**Lab Notebook and Lab Report Format**

**LAB NOTEBOOK:**

In this course, all of your labs and simulations will be kept in either a thin (1/2 inch) binder or a pocket folder with brads. I would also keep a spiral notebook to record observations. If you earn the required score on the AP Chemistry exam, the university you attend may want to see your lab notebook to decide if you must take the laboratory component of the class. Most colleges will not ask for this notebook. However, t his is a great resource to help refine your knowledge and prepare for in class tests and the AP exam. Questions about how to perform labs will be both on the multiple choice and free response section of the AP exam.

* Set up of a binder:
  + Two dividers, one labeled labs, one labeled simulations
  + FIRST DIVIDER: LABS
    - The first page should be a table of contents (I will give you a handout for this)
    - Keep all laboratory directions in your lab book
    - Insert completed and graded lab report behind directions.
    - Labs should be placed in order of which they were completed (labs in August come before labs in March)
  + SECOND DIVIDER: SIMULATIONS
    - The first page should be a table of contents (I will give you a handout for this)
    - Place all graded simulations behind this tab
    - Labs should be placed in order of which they were completed (labs in August come before labs in March)
* Set up of a folder with brads
  + ONLY the labs should be kept in the brads
  + Follow the same directions as Set up of a binder, First divider: Labs
  + The pocket on the left will include simulations from Semester 1
  + The pocket on the right will include simulations from Semester 2
  + Follow the same directions for these simulations as set of a binder, Second divider, simulations

I will likely not do notebook checks, since that is very elementary. It is your responsibility to keep this notebook up to date. I suggest bringing it to class each day.

**LAB POLICIES:**

* Follow all safety rules as provided to you!
* You MUST have closed toe shoes for every lab!
* **IF YOU ARE LATE TO CLASS ON LAB DAYS, YOU WILL NOT BE ABLE TO PARTICIPATE IN THE LAB AND WILL RECEIVE A ZERO!**
* There will be no more than 3 times that you will be required to be in class at 8AM on Tuesdays for lab if it will require more than 80 minutes and cannot be stretched across 2 class periods.
* WHEN YOU WALK INTO LAB YOU SHOULD HAVE: pre-lab questions answered, data tables prepared to enter data or observations, read through the procedure.

**LAB REPORT FORMAT:**

Unless otherwise indicated, you will be required to type a report for each lab completed in class (NOT SIMULATIONS). You will have 1 week after the lab is completed to turn in your lab. I would suggest you start the night after the lab, and stray away from procrastinating until the night before when I cannot help you answer questions. Labs should be typed using a word processing program (Microsoft Word) and graphs should be made using a spreadsheet program (Microsoft Excel)

Lab reports must be written by YOU and YOU ALONE. You and your lab partner should not have the same report. If it is found that students have copied, cut/paste, or otherwise plagiarized from one another, all work will receive a zero.

*Basic Formatting:*

* 1 in margins, double spaced, 12 pt basic font (Arial, Tahoma, Times New Roman)
* Title Page with Title, Name, Lab Partners Name, Class Name, Date
* Page numbers on each page except title page
* Written in past tense, 3rd person (no I, you, we)

*Objective:* A brief 1-2 sentence statement of the scientific principles that will be investigated through the experiment. What are you trying to accomplish or prove in this lab? Do not discuss how you will accomplish this in this section.

*Background information:* Define important concepts, theories, or laws being examined. This should be no longer than 1 paragraph (10 sentences MAX). Begin by approaching the topic in general terms and then break it down into specifics. Also include any necessary *mathematical equations* and *balanced chemical reactions*. This is an important part of your lab report.

For example, the Theoretical Background for an experiment (Physical and Chemical Changes) should answer the following questions: What is a physical property? What is a chemical property? How are physical and chemical changes different? What are some examples of physical and chemical properties/changes that illustrate these differences?

You will probably need to look up some information in order to complete your Theoretical Background. You MUST reference ALL of your sources at the end of this section! ***Failure to cite your sources will result in a grade of ZERO on your Theoretical Background section.*** These citations should be included in your references section at the end of your lab report.

*Procedure:* DO NOT JUST COPY THE STEPS! Summarize the procedure in your own words of what you did in the lab.

Example:

|  |  |
| --- | --- |
| **Step from Lab** | **Summarizing in your procedure** |
| Measure out 10.0 mL of the 5% NaCl solution using a pipet and a graduated cylinder, being careful not to lose any solution. Place the graduated cylinder on an analytical balance and determine its mass to 3 decimal places. Record the mass. | Using an analytical balance, determine the masses of 10.0 mL samples of each of the solutions of known concentration. |

*Data and Calculations:* This section will contain any and all measured data from the experiment, usually in tabular (make a table) form of your own design. It will also include calculations for the lab. You will only need to show one example of each type of calculation that was done as part of the write-up. You may also handwrite these calculations in your lab report. This will include a complete set up with units and correct sig figs. If you need to do the same calculation to more than one number, show only one calculation as an example, and show the results from the others. Graphs should also be included in this section. All graphs must have labeled axes with the dimensions being represented, and an appropriate scale chosen for both axes. You should make your graphs in Microsoft Excel or a similar program.

Examples:

Table

|  |  |
| --- | --- |
| **Unacceptable** | **Acceptable** |
| 5% solution=10.012 g  10% solution=10.180 g  15% solution= 10.230 g | |  |  | | --- | --- | | Concentration | Mass (g) | | 5% | 10.012 | | 10% | 10.180 | | 15% | 10.230 | |

Calculations

|  |  |
| --- | --- |
| **Unacceptable** | **Acceptable** |
| #1 Density=10.012g/10.0 mL=1.0012 g/mL  #2 Density=10.012/10.0=1.001 g/mL | Density=m/V  Density=10.012 g/10.0 mL=1.001 g/mL  (fundamental eqn shown, labels present throughout calculation, sig fig rules) |

*Discussion & Conclusions:* In this section, you will summarize your results and address how well your lab work satisfied the objective of the experiment. You should also include any errors that could have affected the results of your experiment. Every experiment has room for errors. Discuss possible sources of experimental error. You error analysis must be specific. If you exceeded the expected value, you must point to specific errors that might have causes that particular error. Do not discuss crazy errors that you know you did not make (ex-the proper chemicals were not used) and do not mention mistakes that you corrected during the lab (a test tube was broken and trial 2 had to be repeated). “Data may have been calculated incorrectly” is also in appropriate. Think Hard. What could you have done (or not done) to improve the outcome of the lab.

*Questions:* Any questions assigned in the lab handout sheet should be answered here

*References:* Any citations for information that you looked up should be placed here. You will not be penalized for having many sources. If you used anything to help write your lab, it must be cited here. Failure to do so is plagiarism and will result in NO CREDIT for the lab.