Rules for Graphing Scientific Data

1. Put a title on each graph you make. Write it like this: "A Plot of _____ vs. _____". The name that goes first is the one that is plotted on the vertical (y) axis. The y-axis is for the dependent variable; the x-axis is for the independent variable. The independent variable is the measurement which you are controlling (it usually changes systematically).

2. Label the axes -- tell what is being plotted on each axis -- length, mass, time, etc.

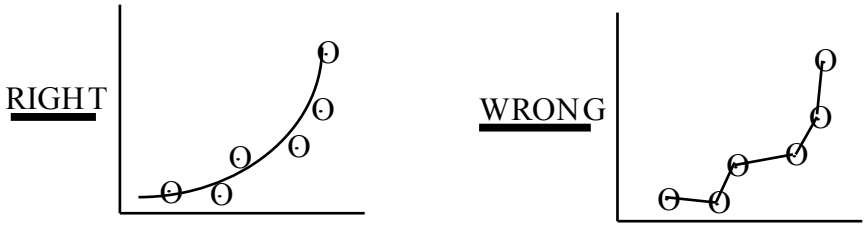
3. Include UNITS on each axis. cm, kg, sec, etc.

4. Choose a number scale for each axis that will make the graph cover as much of the page as possible. Graphs of scientific data are usually constructed using only the first quadrant, so they need to start at zero/zero unless the directions tell you otherwise.

5. Make sure that each square on an axis has the same numerical value. Each square equals one or each square equals 5. The scales can differ for each axis.

6. Plot the points as tiny dots surrounded by small circles or other shape. The actual data points represent only a small
spot on the graph, but in order to see what you plotted, circle them to show where they are.

7. ALWAYS DRAW A **SMOOTH LINE** (A LINE DOES NOT HAVE TO BE STRAIGHT, IT CAN CURVE, IT JUST HAS TO BE SMOOTH). THE SHAPE WILL BE OBVIOUS TO YOU ONCE YOU HAVE PLOTTED ALL THE POINTS. **DO NOT PLAY 'CONNECT THE DOTS'.** If the graph is a straight line, use a ruler to draw in the line.



8. If the graph is a straight line, you may have to find the slope.

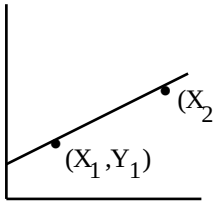
   a. Select any two points ON OPPOSITE ENDS OF THE LINE (there is an infinite number -- they do not have to be plotted points, just ON THE LINE). If a data point does not fall on the line you CANNOT use it.

   b. Subtract the Y value point lower on the graph from the Y value point higher on the graph. Y_2-Y_1

   c. Subtract the corresponding X value of the low point on the graph from the corresponding X value from the high point on the graph. X_2-X_1

   d. Divide the difference in Y by the difference in X. $\frac{Y_2-Y_1}{X_2-X_1}$

   e. Divide the numbers, and write as a decimal*. Keep the units as a fraction. This is the slope of the line.



$$\text{slope} = \frac{Y_2 - Y_1}{X_2 - X_1}$$

*This is true ONLY for graphs of SCIENTIFIC DATA. Otherwise, keep slope as a fraction.