Lab Report Template for CHS Physics 211 v2.0

Put your name and your partner's names here

February 6, 2026

Abstract

The abstract should be a short 3-5 sentence paragraph. In it, you should state the hypothesis, what you did, and what you found. The abstract is meant to be a very short summary of your paper to follow. It is a good suggestion to write the abstract last in your report after you have written everything else. This will allow you to best summarize your work.

1 Introduction

This template is designed to be a guide for completing lab reports for Physics 211. Please note that although I have provided this template, you are not under any obligation to use it. It simply provides a nice general design and tips for writing an exceptional physics laboratory report. As you use this template, please make a copy of this code and copy/paste it into a new document so that you will always have access to this original version to look at. It would lso be a good idea to have a printed copy of the pdf template and code to reference when needed. In addition, the formatting for various things like data tables, graphs, citations, etc. is in here for convenience. Please read through the code provided carefully as there are lots of things in % that you can't see on the generated pdf (like how to include pictures, equations, and LOTS of notes on how to do everything). What follows is a general description of what each section of the lab report should contain. Finally, please note that there are equations and useful latex code at the bottom of this report.

The introduction is usually a paragraph or two. You should start off by stating the problem of the experiment and why the problem is worth studying. If there is any historical or background knowledge required to understand your report, you should state it here. Finally, you should state your hypothesis as an if-then statement. [1]

2 Experimental Setup

In this section, you should explain your experiment in detail. The usual method is that you first explain what you did, then you explain how you did it. I.e. first explain the data you are trying to collect. Then explain (citing relevant equations as necessary) why this data is necessary in order to prove/disprove your hypothesis. Finally, explain how you collected the data, citing both the materials used as well as stating their purpose and what they are used to collect or to do. You can break up this section into two sections if you wish. The first would be materials and the second would be procedure.

- 61cm ramp

- stack of textbooks
- ball
- meter stick
- tape
- timer
- Logger Pro
- motion sensor

3 Data

In this section you should explain your results. You should not interpret the results in this section, that is for the analysis/conclusion portion of the lab. Again, you are merely stating the results of your experiment here. Please avoid gigantic tables with every data point in existence that no one will ever read. Use data tables wisely to summarize large amounts of data or to highlight important trends/results. If you want to display large amounts of data, often a graph/histogram, pie chart, etc. is the wiser choice.

Angle of incline	Trial 1 (Sec.)	Trial 2 (Sec.)	Trial 3 (Sec.)	Average Time (Sec.)
2°	2.615	2.735	2.585	2.645
4°	1.8	1.875	1.685	1.787
6°	1.445	1.39	1.44	1.425
8°	1.195	1.31	1.1	1.202

$$K = U_g \tag{1}$$

$$mgh = \frac{1}{2}mv^2 \tag{2}$$

$$(10)(.225) = \frac{1}{2}v^2$$

$$4.5 = v^2$$

$$2.12\frac{m}{s} = v \tag{3}$$

4 Analysis

This is the most important part of the lab report; it is where you analyze the data. In this section you will interpret your results. You need to look at your data and decide if the hypothesis was supported or contradicted by your data.

Your discussion should include the following at a minimum. [1] What is the relationship between your measurements and your final results? [2] What trends were observable? [3] What can you conclude from the graphs that you made? [4] How did the independent variables affect the dependent variables? (For example, did an increase in a given measured (independent) variable result in an increase or decrease in the associated calculated (dependent) variable?)

Then describe how your experimental results substantiate/agree with the theory. (This is not a single statement that your results agree or disagree with theory.) When comparison values are available, discuss the agreement using either uncertainty and/or percent differences. This leads into the discussion of the sources of error. Your discussion should include the calculation of averages and standard deviation to be able to describe precision of experiment. All data points should be plotted ± two standard deviations and compared with theoretical data to interpret accuracy. It is ok to say that your results were inconclusive. It is important to cite all possible sources of error and state specifically how you believed they affected the collected data. If you get a result or an uncertainty that is ridiculous (or just really big/small), show that you have noticed and thought about it, not just copied a number from your calculator and moved on.

For example, when rolling a ball down a ramp, you may not have taken in account the effects of rolling friction or the fact that some gravitational potential energy is converted into rotational kinetic energy. Both of these would cause the overall time for the ball to roll down the ramp to increase.

5 Conclusion

The conclusion should connect to the introduction and re-state the relevance and importance of the experiment. Its a nice touch to sometimes make historical connections in this part of the report as well. It is always good to end on a note stating the importance of your findings, the connections to other topics in physics and science, and opportunities for future extensions/research/experiments in the subject. Remember to report your results with correct units and uncertainties, for example $g = 9.7 \pm 0.2 m \cdot s^{-2}$.

References

[1] Cite your first source here

[2] Cite another source