

Introduction

The lab notebook is a record of everything you do in the lab. To be successful in the chemistry lab - and in many fields outside of chemistry - you must be able to keep accurate records of the things you do and observe. Even if this is the last chemistry course you'll ever take, chances are that you will be required to keep a record (a log book, a notebook, etc.) of the work you will do after you graduate and get a job - or move on to that higher-paying job you've been chasing.

Your lab notebook will help you remember what you did in the lab, and it will give you practice keeping a log. By the time you get through freshman chemistry, writing down what you're doing and seeing should be second-nature to you.

What kind of notebook to buy

The proper notebook for the chemistry laboratory is a bound notebook. These are commonly called "composition books" (see Illustration 1). The notebook must be bound in such a way that it is not possible to tear out pages from or add pages to the notebook without it being immediately obvious that the notebook has been altered.

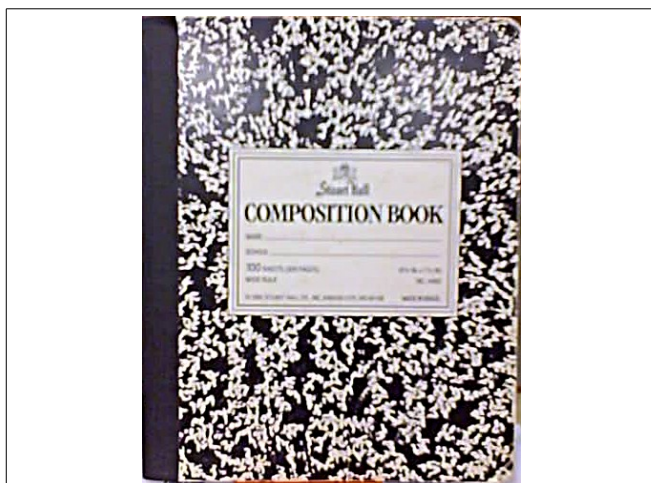


Illustration 1: A bound composition book

Ring binders and spiral notebooks are **not** acceptable lab notebooks. If you're unsure of whether your notebook is okay, please bring it to me before the first experiment.

Bring your notebook to every lab period, and record information in it as you are doing each experiment. Don't write down things on loose sheets of paper or in the lab manual and then copy them to the notebook. Instead, write down everything in your notebook first, then transfer it to other papers/books if needed.

How the notebook is graded.

Your lab notebook will be graded on organization and content. You must follow the guidelines given in this handout for the organization of your notebook. You must also record enough detail in your notebook so that another lab scientist could reproduce your work and compare data recorded with yours.

Your notebook will be turned in for evaluation twice during the semester – once at mid-semester and again near the end of the term. Late notebooks will be assessed a penalty of ten points per late day, so make sure you turn in your notebook on time. The two evaluations will be counted the same as experiment grades for the lab.

How to format your lab notebook.

You will choose how to write up the majority of the information yourself. However, you must organize your notebook so that other people can read it. Here is the way you will organize your notebook for CHM 110 and CHM 111.

Table of contents:

Reserve the first two pages of your lab notebook for a *numbered* table of contents. *All pages in the notebook must be numbered at the upper right-hand corner of the page*, and your table of contents will refer to these numbers. You may choose to write on the front of pages only or on the front and back. If you write on the front only, number only the fronts of the pages. If you write on the front and back, number both fronts and backs of the pages. *Be consistent in writing either on both sides of the page or on one side! Don't switch back and forth!*

Experiments:

Except for the title/date, make sure each section is labeled with the labels given below.

1) **Title and date:** Start off your entry on each experiment with the experiment's title. You should also record the date you started the experiment. Your notebook tells not only **what** you did, but **when** you did it.

Example:

Experiment 4C: Titration of acetic acid
Performed: October 4, 2013

2) **Objective:** You must write - immediately after the experiment title - a short sentence or two describing what the experiment is supposed to prove or determine. It's best to go ahead and write this before you come in to the lab for your experiment. Label this section "Objective".

Example:

Objective

The concentration of acetic acid in vinegar samples will be determined by titration with sodium hydroxide. These concentrations will be compared with manufacturer's stated claims.

Optional: You may include a short section after your objective called "Theoretical". In this section, you may put general notes related to the experiment. If you would like to copy the notes given on the screen at the beginning of the experiment into your notebook, copy the notes into this section.

3) **Data and procedure:** This is the longest section of your experimental writeup. Write what you did and what you observed. As you perform each step, record the step and any important observations. Record **all** measurements **with units!** Pay attention to significant figures as well.

You are free to organize this section any way you wish, but here are a few suggested styles you can try.

Example:

[Paragraph format]

Data and procedure

Using analytical balance, weighed 1.5752g NaOH into 400 mL beaker. Added 150.mL water from graduated cylinder with stirring. Observed NaOH dissolves completely with evolution of heat when stirred. Added 4 drops phenolphthalein indicator solution to beaker. Observed color change from clear to pink.

You don't have to write this section like you were writing a paper for English composition class. Just make sure people can follow what was done.

Example:

[Column format]

Data and procedure

Procedure

1. Weighed NaOH on analytical balance.
2. Measured 150. mL water with graduated cylinder and mixed with 1.5752g NaOH in 400 mL beaker with stirring.
3. Added 4 drops phenolphthalein indicator solution to beaker.

Observations / Measurements

1. 1.5752g NaOH.
2. NaOH dissolves. Heat evolved.
3. Color change: clear to pink.

To use column format, just draw a line down the middle of the page in your data and procedure section and record procedure on the left side and observations on the right. Column format makes it very easy to follow the flow of the experiment.

Make tables in your lab notebook for data if you feel that this would be easier to follow. You'll want to use tables for any repeated measurements.

If you need to make a correction in this section or any other part of the lab notebook, cross out the error with one line (so that the original mistake can still be read), make the correction, and then initial and date the correction. *Don't white-out or erase mistakes in your lab notebook. You will not lose any points for having to make a correction in your lab notebook, but you may lose points if you don't make the correction as described above!*

Write down any calculations you performed during the lab after your procedure and observations. For repetitive calculations, like calculating the concentrations of several different solutions using the same method, you only need to write down one example.

4) **Results:** This must answer any question asked in the objectives and describe your important findings. For example, if you were investigating the color of the indicator phenolphthalein in acid and base solutions, you would make sure to write that phenolphthalein was colorless in acid and pink in base. The results section should be short, and it may contain information you have already described in the data/procedure section. Think of the results section as an executive summary of your findings.

Example:

Results

Tested phenolphthalein solutions were colorless in acidic solutions and pink in basic solutions. Litmus indicator was red in acidic solutions and blue in basic solutions. The green dye sample did not change color significantly in either acidic or basic solutions; it did not appear to function as an acid/base indicator.

After each experiment:

Initial and date each page: At the end of the experiment, go back and initial and date each page in the same corner you put the page number. This certifies that you did the work on that page on a certain date.

Tips

- Do the table of contents entry *right after you finish the lab* so you don't forget it.
- Write down the data in your lab notebook first, *before* you fill out the report forms you turn in. This will make your report forms neater and save you from turning in a bunch of scribble and erasing at the end of the day's work. You're expected to have some corrections in your lab notebook. The reports your team turns in should be neat.
- If you're doing multiple trials using the same procedure, don't write the procedure over and over. Write something like "Sample 2 was analyzed in the same manner as sample 1." This will save wear and tear on your writing hand. **Do** record any **measurements** you make on sample 2, though. They won't be the same as the measurements for sample 1.

If you want to know whether your notebook looks good, just show it to me in lab!