

Appendix A: Laboratory Report Format

The following guidelines apply to any lab report that you submit. Remember, all labs you produce should look professional, just as an actual researcher would produce for a scientific journal. You will be marked accordingly.

- **Reports should be typed**, but if written then it must be written in ink on one side of lined white paper .
- Calculations for the *Analysis* section can be done as a spreadsheet, or written in pencil on paper and handed in separately.
- Graphs must be done in pencil on graph paper, or as part of a spreadsheet.
- The lab must be written using full sentences. The exception to this is the equipment list, which is done in an itemized format like a shopping list.
- Any papers handed in must be stapled in the top left hand corner and include all group member's names, the block, and date in the top right corner. Please don't hand in duo-tangs or things like that. It's just more for me to carry.
- **The preferred method of submitting your lab report is to email it to me as an attachment.** The emailed files **must** all have the naming system as follows. For these examples we will assume a student named John Smith is emailing the files to me, and used Microsoft Office to create the files.

John Smith typed up his lab document → smith.doc

He did his Analysis as a spreadsheet → smith.xls

John also sent a presentation that goes along with his lab → smith.ppt

Notice that the file names do **not** contain his first name, nor any mention of the lab title.

Students have access to different programs for typing up work, whether at school or at home. The following list shows the programs and file types that you can and cannot use to produce the lab work you will send me. It is recommended that you use a service such as Google Drive or Office 365 (Live@EDU) for group projects.

| Acceptable | Unacceptable |
|--|------------------------------|
| Google Drive | Copy and Paste into an email |
| OpenOffice or LibreOffice | Microsoft Works |
| Rich Text Format (rtf) | WordPerfect |
| Microsoft Office (saved as XP/2003 files)* | WordPad or txt files |
| Office 365 (Live@EDU) | |

* Office 2007/2010 files ending in "x" are **not** accepted due to common errors in showing formulas.

On the following page is an outline of the format that your lab **must** follow. Failure to follow this outline will result in lost marks.

Title of Lab

I. Objective:

State what you are trying to do or discover. This is usually a simple, single sentence that does *NOT* talk about how you are going to try to figure it out.

II. Hypothesis:

Three parts to this section. **First**, make an educated guess as to what you think the outcome will be (probably an accepted value). Make sure you actually give an answer to what our objective is asking... don't start discussing other stuff. **Second**, you must show the formula (explaining its variables with units) that is the basis of your lab. Do not include "math" formulas. **Third**, list the manipulated, responding, and controlled variables for your lab.

III. Equipment:

Make a list (in point form like a shopping list) of the equipment you will be using. You do not list things like your pencil and calculator. We only need to know about the equipment that was necessary for you to perform the experiment itself. Sometimes you might want to include a labeled diagram of the setup you used.

IV. Procedure:

Make a numbered outline of the steps you did to actually perform the lab itself. Be brief but complete. As a rule of thumb, I should be able to show your lab to a grade seven student and they would be able to complete the lab based on your instructions, even though they might not understand what the lab is about. Don't bother telling me to "gather materials" or to "clean up at the end." Do *not* explain how to analyze the data here.

V. Pre-Lab Questions:

Sometimes I might assign questions you are supposed to answer *before* starting the lab. Answer those questions here.

VI. Observations:

Most of the time you measured a bunch of numbers during the lab. These are your *quantitative* measurements, and they must be organized in a table. If you noticed noteworthy things, like a smell or color, you may also describe these *qualitative* measurements here. **Calculations or calculated numbers do NOT belong here!**

VII. Analysis:

This is where you do your "number crunching." Show any calculations that you need to do with your observations to come to a "final answer." If you need to make a graph based on your data and analyze something like its slope, all that work belongs here also. If you want, this work can be shown on a separate sheet of paper in pencil.

VIII. Error:

List things that might have caused mistakes to happen while performing your lab... be specific and complete. Keep in mind that listing things like "wrong formula" or "calculation errors" are not acceptable, since they are mistakes in your own work, not errors in performing the lab. You will also calculate percentage error or percent difference (if applicable) in this section to figure out how far off you are. If you want, the error calculations can be shown on a separate sheet of paper in pencil.

