Introduction to Graphing

Science Learning Center

You will be able to:

- Identify independent and dependent variables based on the description of an experiment
- Scale and label your x- and y- axes
- Plot data points
- Title the graph
- Draw a line of best fit if appropriate

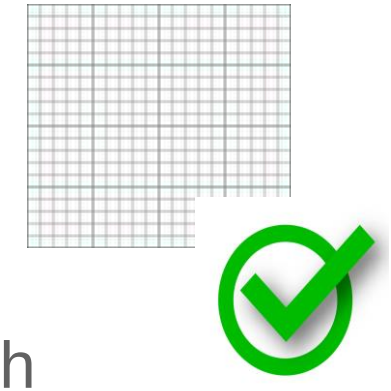
Why make a graph?

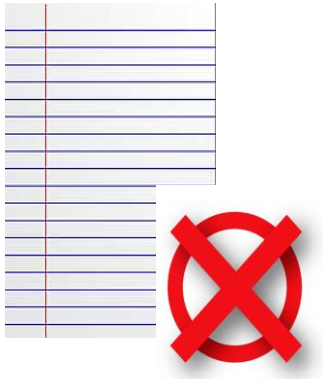
- Clearly communicate information
- Make it easier to see any patterns in our data

What do we need?

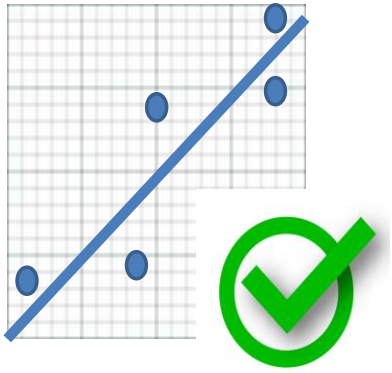
A ruler and appropriate paper:

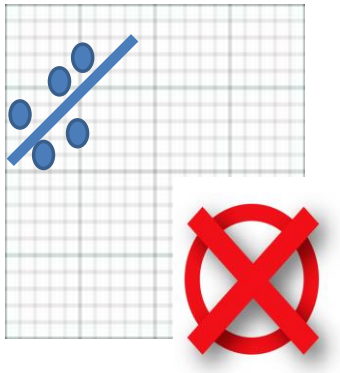
- Use grid-ruled paper, ideally with major and minor divisions.
- Notebook paper is not accurate enough





The graph should cover most of the paper





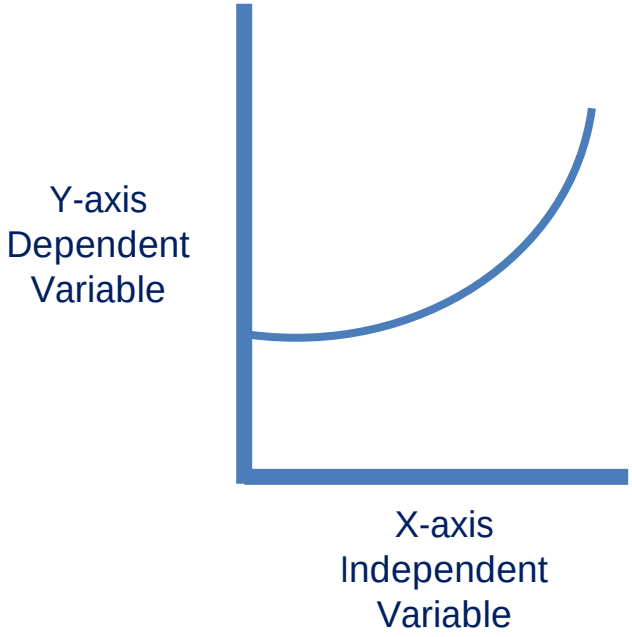
Independent and Dependent Variables

Independent

- The variable we know
- (Think “I decide”)
- Typically placed on the horizontal or x-axis

Dependent

- The variable we are measuring
- (Think “Do experiment”)
- Typically placed on the vertical or y-axis



Practice: Independent and Dependent Variables

What is the dependent and independent variable in each scenario?

