

Honors Biology
2007-2008
Mrs. Csolak

Lab Reports

During this year, you will encounter 3 kinds of labs. The first type of lab is what I would call a lab exercise or activity. In a lab activity, you will be observing something (for example, learning how to use a microscope), but not conducting an actual experiment. For this type of lab, you will be completing a handout. In the second type of lab, you will be conducting an actual experiment, incorporating the steps of the scientific method. These labs will require a report reflecting the steps of the scientific method, but not requiring outside research. The third type of lab is like the second, conducting an actual experiment, however, in this type you will be conducting a long term experiment or collecting lots of data. These labs will again require a report, but here you will need to do research on background information and the analysis will be more extensive. In other words, you will really be writing a scientific paper. You will complete two of these reports this year, one being the planaria experiment and the second, the science fair project.

Lab reports reflect the steps of the scientific method. Those steps are:

Define a **problem**.

Educate yourself about the problem by **researching background information**.

Make a **hypothesis**.

Design and conduct an experiment to test the hypothesis.

Obtain **results**.

Analyze results.

Draw a **conclusion**.

Lab reports are broken up into sections with the following headings:

Title: You should always have a title for the lab report.

Introduction: This section of the lab report includes the **purpose of the lab** (or the question you are asking), **background information**, and your **hypothesis**. For most of your labs, you will not need to do research on the problem. Most labs give you some background and your text or class discussions fill in the rest, and this should be one or two paragraphs long. You do need to identify your hypothesis, and the standard format is if/then form (My hypothesis for this experiment is: if I place leaf cells in a concentrated salt solution, then the cells will shrink.)

Procedure: This section tells how you did the **experiment**. Most labs that you conduct in class give you the procedure in a recipe type format. However, when you write your report, you are telling someone else what you **did**, therefore the report should be written in **past tense**. This section should be detailed enough that someone could read your report and conduct the

experiment exactly as you did it. You also should include information on any problems you encountered while doing the lab. This can alert a future student to watch out for certain things or can give a key to redesigning the experiment.

The procedure should also reflect the design of your experiment by identifying the following things: **the independent variable, the dependent variable, the control group, the experimental group(s), and the standard conditions.** Along with standard conditions, you should list things that you could not keep standard. The Science Fair project will also require a materials segment.

Results: For high school labs, this section should tell where the **data** can be found (Table 1 shows the results of...Table 2 shows...Figure 1 shows...). You also might want to highlight some data for the reader, but do not discuss what it means yet. If statistics are required, those should be shown here also.

Most of your lab reports should have both data tables and graphs. Data tables can include both raw data and summarized data. All tables should be titled, all columns should be labeled, all numbers carried out to the same decimal place, numbers should have units. Titles should be descriptive of what the reader will find on the table. (Bad title: Table 1. Data from the experiment. Good title: Table 1. The effects of light intensity and temperature on photosynthesis.) The purpose of the graph is to show a visual representation of the data. Again, graphs are always labeled (Figure 1.), and titled. Graphs should be on graph paper (if done by hand), should take up a whole page, should be neatly drawn, with all axes labeled, and numbers with units. I personally prefer tables and graphs to be put into the body of the paper after the written results section rather than at the end of the paper.

Analysis: This is the most important section of the lab report. This is where you look at your data and try to figure out what the results say. Analysis means a breaking up of a whole into its parts to find out their nature; to examine in detail. Most of your labs will give you questions to answer in the analysis section. You can choose in this class to answer the questions by number, or to answer the questions in paragraph form. But remember, do not just answer the questions, **discuss** the answer. For the long term experiments, there will be no specific questions from me for you to answer. In these labs, you will pick apart the data and figure out and **discuss** what it means. Remember the control is the basis of comparison in any experiment, so you need to discuss and analyze the differences seen between the control and experimental groups. You also need to restate the hypothesis and **discuss** whether it was supported or refuted by the data. You should discuss problems encountered during the experiment and give suggestions if it could have been done better. Also, every good experiment should lead to more questions, so you should state what experiments could follow the current one.

Conclusion: In this section, you should restate the problem and tell whether it was answered in this experiment. You should restate your hypothesis and tell whether it was supported by the data or not. You should also give a summary statement as to what you learned in this experiment and how you can relate it to your life.

This is where most of your lab reports will end, and as I stated earlier, this is how most lab reports in this class should be written. However, the planaria report and the science fair project should also include a **references** section at the end of the report and an appendix.