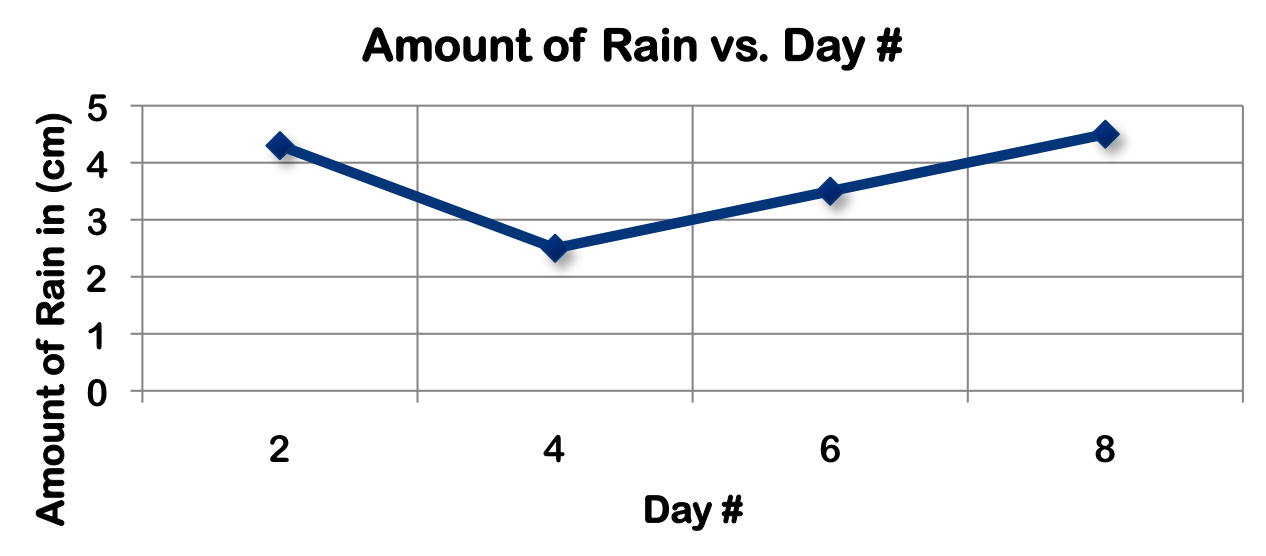
**Graphing**

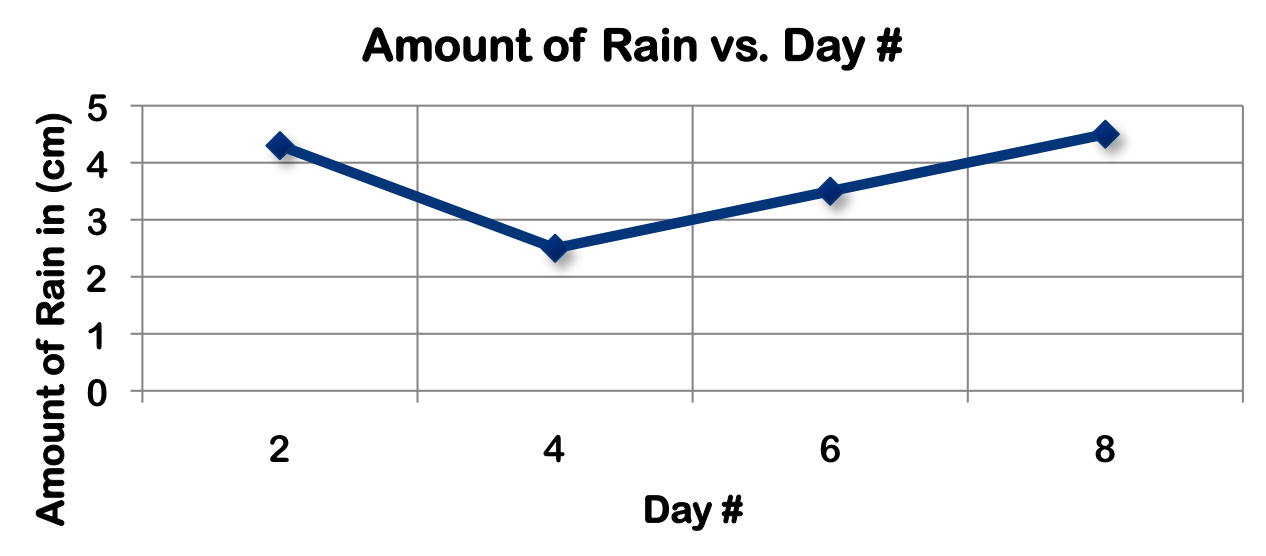
**Background**

* Scientist \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tables, graphs, and diagrams to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationships in the data, and extend those relationships beyond the data.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ graphs can be like reading a foreign language though. It come easy to some and very difficult to others

**What Are The Parts of a Graph?**



**Where Are The Variables Plotted?**



**Graphing**

In Looking At How To Read Graphs, Tables, and Data When It Comes to the ACT….

