Graphing Techniques

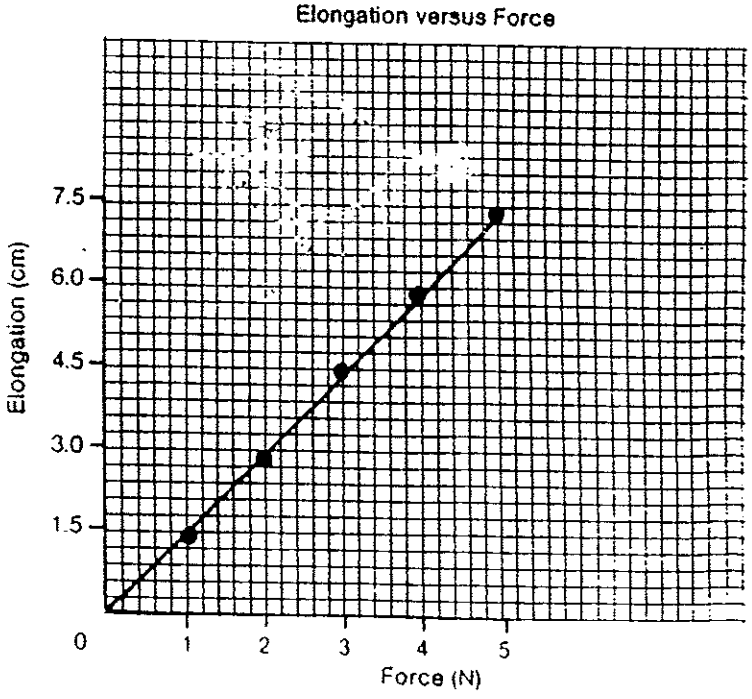
Frequently an investigation will involve finding out how changing one quantity affects the value of another. The quantity that is deliberately varied is called the *independent variable*. The quantity that changes due to the variation in the independent variable is called *dependent variable*.

More often than not the relationship between the independent and dependent variable is not obvious from simply looking at the written data. However, if one quantity is plotted against the other, the resulting graph gives evidence of what sort of relationship, if any, exists between the variables. When plotting a graph, take the following steps.

1. Identify the independent and dependent variable.
2. Choose your scale carefully. Make your graph as large as possible by spreading out the data on each axis. Let each space stand for a convenient amount. Choosing three spaces equal to 10 is not convenient because each space is an awkward fraction. Choosing five spaces equal to 10 would be better. To avoid a cluttered appearance, you do not need to number every space.
3. Plot the independent variable on the horizontal (x) axis (abscissa) and the dependent variable on the vertical (y) axis (ordinate). Plot each point as a dark dot with a small circle around it.
4. Label each axis with the name of the variable and the unit. Using a ruler, darken the lines representing the axis.
5. Title your graph. The title should clearly state the purpose of the graph and include the independent and dependent variables.
6. If the data points appear to lie roughly in a straight line, draw the best straight line you can with a ruler and 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 possible.
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. For example, if a cart is at rest when you start the timer, then your graph of speed versus time would go through the origin. If the cart is already in motion when you start the timer, your graph will not go through the origin.

Below is a graph using good graphing techniques. Go back and check each of the items mentioned above.

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



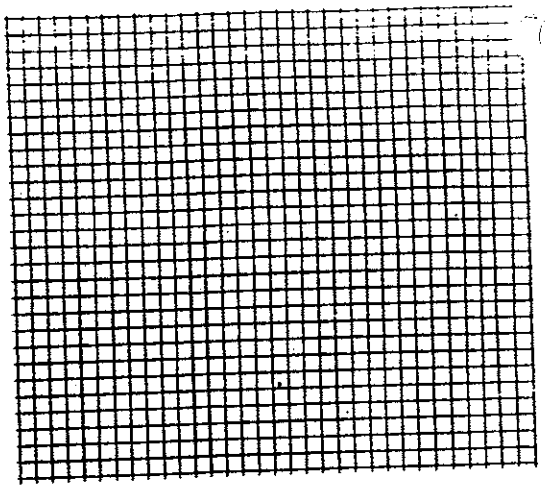
Name _____ Period _____ Date _____

Problems

Graph the following sets of data using the above techniques.

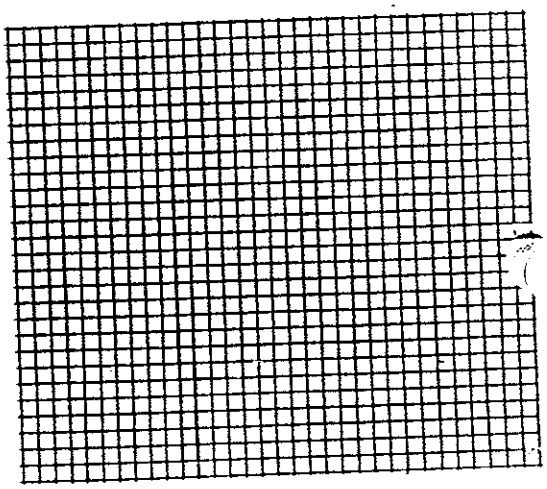
1.

Pressure (torr)	Volume (mL)
100	800
200	400
400	200
600	133
700	114
800	100
1000	80



2.

Time (s)	Distance (m)
0	0
1	5
2	20
3	45
4	80
5	125



3.

Time (s)	Speed (m/s)
0	0
1	20
2	45
3	60
4	84
5	105