Scenario 1:

Students were studying the diets of dinosaurs by comparing the weight of the dinosaurs to their average calorie consumption. Using datasets from modern reptiles they calculated the average calories required to feed dinosaurs of different weights.

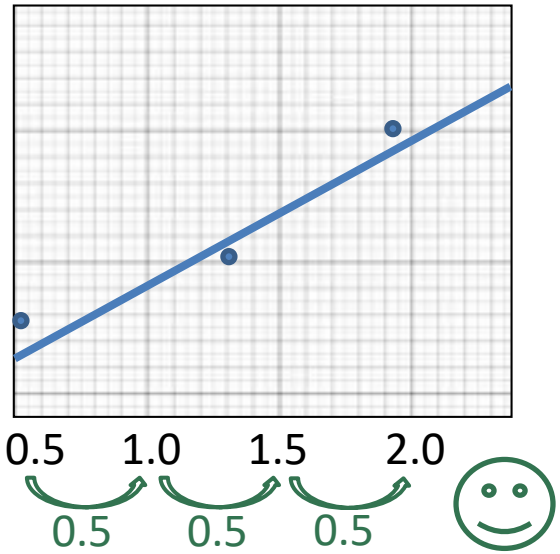
Scenario 2:

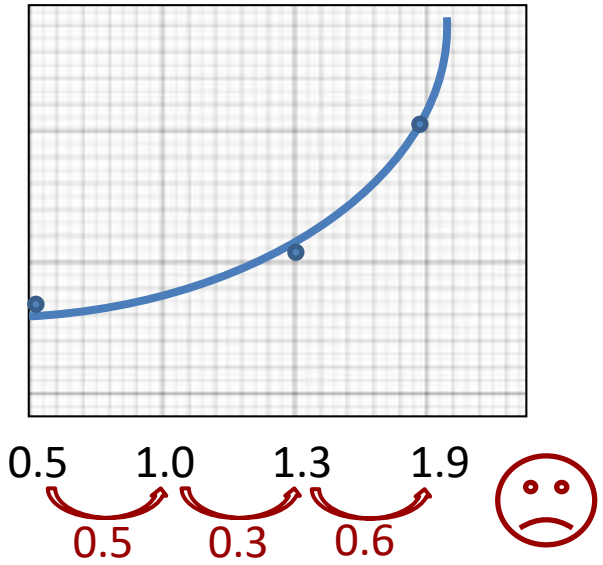
For a psychology class, students asked people to report how many hours of sleep they get each night and then measured their level of stress using the perceived stress scale. Their goal was to test whether sleep duration affects perceived stress.

Answers are at the back of the packet

Decide how to Scale your Axes

- Choose numbers that are easy to read (multiples of 2, 5, 10, etc.) and make sense for your data. You don't need to start from zero.
- Do not just use values from your data table
- Each division must represent the same interval:

