How to Write a Lab report
PCB 3063L Genetics Lab

What is the point of scientific writing?
A major part of your scientific career will involve, if it hasn't already, the ability to read and write in a scientific format. The dissemination of information from one party to another is critical to the process of science. Without clear and concise information, science would quickly find itself at a standstill. A person may have the solution to all of science's questions, but if they are unable to effectively communicate their ideas to other individuals, the ideas become essentially worthless. For example, a person may know how to cure cancer but is unable to clearly describe this important breakthrough to other scientists. Or perhaps they describe this breakthrough in a paper littered with misspellings and incorrect grammar. In the first case it is likely that the breakthrough will never be utilized, in the latter case it is likely that many people will become distracted by the errors and overlook vital information. Science (and medicine) is as much about communication as it is about good ideas. With this said, there are some conventions that have been tried, are widely accepted, and are known to work effectively to communicate scientific ideas.

The seven-part paper
As you know, scientific work is generally published in journals as articles (this includes medical too) and journals are where a new advancement or discovery in a field can be found. The formats utilized in most journals are usually very similar, although there are journals that use unique formats. Despite the differences, all scientific writing aims to be clear, concise, and informative. Generally speaking, a scientific paper consists of seven main portions that work together to express a scientific idea or discovery. These parts are: Title, Abstract, Introduction, Methods (sometimes called by other names), Results, Discussion and Work Cited (also sometimes called by other names). These names should be used as a header to denote each section in the order given (with the exception of "title"). The paper should be constructed as follows:

Title
This should be a very brief (one sentence) and concise description of what the paper is about. Notice that the title is included to instantly indicate how a paper is relevant to a scientist.

Abstract
This section is a brief (one paragraph or so) synopsis of the important points of the paper. It is included so that a scientist searching for information will be able to quickly discern whether a paper contains the information he/she is seeking without reading the entire paper. Notice that this section is included to decrease the amount of time a person needs to spend to understand the main point of the paper.

Introduction
This section is as long as necessary to set up the context within which an idea or discovery exists. For example, if a scientist discovers a treatment for malaria the introduction may include a very brief background on what malaria is, where it is found, how it is currently treated, how these treatments lack efficacy, how a new treatment may help the situation. The information provided may become more specific as the situation warrants. It is important to construct the introduction as a funnel i.e. the broadest
information comes first and the reader is "funneled" to the specific points the paper is addressing. It is also important to only introduce the broadest background facts in a very brief manner, as the reader is likely an interested scientist who only needs a "refresher" to understand the context. Since this section contains much of the background information it will also contain many of your cited sources. Background information comes from a source and that source must be acknowledged properly! The last sentence or two of this section should form the "end" of the funnel by clearly stating the objectives of the study. This is included to clearly focus the reader on what the paper is about.

**Methods**

This section describes how and what you did. When writing this section you should assume the reader has some scientific knowledge of laboratory procedures and techniques. You do not want to be overly specific. A recitation of the lab manual or task sheet is **not** the correct way to write this section. The aim here is for another scientist to be able to replicate your results from your methods section.

**Results**

This section should contain your results presented in as clear a method as possible. If a graph or table can portray the results more clearly be sure to use one. The aim here is for clarity and once again, brevity. This section should only be used to report your results. Take care not to wander into a discussion about your results just yet. It is vitally important that figures and tables are properly labeled with captions and adequate descriptions. It is also important that any keys or legends be included in as clear a way as possible. The idea here is that a reader should be able to understand your graphs or figures with as little work as possible. Captions for tables should go above the table. Captions for figures should go below the figure. Please see the example paper for more details.

**Discussion**

This section is vitally important to the success of the entire paper. It is in this section that you may want to explain, qualify, or disqualify your results. The discussion section will also contain your (scientifically supported) viewpoint. You should also include references to primary literature that will help illustrate and support your point of view. For example if your results are in agreement with previous work than this is the place to say so. If your experiment was a failure than this is the place where you should try and identify and explain the source of the failure. If your experiment is a success than this is the place to illustrate how and why your experiment was a success. Don't forget to reiterate what your final results actually mean in the context of your introduction. For example, if you discuss in an introduction relevant background material, don't forget to mention how your results connect to that background material.

**Work Cited**

This section should contain a properly formatted and alphabetized list of the sources you used in your paper to help support and explain your experiment. **Please see the example paper for the correct format.**

**Final Considerations**

Science writing is somewhat different from the writing you may have done in an English class. The basic rules of written English are the same but the final purpose is very different. It is important to remain in the 3rd person and to also remain in the passive voice (Words to avoid: avoid I, we, you, us, yours). Please refrain from using
words or phrases like "a lot", "24/7", "sort of", "really", and "used to". These words are "spoken" English and are generally considered improper in the written form. Furthermore, English is frequently used internationally to communicate science and slang may be confusing. Scientific writing usually aims to be as clear, understandable, and concise as possible. Because of these considerations, the content and sophistication of scientific writing is more important than the length. However, it is important to note that a fully developed idea and paper will always take more than a few pages.