In order to write good lab reports, it is important to understand exactly what is expected of you. This guide gives a description of how lab reports differ from class assignments, what the overall goals of lab are, and how the individual sections in the lab report contain objectives to help you with the overall goals.

**How is the laboratory setting different from a classroom setting?**
In a lecture-style class you spend the majority of class listening to the professor, trying to absorb information. You must determine the important information, learn it, and be able to reproduce this information in homework and tests. The lab is designed to give you a hands-on approach to material you already know, so that you can learn to use this material in different ways and in new situations.

- Class is focused on teaching you information and evaluating how well you have learned it.
- The lab is focused on helping you to develop the skills to apply this knowledge and to recognize when and where the knowledge can/should be applied.

**How are these goals demonstrated in the labs themselves?**
- Most of the labs are built on pre-existing knowledge from class.
- Most activities require you to actively perform tasks that describe or confirm concepts you are already familiar with.
- The questions in the lab manual are all based on the procedures you completed, yet they require you to think and recall information without explicitly telling you which information to recall.
- The lab write ups are designed to help you organize your thoughts and to test how well you have developed these important skills.

**Why is the lab report so important?**
Being able to communicate efficiently through writing is a valuable skill in any discipline. More specifically, being able to describe a process (including why you felt it was necessary to perform the task, exactly what you did to execute the task, what you learned from the process, and what might be some future consequences of the results) is also an essential life skill. Technical writing is not only important in the sciences, it is important for presenting a report to a boss, for teaching material to students or colleagues, and for presenting valid arguments.

The lab format (Objective, Introduction, Procedure, etc.) is designed to help you know what to include in a report, and how you might go about organizing your thoughts. By breaking the lab into separate sections, the writing process becomes much more manageable. Below are some brief descriptions of the important lab sections and tips for ways to maximize the quality of these sections. You do not have to follow all of the suggestions; they are simply meant to help you as you are learning the art of technical writing.
| OBJECTIVE | **Purpose:** By summing up the lab in one or two sentences, you are forced to consider what is truly important about the lab.  
**Tips:**  
- Do not just copy or paraphrase the objective from the lab manual. Think for yourself what was important.  
- Keep it short and sweet—this should be a brief summary, not a mini-introduction or a mini-procedure. |
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| INTRO | **Purpose:** In this section you want to consider why the experiment is being performed and why the results will be (or were) important to the world. In essence you are justifying why you did all this work.  
**Tips:**  
- Provide a historical context. What were some of the popular ideas at the time? What was wrong with these ideas?  
- Provide some theory from class, if possible. Explaining how theory predicts a certain phenomenon sets up the need for observational or experimental tests to prove or disprove the theory.  
- Do not mention the precise details of the experiment—those will go in the procedures section. Similarly, do not yet mention your results. You want your write up to be free of redundant sections; otherwise, it is a waste of your time.  
- Include external sources (and cite them properly).  
- Keep it interesting! The more interesting you find the lab, the more interested the reader will be. |
| PROCEDURE | **Purpose:** The intent of the Procedures section is to get you to write down the steps of the lab in a linear fashion (i.e. first step, second step, etc.). This helps you to organize your thoughts and see how the different steps relate to each other, but it also helps you practice your ability to guide someone through a process in writing. It also tests whether or not you completed each step, and whether or not you understood the individual steps.  
**Tips:**  
- Keep it short! Don’t stress over this part, just keep it simple.  
- Number your processes (i.e. Step One, etc.) and keep the individual steps separate and distinct. This will help you to focus on the individual tasks and the order in which they were performed.  
- Be as thorough as possible in describing how to do something. If you measured an angle, describe where you set the 0º mark. If you observed an object, make sure to mention if you observed in with the naked eye or with a telescope.  
- Keep your procedure free of any results. Do not answer any of the questions in this section, do not discuss any observations you made in this section. |
- Any equipment you reference should be listed in the Equipment section.
- Read your procedure back to yourself. If you handed these steps to other students, could they follow them and successfully complete the task? If not, be sure to fill in any gaps.

### RESULTS

**Purpose:** The Results section is where you present your findings. Did the lab have specific numbers for you to determine? Did it have graphs or plots for you to sketch? Present them here. This is the “answers” section of the lab, and you should focus on clearly explaining what these answers are. Remember, any answer should include a discussion of the errors!

**Tips:**
- The Procedures section focuses on tasks. If you must perform calculations using data, or if you must determine numbers from a graph, explain these results here, not in the Procedures section.
- If you can determine the uncertainty of a measurement, include that in this section. Explain possible sources of uncertainty.
- Reference all Figures and Tables you include (“Figure 3 shows the plot of…”).
- Include your own comments or observations if you notice anything in particular.
- You can either answer the questions here, or you can answer them in a separate section, but make sure to explain how you arrived at your answers.

### CONCLUSION

**Purpose:** In this section you should be able to summarize your results, and present potential consequences of these results.

**Tips:**
- Discuss whether or not your results make sense, or agree with the currently accepted results.
- Include historical results that came out of these new results. Did these experiments disprove a commonly accepted theory? Mention it.
- Include information you learned in class that is relevant to your findings.
- Discuss any assumptions you may have made and what effect these may have had on your results.
- Qualitatively discuss your errors.
- Include external references, and make it interesting.

Remember, ultimately you will decide on the structure and style of your lab write-up. Include what you think makes a good report, but remember that you will be graded based on how well your sections achieve their individual purposes. For additional detail, see the lab manual.