



Name: _____

Partner's Name(s): _____

Lab Date: _____ Lab Instructor's Name: _____

CHEMICAL AND PHYSICAL CHANGES LAB NOTEBOOK PAGES

All purpose, procedure(s), and data/observations must be recorded in the lab notebook in pen with permanent, waterproof ink (black or blue). Pencils, markers, highlighters, and correction fluid (white-out) are not permitted. No information can be recorded elsewhere and transferred after leaving the lab. Lab notebooks can be digital or paper; you may write directly on the lab notebook pages in your lab manual or download a digital copy onto your electronic device and then write in it. Refer to the Guide For Success in the General Chemistry Laboratory section in the front of this lab manual for more detailed instructions.

- ⦿ **Before Lab:** Make sure to complete the Purpose and Procedure sections, as well as any required data tables in the Data and Observations section, in your lab notebook pages.
- ⦿ **After Lab:** Upload your notebook pages to the appropriate Carmen assignment within 48 hours after the start time of your in-person lab session. If you used the notebook pages in your paper copy of your lab manual, you should scan or take photos of the pages. Do not remove them from your lab manual. Refer to the CPC Notebook upload assignment in Carmen for more detailed instructions.

PURPOSE _____

Describe the what, why, and how of the experiment in bullet points or a few sentences. Consult the Expected Learning Outcomes and the procedure for the experiment to develop the purpose.

PROCEDURE CITATION _____

Chemistry 1610: General Chemistry Laboratory Manual, Fall 2025.; Weaver, T. A., Opoku-Agyeman, B., Fontes N. Da Silva, C., Welch, A. N., Stern, J. E., Wroblewski, R. A., Walter, C., van Helmond, A. Eds.; Van-Griner Learning: Cincinnati, OH; pp. 13–21.

PROCEDURE

PART A

Observe the distillation apparatus and answer the accompanying questions provided in the Data and Observations section.

PART B

Before Lab: Write a *step-by-step* procedure you plan to use. Be as detailed as possible.

During Lab: Note any updates/adjustments you made to your procedure before you leave the lab.

PART C

Write a summary or step-by-step procedure for this part of the experiment in the space below.

PART D

Write a summary or step-by-step procedure for this part of the experiment in the space below.

CLEAN UP AND WASTE DISPOSAL

Spheres from Part B should be disposed of in the Blue Solid Waste bucket under the reagent cart. The plastic bag your spheres were provided in should be thrown in the trash. Waste from Part C may be rinsed down the drain with a large amount of running water. Used 25-mL test tubes should be disposed of in the Orange Glass Waste bucket. Green No. 0 stoppers should be rinsed and returned to the correct drawer. After cleaning up, wipe down your work area with 70% ethanol spray and a paper towel. Wash your hands thoroughly after completing this experiment.

6. Molecular models of H_2O_2 and H_2O have been provided with the distillation apparatus. **Figure CPC.4** shows a diagram of a simple distillation apparatus. Region 1 is the still pot. Region 2, the area around the bulb of the thermometer, is located near the top of the condenser. The condenser connects Region 3, the receiving flask on the right, to the flask being heated on the left. Use the models to help you draw a **particle representation** for Regions 1, 2, and 3 below. Your drawing should indicate which substances are present and which phase they are in. You may find **Figure CPC.1** helpful for determining how to depict different physical states on a molecular level. Label the temperature on the thermometer. You may find **Figure CPC.1** helpful for determining how to depict different physical states on a molecular level. Label the temperature on the thermometer.

Boiling Points

Water: 100 °C

Hydrogen peroxide: 150 °C

T = _____ °C

Water

$$\begin{array}{c} \text{O} \\ / \quad \backslash \\ \text{H} \quad \text{H} \end{array}$$

Hydrogen Peroxide

$$\begin{array}{c} \text{H} \quad \text{O} \quad \text{O} \quad \text{H} \\ | \quad / \quad \backslash \quad | \\ \text{H} \quad \text{O} \quad \text{O} \quad \text{H} \end{array}$$

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FIGURE CPC.4

A simple distillation apparatus.

7. The distillation setup we have provided will run for 3 hours. Will the composition of Region 1 change during this time? If so, how?

PART B

Before Lab: Based on your procedure, create your own Data and Observations section. Since you will be collecting quantitative data, we recommend creating a table with clearly labeled columns and/or rows. Make sure your table includes the masses of the individual components, price of each component, percent composition of each component by mass, and monetary value of the mixture. Units and correct significant figures will also be necessary!

During Lab: Make any necessary updates or adjustments to reflect the procedure you actually used.

Which calculations must be completed in lab?

For some experiments, calculated values are necessary to either move forward in the experimental procedure or answer a question posed in the lab manual. In these cases, make sure all calculations are recorded in your notebook. Some calculations may be done after you leave lab if they are only relevant for your data analysis. These would not need to be recorded in your lab notebook. If you have any questions about when a specific calculation should be done, please ask your lab instructor. When analyzing your data, if you realize a mistake has been made in a calculation, you may re-do the calculation and change that value.

PART C

INITIAL OBSERVATIONS OF KI/I ₂ SOLUTION	INITIAL OBSERVATIONS OF Na ₂ S ₂ O ₃ SOLID
OBSERVATIONS BEFORE SHAKING THE TEST TUBE	
OBSERVATIONS AFTER THE TEST TUBE IS SHAKEN	
HOW DO YOUR RESULTS COMPARE TO THE RESULTS OF YOUR GROUP MEMBERS? BE SPECIFIC.	
WAS THIS A CHEMICAL OR PHYSICAL CHANGE? SUPPORT YOUR ANSWER WITH EVIDENCE.	

PART D

INITIAL OBSERVATIONS OF KMnO_4 SOLUTION	INITIAL OBSERVATIONS OF ACIDIC NaHSO_3 SOLUTION
OBSERVATIONS AS THE KMnO_4 SOLUTION IS ADDED TO THE ACIDIC NaHSO_3 SOLUTION	
OBSERVATIONS OF THE DISTILLED WATER RINSE IN THE TEST TUBE	OBSERVATIONS AS THE RINSE SOLUTION IS ADDED TO THE ACIDIC NaHSO_3 SOLUTION
HOW DO YOUR RESULTS COMPARE TO THE RESULTS OF YOUR GROUP MEMBERS? BE SPECIFIC.	
WAS THIS A CHEMICAL OR PHYSICAL CHANGE? SUPPORT YOUR ANSWER WITH EVIDENCE.	