* First We Need To Understand The Core Elements Of A Graph
  + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **The Importance of Labels**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are VERY important on the ACT Science sections.
  + Each visual is labeled with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plus a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + So, if there are three 3 visuals, they will be labeled Figure 1, Figure 2, and Figure 3.

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ help you to refer to the correct figure.

\*\* *Although many students still don’t look at the right visual\*\**

* Some \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will often \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tell you which figure to look at.

*\*\* Example: In Figure 2, what percent of captured finches from Island C have a 10mm beak depth?*

* To \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ answer this question, you need to check the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and make sure you are looking at Figure 2. Then, identify the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that shows the finches from Island C.
* THE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ STEP IN MOST ACT SCIENCE QUESTIONS IS TO \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, BECAUSE IF YOU GET THIS STEP WRONG, YOU WILL GET THE ANSWER WORNG.
* **How To Use Axes**
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are useful to figure out the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(s) in the experiment .
* Graphs we know by definition have an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The x-axis is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ line (usually on the bottom), and an y-axis the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ line (usually on the left side of the graph).
* Although, more challenging graphs on the ACT Science will have one on the left and one on the right.



* + In this graph, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ doesn’t measure anything (only list the animals).
  + The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measures the animals’ weights. The animals’ weight would be considered the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the research.
  + We can use this graph to compare the 4 elements of only one data set: the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the animals.
  + What if the passage that went along with this graph had asked you,
    - * What is the weight of the dog? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* Now let’s look at a slightly more complicated graph you may see on the ACT Science section.
* In this graph, the x-axis measures the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the plot to the nearest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The y-axis measures the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (it’s not important that we understand what AGTB is)
* Which one of these would be considered the “dependent variable” in the research?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* You can use this graph to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the distance from the center of the plot to the nearest clearing to the average change in AGTB



* + What if the passage that went along with this graph asked you
    - What is the average change in AGTB at a distance of 50m from the center of the plot to the nearest clearing?
  + To do this you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ need to find 50 on the axis that defines the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the center of the plot to the nearest clearing, which is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Next, we look on the y-axis for the value of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and see that it reads 5t/yr.
* **What To Do With Units of Measure**
* On \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the ACT Science section, they will present \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for each axis next to the label.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ try to understand what the units mean.
* The ACT throws in these \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ units that you won’t have seen unless you studied very \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Physics or Chemistry.
* You \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ need to know exactly what they refer to in order to answer the questions.
* For example, take the graph previous graph.
* While you probably know that m is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, you may be unfamiliar with t/yr.
* For the Science section of the ACT the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_are listed in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, they \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the units shown in one of the visuals or mentioned in the passage.
* So, there is \_\_\_\_\_\_\_\_\_\_ need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on them or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over them.
* Another thing, out of all the ACT Science practice sections I have seen they \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ask you to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the units form one form of measurement to another.
* The ACT includes these crazy units to make the graphs look more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_or to test your ability to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ information that you may not know.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what you don’t need and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the information to answer the question. Focus on what you can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **What Types of Data Are Recorded and What Methods Are Used?**
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ design that a scientist selects depends on what \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the scientist hopes to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be classified into one of two main types, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (numerical) or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (descriptive).
* Scientist recognize that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of data from experiments helps them to better \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ their results.
* The data may be presented in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **What Are The Steps To Take In Constructing A Graph?**

1. Determine which variable is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable and which is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable.
2. A graph consist of two principle lines called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, that lie at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to each other. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable is plotted on the x-axis, and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_variable is plotted in the y-axis.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_your graph and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_both axes. The units of measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ be shown.
4. The axes must be properly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Numbers increase across the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_axes from the zero point.
5. The numbering scale must include both the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_values.

* **The Different Types of Graphs on the Science Section**
  1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Reading Bar Graphs
* Bar graphs are used to show a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of multiple objects.
* Bar graphs tend to be one of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ visuals used by the ACT Science section.
* They are easier because there will only be \_\_\_\_\_\_\_\_\_\_\_ variable shown.



