Lab Reports

Your assignment is to write a formal laboratory report that clearly conveys all necessary background information and all the components of the laboratory exercise to a wider audience. Although I, your instructor, will grade your reports, your true “audience” is a person who understands science but is not necessarily knowledgeable about your particular subject. The following guide serves to explain the specific format of the laboratory report and what is expected of you as the writer.

Why am I making you write lab reports?
Lab reports are an important learning tool that will prepare you for writing scientific papers later in your careers. More importantly, they force students to critically analyze the exercises that are being performed in lab. Writing a formal report is one of the best ways for students to put the laboratory exercises in perspective, to truly gain an understanding of the biological principles that were being demonstrated in the exercise, and to improve their ability to think scientifically by presenting, analyzing and interpreting real data.

Report Format
Your report should be typed and double-spaced. Length will vary depending on the exercise and the amount of data that was collected. Quality not quantity is what is important. Your report should include the following sections and each section after the Title should be clearly defined by a section heading:

Title- should be informative and state the problem that you are investigating. Following the Title should be your name, the name of the course, the names of your lab partners and the date.

Introduction
Introduce as much background information as is relevant on your topic. In other words, what is the main principle being investigated, explained as though you are informing someone that knows nothing about the subject matter. Why it is worth researching? What is the significance to the scientific community and what is some of the current research that is being done on this topic. You should provide all necessary background information that is important for the understanding of your investigation, including explanation of biological principles and definition of terms. Since you are not an expert in this field (not yet anyway), you must use references to provide the necessary background information. References may include your lab manual, your textbook or other books, scientific journals, and even your Instructor. These references must be cited within the body of the report by giving the authors’ last names and the date of publication. A list at the end of your lab report, called the “Bibliography” or “Literature Cited” section, provides the other details (title, journal name, volume and page numbers, etc.) so this reference can be found by the reader.

In the final paragraph or your introduction, you should introduce your research experiment and what you will be investigating and you should state why this research question is an important or worthy question. Your hypothesis should be clearly stated in the introduction. You should also briefly state how you will go about testing your hypothesis and what your expectations are.

Materials and Methods
In this section, you must give a detailed description of the procedure so that other scientists could replicate your experiments if they wished to. Write this section as if you are explaining to someone what was done in your investigation. You must write in the past tense and in paragraph form. DO NOT write as if you are giving instructions and DO NOT write in list form. Be specific. State specifically the number of replicates, specific measurements, what equipment was used, etc. Explain how the experimental design can distinguish between rejection and acceptance of the hypotheses.

Results
In this section you must present your results in an organized, readable format. In addition to figures and tables, your result section should include a paragraph that draws the reader’s attention to the important points or
trends in your data. Do not, however, explain why the results are significant, that is saved for the discussion section.

Data should be organized into tables and relationships or trends should be demonstrated in graphs. Graphs should be computer generated. Please see me if you are not familiar with graphing using a computer. I can quickly teach you how to make simple graphs using Microsoft Excel which is available on all campus computers. All tables and graphs should have a Figure number and a descriptive Title. For example:

Figure 1. The Effects of Temperature on Growth Rate.

Numbering each table and figure will allow you to refer to them in your written results paragraph and in the discussion section.

Discussion

This is the section where you interpret your results. Explain what your data means and point out any flaws or weaknesses in your investigation. This is the most important section of your lab report because it shows how well you understood your investigation.

You should analyze all of your results and explain their significance to your initial question and hypotheses. You should state whether you accepted or rejected your hypotheses. The rest of this section is your support of why it was supported or why not. This explanation should also include references to tables and figures whenever specific reference is made regarding the collected data from the experiment (ex. See figure 1 or see table 1 etc.). In addition, it may be necessary to discuss if other studies lend support or contradict the findings of your experiment (may not always be necessary or possible to include this, but it can be very helpful). You should come up with a conclusion for your lab report based on the analysis of your results and specifically state your conclusion in this section.

Final paragraph state possible errors or issues with the procedure or materials and methods that may have affected data outcome (this is where other researchers that read your study could benefit by your mistakes and avoid similar errors). In addition, the researcher could state additional studies that could be done to advance the preliminary findings (all good research projects lead to more questions).

You may also use this section to point out any sources of error, difficulties that arose or weaknesses in your experiments. You can also relate your investigation to a larger biological concept. You can make recommendations for future research that will help to more clearly answer your original research question.

Literature Cited

You must list all the references that were used to write this report. I am less concerned with the specific format used than I am that all of the necessary information is included. Please see me for some format examples. Sources should be listed alphabetically by author’s last name.