

## GRAPHING RULES

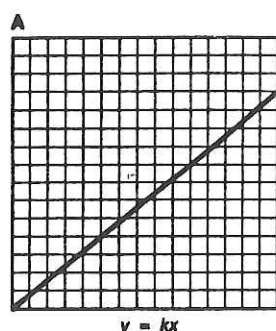
1. Collect data in two variables  
e.g. Time and Temperature  
Mass and Volume  
Pressure and Volume  
Temperature and Volume.
2. Identify the independent variable - the manipulated variable - the variable being controlled by the experimenter, and the dependent variable the quantity being measured as a result of changing the independent variable.
3. Leaving margins to label both axes, draw a horizontal line for the X- axis and connect it on the left to a vertical line for the Y-axis. Using a ruler, darken the lines representing each axis.
4. Label the X-axis with the quantity and unit of measure of the independent variable.  
e.g. Mass (g)  
Pressure (ATM.)

Label the Y-axis with the quantity and unit of measure of the dependent variable.

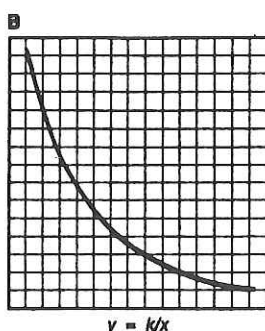
e.g. Volume (ml)  
Elongation (cm)

5. Look at the range of values for the independent variable.  
e.g. the lowest is 0.1 and the highest is 99.0.
  - a. Make the origin zero
  - b. Your range of values must be zero to 100 in order to include all values from 0.1 to 99.0.
  - c. Make each block equal to a number that will go from zero to the highest value(easiest numbers = 2, 5, 10 and 20). If each block equals 5 it will take 20 blocks to reach 100. if each block equals 10 it will take 10 blocks to reach 100. This is called scaling the axis.
  - d. The most important points:  
EACH BLOCK MUST BE EQUAL  
SPREAD THE GRAPH OUT. USE AS MUCH GRAPH PAPER AS POSSIBLE. THE BIGGER THE BETTER!
6. Repeat procedure 5 for the Y-axis - the dependent variable.
- \* 7. All graphs do not go through the origin (0,0). Think about your experiment and decide if the data would logically include a (0,0) point.

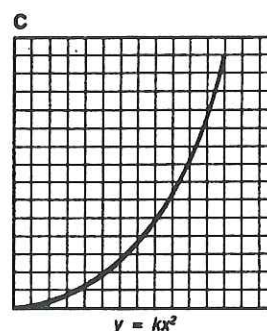
8. Plot the independent variable on the horizontal (X) axis and the dependent variable on vertical (Y) axis. Plot each data point.
- \* 9. If the data points appear to lie roughly in a straight line, draw the best straight line you can with a ruler and a sharp pencil. Have the line go through as many points as possible with approximately the same number of points above the line as below. NEVER CONNECT THE DOTS. If the points do not form a straight line, draw the best smooth curve.
10. Title your graph. The title should clearly state the purpose of the graph. DEPENDENT versus INDEPENDENT.
11. Graphs should always be accompanied by a data table. This table should be titled and is written as an ordered pair. Independent (X) on the left and Dependent (Y) on the right in a table format.
12. Scientific graphs are generally one of these three types.



Direct



Indirect



exponential

← (Relationship between x & y)

13. The graph and table below were prepared using good graphing techniques. Use this as guide for the graphing worksheet.

Table 1: Elongation of a Spring

Force (N)	Elongation (cm)
0	0.0
1	1.5
2	3.0
3	4.5
4	6.0
5	7.5

Graph 1: Elongation verses Force

