

Keeping a Good Laboratory Notebook

Plymouth State University, CH2250: Techniques in Laboratory Chemistry

Your notebook should be written in such a way that anybody familiar with the concepts but not with the exact experiment can pick up your notebook, follow what you did, and repeat the experiment. This is the single most important aspect of your notebook. If your work cannot be understood by others, you may as well have not done the experiment. And if I cannot understand it, your lab reports will receive low grades. Sample lab notebook pages have been posted on the website. Use them as a guide. Here are some characteristics of a good lab notebook:

1. The notebook should be NEAT AND EASY TO FOLLOW.
2. Pages should be numbered.
3. The first page should be a continuously UPDATED Table of Contents.
4. The title of the lab experiment must appear at the top of the first page of the experiment.
5. Dates should appear frequently. Write the date at the start of the experiment and anytime throughout if work is interrupted. The date should be written when the lab is completed.
6. Each experiment must start with a purpose / introduction. Why are you doing this experiment and what, briefly, will be done? Write any reactions that are to be run.
7. When needed, a "Calculations" section with the calculations needed to do the procedure should appear in the opening material of the lab
8. Each experiment must start with an easy-to-follow list of steps to be performed, including amounts of chemicals to be used. The Procedure need only be detailed enough for you to run the experiment using only your notebook. Do not copy, verbatim, the instructions for the lab.
9. References must be listed at the start of each experiment. Where did you get the instructions for the lab?
10. Use ONLY the front side of the page. Your pages will not duplicate if you use the back sides, and you will be graded on the content of the duplicate pages you hand-in.
11. Use a ball point pen, not a gel pen. Gel pens have a tendency to run when the page gets wet (Lab notebooks have a way of getting soaked!) Pencils are not allowed.
12. Clearly label the various sections of the experiment (i.e., purpose, references, procedure, observations and data, etc.). You should double underline or draw a box around these keywords.
13. Clearly label all tables, charts, graphs, and data collected. Each label should start with something in the form "Table XX.xx", where XX is the experiment number, and xx is the number of the table in sequential order for that experiment. (Example: "Table 1.1. Glassware Identification and Uses")
14. Include units with ANY data you collect or number you calculate.
15. Record data and observations as the experiment proceeds, not as a summary at the end.
16. Drawings are useful and welcome in a notebook.
17. Clearly label and explain any calculations. Anything you calculate during the lab must be noted. If several of the same type of calculations are done, you may include only one sample calculation and note that the other numbers were calculated in the same way. Additional results can be presented in tabular form (and the sample calculation referenced).
18. You are encouraged to construct any necessary data tables ahead of time.
19. Sign and date at the end of your work of each lab.

Science is a messy endeavor and mistakes are common (and totally okay!) in a lab notebook and in an experiment. If you make an error writing in your notebook, simply draw a line through the error and initial next to it. NEVER "scratch out" a mistake so that the original text cannot be read. Never tear an original page out of your lab notebook. If you feel you must start on a fresh page after an error, place an "X" through the page and go to the next page.

The list of sections and items to be included in your notebook is given below. Not every experiment will necessarily have all of these, but the vast majority will:

1. At top of first page of experiment: **Experiment Number and Title, Date** experiment is started, **your name**
2. **Purpose.** One sentence or short bulleted list answering the questions "Why are you doing the lab? What do you intend to accomplish / learn?"
3. **Introduction.** A short paragraph describing the experiment and providing any needed background
4. **References.** From what sources did you get the procedure for the lab and data needed to do calculations and analysis? In many cases, this may be just the lab manual
5. **Equipment**
6. **Safety Considerations.**
7. **Calculations** that were needed to determine the amounts of reagents to be used in the Procedure.
8. **Procedure .** A concise list of the steps you will do in lab. It should be written so that you can walk into lab with no other references and perform the lab, but it need not be overly detailed. It should contain masses, volumes, etc you intend to use.
9. **Results and Observations.** What you actually did, the data collected, and observations. Each step given in "Procedure" should be seen in this section, and in many cases, the step will be re-written with more detail to indicate what you actually did. NO mathematical calculations should appear in this section
10. **Analysis.** Mathematical calculations using the data collected in "Results" are done here.
11. **Conclusions**