IX. Concluding Statement:

Tie everything up here. Discuss your objective... did you answer it? Compare your hypothesis to your results... do they agree? Comment on your observations and analysis. Would you do something different next time? Can you suggest a different lab that is somehow related to this one? Use full sentences, and expect to write a pretty big paragraph.

X. Post-Lab Questions:

If any other question were assigned to you to answer after the lab, answer them here.

Appendix B: Marking Rubric

The following marking rubric will be applied to each section of your lab report. A typical lab report without any pre or post lab questions will be out of 24 marks. Failure to follow the format guidelines given will result in the following penalties:

Misnamed file (like "lab report.doc) = -1 mark

Disallowed file format (like docx file) = -1 mark

Missing information from top right of lab (e.g. name, block, date) = -1 mark

Failure to follow order of write up = -1 mark

Critical spelling or grammatical errors = -1 mark

Each day late = -5% of lab mark

| | Excellent (3) | Good (2) | Poor (1) | Unacceptable (0) |
|---------------------------|---|---|---|---|
| Objective | Clear and concise statement of goal. | Workable statement of goal, some fuzziness. | Purpose of lab not clearly identified or understood. | "What was this lab about?" |
| Hypothesis | Reasonable educated guess, formula shown, variables identified. | Good guess and formula. | Guess or formula is missing. | "I think Elvis is the King!" |
| Equipment | Point form list of required equipment. Diagram if necessary/ | Vital items listed, maybe one omission. | So many omissions that performing the lab would be difficult. | "We used that green gizmo with the lights." |
| Procedure | Step-by-step numbered list the show how to do the lab. | Possible to do the lab, although some assumptions might have to be made. Might not be numbered, | Difficult to follow how lab was performed. Steps go off topic or are otherwise distracting. | "Just do it ®" |
| Pre-Lab Questions | Varies depending on questions assigned, if any. | | | |
| Observations | Collected quantitative data is well presented in a table. Qualitative data may be given if necessary. | All data is present, but shown in a format that may be confusing or misleading. | Some data is missing. Data shown in disorganized or sloppy manner. | "Were we supposed to write that number down?" |
| Analysis | Well laid out and calculated analysis based on data. Graphs (if needed) follow all rules and have appropriate calculations showing relationship between calculated value and physics concept. | Calculations are essentially correct, although some parts may be implied, including values calculated from the graph. | Work is poorly shown, as if a rough draft. Serious calculation errors affect results. | "The answer is 5.4e6 m/s. Uh, or maybe 2 m/s. Can I get back to on this?" |
| Error | Several sources of error are listed, and each is well explained. Shows calculation of error (if appropriate). | List of sources of error is incomplete. Calculation of error is wrong. | Seriously lacking list of sources and/or no calculation of error. | "My sock got caught on the dial-thingy... is that a problem?" |
| Conclusion | Wraps up the lab, just like the conclusion of an essay for English. | Shows the person has not lost sight of the lab's reason, but could focus more on what's going on. | Has serious trouble showing link from Objective through to Conclusion. | "The End." |
| Post-Lab Questions | Varies depending on questions assigned, if any. | | | |

Appendix C: FAQ

Q: So it's ok if I call my file “**momentum lab from steve joe and philip.doc.docx**”?

A: No. The file must be named using ONLY the last name of the person sending the file. Also, notice that the person sending it thought typing “doc” on the end would make it ok, but Word still saved it with “docx” on the very end. Check first *if you need help saving in the correct format*.

Q: I don't know how to set up a spreadsheet to graph.

A: Watch the video [Line Straightening and Graphing in a Spreadsheet](#) on the multimedia page of www.studyphysics.ca.

Q: If I copy and paste my graph into the lab document, do you still want the spreadsheet?

A: Yes. If anything is squirrely about your calculations, it might be necessary to look at the spreadsheet.

Q: If I email the lab before midnight on the due date, when do I hand in the analysis stuff I wrote on paper?

A: Next school day.

Q: I did my analysis / error calculations on paper, so I can skip that section in the lab write-up, correct?

A: Nope. You still need to have those sections and tell me where to look for your written out work.

Q: Where do I get that free program for making documents and stuff?

A: LibreOffice.org