

## Laboratory Notebook

Of all the costly items, which constitute a research lab, it is perhaps surprising that the most valuable is your research notebook. If properly kept, it is a complete record of scientific activities in which you, no doubt, have invested thousands (yes, thousands) of hours. The sound of a fire alarm has caused more than a few graduate students to grab their research notebooks before fleeing a burning building. When it is time to carefully describe your scientific activities in a report, you will rapidly discover that these notebooks are indispensable. The human mind simply cannot remember every minute detail of so many experiments. Additionally, it is not uncommon to attempt to reinterpret experimental results years after the original observations were made. Without careful records, we are all doomed to be constantly repeating our own work. This handout is designed to aid you in establishing an efficient method of recording your experiments and their results.

### Notebook logistics

1. You should use a notebook with **bound** pages. Suitable types of notebooks are: composition books, or carbon copy and carbonless copy lab books. You will probably have to make copies of your lab notebook at some point, so make sure that if you use a carbonless copy lab book that you use the backing board. All of these notebooks can be purchased in the bookstore on campus. You cannot use spiral bound notebooks because the pages tend to rip loose.
2. Use non-water soluble ink **ONLY**. NO PENCIL!
3. Handwriting must be legible! If you make a mistake, cross it out **ONCE**. Do not use white out, or cover it with black ink.
4. Use your notebook during lab. Do not write things elsewhere and then copy them into your notebook later. This is very bad lab practice, and you tend to forget things. It's OK if your lab notebook is sort of messy...That means that you have been using it correctly. All experiments, regardless of whether they "worked" or not must be recorded. Often the details of failures are most informative.
5. Each bound notebook must have a Table of Contents at the beginning of the book, which should be kept up to date throughout the quarter.
6. Page numbers. If you have a composition book you will need to write in the page numbers manually.
7. Date. Each new lab day should have a date at the top of the page.

### For each lab your notebook should contain:

1. Title of the experiment (not "lab 1").

2. Date. I find the upper right corner convenient, the format 4/2/07 is fine. Notebooks are legal documents, used in part to establish priority of discovery, so this is important.
3. Your name should be on the notebook cover or inside the cover. You don't have to write your name in the notebook for every lab, but you will need to write it on the copy you turn as your lab report, so leave space for it. You need to record your partner's first and last name, to give him or her credit for participating in the work. From a legal point of view, failing to cite your partner is plagiarism, so this is very important too. When class data is shared, you will need to cite the sources of the data. Usually this is done by referencing the data by last name, first initial of the providers, making it clear which data is from whom.

Each page must be numbered and the experiment (and page number) needs to be listed in the Table of Contents

4. Purpose/Objective. This should be a sentence or two explaining what you are trying to find and the technique that you are using. This is the scientific purpose, not my instructional purpose in assigning it, so nothing along the lines of "to learn ...". Mostly it will be "to determine ...".
5. Materials and methods. You should sketch all new glassware and equipment into your notebook. List the chemicals that will be used in the lab including any hazard warnings.
6. Brief procedure (in your own words) of the lab. DO NOT copy directly word for word from the handout. Some statements from the handout are directions such as "draw a table" and it is silly to write that. The idea is that another person with comparable lab experience could carry out the experiment from your procedure. As you proceed during lab, include the exact amounts of chemicals used and any changes to the procedure. So leave a little extra space.
7. Data/Observations
  - a. Prepare your notebook data tables in advance. That way all you have to do is fill them in during lab.
  - b. Write down all qualitative observations as well as data.
8. Calculations. Show a sample calculation for each different type of calculation in the lab.
9. Computer generated data tables, graphs, charts, etc.. should be carefully and neatly taped into your notebook

Overall, stuff should be in chronological order, data before graphs, calculations following the data or graphical information used in the calculations, analyses after calculations, conclusions after analyses.