

The Lab Notebook/Journal

Laboratory journals are an integral part of scientific research. They serve as a permanent record of actual experimental work. Thus, it is critical that they are both accurate and truthful. In this course, you will implement some of the procedures used by chemists to safeguard against false or inaccurate records.

Your lab notebook should be lined paper in a thin note binder used only for lab experiments.

Write neatly using only black ink. If you make an error, draw a single line through the mistake. **DO NOT SCRIBBLE OUT ERRORS OR USE WHITE OUT.**

Start each lab on a new page.

All notes made during a lab should go **directly** in your lab journal, **NOT** your notes.

How to set up a journal:

Page 1: Title Page

The first page of the notebook should include the following information:

The name of the researcher

The name of the institution where the research was performed

The date the journal was started and finished

Complete contact information so the notebook can be returned in case of loss.

Page 2-4: Table of Contents

It is usually a good idea to leave two or three pages after the title page for a table of contents. There should be columns for the name of the lab, the date of the lab, and the pages on which the lab can be formed.

Page 5: Your First Entry

Use the format provided for each lab unless instructed otherwise. Include headings for each section. You should have a Title, Purpose, and Procedure written before you come to class. If the lab requires a Data table, you should also prepare that in advance in order to save time during class.

TITLE OF EXPERIMENT**DATE**

PURPOSE: In one or two sentences, describe the purpose of the experiment *in your own words*.

PROCEDURE: This is a very clear, step-by-step list of things you plan on doing during the experiment. Each step should be short (one phrase or sentence).

DATA or OBSERVATIONS: Items in this section should be recorded in chronological order while you are conducting the lab and should include....

- ◆ Quantitative measurements such as mass, volume, temperature, etc. (Be sure to include units)
- ◆ Qualitative observations such as changes in color, appearance of bubbles, etc.)
- ◆ Neat and clearly labeled data – USE A RULER TO DRAW DATA TABLES

ANALYSIS: In this section, you will analyze your experimental data.

- ◆ Show all your work whenever calculations are necessary. Always label each calculation and include units for example:

$$\text{Density of metal A: } D = M/V = 56.03 \text{ g} / 8.0 \text{ cm}^3 = 7.0 \text{ g/cm}^3$$

- ◆ The results of all calculations should be summarized in a Results Table including labels and units for each value.

Density of metal A	7.0 g/cm ³
Density of metal B	0.69 g/cm ³

- ◆ Graphs should conform to the *Graphing Guidelines*.
- ◆ Percent error calculations.

CONCLUSION: In this section, you should summarize your findings and/or answer questions as instructed. Write clearly and concisely using complete sentences. Be specific. Avoid using vague pronouns that force the reader to guess what you are describing. Include a brief error analysis section. You should list at least two sources of error as well as ways you can prevent those errors in the future. The errors mentioned should be errors that you can do something about, not mystical errors that probably didn't happen. This is the most important part of the report. It is where you tie everything together and show me what you know.

Graphing Guidelines

- ◆ **Trim your graph** to fit a single page with your lab report and attach neatly with glue or clear tape. If appropriate, you may include the graph as a separate piece of paper.
- ◆ **Give your graph a title** “y-axis quantity vs. x-axis quantity” is an appropriate title. In some cases you will need to be more specific, such as when identical graphs are being created for two different substances (e.g. “Mass vs Volume of Metal A”).
- ◆ **Label each axis.** Indicate the quantity and the units of each variable (e.g. “Mass (g)”). The *independent* variable (the variable you are manipulating) is labeled on the x-axis, while the *dependent* variable (variable that changes in response to the independent variable) is labeled on they-axis.
- ◆ **Choose an appropriate range.** Check the minimum and maximum values of each variable to determine the range of each axis. Unless instructed otherwise, you do not need to start at zero.
- ◆ **Maximize your graph area.** Choose a scale that expands your data to fill as much of the graph as possible, while still using convenient increments. Graph is easier to read when each square represents increment of 1, 2, 5 or a multiple of these numbers (e.g. 0.1, 10, 100). Label each axis at regular intervals such as every axis, but the x-axis and y-axis do not need to have the same scales.
- ◆ **Plot points clearly.** A dot with a circle around it can be located more easily than a single dot after the graph line is drawn.
- ◆ **Draw the best-fit line or curve.** Since your data points represent experimental measurements rather than absolute numbers, they will not all fall precisely on a line or curve. Therefore, you should draw a straight line or smooth curve that best represents the general tendency of the data points. Use a fine point pen to avoid a thick line.

Lab Safety Rules and Waiver

1. Approach laboratory work with maturity. Never run, push, or engage in horseplay or practical jokes of any kind in the laboratory.
2. Unauthorized experiments are prohibited. Do only those experiments assigned by your teacher.
3. No food, drink, or gum is ever allowed during lab periods; and no substances used in the lab should ever be tasted unless you are told to taste it as part of the lab.
4. Safety. Goggles must be worn when chemicals are used in the classroom.
5. If an accident occurs and lab materials break or spill, inform the tutor immediately so that chemicals can be cleaned up properly.
6. Always clean up and wash your hands after labs.
7. Be prepared for lab. (READ THE INSTRUCTIONS)
8. If you do not understand the procedures in a lab, ask the tutor for help.
9. Use equipment properly, for its designed use. (Rulers are not swords, catapults, etc...)
10. Long hair and any other long/loose items of clothing or jewelry must be pulled back or removed.
11. Footwear should cover feet completely. **No open-toe shoes.**

In order to participate in labs, you must agree to follow these rules and have this page signed by a parent. Continually breaking these rules and acting irresponsibly during labs will result in loss of lab privileges. Student will be reminded of rules and if there are still problems, parents will be contacted before the student loses lab privileges. If a student continues to behave irresponsibly after contacting the parents, then they will lose lab privileges for at least one lab.

We understand that following these rules protect both _____(student) and his/her classmates from injury during experiments. We understand that repeatedly breaking the lab safety rules will result in loss of lab privileges. In addition, we understand the nature of the tutorial program and release Roxanne Reid, Cornerstone Tutorial, and Severna Park EP Church from all liability related to the activities of this program.

Student Signature: _____ Date: _____

Parent Signature: _____ Date: _____