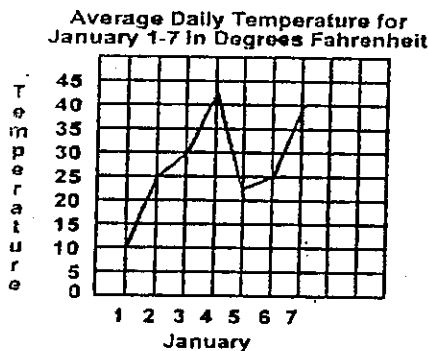
- shows the relationship between two sets of numbers (no words)
- data is organized by number value
- data is not limited to these values, values exist in between plotted points

3) Pie Graph

Favorite Video Game System Among High School Students

PS2
Xbox:
GBA:

10%
30%
60%
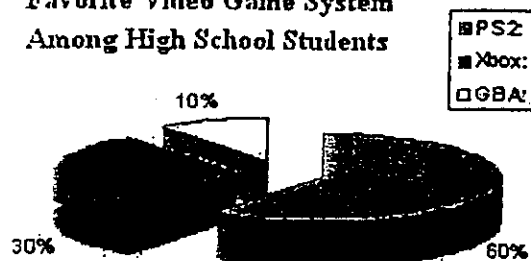
- shows the relationship between words and numbers
- data is organized into categories; no "in- between" values
- shows what **percent** of the data belongs in each category