

ST. PIUS X



STYLE GUIDE FOR SCIENTIFIC LAB REPORTS



SCIENTIFIC LAB REPORT FORMAT

This *general* outline is meant to guide you in how to prepare a formal lab report if your teacher requests that a formal report be completed. Note that in some cases, your teacher may have specific requirements for your lab report that take precedence over this outline. Your teacher may also provide you with most of this information and require only certain components of this to be completed by you. In all cases, you should pay careful attention to the instructions your teacher gives you and refer to this outline as a starting point only.

There are several types of Science experiments.

Inquiry/Problem – Attempting to answer an unknown question. This solves a problem with a specific Hypothesis in mind. We are trying to find the set of variables/conditions under which our hypothesis will be proven incorrect. Ex *“To determine what provides more resistance to an electric circuit, a 2cm long wire or a 4cm long wire of the same thickness and material?”*

Identification – Uses accepted properties or laws to identify a material. Ex *“To distinguish between two unknown substances by finding their densities and comparing these to a table of known densities.”* You can make a hypothesis based on readily observable properties before testing.

Demonstration/Model – creating a model/chemical reaction in order to illustrate an accepted scientific law, principle or phenomenon. This is a Purpose based science experiment without the need for a hypothesis. Ex *To build a model of the solar system, **OR** to observe the hydrogen gas test for a quantity of a known gas. **OR** to observe the effect of adding additional loads to a parallel electric circuit. **OR** to observe the digestive system of a fetal pig through a dissection.*

LAB REPORT FORMAT

TITLE PAGE

Your title page should include the following information: title of lab, your name, due date, teacher's name, course code. The title page is the first page of your lab report. Therefore, there should NOT be a title on the second page of your lab report.

PURPOSE/PROBLEM

You must decide which type of experiment (from the list above) you are conducting before writing your one sentence question (or statement) that you are trying to answer with your experiment. Ex *"To find/identify/demonstrate the ..."*

HYPOTHESIS

Make a prediction for either an Inquiry or Identification. Support your hypothesis with **known facts** BEFORE you begin your experiment. Ex *Substance A is clear and odourless so it could be water.*

MATERIALS / APPARATUS

Any equipment needed. This list must be written in point form. Labeled diagrams of your apparatus can also be included in this section. Be sure to include important safety equipment. *Materials* are those things that are consumed during a lab while *apparatus* is the equipment used.

METHOD / PROCEDURE

This is generally done as a numbered list. This list should be as specific as possible. Someone should be able to duplicate your experiment following nothing but your instructions. Include all measurements accurately and be sure your instructions are in the form of a command. Ex. *"Place 100 ml of substance A into the beaker and place this on the triple beam balance."*

Complete this only if you have made changes or modifications to existing lab instructions either in a handout or textbook. You may direct your reader to these instructions ex. *“Refer to Procedure on pg 245 of Science 9”* only if the teacher has instructed you to do so.

OBSERVATIONS

This can usually be done in table/chart form. These are your raw observations with as much detail and description as possible. There is no manipulation of this data: calculations, inferences (Ex the burning splint popped so it must be hydrogen) are all done as part of your analysis. All tables, graphs, and diagrams need numbers and titles (i.e., *Table 1. Mass of each substance*).

DISCUSSION/ANALYSIS

This is where you interpret your results.

1. Any required calculations are made here. You should provide **one** example of each type of calculation.
2. Inferences and connections between observations are also done in this section and can be done in paragraph, graph or chart form. If your teacher has not specified, use your judgment as to what is appropriate. By referring to specific observations and connecting these to known scientific facts, you show the reasoning behind the conclusions you have reached.

Ex: “We found that substance A had a density of 1.15 g/mL. From our table of known densities, the closest substances are Phenol Red with a density of 1.03 g/mL and water with a density of 1.00g/mL. Since substance A is colourless, we have concluded that it is water.

3. This is also where you explain any possible sources of error. This should be an experimental error (problems with equipment, procedures that could be done differently). If you suspect any human error, you would of course have gone back and corrected this during your experiment. If it is impossible to do this, then report these errors as well.