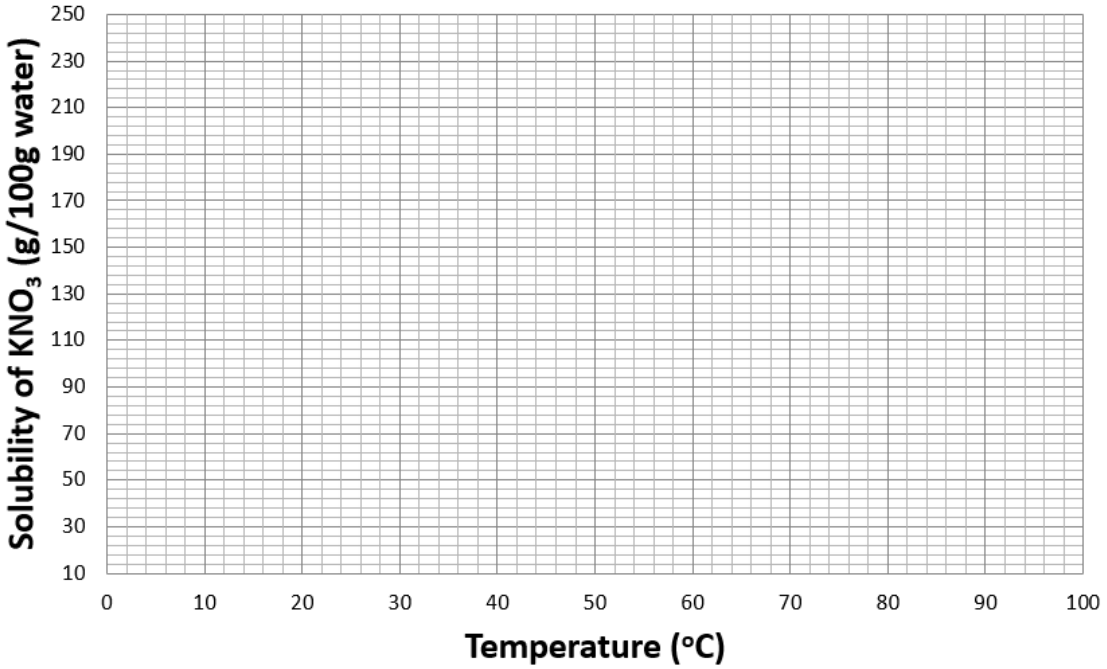




Label your Axes

- Label each axis with both the variable and the units
- The units are usually in parentheses after the variable

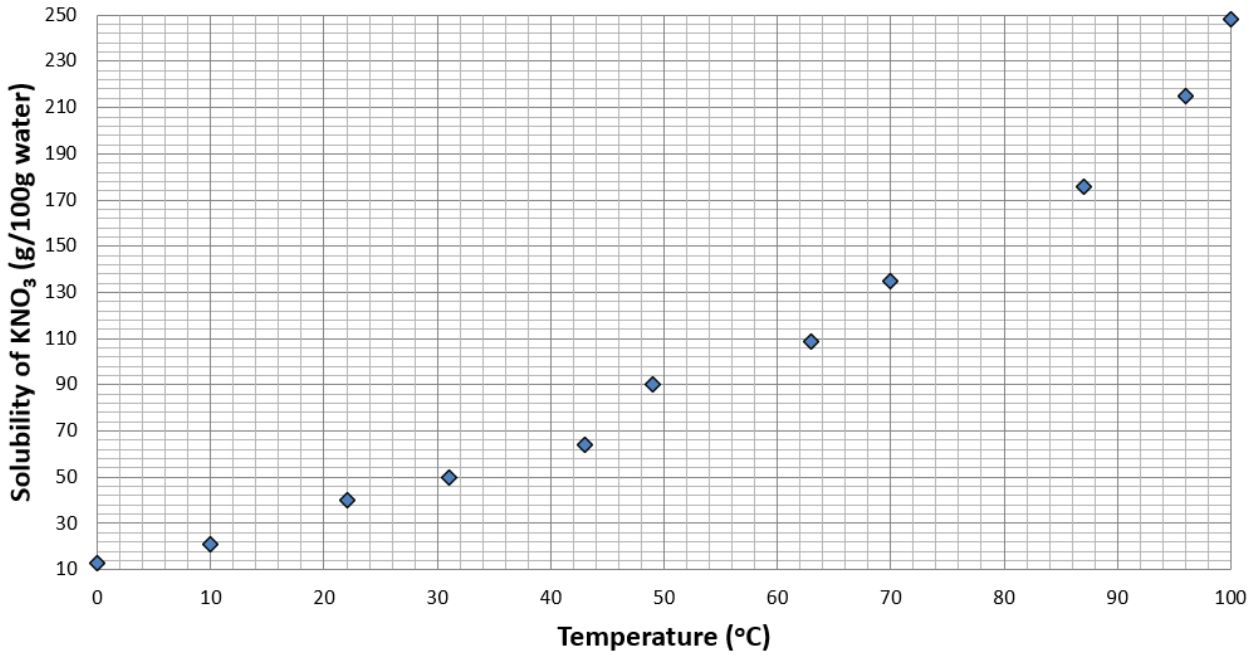
y-axis labeled
Variable (Unit)



x-axis labeled
Variable (Unit)

