

## *Guidelines for Keeping a Laboratory Notebook AP Chemistry/AP Biology*

Specific requirements for different teaching, research, or industrial labs vary; however, a well-kept, comprehensive lab notebook is organized, thorough, and complete, including procedures as well as raw and processed data. You will be required to maintain a comprehensive and organized lab notebook for this course. Some colleges require proof that a hands-on, rigorous laboratory experience was completed before awarding AP credit; this document will be your primary evidence. In industrial or academic research, a thorough lab notebook protects your intellectual property rights, including patent claims.

### **Choosing a notebook**

For this class, select a bound notebook, quadrille ruled. (These may be purchased at any office supply store and are usually quite inexpensive.) It must be impossible to tear out a page without leaving evidence.

### **Preparing the notebook**

Use a ballpoint pen for all entries, so that the marks will not smear and cannot be erased.

Put your name, a telephone number or address, and course name and section on the outside front cover of the notebook. Put that same information on the first page inside or on the inside front cover.

Reserve the first 4 pages for a table of contents by labeling the top of each page as *Table of Contents* and numbering each page using lower case Roman numerals. Next, number the next several pages with Arabic numerals in sequence. Now you are ready to begin doing experiments!

As part of your summer assignment, you are expected to prepare your notebook and bring it for the first day of school.

### **What to enter**

Above all, it is critical that you enter all procedures and data directly into your notebook in a timely manner—that is, while you are doing the actual work. Your entries must be sufficiently detailed so that you or someone else could conduct the procedure with only the notebook as a guide. Few students record sufficiently detailed and organized information.

Write a title for each new experiment. For each new experiment, write down the title of the experiment and list the objectives. If you have a specific hypothesis, write it down. The object is to make it completely clear what you intend to do. It is necessary to read through the procedure carefully before coming to lab. Use this information to plan and create the appropriate data tables in advance, leaving space to record any necessary measurements and observations as you work. *In Bromfield AP lab courses, this will be checked, along with any required pre-lab assignments, before beginning the experiment as part of the grade for the lab.*

Note: Students who are very familiar with the lab procedure and have a well-organized data table will be less likely to need to come after school to finish labs!

### **Making entries**

Someone else may need to consult your lab notebook sometime, so make your entries clear and legible. Each page should be numbered and dated. If a page is deliberately left blank, put a corner to corner line to void the space.

Record everything you do in the lab, even if you are following a published procedure (in AP, this is typical). For example, if you started by obtaining a sample of tissue from your instructor, then write down that you obtained a quantity of tissue, its condition etc. How much you write down is up to you, but any relevant information should be included. For example, it doesn't much matter if you received a sample of an unknown chemical in a test tube or a vial; however, it does matter that the sample was a green solid.

*If you change a protocol or decide between alternative methods, then the correct information must be recorded in the notebook.* For example, a protocol for tissue fractionation may recommend centrifugation at 9400 x g, but we may decide to use 12,000 x g in the lab. The correct g force must be noted.

If you make a mistake, put a line through the mistake and write the new information next to it. NEVER erase or obliterate an entry. When you finish a page, put a corner-to-corner line through any blank parts that could still be used for data entry. Every bit of every page must be legible and filled, either with information or with a mark that voids the section.

Sometimes calculations involving raw data are required during an experiment. For example, you may need to calculate the mass substance after adding it to a crucible. Your data table would have an entry for the mass of the empty crucible and for the mass of the crucible with the substance. You would then show the calculation of the mass of the substance by difference. Other calculations would be more involved, but all formulas and setups should be shown completely.

### **Loose materials**

Suppose you enter raw data into a program and have a printout with 40 pieces of data. Or, suppose you generate a graph using a software program. You might even have a protein electrophoresis gel that you wish to refer to frequently, or a paper chromatograph that sums up your results nicely. In this course, we will tape or glue such materials directly and neatly into the lab notebook.

### **Table of Contents**

Record all entries in the table of contents as you go along. While there are many ways in which the table of contents can be organized, for this course it is advisable to list each experiment separately by title. You may wish to include sub-headings for specific parts, especially for multi-day experiments.

### **Notebook Checklist**

As you record your activities in the laboratory, ask yourself, "Did I..."

- Keep up with the table of contents?
- Date each page?
- Number each page consecutively?
- Properly void all blank pages or portions of pages?
- Enter all information (data and observations) directly into the notebook?
- Properly introduce each experiment?
- Include calculations where necessary?