

ACTIVITY: Graphing with Excel

Making Best-Fit Line Graphs (Scatter Plot) Using Excel Online

You will be using Microsoft Excel to make graphs (scatter plots charts) this year. Students can sign up for Office 365 for FREE and have FREE access to Excel online. Using this, you'll be able to sync your work at school and home and access your work from any device – including your phone, iPad, tablet, etc., if you have the One Drive app.



BEFORE YOU BEGIN! You must be signed up for Office 365



- Go to <https://www.microsoft.com/en-us/education/products/office> to sign up for an account with your **school email** and get FREE access to Microsoft Office products (for Graphing with Excel)
- Download **OneDrive App** on your phone
- Download **Microsoft Authenticator App** on your phone

ASSIGNMENT OVERVIEW - SAMPLE GRAPH

As the volume of a mysterious substance was changed, the mass of the substance was observed and data was collected. Use the sample data in the chart on the right, along with the instructions that follow below, to construct an Excel scatter plot graph. When you're done, copy your Excel graph into a Google Doc and turn your Sample Graph in to your Chemistry Shared Folder with this assignment title: **Sample Graph**.

Begin making your Excel graph by following the instructions below:

Volume (cm ³)	Mass (g)
1	1
2	2
3	4
4	8
5	16
6	32
7	64



How to Make a Scatter Plot Graph

1. Login to your Office 365 Online account. On the left menu bar, click on Apps and then and open the Excel online app
2. Open a new Blank Workbook
3. Refer to Example A below and enter your data for the x axis in column A and the data for the y axis in column B, just as it is typed in Example A. Be sure and keep the x and y data straight!!!
 - **OPTIONAL:** In the future, if you have multiple sets of data in one graph, more than one set of dependent variables, follow Example B below and use Row 1 to title the different sets in the y-axis column - for example, Trial 1, Trial 2, etc. Then enter your data under that (like the diagram below on the right).

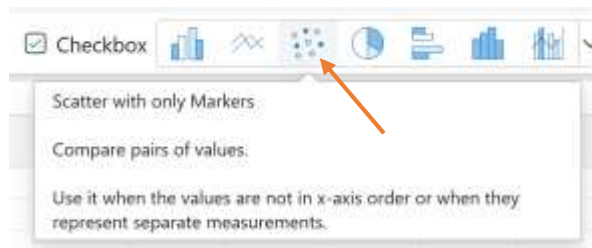
Example A: One Data Set (one line)

	A	B
1	1	1
2	2	2
3	3	4
4	4	8
5	5	16
6	6	32
7	7	64

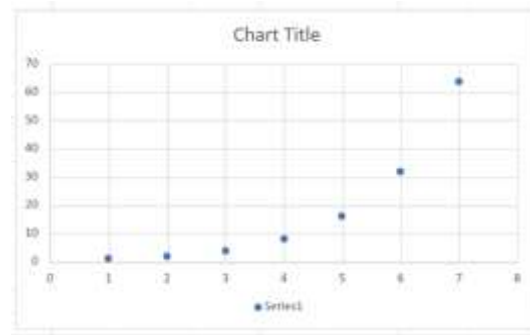
Example B: Multiple Data Sets (more than one line):

	A	B	C	D
1		Trial 1	Trial 2	Trial 3
2	5	2	3	0
3	10	4	6	15
4	15	8	12	30
5	20	16	24	45
6	25	32	48	90
7	30	64	96	180

4. Next, click in your top left cell (A:1) and left click/drag across and down to select all of your data – just the data you entered in column A and B (like the diagram below on the left)
5. Go to the **Insert** tab at the top and in the **Recommended Charts** menu, select **Scatter with only Markers**

