SYOSSET HIGH SCHOOL GRAPHING PROCEDURES

The Main Purposes of Graphing

1. A graph shows a picture of collected data that allows you to discover possible patterns.

2. A graph sometimes allows you to predict information that you didn't actually obtain in an investigation. This is called extrapolation. To **extrapolate** means to find information beyond the plotted data.

How to Construct a Graph

1. **Using a ruler, draw the horizontal (X) and vertical (Y) axes. Remember to leave space to the left and on the bottom of the page to be able to number and label your axes. (The graph paper we use, already has space for this)**

2. **Always put the independent variable on the X-axis and the dependent variable on the Y-axis. The independent variable is the one controlled by the investigator and is usually the first column on a data table.**

   Example: A student was conducting an experiment to see how the size of a pebble affected the speed as it fell from the surface of the lake to the bottom of a lake.

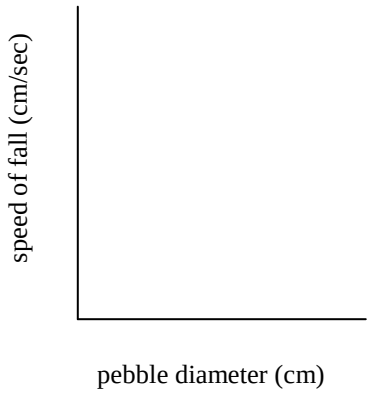
independent variable → **"CAUSE"**

pebble diameter (cm)	speed of fall (cm/sec)
2	3
5	7
8	10

dependent variable → **"EFFECT"**

Special Note: ** If "clock time" is one of the variables, it is always the independent variable and goes on the x-axis (bottom of graph). **

3. **Label the variable on each axis, followed by the units. Make sure to leave enough space to create a numerical scale on both axes.**



4. Construct a numerical scale according to the following guidelines:

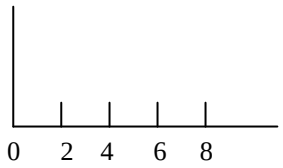
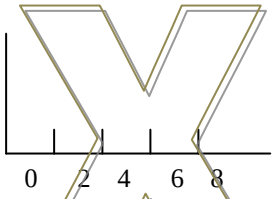
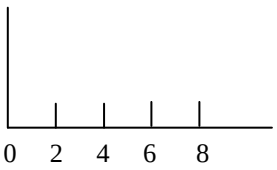
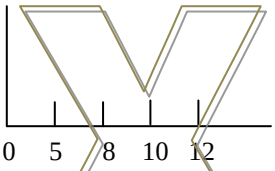
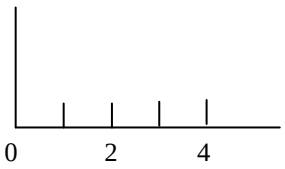
a. Before you commit to a numerical scale, remember that you always have to follow the **"halfway rule".** This means that the graph should extend more than halfway across the page. Don't scrunch your graph into one small corner of the graphing area.

b. Pick an interval to count by that will fit all the data (count by 2's, 5's etc..)
Counting the boxes on the graph helps, and then trial and error works real well.
(The graph paper we usually use is a 40 x 50 grid)

c. Never use lightning bolts! If you can start with zero, do so.
If not, start the scale with the lowest number, or close to the lowest number.

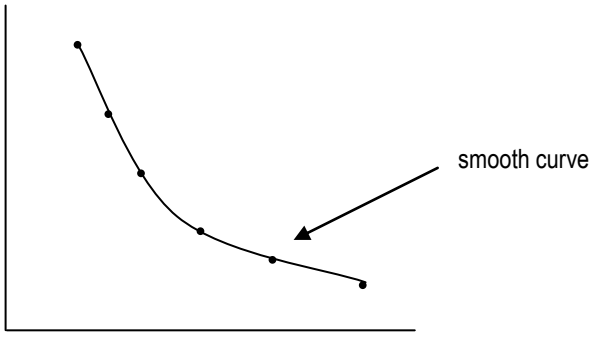
d. Make sure to stick to the scale you decided upon and make sure your numbers are clearly written.

Examples of correct versus incorrect labeling:

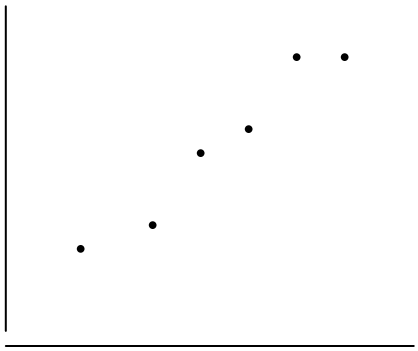
	Correct Way	Incorrect Way
1.	 Put numbers on the lines.	 DO NOT put the numbers in the spaces.
2.	 Make sure the numbers are evenly spaced (in this case, every box represents "2")	 DO NOT change the interval – the interval of this axis changes many times.
3.	 Know what you are counting by – even though this graph axis is labeled every other box – the interval of the axis is still counting by ones.	 This graph starts at "0", but then jumps to "2" and counts by ones for the rest of the axis. The "1" box was omitted.

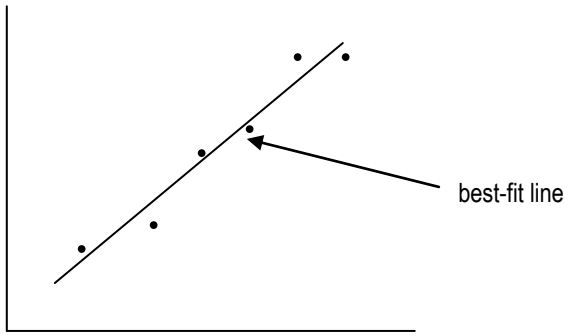
Most often seen mistake

5. Connect all the points to form a smooth curve. Do not extend the graph beyond the last point plotted.



Or when a scatterplot graph is constructed, a best-fit line or curve can be drawn to show the relationship between the two variables.





6. Place an appropriate title in an open space on the graph paper.
A good title includes the names of the two variables shown on the graph and clearly explains the experiment conducted.
"Time versus Temperature Graph" does not say much…
"The Temperature of Room E96 Measured for 24 Hours on 9/7/12" is so much more clear and specific.

FINAL GRAPHING CHECKLIST

- Appropriate scale for each axis – remember the "halfway rule"
- Both axes labeled with variables and units
- No lightning bolts
- Small dots for each point
- Appropriate Title
- Include a key when more than one line exists on graph