

Introduction

Each week, you will have to write a conclusion a section from the previous week's lab assigned by your TA. In your conclusion, you should summarize the physics concepts you studied in that section, describe your results, and do some error analysis. Your conclusion does not need to be long (one page is usually enough), but length alone will not guarantee full credit.

Physics Concepts

Each lab will explore one or more physics concepts. During lab, you will test whether the world works the way your professor said it does in lecture. This often takes the form of an assumption and an equation based on this assumption. In this section, you should demonstrate that you understand what equation you are testing and where that equation came from. Do not include a repetition of the lab procedures since your TA already knows the procedure.

Results

In this section, you will describe whether the equation you tested is consistent with your measurements. You will do this by comparing your predictions with your actual measurements. If you have numerical results, be sure to show your TA what your results were by including both the predicted and measured numbers. Do not merely say that your measurements did or did not agree with your predictions without supporting your statements. You only need to include your results, not your raw data. Do not hand in your in-lab notes. Always include the correct units.

Error Analysis

In order compare your results with your predictions, you need to know how much error is in your numbers. For example, if you predicted 52 but you measured 50, your prediction and measurement differ by 4%. Your prediction would be consistent if you had measured everything to the nearest 10% but it would not be consistent if you measured everything to the nearest 1%.

In this section, you should describe the biggest sources of error for your measurements and give an estimate of how large it is.

If your measurements and predictions are close to each other, do not say that there was no error. All data has error. Do not mention mistakes you made or that you could have made. Do not mention rounding or calculation error since you do the calculation again more carefully if this is causing problems.

Example Lab Section

- Try to measure the acceleration due to gravity near the surface of the Earth.
- Drop a ball at a certain height
- Measure the time it took for the ball to hit the ground
- Use Newton's equation of motion to determine the value of g in units of m/s^2
- Repeat several trials to get an average

Example Conclusion (This is the part you turn in for credit)

In this part of the lab, our group tried to measure the value of g in units of m/s^2 . We used the Newtonian equation of motion, y 's are the positions, v 's are the velocities, a is acceleration, t is time to tell us where the object would be if we know enough about the above parameters. The equation we used: $y = y_0 + v_0*t + 1/2*a*t^2$, where we neglected air friction and dropped a ball from rest ($v_0=0$ m/s) starting at 1 meter height ($y_0= 1$ m), and measure the time of fall t until it hits the floor ($y=0$ m).

	t measured in (s)	g derived in (m/s^2)
trial 1	0.452	-9.789334
trial 2	0.477	-8.790088
trial 3	0.429	-10.86714

The average of our results for g is about $9.816 m/s^2$

The Error or Uncertainties in this lab came from the limitation of the instruments we used to make the measurements. The Meter Stick could only measure distance to $1/1000^{th}$ of a meter (1mm), and the stopwatch could only measure time up to $1/1000^{th}$ of a second. Therefore, our accuracy is only accurate to 4 digits of significant figures, and therefore our average is reported to only accurate to 4 digits as well.

Notes

- The questions in the lab can help you get an idea of what concepts and results are important in a particular section.
- Your conclusion can be either handwritten or typed.
- As with the rest of the homework, you can discuss your conclusion with your classmates, but what you hand in must be your own work.
- If you received permission to attend another section the previous week, note this at the top of your conclusion. Different sections will receive different sections of the lab about which to write.