

Chemistry

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Lab Reports

Lab reports and all scientific writing are generally written in the past tense. The information is objective and written in a way that is short and concise. Personal pronouns should be avoided in most cases unless the teacher specifies that they do not mind them. The entire experiment should be repeatable from the information given and unless there were errors, the results should be the same. All of the conclusions should be supported with data from the results. All teachers have specific method that they like their students to follow and this is usually handed out, explained in lab, or on the course web site. Most teachers divide a lab into the following categories: **Title**, **Introduction**, **Results**, **Discussion**, and **References**. But again, everyone has their own preferences.

Title

A title is important to any lab report and it must be clear and specific. It summarizes the purpose of the lab. It is never a good idea to use the title from the lab manual. An example title might be "Finding an Unknown Dilution by Measuring Optical Density of Serial Dilutions."

Introduction

The introduction includes the purpose of doing the experiment, background information needed to understand the experiment or procedures, and at least one hypothesis that makes an educated guess from the background information. Any important definitions that are needed to understand the experiment should be found in the introduction.

Method and Materials

This section is a summary of the procedure that includes all measurements and equipment used. The experiment should be repeatable from the information given. The method of how data was analyzed should also be explained. The information should all be in past tense and written in paragraph form instead of lists or bulleted items.

Results

The results include all data found, observations made, figures, tables, charts, and graphs. All charts, graphs, figures, and tables are kept separate and referred to in the results when they are being explained. The results are explained in this section, but they are not interpreted.

Discussion

This is the most significant section of the lab report. The results are analyzed and related to the hypothesis and purpose. They are compared to what was expected and any differences should be

explained. The writer should go in deeper and explain what these findings have to do with the bigger picture of life as a whole. All weaknesses or errors in the experiment, including human error, are mentioned and it is explained how they had an impact on the results. Even if the experiment failed, the lab report can be saved by explaining the errors, showing what they did to the results, and explaining what should be done differently next time to prevent this failure. Further questions on the subject or improvements in the lab should be mentioned in this section.

References

Any sources used in the lab report should be cited in the report and then documented in the references. These sources might include the lab manual, textbook, or some other source used to write the background information in the introduction. Any information that is not common knowledge should be cited. Generally, students use MLA format for citations and references and teachers do not usually have any preference as long as you're consistent.

Guidelines

Though the specific requirements for each professor/TA differ, lab reports as a whole follow a general format. Scientific writing is generally done section by section, and is formal and concise. Grammar and good writing are still important, but it's very different than writing in the humanities. Flow, language and cohesiveness are not all that important; what you are looking for is the incorporation of all the necessary information in a detailed but to the point document. Additionally, formal lab reports are nearly always written in the third person.

The following sections AND their content are subject to change. The specific requirements for each TA are different, but this is a general guideline to follow. It will help if the student has the sheet laying out what sections the particular TA is looking for, and what they want to see in each section.

Title

- Generally taken from the lab manual; just the given name of the experiment.
- Include a heading with your name, your partner's name, date, lab section and experiment number.

Purpose (also called "Pre-lab")

- Describe the general purpose of the experiment: **what** you're trying to find, **how** you'll find it, and **why** it might be important.
- Information for this usually comes from reading the lab manual.

Experimental Procedure

- Briefly summarize the steps performed in the experiment.

- Should be concise but specific.
- Mention any equipment used that did not come from your lab drawer.
- Try to do this in paragraph form; not only is listing less formal, but it's also the style used in the lab manual.

Calculations

- A calculations sheet (on which you show sample problems with work) is usually given out in lab and is a required part of the lab report.
- **MAKE SURE ALL DATA IS LABELED WITH APPROPRIATE UNITS** both on the sheet and throughout the lab report. TAs love to take off points for this.

Data

- TAs generally don't want to see EVERY number you've collected throughout the experiment.
- Often one large table of **IMPORTANT CALCULATED VALUES** will suffice (important values = numbers you've had to calculate, including averages-or measurements you've taken).
- If there is data that can be graphed (anything with multiple trials or recordings; example = time v. temperature) it will usually be required.
- Graphs should be done in Excel, with separate graphs for separate trials.
- Graphs are sometimes their own section. It is not uncommon to have four or six graphs for one lab report.
- Generally, no explanations or interpretations of the graphs will be required in this section, **BUT THEY CAN BE USED IN THE DISCUSSION AT THE END OF THE LAB REPORT.**

Results

- **THIS IS SEPARATE FROM DISCUSSION.**
- Summary of what you found and how you found it.
- Include observations from the experiment (color changes, smells, and phase changes— basically anything you can see, smell, hear or feel).

Discussion

- **THIS IS SEPARATE FROM RESULTS.**
- Talk about what your results mean in terms of the experiment.
- Include error analysis: if your results were not near what they should have been, explain what happened or what might have happened.
- If you have to include information from outside sources, this is where you should do it. The information should help to explain the meaning of your results or experiment, and should be cited using APA format.

Lab Questions

- The lab manual usually asks four or five questions at the end of the experiment.
- These are usually separate from the discussion section, and should be answered in their own section of the lab report.

Samples

Sample Lab Report 1:

Informal Lab

(<http://www.uvm.edu/wid/writingcenter/tutortips/chemsampleinformallab.pdf>)

Sample Lab Report 2:

“Wittig Reaction,” by Rachel Conrad

(http://www.uvm.edu/wid/writingcenter/tutortips/chemsamplelab_wittig.pdf)

Sample Lab Report 3:

“Production of Biodiesel,” by Steven Ushakov

(<http://www.uvm.edu/wid/writingcenter/tutortips/chemsamplelabannotated.pdf>)