

## A. The Laboratory Notebook (first written by Jane Knox and then edited by Jim Stuart)

The purpose of the laboratory notebook is for you to keep a permanent record of your laboratory work which can be read and understood at a future time by both you and other scientists. Experimental work should be able to be reproduced by someone else directly from the description that you provide in your laboratory notebook.

1. There are three major concerns about the notebook: (a) the safekeeping of the lab notebook, (b) the organization and readability of the lab notebook, and (c) the quality of the record keeping.

### a. Safekeeping

In laboratory jobs, the laboratory notebook belongs to the organization for whom the work is being done. There will be very specific guidelines about exactly how and where the notebook must be kept, (in any case it stays at the work site!) Generally if you are doing research all day, you will not have time or the inclination to work on your lab notebook outside of the lab to make it look nice. You need to get the important observations into the lab notebook as you are doing the work. To help you get into this habit, **we require you to leave your lab notebook in the laboratory**. You will be making a carbon copy of everything that goes into the book, and that copy may be taken with you as you leave the lab.

### b. Organization and Readability of the Lab Notebook

The main concern is the permanent nature of the record of your laboratory activity. A bound notebook (as opposed to spiral) minimizes the chance of losing pages. Good quality, black ink minimizes the chance for erasures, obscuring of written material and provides for a clearer photocopy in the event that it is necessary.

### c. Quality of the Record Keeping

The importance of being able to find, in one place, your past experimental work cannot be overemphasized. No one likes to redo, or rethink past work that had been successfully completed! Without complete information, work cannot be reproduced and verified. Without well organized information, the significance of experimental results might not be realized.

## 2. Guidelines for Keeping the Notebook

With the above points in mind, the following guidelines for keeping laboratory notebook have been developed.

a. The notebook must contain bound, numbered pages. A carbon copy of the primary page should be made onto the dually-numbered page.

b. Entries must be made in the notebook with good quality ball point pen, preferably black. Avoid writing over data. If an entry is made in error, cross out that error with a single line and add a simple legible explanation (for example, scale misread, etc.)

c. All entries must be made in duplicate using the carbon paper.

d. 1. The Lab Notebook must be kept in the lab at all times. **All data taken in the laboratory must be directly written into the laboratory notebook.** No scraps of paper will be tolerated!

2. At the end of each lab period or any time thereafter, the carbon-copy pages of material may be taken home.

e. At the time that the lab reports or papers are due, the carbon copy pages are to be stapled together and handed as **Appendix 1** of the laboratory report or paper.

f. The Lab Notebooks should be left on the central cabinet as you leave the Laboratory. Their presence will be checked each laboratory period and evaluated at least twice a semester (see the part on grading of the laboratory notebook at the end of this section).

### 3. Contents of the Notebook

a. The items which follow should be entered before beginning the experimental work:

#### 1. Table of Contents

This is the only part of the notebook which does not have to be duplicated. Leave two or more pages at the beginning of the book and be sure to keep this table up to date.

#### 2. Title of Experiment

The title identifies the experiment in a few words. It should precede anything related to that experiment that goes into the book. One should never open the book and find a bunch of data or experimental description without a title.

#### 3. Summary

This should be a synopsis of no more than a paragraph summarizing the results and findings of this experiment.

#### 4. Introduction

This section should provide a brief, no more than a half page introduction as to the principles behind this experimental experiment be no longer than about a half page.

5. Procedure

This should not be a rewriting of the experimental handout but rather an outline of the procedure showing that you have read the experiment and are familiar with the basic steps that will be taken to carry out the experiment. It should also serve to help you to carry out the experimental steps. Thus, if the procedure is adequately and completely presented in the Instructor's Laboratory Handout it need not be rewritten but it may be cited, outlined or summarized.

6. Data Tables

Tables should be constructed with a straight edge, should have a title, and should have clearly labeled columns and rows. Since you know ahead of time what data you need to collect, you could come into the lab with these tables already constructed for any particular lab. Note that data is read directly from the measuring device. Numbers calculated from a measurement is a result, but as noted below may be subsequently added to a table.

Referring to the following table as an example, a table may contain both raw data (weights obtained from a balance) as well as calculated results (calculated weights of sample obtained by differences and by % sulfate calculated using an equation).

**Example of a Table**

**TABLE 3:** Gravimetric Determination of  $\text{SO}_4^{2-}$  in an Unknown Sample

	Sample 1	Sample 2	Sample 3
<u>gm. vial + sample</u>			
<u>gm. vial - sample</u>			
<u>gm. sample</u>			
<u>av. gm. crucible + ppt,</u>			
<u>av. gm. empty crucible</u>			
<u>gm. precipitate</u>			

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% sulfate in sample

b. To be entered as you work in the lab:

1. Dates. Always date the work in a prominent position where it can easily be seen so it is clear where a new day's work begins.
2. Data. The data should be entered into the previously constructed table directly as it is taken! Nothing should go onto scraps of paper!
3. Notes. Any notes necessary to clarify, emphasize or interpret the data should be entered in the Laboratory Notebook as the experiment progresses. Be especially careful to document any change from the described procedure.
4. Calculations. If you do calculations during the lab, do them in the Lab Notebook.
5. Results. If you have the calculations in your Lab Notebook, the results should follow the calculations. If you have done the calculations outside the lab, put the final result(s) in the Results and Discussion Section in the Lab Report or Lab Paper and do not have to be entered in the Laboratory Notebook.

## 1. **Grading of the Laboratory Notebook**

The Lab Notebook grade is separate from the lab report and lab project grades and is an evaluation of your record keeping. Each time a lab report is graded, an evaluation will also be made of the material on the carbon copies of the lab book. In addition, the lab notebooks themselves will be collected and evaluated as a whole at least twice a semester; this collection will not necessarily be announced! This grade is based on the following criteria:

1. Physical Aspects. Is the notebook bound with numbered duplicate pages? Is the writing recorded in permanent ink? Are there unexplained crossing out of data?
2. Format. Are all the required sections included such as table of contents, dates, title, introduction, experimental procedure, etc.)?
3. Neatness. Does the book have a neat appearance? Is there a lot of writing or crossing out of data, scribbling, etc.? This is a working notebook so you are writing as you are doing; therefore, we do not expect it to be flawless, but neither should it be a total mess!
4. Organization. Is the material well organized? Can we find what we are looking for easily?
5. Completeness. Is all the information there which is necessary for one to evaluate the quality of your work.
6. Appropriate Record of Data. Are the tables clear and well designed? Do the numbers include units?

## 2. **How the Lab Notebook will be Graded.**

The grade should signify the quality shown here:

- 10 - just about perfect; hard to find much wrong
- 9 - very good book with a few minor problems
- 8 - good book but has definite areas that need improvement
- 7 - OK but many things need to be straightened out
- 6 - mediocre; can find most information but with a lot of work
- 5 - poor; just about acceptable
- 4 or lower- unacceptable

**Lab Notebook:** By the second laboratory period, be ready to leave in the laboratory, a lab notebook in which to record all of the data and observations that you take in the laboratory. You must have a bound book with numbered pages that allows making a carbon copy, -e.g. National **43-644** or **43-645**, are both available in the UCONN COOP.