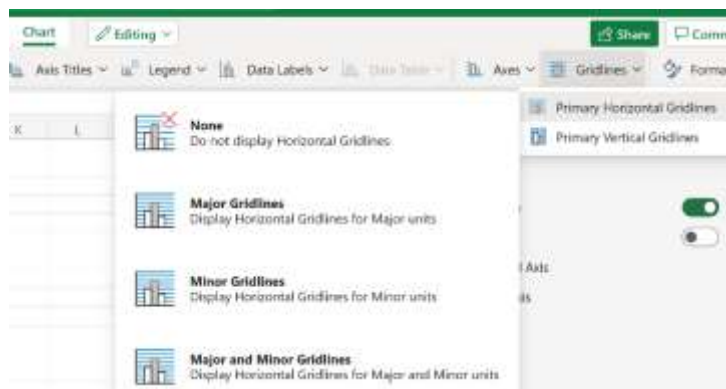
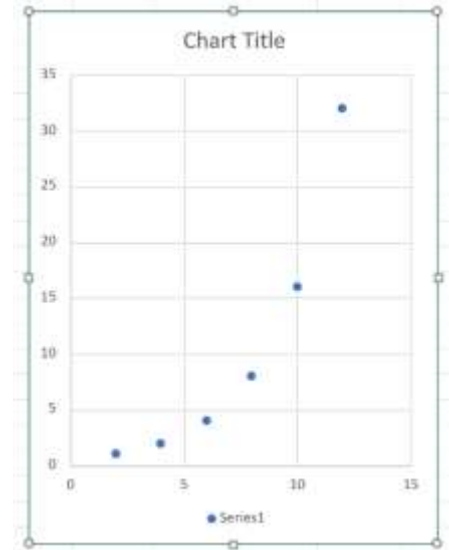


- Voila!!!** This is what you should see.
Go to Section 2 below to format your graph.

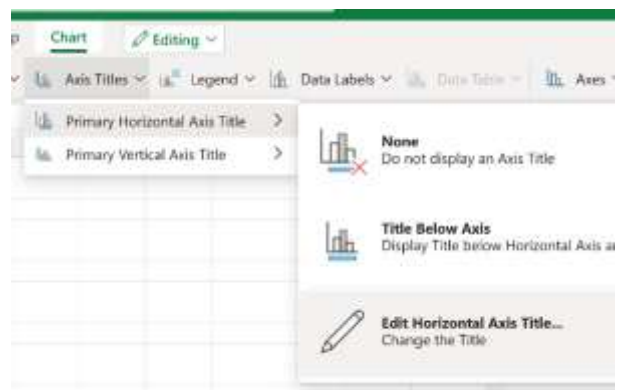


How to Format Your Scatter Plot Graph

- Re-Size Graph:** Click on the graph and then use the tabs at the top/bottom and left/right to lengthen or shorten the x and y axes so that your graph is sized proportionally.
- Appearance:** Click on your graph and then select the **Chart** tab at the top of Excel file. This is where you can edit the Gridlines, Chart Title, and Axis Titles. You can also Double click inside your graph and a quick Format menu will pop up on the right side of your screen.
- Gridlines:** Click on your graph, select the **Chart** tab at the top of Excel file, and click on **Gridlines**.
 - Click on **Primary Horizontal Gridlines** and then select **Major and Minor Gridlines**
 - Click on **Primary Vertical Gridlines** and then select **Major and Minor Gridlines**



- Chart Title:** Click on Chart Title in your graph and edit the title of your graph. The title should be Graph of Y vs. X (substitute the Y and X for those variables)
- Axis Titles:** Click in the graph, select the Chart tab at the top, click on **Axis Title** and select **Primary Horizontal Axis Title**. Click on **Edit Horizontal Title**. Type in your x axis quantity and unit. Like this – Acceleration (m/s^2). Do the same thing for the Primary Vertical Axis Title
 - If you need to add a superscript or subscript to the axis label, you will have to copy and paste it in the title. Copy and paste whatever number you need from this set here to the axis title: $0^{123456789}$ $0^{123456789}$



- Series Legend:** If you only have one set of data for your graph, click on the "Series 1" legend – usually on the bottom or the right side of the graph, and delete it. Leave the legends if you have more than one set of dependent variables.

