

## Formal Lab Report Guideline/2011

All formal lab reports must include a heading on the top left of the first page which includes: name, date, title of lab, and names of lab partners. A 12-point readable font should be used. The report should be single spaced with generous margins (1 ½ inches). Double spacing should be used between each section. The entire report should be written in third person passive voice. The following headings should be clearly visible with the required information reflected within each category.

### PLANNING:

State clearly the focused **PURPOSE**, **RESEARCH QUESTION**, or **HYPOTHESIS** for the lab.

**VARIABLES:** If it is a *controlled* lab, identify relevant variables and explain methods for the effective control of variables.

Independent: *Identify the variable you are manipulating. (changing or varying)*

Dependent: *Identify the responding variable.*

Constants: *List the variables/conditions held constant throughout the experiment. (Remember, to include a description of the methods used for controlling the variables.)*

Describe a **METHOD** or **PROCEDURE** that allows for the collection of sufficient relevant data. This would include:

**Materials:** Provide a list of all the equipment and chemicals used in the experiment, including the proper sizes of the glassware used.

**Methods:** Give a detailed, step-by-step description of how this experiment was conducted. Write it in such a manner that another scientist could replicate the lab exactly. Numbered steps are recommended, but paragraph form can work as well. Remember to use third person passive voice. If you are designing the experiment, you must explain how you determined what was considered sufficient and relevant data.

### DATA COLLECTION AND PROCESSING:

**Data:** Present all data in clearly identified tables. *Both* number and title the tables. Be sure to include units (in column headings) and record uncertainty of the instrumentation. Underneath each table, briefly describe the results. (Do not explain why, simply summarize.)

**Calculations:** Show *only one* calculation of each type used in interpreting the results. It is necessary to show the *generic formula* for the calculation followed by a *specific example*. Be sure to consider significant figures when processing data. (if the data is measured and not counted)

**Graphs:** If applicable, one may provide a labeled, properly scaled graph to aid in interpretation of the data. Scaling should be suitable, and units labeled. The independent variable should be on the **x**-axis and the dependent on the **y**. The proper type of graph should be chosen. For example, if both variables are continuous, a point graph should be used. A best-fit curve should be chosen over a connection of the data points.

### DISCUSSION, EVALUATION AND CONCLUSION:

**Discussion:** A discussion reads well if you start with some background/introductory type information. Then, discuss what happened in the lab and the outcome. (e.g., What reaction occurred? What did you see? How

did the independent variable affect the dependent variable? *Why* do you think so?) Describe how you *analyzed* the data in order to form a conclusion. Explain what the results mean. Show that you have a clear understanding of what occurred in the lab. This should be well-written and new paragraphs should be incorporated as necessary.

**Evaluation of method or procedure: (error analysis):** In this section, explain how confident you feel with the outcome of your lab and why is this so. Suggest weaknesses, uncertainties, or losses that occurred during the experiment. Describe how these uncertainties would change or *if* these uncertainties would change the outcome. Include suggestions as to what you would do differently if the lab were to be repeated. (Refrain from avoidable human error.)

The format for this section should include at least three paragraphs. Each paragraph should include (1) possible source of error, uncertainty, or cause of loss, (2) followed by how that said error could have affected the end result, and (3) what you would do in the future to avoid this stated error.

If possible, provide a statistical analysis of the accuracy of your data. (e.g., percent yield or percent error) Results may be compared to literature values (with sources cited) or theoretical expectations.

**Conclusion:** State clearly whether or not the purpose of the experiment was achieved and whether or not the hypothesis was validated. Only briefly support this statement. This section should not be more than a few sentences long.

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## OVERALL IMPRESSION

You will also be evaluated for your **OVERALL IMPRESSION**. Some of the items evaluated will be:

- Formatting (Is it well organized and are sections CLEARLY labeled? Did you space correctly?)
- Tense (Did you stay in 3<sup>rd</sup> person passive voice..."The stockings were hung by the chimney with care.")
- Clarity (Are you clear and to the point?)
- Terminology (Did you use proper scientific language?)
- Spelling
- Grammar
- Sources: Properly site all sources used *within the text* of the lab report. (For this format reference, I used a combination of AP guidelines, IB guidelines, and the Signature School Science department.)

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## PERSONAL SKILLS

The following **PERSONAL SKILLS** criteria are **EXPECTED** of each student for every lab. **Deductions** will be taken from the lab report if these criteria are not met.

- Be methodical in the use of a range of techniques and equipment. (read instructions, watch what is demonstrated, and follow directions)
- Consistently collaborate and communicate in a group situation and integrate the views of others.
- Pay attention to safety issues and show due regard for the environmental consequences of his or her actions and academic integrity.

