

AP Physics Lab Experiment Report Format

All lab reporting should be done in Evernote. (<https://evernote.com>) Evernote is a free program that comes in a downloadable or web-based form. It is also available on your smart phone. There are slight differences in the platforms that will become obvious over the year. All labs will be shared with me for grading.

In the upper right hand corner of the first page of each lab, write the date the experiment was performed and the names of lab partners or collaborators and the class hour. Roman numerals should be included in your lab and it should strictly follow the following template.

After giving the lab a *title*, and listing your name and class hour.

I. State the *Problem* or *Purpose*. If there is more than one, they should be listed numerically. Provide essential conceptual *Background* information to be used during the experiment.

II. List the *Materials* needed for the experiment.

III. Describe the *Protocol* by including a diagram of the setup (or a brief explanation of the setup if it is very simple), and list the steps used in gathering the data required for the lab. The Protocol should be detailed enough for anyone to repeat your lab.

IV. In your *Data, Analysis, and Calculations*, include all quantitative measurements in tables and any other qualitative observations that were significant. In addition, there should be an organized presentation of all calculated results plus one example of how each type of calculation was done (sample calculations of averages are unnecessary). Calculations include the raw formula, iteration, data substitutions, and final answer. Sample calculations are very important! All measurements and calculations should be reported with appropriate significant figures. Graphs and error analysis (i.e., percent difference, percent deviation, etc.) should be included in this section as well.

V. The *Results* contain the final results of your lab and should be presented neatly in chart form. Headings and units are required.

VI. The *Conclusion* involves no sharing or copying. It should be your own, unique work just like an English paper. The conclusion section is very important. It will require a substantial amount of writing and thought. Two or three sentences on the order of, "We had a lot of fun doing this lab and learned a lot. We learned that velocity and acceleration are very important in our daily lives. It was very interesting." Simply will not do. They don't *say* anything. The conclusion should be in complete, self-inclusive sentences and should include the following:

- (A) A short recap of the lab. Next a statement of whether the objective(s) of the lab were or were not met, along with a justification for that statement. Be sure to identify whether or not your experimental results were "in agreement" with the accepted value(s) by considering the uncertainty associated with your final values.
- (B) Your conclusions from your analysis of the data and graph(s). This should include the final value(s) you found from your experiment (i.e., your "answer" to the problem or purpose) and should also include a thorough explanation of the concepts and/or physical relationships that were observed/discovered in the lab as they pertain to your results. Included in this explanation should be a discussion of any graph(s) you created.

VII. Error Section:

(A) A discussion of possible sources of error—not only identifying them and classifying them as "random" or "systematic" but also mentioning *specifically* how your results may have been affected by each of the errors (i.e., did the error cause your result to be *larger* or *smaller* than it would have been without the error?). For each possible error that could have gone in either direction (e.g., a measurement that could have been slightly larger or smaller than it should have been), you should *specifically* identify the option that would account for your result. Also list some possible methods of reducing the errors you listed. Please *don't* refer to "human errors." Examples of so-called human error include misreading a ruler, adding the wrong reagent to a reaction mixture, mistiming the reaction, miscalculations, or any kind of mistake. Scientists would never report the results of an experiment affected by human error--instead, they repeat the experiment more carefully.

(B) Your suggestions for improvement of experimental design or ideas for further experimentation.

Notes: Gathered from many sources

- 1.) Graphs must be computer generated. When discussing your graph(s) in the conclusion, be sure to discuss the significance of the intercept(s) and slope(s) of the best-fit line(s).
- 2.) If you have more than one data table or more than one graph, number them (Table 1 or Graph 1, etc.) to make it easier to refer to them in your conclusion.
- 3.) You will lose points if your conclusions do not follow logically from your results. Do not say something just because that is what the textbook says.
- 4.) You will lose points if you do not remark about remarkable results, and attempt to analyze their cause. For instance, if your lab record says "We measured the free-fall acceleration, g , in the classroom to be 468 m/s^2 ." without any further comment, you are "toast".
- 5.) You will lose points if you use the word "prove" or "disprove" in any of its forms. Proof is a mathematical notion, and you haven't done it. There is no absolute truth in science. Your results may "support" or "not support", some hypothesis, theory, or law, but you did not "prove" it.
- 6.) You will lose points if you merely speculate about sources of experimental error. Statements like "Friction may have caused a discrepancy in the results" need to be supported with data, or at least some plausible theoretical mechanism.
- 7.) You will SO lose points if you use the words "human error". Your instructor will read this phrase as "I don't care enough about this experiment to actually think about what is going on in it, so please butcher my lab grade."
- 8.) You will SO lose points if you say something like "there may have been a calculation error". Your instructor will read this phrase as "I really don't care enough about this experiment to go back and check my work, so please butcher my lab grade."