Lab Reports: Guidelines that will Make You Wince

Even with the resources already available to writing fellows concerning writing in the sciences, a consultation involving a lab report can be daunting, because it’s not always clear which general writing rules should be broken, and which should be adhered to. The goal of this handout is to therefore summarize the awkward and wrong-sounding aspects that SHOULD appear in a lab report, so a writing fellow can know whether or not he should accept a wince-inducing format, phrase, structure, or word use. However, all guides to writing in the sciences should come with this disclaimer: how one should write his report depends heavily on the professor. No pamphlet on science writing should ever be relied upon for always being right. The best we can do is give general common guidelines.

The Use of “I” and “We:”

In general, “I” and “We” will often be used in lab reports. However, in sections that more closely resemble traditional writing (such as the beginning of the introduction), the 3rd person should be used. Basically, if the point being discussed is something the student actually did, the student should use the 1st person; however, any examples or general information should not. As usual, the 2nd person should never be used.

Tense Use:

Tense use within a section should be consistent; however, tense use can change between sections. Introduction is usually present-tense at the beginning, when the background information is being summarized, and past-tense when talking about the findings of a previous study, or when the hypothesis is being stated (A cockroach does x. In 2006, these people found y. We hypothesized z). The methods section is usually in the past tense, as is results and discussion. The conclusion or abstract, being a compilation of all the other sections, will have multiple tenses. The most awkward, but completely correct, aspect of tense use in lab reports is the abundance of the past perfect tense, which is rarely accepted in traditional writing. The methods section, especially, often includes both the simple past tense (“we did x”) and the past perfect (“Y was done”).

Redundancy:

Redundancy is abundant within lab reports. However, some basic rules exist concerning what should and should not be repeatedly included. In general, each individual section should follow common-sense rules of redundancy, but between sections, many points may be stated a ridiculous number of times. The desired result is for each section to orient the reader enough so that he does not have to flip back to a previous section to figure out what a current section is saying. Here are some examples of ideas that should appear in multiple sections:

Title:

The title is awkwardly detailed. It should be a spoiler for the most exciting result from the study. If the titles of novels followed the format of lab report titles, they would say something like “In the investigation concerning the murder of millionaire John Smith, the butler was found to be the killer.”

Abstract:

The abstract summarizes everything; everything in the abstract should appear somewhere in the report. Because of this, the abstract should be written last. Note: in Organic Chemistry lab reports, instead of having the abstract at the beginning of the report, they have a conclusion at the end. The two are analogous. They should both include the general idea and a tiny bit of general
background, the hypothesis, a sentence on methods, the most note-worthy results and discussion points, and a statement on why the results are significant or what should be studied next.

**Introduction:**

The first part of the introduction should be like a mini-essay, following most the general rules we know. It should start by presenting the general concepts behind the topic and procedure, and gradually narrow down to the specific ideas surrounding the tested hypothesis. The introduction section should end in the hypothesis. Often, a short statement on how the general methods used will prove the hypothesis is included.

**Methods:**

This section should only include the methods used—no information surrounding them (that should have been in the intro), or results obtained from them, should be included. Though it should be in paragraph form, someone with experience with the material—say, another student in the class—should be able to repeat the experiment by following the methods section. If a given procedure from a manual or another paper was used, citing that procedure, instead of typing it out, is generally accepted (i.e., saying “we dissected the cockroach in accordance with the lab manual (King et al., 2011),” instead of stating the actual dissection steps).

**Results:**

These will sometimes include a brief summary of the hypothesis and the methods used. The professor should have stated his preference; if not, advise the student to ask the professor about it. If statistics are involved, they belong in the results section, and a statement of what the statistic means (for example, a p value of 0.01 means the results are statistically significant) should be stated; the implications of the results and statistics, however, go in the discussion section only. The results should reference the figures and tables, and should include only the important information from the figures and tables—they should summarize, rather than verbalizing every part of, the data.

**Discussion:**

Once again, the discussion will state the hypothesis and methods, usually saying why the method was relevant to the hypothesis—saying something like “doing x, and observing y, would indicate z.” The section should then say what their results say in terms of the hypothesis. Data should be compared and contrasted within the discussion. Look at it like the discussion is the “essay” to the result section’s “book;” no “quote/evidence,” or in this case, piece of data or statistical analysis, should be presented without stating relevant discussion points about why anyone cares about that particular piece of evidence.

**Figures and Tables:**

The figures and tables should include detailed enough footnotes (for tables) or legends (for figures) so that the reader does not need to flip back through the methods section to figure out exactly what is being represented. For example, if the image is a graph of cell voltage versus time, the figure legend would not just say “Cell voltage over time;” it would say something like, “Cell voltage over time. The voltage was obtained by extracellular recordings taken while stimulating the cell with an electrical stimulus.”

**What Shouldn’t Be Awkward:**

As in typical essay writing, the ideas should be presented in a logical fashion, sentences should be clear and flow well, and transitions between sentences should be clear. Those issues should be regarded in a manner consistent with any other consultation. The only thing that needs to be kept in mind is that many sections contain word limits, so conciseness is emphasized more than in most other kinds of writing.