**Introduction to Graphing Guided Notes**

**Experimental Variables**

Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: The factor that is different between groups. The topic of interest in an experiment-because you expect it to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the experiment.
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Levels can be *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* (age, weight, etc.) or *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* (gender, color, etc.)

**Experimental Variables**

* + **Variable**: A factor in an experiment.
		- **Independent variable**: The factor that is different between groups. The topic of interest in an experiment-because you expect it to cause a change in the experiment.
		- On graphs, the independent variable always goes on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.**

**Experimental Variables**

* + **Variable**: A factor in an experiment.
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **variable**: The factor being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the experiment.
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- On graphs, the dependent variable is always on the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*.

**Types of Graphs**

Two common types of graphs used in science:

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

-Bar graphs are used when the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*

Boys/girls, Adults/children, Salt water/distilled water /tap water,Etc.

-Line graphs are used when the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Hours of television watched, Age (in years), Calories eaten per day, Etc.

*Both line graphs and bar graphs show the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ independent variables and dependent variables.*

**Making a Graph**

1. Choose a scale for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that includes \_\_\_\_\_\_\_\_\_\_\_ values. Number your gridlines *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and connect your dots with a line.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Graphing and Analyzing Scientific Data Cheat Sheet**

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:

 Pie/circle graphs: 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**:

 **Title:** Summarizes information being represented in ANY graph.

 **Independent Variable:** The variable that is controlled by the experimenter, such as, time, dates,

depth, and temperature. This is placed on the **X** axis.

 **Dependent Variable:** 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.

**Scales for each Variable:** 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.

**Legend:** 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.

 **Median\*:** 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.**

**Graph Worksheet Name:**

**Graphing & Intro to Science**

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

|  |  |
| --- | --- |
| **Month** | **http://btc.montana.edu/CERES/html/Wobble/images/wobblesimage8.jpg# of deer** |
| Sept | 38 |
| Oct | 32 |
| Nov | 26 |
| Dec | 20 |
| Jan | 15 |
| Feb | 12 |

1. What is the independent variable?

2. What is the dependent variable?

3. What is an appropriate title?

4. What is the average number of deer per month?

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

|  |  |
| --- | --- |
| **# of Days** | http://btc.montana.edu/CERES/html/Wobble/images/wobblesimage8.jpg**# 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?

3. What is an appropriate title?

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

|  |  |
| --- | --- |
| **# of Hours of Study** | http://btc.montana.edu/CERES/html/Wobble/images/wobblesimage8.jpg**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** | http://btc.montana.edu/CERES/html/Wobble/images/wobblesimage8.jpg**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?