Graphing and Analyzing Scientific Data

Graphing is an important procedure used by scientist to display the data that is collected during a controlled experiment. There are three main types of graphs:

<u>Pie/circle graphs:</u> Used to show parts of a whole.

Bar graphs: Used to compare amounts.

Line graphs: Use to show the change of one piece of information as it relates to another change.

Both bar and line graphs have an "X" axis (horizontal) and a "Y" axis (vertical).

Parts of a Graph:

<u>Title:</u> Summarizes information being represented in ANY graph.

<u>Independent Variable:</u> The variable that is controlled by the experimenter, such as, time, dates, depth, and temperature. This is placed on the X axis.

<u>Dependent Variable</u>: The variable that is directly affected by the I.V. It is the result of what happens as time, dates, depth and temperature are changed. This is placed on the Y axis.

<u>Scales for each Variable:</u> In constructing a graph, one needs to know where to plot the points representing the data. In order to do this a scale must be employed to include all the data points. This must also take up a conservative amount of space. It is not suggested to have a run on scale making the graph too hard to manage. The scales should start with 0 and climb in intervals such as, multiples of 2, 5, 10, 20, 25, etc...the scale of numbers will be determined by your data values.

<u>Legend:</u> A short descriptive narrative concerning the graph's data. It should be short and concise and placed under the graph.

For any set of data, you will need to determine the following:

Mean: This is determined by adding all the numbers in a set of data and then dividing by the number of values.

<u>Median*:</u> This is the middle number in a set of data. If the there is an even set of numbers in the data, then take the average of the two middle numbers.

Ex: 2, 3, 4, 8, 12, 16, 20 median = 8

Ex: 3, 5, 8, 11, 17, 19, 27, 30 median is 11 + 17 = 28/2 = 14

Mode*: This is the number that occurs most often in a set of data.

Ex: 3, 4, 6, 6, 7, 9, 9, 9, 12, 12, 15 mode = 9

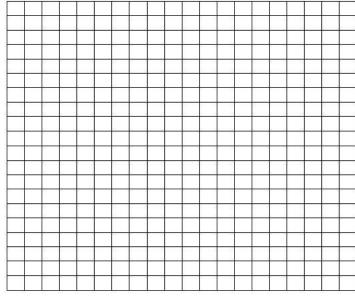
* To determine median and mode, the numbers in the set of data must be put in numerical order.

Extrapolate: extending the graph, along the same slope, above or below measured data.

Interpolate: predicting data between two measured points on the graph

A. Graph the following information in a **BAR graph**. Label and number the x and y-axis appropriately.

Month	# of deer
Sept	38
Oct	32
Nov	26
Dec	20
Jan	15
Feb	12



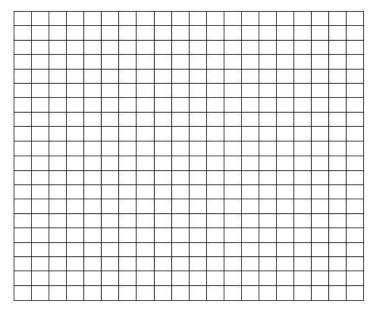
dependent variable?

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3. What is an appropriate title?	
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B. Graph the following information in a LINE graph. Label and number the x and y-axis appropriately.

# of Days	# of
	Bacteria
1	4
2	16
3	40
4	80
5	100
6	200

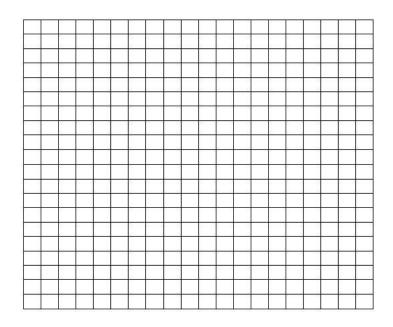


1. What is the independent variable?	

2. What is the dependent variable	?

C. Graph the following information in a **BAR graph**. Label and number the x and y-axis appropriately.

# of Hours of Study	Grade
0	20
2	60
4	70
6	80
8	90
10	100

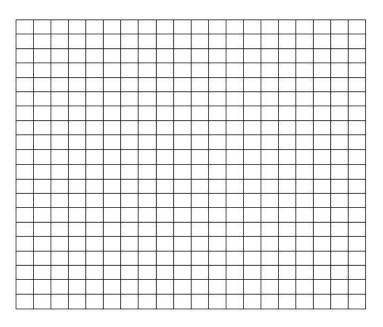


1. What is the independent variable:	
2. What is the dependent variable? _	
3. What is an appropriate title?	

4. What was the average grade earned?

D. Graph the following information in a **LINE graph**. Label and number the x and y-axis appropriately.

Temperature	Enzyme Activity
0	0
20	10
30	15
40	20
50	8
60	5
70	0



1. What is the independent variable?	

- 2. What is the dependent variable?
- 3. What is an appropriate title?