# How to Make a Graph in Google Sheets

Since Google Sheets is a Google product, it works best if you use Google Chrome as your Browser. Using other browsers like Firefox might eliminate some of the options you see below.

1. **Create:** In Google Drive, click [NEW] and choose [Google Sheets] . If you didn't actually collect the data for the graph, the teacher might have made a template for you. If the template is in Google Classroom, the teacher probably made an individualized copy of the template for you. If the template is a "view only" template, you will need to go up to File → "make a copy" so you can edit the template. If you are starting with a template, you can skip ahead to step 4.

2. **Name:** Title your file Pd#_LastNameFirstInitial_AssignmentName (Pd8_BalmerD_PhaseChangesOfWater)

3. **Enter Data:** In the first column, create a label with units in parentheses for your independent variable. On a Mac, you can get a degree (˚) symbol by holding down the option/alt key while pressing the letter "k". Type your values (without units) in the cells under the label. Repeat this process for your dependent variable data in the second column. If you have multiple trials of data, you can create a column for each trial. For example trial 1 would go in Column B, trial 2 would go in Column C, and trial 3 would go in Column D. You could put the average of all three trials in Column E. On the other hand, if you need to graph multiple trials **AND** need Google Sheets to calculate the equation for the line of best fit and R^2 value, you will need to put all of the trials in the same column (Column B). If you need more or less decimal places in your data, highlight the data and then click on one of the buttons with the zero(s) and arrow.
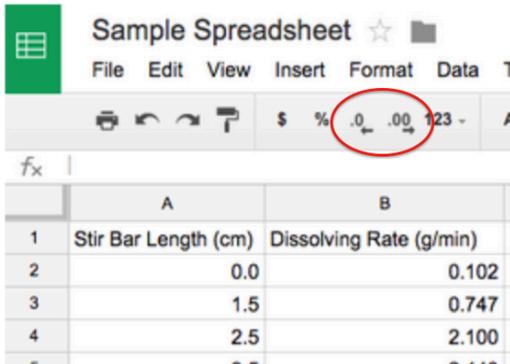

4. **Highlight:** select the data, including the labels. Highlight the independent/x variable first and then the dependent/y variable. Then click "Insert", then [📊 Chart...] .

5. **Chart Type:** In the Chart Editor, click the second tab, "Charts". We will usually be selecting [Scatter] for most of our graphs. Click on the blue and red dotted graph. If some of your data is qualitative (color, type of fish, element name, etc.) you might have to use a line graph or bar graph instead.

6. **Move Chart:** To make it easier to see your graph, I recommend moving it to its own sheet. Click on the 3 dots in the upper-right corner of the graph and select "move to own sheet." Now your graph is full screen.

7. **Customize:** Click "Customize". In this panel, you should do the following:
   a. **Chart Style:** Use these options if you want to change any of the colors.
   b. **Chart & Axis Titles:**
      i. **Title:** Give your graph an appropriate title (Topic or Assignment Name: The Effect of (independent variable, x-axis variable) on (dependent variable, y-axis variable). An example of a good title would be **Graphing Temperature Conversions: Celsius Temperatures Vs. Fahrenheit Temperatures**. The topic in your title should actually be a topic, not the word "topic."
      ii. **X- and Y-Axis:** Use the drop-down menu to change the chart title menu to the horizontal (x-axis) title and vertical (y-axis) title menus. This is where you will give your axes titles with units in parentheses. This is also where you would change the scale and minimum and maximum values for the axis. You will need to choose "vertical" from the dropdown menu once you are done editing your x-axis (horizontal) labels.
   c. **Series:**
      i. **Trendline:** This is where you will add a trendline, if necessary (See #7). Check your teacher's rubric for the graph to see if this is required.
   d. **Legend:** I usually choose "none" if my graph only has one series of data.
   e. **Horizontal Axis:** This is where you will play around with the scale for the x-axis. Generally, we want the minimum value to be below our smallest data point and the maximum value to be above our largest data point.
   f. **Vertical Axis:** This is where you will play around with the scale for the y-axis. Generally, we want the minimum value to be below our smallest data point and the maximum value to be above our largest data point. We don't want lots of extra white space. Take a look at the graph below. Notice how none of the data points go below 0.75. I would try changing the minimum y-axis to 0.75.

