CH30S/40S/42A

Guidelines for Writing a Lab Report

WHAT IS EXPECTED OF YOU!

The study of science is an attempt to make sense and explain our natural world. This is carried out through the process of scientific enquiry via the scientific method. The most effective vehicle for the scientific method is field and/or laboratory work. All major scientific discoveries throughout history have been as a result of this method, thus study in the lab setting is an essential and integral part of your science education!

In addition to the experiments that you will carry out in the lab setting, it is also important that you learn how to communicate your results in the form of a proper scientific lab summary. Sharing of results furthers the scientific process, as Isaac Newton knew all too well; "If I have seen farther than other men, it is because I have stood upon the shoulders of giants." Writing a lab report is NOT like writing an essay! You must follow certain conventions, as outlined below.

1. Title Page
    a. Be descriptive in you title and don't worry if the title seems too wordy! Place the title in the top middle of the first page, centred, and followed by your name and the names of your partners and the date.

2. Abstract
    a. The abstract is similar to the blurb on the back of a novel, in that it gives you a brief overview of the report. It allows other researchers who may want to use your report as reference material the chance to decide if it is applicable to their needs or not.
    b. There are 5 essential components to an abstract, each of which should be no longer than 3 sentences:
        i. Background statement: What important concepts are being examined?
        ii. Purpose Statement: What question were you attempting to answer?
        iii. Procedure Statement: What method did you use to complete your investigation?
        iv. Results Statement: State the concluding results of your efforts.
        v. Concluding Statement: Was the concept in your Background Statement reinforced? What experimental errors influenced your results?
    c. The abstract is written as a paragraph in narrative form and goes on the title page. It is NOT a list!

3. Procedure
    a. Written in past tense. A summary of what you did, not a recipe for what to do!
    b. A short paragraph, not point form.
    c. Must include all important steps necessary for a successful experiment, but not minute detail!
    d. Begins on the second page of the report.

4. Results
    a. This is a big part of the lab! Generally speaking, it consists of quantitative observations (measurements you made), qualitative observations (things you witnessed during the experiment), and calculations you did to your measurements in an attempt to answer the question.
    b. All measurements must go in a labeled and titled chart.
    c. All qualitative observations should be written in paragraph form under your chart.

Results (cont'd)

d. Diagrams of apparatus used in the experiment may be required.
e. If a graph is required, it would be noted in this section and then attached to the back of the report.
f. Your report is meant to show that you know how to properly analyze the data you collected and explain your results. To demonstrate this, you must provide fully worked out calculations. Each calculation must be labeled. No naked numbers! All numbers to the correct sig digs. Use the sample lab report provided as a guide.

5. Discussion
    a. The *discussion* is the most important part of your lab report, because here you show that you have not merely completed the experiment, but that you also understand its wider implications.
    b. The discussion section is reserved for putting experimental results in the context of the larger theory. Ask yourself: "What is the significance or meaning of the results?"
    c. A good discussion has these two elements:
        i. Analysis: What do the results indicate clearly? Based on your results, explain what you know *with certainty* and draw conclusions.
        ii. Interpretation What is the significance of your results? What ambiguities exist? What are logical explanations for problems in the data? What questions might you raise about the methods used or the validity of the experiment? What can be logically deduced from your analysis?
    d. TIPS:
        i. Explain your results in terms of concept you were investigating. How well has the theory been illustrated? Describe any patterns, principles, and relationships that your results show. Explain how your results relate to what you expected to see. Explain any agreements, contradictions, or exceptions. Describe what additional research might resolve contradictions or explain exceptions.
        ii. Stay on topic! Only discuss your results in terms of your purpose you identified in the abstract.
        iii. Compare expected results with those obtained. If there were differences, how can you account for them?
        iv. Analyze experimental error along with the strengths and limitations of the experiment's design. Were any errors avoidable? Were they the result of equipment? If the flaws resulted from the experiment design, explain how the design might be improved. Human Error is not an acceptable excuse!

General Stuff to Consider…

- The language you use should be formal and clear. This is not a blog or an entry into your personal diary!
- Avoid using contractions such as "should've" and "could've".
- Be careful when using pronouns! Don't use "it" if the reader doesn't know what "it" is!
- Don't fall into the trap that "fancy sciency talk" is better than simple, concise English…it's not!
- Use the rubric, the sample report, and this handout to guide your writing for the first couple of reports.

Science courses in university all have weekly 3-hour labs that make up a large part of your mark. If you don't pass your labs, you don't pass the course, no matter how well you do on tests and quizzes! Take the next 2 years in high school to hone your skills so that you won't get burned later!