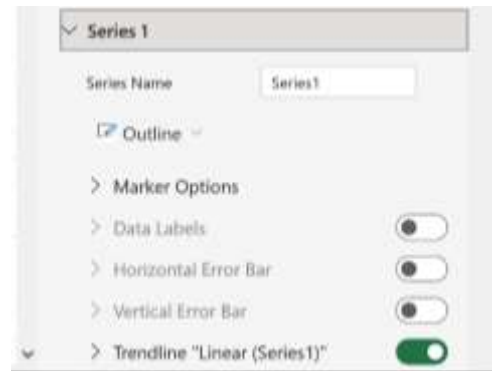


How to Add a Trendline

13. Click in the graph, select the **Chart** tab at the top and then click on **Format** at the far right of the screen.

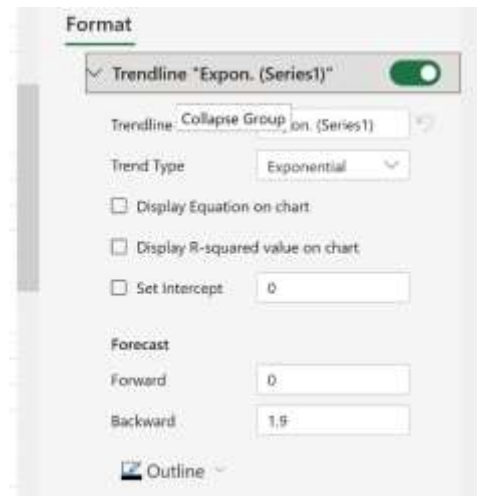
14. Scroll down to Series 1 and click to check the box to turn on **Trendline "Linear (Series 1)"**. The check box will turn from white to green.

- Under the Series Name, leave the Series Outline color blank – No Outline



15. Click on the dropdown menu for **Trendline "Linear (Series 1)"** and **Trend Type**.

- Scroll through the Trend Types until you find the one that gives you the best fit line. This is usually Linear or Exponential, but you may have to check different types to find the best one.
- Sometimes the line hits all the points, sometimes it doesn't. Remember that how far off the line your data point is gives you an indication of your error.



16. **Get closer to 0,0.** If you have a linear or parabolic graph, you need to get as close to 0,0 as possible and intersect with the y axis or the x axis (whichever fits best).

- Under the Trendline options, go to Forecast and in the Backward box, type in an amount that will extend your line closer to 0, 0.
- Type in approximately how many squares you are away from 0 on the horizontal axis in the Backward box. If this doesn't work, try counting how many boxes away you are from the vertical axis.

17. Change the trendline **Outline** color to Black.

18. **You're almost done!** Be sure and check the handout [Checklist for a Good Graph](#) (on the class website) to make sure your graph meets all the requirements of a good graph.

19. **Copy your graph and paste it into your doc.** (IMPORTANT: If you are pasting into a Google doc, you may FIRST have to paste it into a Word doc and then a Google doc.)

- In Excel, right click on the empty space at the top of your graph and select Copy.
- Go to Office 365 and open a new Word doc. Click inside your doc and enter Ctrl+V to paste the graph into the Word doc
- In the Word doc, click on the new copied graph and enter Ctrl+C to copy the graph again
- Go to your Google doc. Click inside your doc and enter Ctrl+V to paste the graph into the doc
- Click on your graph and then click on Wrap text so that you can move your graph around to whatever page you need.
- Adjust the size of your graph so that it is a full page graph. Click on the graph and pulling the tabs at the CORNERS – this keeps the proportions the same. Do not pull the tabs at the top, bottom, left, or right – this will cause your graph to be skewed.
- **OPTIONAL for Mac** – If you are using a Mac, the steps above may not work. You may have to use a snipping tool to copy and paste the graph from Excel into your Google doc.

20. **Name your doc** as you name all files, with this assignment name: **Sample Graph**. Save as a PDF and move the PDF into your Shared Folder.