

Graphing Exercises 1 & 2

You will be using Microsoft Excel to make graphs (scatter plots charts) this year and Exercise 1 will help you learn how to do that. 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.



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

Exercise 1

IMPORTANT: This part of the assignment takes quite a bit of time. Make sure you plan ahead and give yourself plenty of time to answer the questions, complete both graphs and submit everything correctly.

- 1) Read the experiment on the next page, "Generation of Oxygen".
- 2) Analyze the experiment by answering the experiment questions and making two graphs using the instructions below.

Turn in these **three pages** in one doc and then convert the doc into a single PDF. You will then submit the PDF to BOTH your Chemistry Shared Folder AND Turnitin.

Page 1 - QUESTION ANSWERS: Type your answers, double spaced, on the first page (and only on page 1)

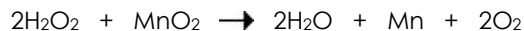
- A) In the top left corner, type your name info like this:
Your Name, Class Period (HC1, etc.)
Date
- B) Under the header, add this title: **Graphing Exercise 1 – Generation of Oxygen** (center the title)
- C) For question **A**, either scan the test tubes from the sheets, make your own test tubes, or use a snipping tool to cut and paste the test tubes.
- D) Be sure to reduce the size of the test tube image and edit the spacing of the question answers (and maybe even the page margins) so that everything will fit on just one page.

Page 2 - GRAPH J: Construct the first graph using Excel. Create a full page, scatter plot graph. (You can only use Google Sheets or other software if you get special permission from Ms. Skinner.)

Page 3 - GRAPH K: Construct the second graph using Excel. Create a full page, scatter plot graph. (You can only use Google Sheets or other software if you get permission from Ms. Skinner.)

Graphing Exercise 1 – Generation of Oxygen

Oxygen gas can be generated by the reaction of hydrogen peroxide (H_2O_2) with manganese dioxide (MnO_2).

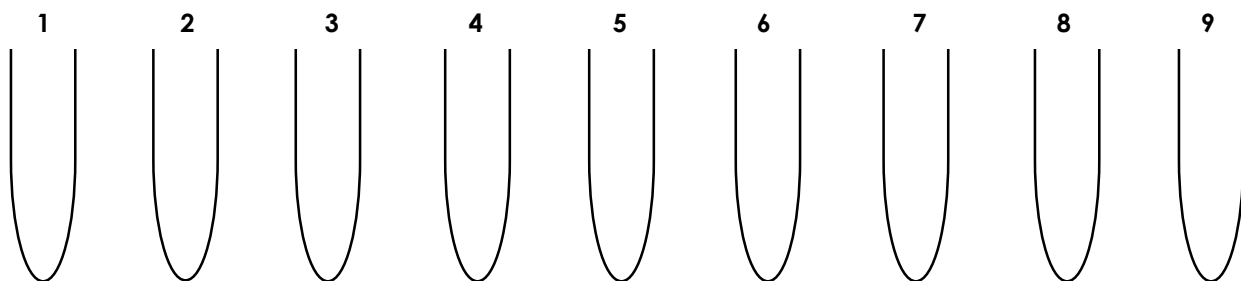


A chemistry class sets up nine test tubes and places different masses of MnO_2 in each test tube. 100.0 mL of H_2O_2 is added to each tube and the volume of gas produced is measured each minute for five minutes. The table below contains data from the experiment. The volumes recorded show the volume of gas in the tubes at that time.

Tube #	MnO_2 (g)	1 min (mL O_2)	2 min (mL O_2)	3 min (mL O_2)	4 min (mL O_2)	5 min (mL O_2)
1	0.1	1.4	2.6	3.5	4.2	5.1
2	0.2	2.8	4.6	5.8	7.1	7.6
3	0.3	4.9	7.2	8.8	10.2	11.3
4	0.5	5.9	8.5	10.4	11.8	13.3
5	1.0	8.5	12.4	14.4	16.1	17.1
6	1.5	11.0	14.8	17.5	19.8	21.8
7	2.0	12.0	17.0	20.2	22.7	24.8
8	2.5	13.6	19.0	22.1	24.7	27.3
9	3.0	16.2	21.8	25.1	28.2	30.4

QUESTIONS

A. Use the diagram below to label all of the chemicals that were added to each tube.



- B. In the experiment, what was the control? Explain why.
- C. What was the independent variable? Explain why.
- D. What was the dependent variable? Explain why.
- E. How much O_2 is produced in tube #3 after two minutes?
- F. What volume of O_2 did tube #5 produce between the second and fourth minutes?
- G. How much oxygen did tubes 8 and 9 produce together during the third minute?
- H. What total volume of oxygen gas was produced during this procedure?
- I. After you make the graph in question **K** below, answer the following: By comparing the slope of the graph curves, which tube was producing oxygen at the fastest rate between minutes four and five?

GRAPHS (Refer to the info on the next page for special instructions on making these graphs)

- J. **Graph J:** Make a graph using the mass of manganese dioxide and the volume of oxygen for each tube at 4 minutes – **only at 4 minutes!** (Careful, this one might be tricky! Hints: What are the independent and dependent variables? At five minutes, what are you purposefully changing, and what is changing as a result?)
- K. **Graph K:** Graph the amount of oxygen produced each minute in test tube 1, tube 5, and tube 8. (Hint: You will have one graph with three lines, one for each of these test tubes.)

SPECIAL GRAPH INSTRUCTIONS:

- **HOW TO PRINTABLE INSTRUCTIONS:** Go back and review the instructions in the activity, [Graphing with Excel & Online Graphs Tutorial](#) (on class website under the Worksheet tab)
- Use the handout [Checklist for a Good Graph](#) (on the class website under the Worksheet tab) for guidelines on the format of your graph. Be sure to follow the guidelines on this page very, very carefully!!!! Especially pay attention to the examples of a bad graph and a good graph at the end of the handout.
- Use a SCATTER plot graph and not a line graph. In graphing software, line graphs connect the dots and that is a no, no!!
- If the instructions for making a graph are confusing or aren't working, GOOGLE IT until you find instructions that make sense to you!

Extra Hints for Graph J & K:

- What are the independent and dependent variables? What are you purposefully changing, and what is changing as a result?
- Double check the title. Make sure you are using the traditional method of assigning a title
- Double check both of the axis label – do you have the quantity that was measured and the unit used to measure it?
- **For Graph K:** Will you be graphing every test tube?
- **For Graph K:** You will have just one graph for this, but you'll have more than one line on the graph.

Exercise 2

It is important that you be able to interpret data that is represented in graph form. Use the following link to go to the online worksheet where you will practice reading and interpreting graphs and charts. Make sure you complete all parts of the worksheet and click **Submit** when you are finished. ****Caution:** Your work will not be saved if you leave the program.

<https://forms.gle/J71oXVPg6c7BwQGr8>