The Art of the Lab Report

STARTING OFF ON THE RIGHT FOOT

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After taking a year of freshman English classes, I asked myself, “What major will guarantee that I will never write about Shakespeare again?” Chemistry seemed like a great answer, and I figured that writing a few lab reports could never be more painful than analyzing gender roles in Othello.

Since then, however, I’ve found that while the subject matter may be different, I write just as often now as I did in EN101. In fact, my first major assignment in general chemistry was to write the abstract of a lab report. And (in the interest of full disclosure) that first assignment didn’t earn me many points.

I didn’t realize it at the time, but writing in chemistry and the “hard sciences” requires a discipline-specific approach, an approach which is very different from writing an English paper.

To help understand these differences, I’ve put together a few key points that will help you start off on the right foot.

The Big Takeaway:

A Lab Report Is Very Different from an English Paper.

The following key points, though certainly not an exhaustive list, will help you avoid some of the common writing pitfalls experienced by the novice scientist. Remember, in the end the whole point of putting words to paper in the context of science is to expand the breadth of human knowledge. Clearly and concisely articulate what happened, defend your interpretation of the results, and honestly lay out everything that might have gone wrong. One day, a fellow scientist may very well use your interpretations, and your mistakes, to make their own contribution to human progress.
Lab reports are thesis-driven until…

Every lab report is written to argue something. The first sentence of every lab report almost invariably begins the same way: “The purpose of this lab is to demonstrate…” A professional report might try to demonstrate that a new method is faster, cheaper, or somehow better than the old way of doing things. Your undergraduate chemistry or biology classes probably won’t be so groundbreaking, and oftentimes your goal in writing a report will be to provide evidence that you actually did the lab correctly. What this means for you, eager student, is that many of the “rules” of essay writing that you discussed in EN101 still apply. For instance, your reports need to contain evidence and analysis that supports your thesis. The important distinction between an English thesis and a chemistry thesis, however, is that in science it’s pretty hard to “prove” anything once and for all. An old English professor once told me that a great essay makes a reader feel like the thesis could not possibly be wrong. In chemistry, however… a Chemist never “proves” anything 100% correct, and your job is to present your evidence dispassionately and accurately. Which leads me to my next point...

Sometimes you’ll be wrong. And admitting that is actually a good thing.

**Precision reigns supreme.**

Addressing and supporting your thesis (affirmatively or otherwise) is the primary aim of a report, and providing enough detail so that any other scientist can pick up your report and duplicate your experiment helps ensures that you have successfully done so. Remember that phrases such as “a small amount,” “to a large extent,” or an unqualified “relatively” have no place in the language of chemistry. For example, in my first report I wrote, “A small amount of product could have been lost to side reactions.” While not necessarily incorrect, this kind of vague sentence leaves important questions unanswered. How much product was lost? What side reactions might have taken place? Why these particular reactions and not others? How exactly did this loss affect your outcome? Numbers and specifics, no matter how small or nuanced, provide the information a fellow scientist needs to effectively analyze your report. Remember, a “minor” side result in your lab could mean major consequences for someone conducting a modified version of your experiment.

The purpose of your report may be to show your teacher that you successfully combined hydrogen and oxygen into water. Sometimes, however, your experiment just didn’t work out the way you hoped it would. Or, even if it did, there are probably aspects of your experiment that could have gone better. Successful reports always spend a significant amount of time addressing discrepancies, errors, or sometimes total failures. Your report should also never attempt to explain away an error, as you might explain away a counterargument in English, in order to strengthen your thesis. Unlike a literary interpretation, which is open to debate, your data describes exactly what happened in your lab. **Remember**, science never “proves” anything 100% correct, and your job is to present your evidence dispassionately and accurately. **Some reports are all about why you’re wrong. And that can be a good thing.**

**Brevity is virtue.** Long and flowing prose may be effective, and even encouraged, in English and other writing disciplines. By contrast, lab reports quickly transfer large amounts of information. A very common mistake among rookie chemists is to devote a page worth of explanation to a point that could have been neatly summarized in a table or diagram. A picture really can be worth a thousand words!