Concentration on Solutions: The Effect of Concentration on Density

density (g/mL)   y= -0.64*x + 0.991 R² = 0.456
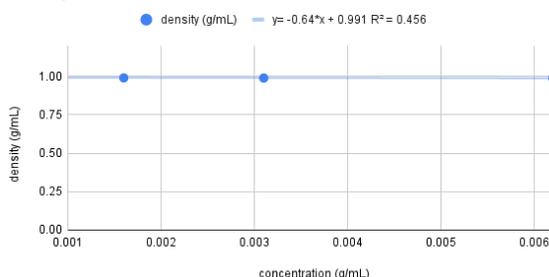
   i. Changing the y-axis minimum to 0.75 still leaves too much white space.

Concentration on Solutions: The Effect of Concentration on Density

density (g/mL)   y= -0.64*x + 0.991 R² = 0.456
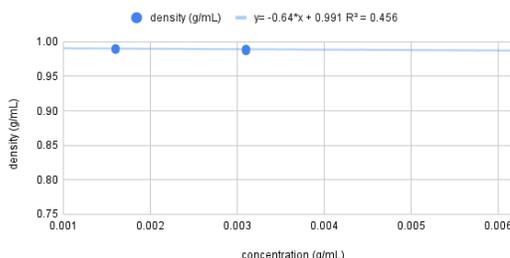
   ii. A minimum of 0.98 and a maximum of 0.99 looks way better.

Concentration on Solutions: The Effect of Concentration on Density
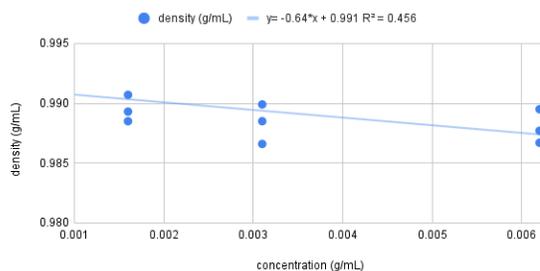
8. **Trendlines:** Sometimes our graphs will need a trendline. The rubric for your graph should indicate if you need a trendline. This is a line/curve of best-fit that goes near or through the data points. To include a trendline:
    a. Under "Type" choose "Linear" if your data looks like a straight line. I'm not a big fan of the way Google Sheets displays the equation. In the graph above, it would show the equation as -0.64*x + 0.991 R^2=0.456. Most people like it when the equation says "y =" and when there is more space between the equation and the R^2 value. To do this, you can click on your equation until a text box appears. You can add "y = " before your equation. I also recommend adding 5 spaces after the y-intercept (0.991) so that there is more space between the equation for the line and the R^2 value. You can play around with some of the other trendlines if your data is not linear.
    b. Beside "Label" choose "Use equation"
    c. Click the box ☐ Show R² . An R^2 value of 1.0 means the trendline is a good fit for the data and probably hits all of the data points. An R^2 value of 0 means the trendline is NOT a good fit for the data and probably doesn't hit most of the data points.
9. When you close out of the Customize menu, your graph will appear in the spreadsheet.

10. If you click on the graph, a series of three dots (⋮) will appear in the upper right-hand corner of the graph. If you click on this, you can make editing changes to your graph, copy your graph, etc. This is where you should go to put the graph on a separate sheet (**move to own sheet**) within your spreadsheet. This makes the graph bigger and easier to work with. It also keeps the x- and y-axis scales more consistent. Sometimes, Google Sheets can be weird with how it labels the scales.

11. **Making Annotations:** If your teacher asks you to highlight or label portions of your graph, you can do that within the drawing feature of Google Sheets or Google Docs. To do this, click on your graph and copy it. (If your browser is not copying and pasting your graph correctly, you might want to use Google Chrome.) In Google Docs or Google Sheets, go to the Insert menu and choose Drawing. Paste the graph you just copied. If Google Draw asks if you want to Link or Don't Link, choose **Don't Link**. If you Link your graph, then your graph becomes a drawing, and you can no longer edit the data. When you are finished with your annotations, you can click on Save and Close. A picture of your graph will appear with the annotations.

12. **Submitting for a grade:** Lastly, you will need to give your teacher a copy of the graph to grade. This will normally be done in a Google Classroom assignment.