Plot your Data Points

- Place a small clear dot on the graph for each data point
- Work carefully to match the exact x- and y- values



Title your Graph

Your title should:

- Include both variables shown on the graph
- Make it clear which variable is dependent and which is independent
- Avoid using “versus”

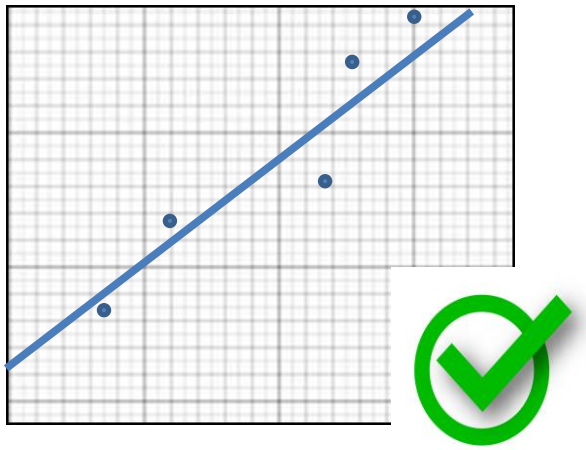
Possible titles for the graph on the previous page:

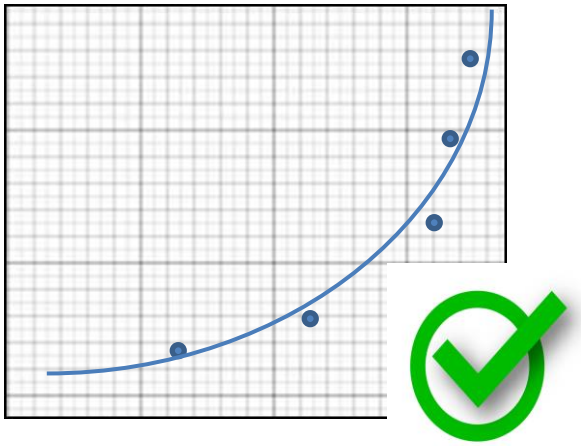
- “Solubility of KNO_3 as a Function of Temperature”
- “Effect of Temperature on Solubility of KNO_3”
- “Solubility of KNO_3 measured at various Temperatures”, etc.

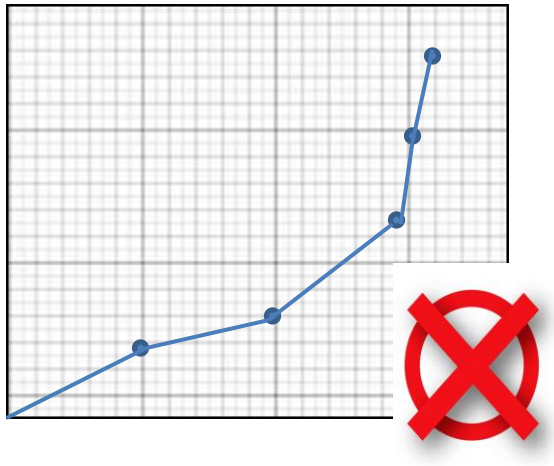
Line of Best Fit

The line of best fit is your trend line, a representation of all your data

- It will either be a straight line or a smooth curve
- It may or may not touch any of your data points
- Do not “connect the dots”:



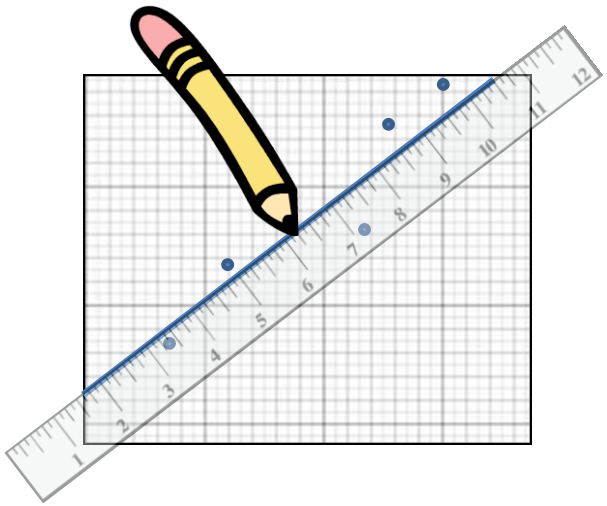




How to add your Line of Best Fit

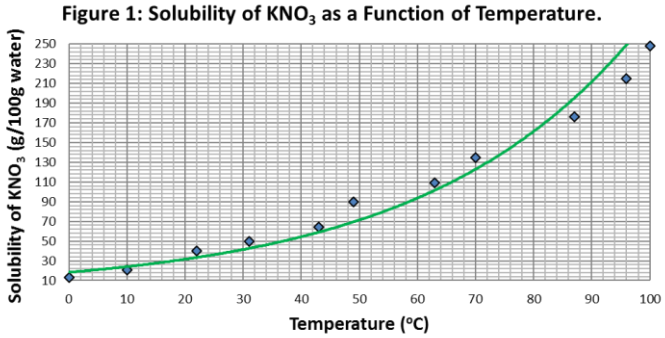
If your data appear to be linear:

- Use a ruler to draw a line that gets as close to as many points as possible
  OR
- Use computer software to fit a straight line to your data.



If your data appear to be non-linear (curved):

- Use computer software (Excel, Graphical Analysis, etc.) to fit a relevant model (exponential, inverse, etc.) to your data.

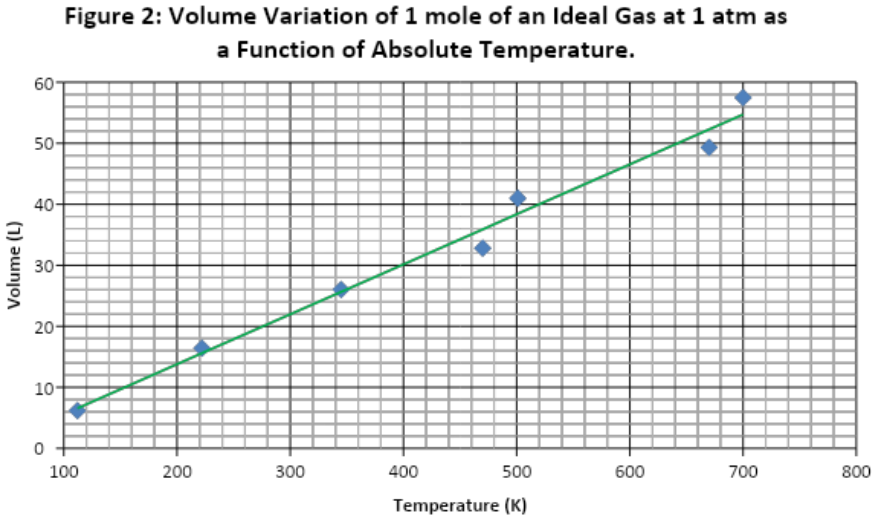


Summary

Your completed graph should have:

- The independent variable on the x-axis, and the dependent variable on the y-axis
- Evenly scaled axes labeled with the variable and units
- Clearly visible dots for each data point
- A title that makes it clear which is the dependent and independent variable
- An appropriate line of best fit

Let an SLC consultant know
if you have any questions!



Answers to practice questions

Scenario 1:

Dependent - average calories

Independent - weight of dinosaurs

Scenario 2:

Dependent - level of perceived stress

Independent - hours of sleep