* In this graph, the x-axis lists the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The y-axis measures \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the variable in this research.
* What if the passage that goes along with this graph asked you
  + - What is the average beak depth in 1983?
* First, you need to find 1983 on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Next look on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the value of the average beak depth and see that it reads \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Bar graphs are really easy, as long as you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ you have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the correct bar, you will find the data you need.
* **Scatter Plot**
* Scatter plots are graphs of plotted points that show the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between two sets of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Example: What is the average cumulative percent change in AGTB during Year 2?
* To answer this question what do we need to do?



* Scatter plots can be slightly more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ if they ask you a question about a point not marked.
* Example: What is the average cumulative percent change in AGTB during year 9?
* When answering these type of trend questions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ out the curve on the graph you are given and then use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **Line Graphs**
* Line graphs are used to show the relationship between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Line graphs are one of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ types of visuals used on the ACT Science section.
* The reason being is because they show an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_number of data points, and you need to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_on which data point you’re looking at.
* Also, the ACT often uses line graphs to show 2 entirely \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, one on the left and one on the right with a key to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the two lines.



* Example: This graph has two lines represented and two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ groups of information. Also, each line has its own range of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* What does the x-axis show? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What is the RCRF in January 1990? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, you must make sure you are looking at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ line.
* According to the key, which line represents RCRF? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Next, you need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the measurement on either the right or left.
* Which side represents RCRF in %? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* In order to ensure you are looking at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of intersection you may want to use your paper or pencil to create a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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* Key strategies to remember with line graphs are:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Accepted Guidelines For Constructing A Table**

1. The title of the data table should clearly communicate the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the experiment.
2. The independent variable is recorded in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ column.
3. The dependent variable is recorded in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ column.
4. When repeated trials are conducted, they are recorded in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable column.
5. When recording data in a table, the values of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variables are ordered from smallest to largest.

* **Tables**
* Tables are one of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ types of visuals provided.
* There are a number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and each entry in a column corresponds to the entry directly to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of that entry in the same row.

**Key strategies to remember with tables:**

* Identify the correct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in question
* Find the correct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in question
* Look to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of it in the same row to find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data point
* Some tables on the ACT will have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rows and columns of data, but the technique is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the same.
* **Tricky Graphs**
* These graphs are not what they seem
* A lot of lines with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ labels
* Example: Which of the following absorbed the most light across all wavelengths?

A. White S C. Red S

B. Orange S D. Brown S



* First, you need to look at the graph. There are 5 lines and each one represents a different color of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_plus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Each graph represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* This ACT question is asking you for which substance absorbed the most light across all wavelengths.
* If we were to break down this question:
* First, we would need to know that “absorb the most light” means the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of reflectance, BUT \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is what is graphed.
* Second, “across all wavelengths” means you’re not just looking at \_\_\_\_\_\_\_\_\_\_\_\_\_\_ point on the x-axis; you’re looking across \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ points.
* If you were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ you might answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because you see it reflects the most light across all wavelengths.
* However, knowing that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the opposite of reflectance and looking across all wavelengths, you would see that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is reflecting the least across all wavelengths.
* Therefore, it is absorbing the most, so the best answer would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Other tricky graphs may look like this



* This graph is even more complex. There are intersecting lines of different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ enclosed by lines.
* Although there are a lot of weird things going on in this graph you approach it just like any other graph \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ thing at a time.
* Let’s say the ACT question asked:
* Example: Which of the following would most likely NOT be found at a pressure of 10kb?

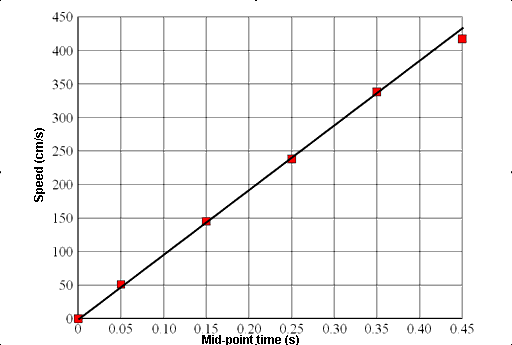
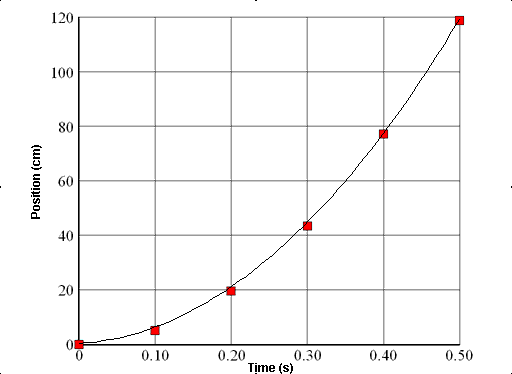
A. Facies A C. Facies G

