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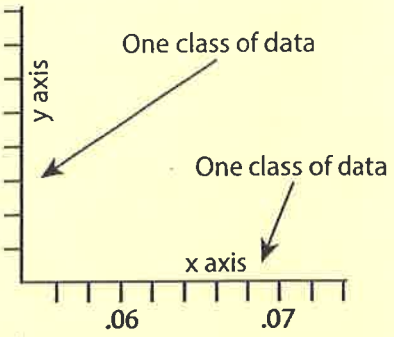
How To Graph Data

Presenting data in a graphic format is an important skill for science students to master. Use this set of instructions to guide you in creating any line graph. You will also learn about other form of charts and graphs and their uses.

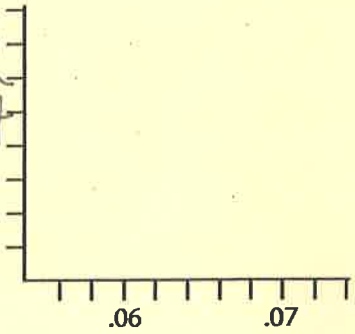
Each lettered step is an instruction for graph creation.



Dependent
Responding
Y-axis

A. **Draw the axes** for the variables. Look carefully at the data. A graph can only show the relationship between two different types of data. If you plan to have a multi-line graph showing multiple trials, be sure to include a key or legend. Use the mnemonic "DRY MIX" to set up the axes for each variable shown.

Manipulated
Independent
X-axis

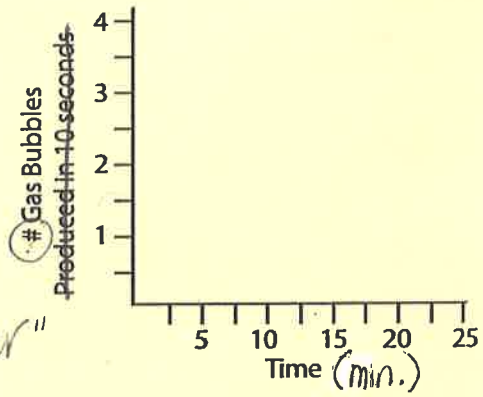


B. **Choose the range** for each variable by taking the largest number in the data set and subtracting it from the lowest number. This is your range for each axis.

max value - min value = range

C. **Determine the scale** for each axis. Divide the range for an axis by the number of graph squares available on the axis to help determine what scale to use for that data (e.g., by 2s, by 5s, by 100s, etc.).

Do not have to start at (0,0)

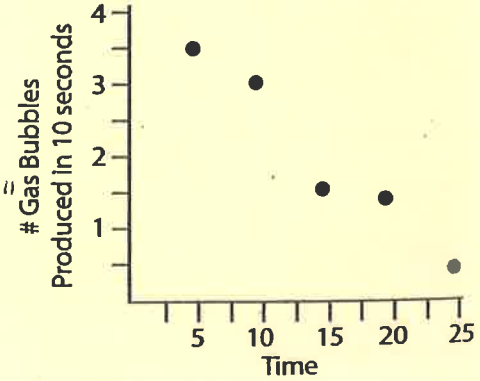


D. **Label each axis** with the quantity and unit being graphed. The x axis always contains the independent variable. The independent variable is data that is manipulated by the experimenter, and will be the variable used to compare the values of the responding variable measured in the experiment.

Use capitals & use words. "Number"

For example, if you collect data at five-minute intervals on the number of times gas bubbles are produced in ten seconds, the time is independent. The five minutes between measurements will pass whether gas bubbles are produced or not. The y axis contains the dependent variable, which depends on the independent variable (i.e., the time).

Number of Gas Bubbles Produced in the Reaction vs. Time



Dependent vs Independent
or
"y" vs "x"

E. **Title your graph.** Remember the title can be a clue as to what is shown by the slope of the line. The titles are usually written as "y versus x." For example a graph of distance on the y axis and time on the x axis can be titled "Graph of Distance vs. Time." In this case, it could also be called "Graph of Speed," since the slope of a distance vs. time graph represents speed.

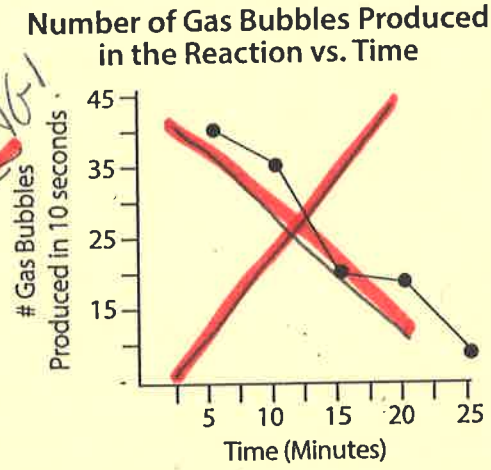
F. **Plot each data point** by finding where the x axis and y axis values intersect on the graph. Remember, in graphing multiple sets of data it is best to use a different color pencil or different symbol for each experimental trial.

G. **Draw the "line or curve of best fit"** showing the average of the graph points—draw a smooth line or curve passing through as many points as possible, with approximately equal numbers of data points above and below the line. Many scientific graphs differ from graphs that illustrate mathematical relationships. Usually in math, the dots are connected on the graph after plotting the points because the mathematical relationship between the points is continuous. For a science experiment, there may be a continuous relationship between the points, but it is more likely that the data will be an average of possible relationships.

Relationship between variables.

H. **Identify trends in the data.** The trends in the data are not always readily visible by just reviewing the data in a table format, so think about what each graph you produce illustrates. After completing any graph, write a few sentences of conclusion about the trends and patterns within the graph, the significance, and/or important findings from the graph.

WRONG!



extend line to hit "y" & "x" axes

RIGHT!