CONCLUSION

In this brief (1-2 sentence) statement, you restate your hypothesis in the form of a firm conclusion. This is written in the past tense. There should be no explanation as to WHY you think this is necessary as this was done in your analysis. Ex: *Substance A is water.*

APPLICATION

This is where you answer any additional questions your teacher assigned you regarding the importance or usefulness of your results. These should be in paragraph form, not numbered. You may also supplement your report with researched information about the laws or principles investigated in this lab. Ex *the formula for density, how density is used as a characteristic property, historical uses of density such as the story of Archimedes and King Hiero's crown.* Remember that any researched information should be **property cited** at the end of your report. See citation guide for clarification of this.

HOW TO CITE REFERENCES FOR YOUR SCIENTIFIC LAB REPORT

Please note that your teacher may have a different preference as to how they would like you to cite your references. You should follow your teacher's directions and use this guide as a starting point.

USING DIRECT QUOTATIONS

Direct quotations should be used only if the material is in the exact language of the author of the source. Use direct quotations sparingly throughout your writing. Limit your direct quotations to one sentence at a time.

After using a direct quotation from a source, or paraphrasing an author's idea, you must cite the references in parentheses (brackets) after the sentence.

Ex: "Carbohydrates are important to living systems because they provide the fuel necessary to sustain aerobic cellular respiration." (Smith, 11)

If using a direct quote from a source where no author is given, or from an encyclopedia then replace the author's name with the title of the source.

Ex. "Protein synthesis refers to the connection of several alpha helices and beta sheets to form a three-dimensional quaternary structure." (Student Success)

PARAPHRASING

When you paraphrase a piece of writing, you are **restating** ideas from a source in **your own words**. In a paraphrase, no traces of the original author's sentence structure should remain. In other words, you are paraphrasing the meaning (or main idea) of the passage. Note that there are no quotation marks.

Ex. Osmosis occurs when there is a net movement of water into or out of the cell, resulting in a hypertonic, hypotonic, or isotonic condition. (Sampson, 20)

HOW TO WRITE A BIBLIOGRAPHY FOR YOUR SCIENTIFIC LAB REPORT

All sources used throughout your research must be outlined in a separate section at the end of your report called the Bibliography (or References). This section must appear on a separate page, and must follow the appropriate format. All sources listed in your Bibliography must be found within the body of your work.

The sources in your bibliography must be in **alphabetical order**. This page should be numbered along with the rest of the pages of your report. Single space your entries with a double space **between** entries. The second line of the entry must be indented **5** spaces to the right.

BOOKS WITH ONE AUTHOR:

Smith, M. The Role of Carbohydrates in Energy Systems. Toronto: Ace Publishers, 1996.

BOOKS WITH TWO AUTHORS:

Johnson, K. & Bennice, E. Birds of Canada. Boston: Harvey Publishers, 2004.

BOOKS WITH THREE AUTHORS:

Richards, B., Shaw, G., & Glenn, J.P. Osmosis in Living Cells. Montreal: Printing Press Publishers, 2004.

BOOKS WITH MORE THAN THREE AUTHORS: *(Note that et al. means "everyone else")*

Carter-Edwards, T., Gerards, S., Gibbons, K., et al. Biology 12. McGraw-Hill. Montreal. 2011

ENCYCLOPEDIA:

"Diabetes." Encyclopedia Britannica. 1999 ed.

MAGAZINE ARTICLE:

Thompson, R. "The Evolving Debate Over Stem Cells." Genetics USA. 20 July 2001, p. 41-44.

WEBSITE:

Jefferson, L. "Mitosis and Meiosis". www.mitosisandmeiosis.ky (October 22, 2019).

WEBSITE WITH NO AUTHOR:

Author Unknown. "Cytokinesis and Cells". www.cytokinesiscells.uk.ky (October 26, 2019).

IMPORTANT INFORMATION:

- When referencing a website, include the date **you** visited the site, not the date the site was built. The dates that you see in the brackets above are the dates the student accessed the information from the websites in question for the first time.
- Author Unknown (see last example of "website with no author") must be included in **alphabetical order** in your Bibliography. For example, if you have an author with the last name Anderson, then Anderson would be placed above Author Unknown in your Bibliography.
- Major organizations can also be used as authors. These are some examples that would be accepted: Mayo Clinic, National Institute of Health, Harvard University. Please check with your teacher to make sure the organization/institution you'd like to include is a valid one.