B. Facies C D. Facies E

* First you need to look at the graph and notice that there are \_\_\_\_\_\_\_\_\_\_ Facies identified.
* The graph shows the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at which these 7 Facies appear.
* The question asked us for which of the following is \_\_\_\_\_\_\_\_\_\_\_\_\_ found at a pressure of 10kb.
* When you do this you can see that Facies \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_ all are found at 10kb,
* but Facies A is not.
* Again, if you were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ you might choose Facies C, G, or E as the answer because you missed the word \_\_\_\_\_\_\_\_\_\_\_\_, or you might accidentally look at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of 10km on the right instead of pressure.
* Key strategies to remember with tricky graphs:
* Always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what you are being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to what the graph actually shows
* Always make sure you have found the correct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in question
* Be extra careful when you see a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

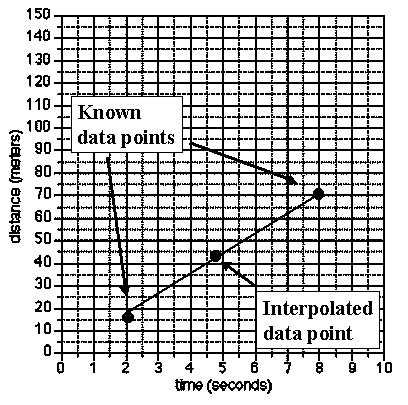
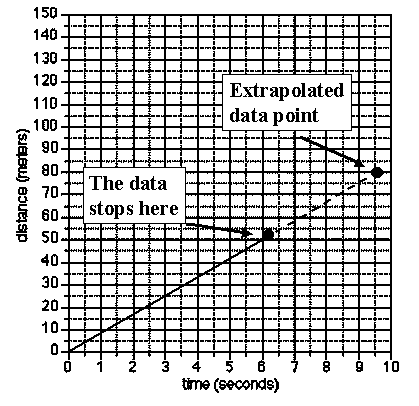
**Scientific Graphing**

* Most scientific graphs are made as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_graphs. There may be times when other types would be appropriate, but they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The lines on scientific graphs are usually drawn either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These “smoothed” lines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have to touch all the data points, but they should at least get close to most of them. They are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



**Predicting Data On A Graph**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are a useful tool in science. The visual characteristics of a graph make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in data easy to see.
* One of the most valuable uses for graphs is to "\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_" data that is not measured on the graph.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ extending the graph, along the same slope, above or below measured data.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ predicting data between two measured points on the graph.



**Directly Proportional and Indirectly Proportional Graphs**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: As the independent variable increases,

the dependent variable increases as well.

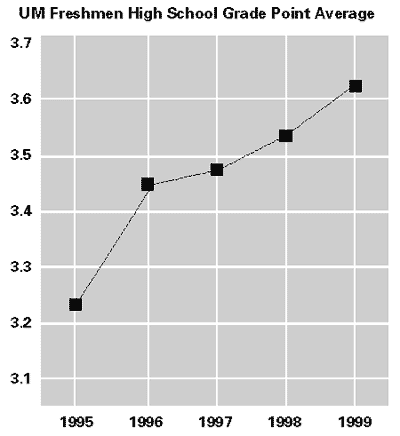
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: As the independent variable increases, the dependent variable decreases

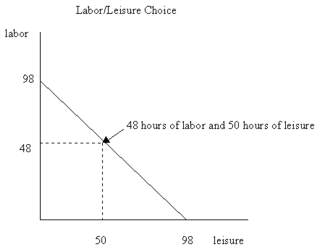
Directly Proportional Inversely (Indirectly) Proportional

**Types of Relationships Between Variables**

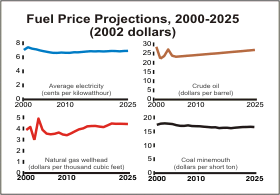
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**:** As X increases Y increases



2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:As X increases Y decreases

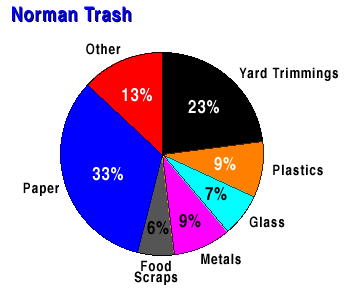


3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** As X increases Y remains the same



**Types Of Graphs**

Pie graphs are used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the parts of a whole.



* **Recap**
* Key strategies to remember:
  + Read \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ very carefully. Make sure you are looking at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Figure
  + Remember the basics: what the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ represent, how the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are depicted, how to go step by step to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ you need
  + All of the same rules apply to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Don’t try to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the units of measure