# Directions

Now that the lab is complete, it is time to write your lab report. The purpose of this guide is to help you write a clear and concise report that summarizes the lab you have just completed.

The lab report is composed of four sections:

**Section I: Experimental Overview**

* + Provide background information.
  + Include the hypothesis(es).
  + Summarize the procedures.

**Section II: Data and Observations**

* + Summarize the data you collected in the lab guide.
  + Include information from data tables.
  + Include any written observations that are relevant.

**Section III: Analysis and Discussion**

* + Discuss any important calculations or formulas used.
  + Identify key results, what the results indicate, and any trends in the data.
  + Include graphs (if constructed) that display trends in the data.
  + Provide possible reasons for any problems with the experiment, or unexpected data.

**Section IV: Conclusions**

* + Identify if the hypothesis(es) was (were) supported or refuted.
  + Provide logical reasoning based on data.
  + Explain how the experiment could be improved.

To help you write your lab report, you will first answer the questions listed below by reflecting on the experiment you have just completed. Then you will use the answers to these questions to write the lab report that you will turn into your teacher.

You can upload your completed report with the upload tool in formats such as [OpenOffice.org](http://OpenOffice.org/), Microsoft Word, or PDF. Alternatively, your teacher may ask you to turn in a paper copy of your report or use a web-based writing tool.

# Questions

## Section I: Experimental Overview

1. **What is the purpose of the lab, the importance of the topic, and the question you are trying to answer?**
2. **What is your hypothesis (or hypotheses) for this experiment?**
3. **What methods are you using to test this (or each) hypothesis?**

## Section II: Data and Observations

1. **Locate the data and observations collected in your lab guide. What are the key results? How would you best summarize the data to relate your findings?**
2. **Do you have *quantitative* data (numerical results or calculations)? Do you have *qualitative* data (written observations and descriptions)? How can you organize this date for your report?**

## Section III: Analysis and Discussion

1. **What do the key results indicate?**
2. **If you constructed graphs, what trends do they indicate in your data?**
3. **Were there any problems with the experiment or the methods? Did you have any surprising results?**

## Section IV: Conclusions

1. **What do the results tell you about your hypothesis(es)?**
2. **How do the data support your claim above?**
3. **If you could repeat the experiment and make it better, what would you do differently and why?**

# Writing the Lab Report

Now you will use your answers from the questions above to write your lab report. Follow the directions below.

## Section I: Experimental Overview

Use your answers from questions 1–3 as the basis for the first section of your lab report. This section provides your reader with background information about why you conducted this experiment and how it was completed. Outline the steps of the procedure in full sentences. It also provides potential answers (your hypothesis/es) relative to what you expected the experiment to demonstrate. This section should be 1–3 paragraphs in length.

## Section II: Data and Observations

Use your answers from questions 4–5 as the basis for the second section of your lab report. This section provides your reader with the data from the experiment, in a summarized and concise way. No paragraphs are required for this section, but you do need to include the key data and observations from which you will generate your analysis and discussion. This section is ***objective***.

## Section III: Analysis and Discussion

Use your answers from questions 6–8 as the basis for the third section of your lab report. This section provides your reader with your interpretation of the data set. You will also give an example of any calculations or formulas you used to analyze your data. Also, you will want to include any graphs that you made and interpret them for the reader.

If you did construct graphs, your Student Guide included information on which graphs to construct. Graphs should have the following:

* 1. Appropriate titles
  2. Appropriate labels for each axis
  3. Appropriate scales for each axis
  4. Correct units for the data

Complete a rough sketch of each graph. Explain in one or two sentences what trend the reader should observe in each of your graphs.

Mention any problems, unusual or unexpected data, or other factors with the experiment here, and suggest possible causes. This section can be somewhat ***subjective***, unlike Section II, because you are free to include your personal interpretations or even speculation if it adds constructive, reasonable insight to the discussion.

This section is variable in length, and should likely be the longest part of your report.

## Section IV: Conclusions

Use your answers from questions 9-11 as the basis for the fourth section of your lab report. In this section you will summarize the outcome of the experiment, and discuss how the original hypothesis(es) was (were) either supported or refuted. Use logic and reason in explaining your statements, and be sure to refer to specific data from your experiment that supports your argument.

This section also demonstrates your understanding of the experiment, through your ability to offer constructive criticism about its design and make suggestions for future experimentation. There are always ways that experiments can be improved. Now that you are a veteran of this experiment and have experience with the procedure, offer some advice to the next scientist about what you suggest and why.

This section should be 1–2 paragraphs long.

## Overall

When complete, the lab report should be read as a coherent whole. Make sure that you connect different pieces with relevant transitions. Review for proper grammar, spelling, punctuation, formatting, and other conventions of organization and good writing.