

GRADE 9/10 FORMAL LAB REPORT GUIDELINES

- The purpose of a scientific lab or research report is to reveal to others scientists some specific data you have collected and what you think those data mean.
- The report must be written as clearly and concisely as possible so that the reader can grasp the material quickly and could easily repeat or expand upon your research.
- Whether you are writing a lab report for a course or a paper for publication in a scholarly research journal, the format is similar to what is described here. Organize your paper according to the following sections:
 1. Title Page
 2. Introduction
 3. Purpose & Hypothesis
 4. Materials & Apparatus
 5. Procedure
 6. Observations and Results
 7. Discussion/Analysis Questions
 8. Sources of error
 9. Conclusion
 10. References/Bibliography
- The following is a checklist of information required for each of the above sections

1. TITLE PAGE

- The title of a scientific paper should clearly and concisely indicate exactly what was studied in the lab.
- This is to be centered at the top of the first page and the remainder of the report should follow in the bottom right hand corner of the page.
 - Title should be < 20 words total
 - Title should include the INDEPENDENT VARIABLES and DEPENDENT VARIABLES considered in the lab
 - **Bottom right hand corner:**
 - **(1) student's full name**
 - **(2) group member's name's**
 - **(3) instructor's name.**
 - **(4) course code and period**
 - **(5) date experiment performed**
 - **(6) date handed in [not date due]**

2. INTRODUCTION/BACKGROUND PARAGRAPH

- The introduction is intended to attract the reader's attention. Background information to why this investigation is explained here [*the reason for the lab is not because the teacher told me to do the lab!*]
- An introduction can include background information/research about the topic being studied, history/facts. See exemplar below:

A mechanic working on a car uses many different solutions. Gasoline, oil, transmission fluid, antifreeze, and brake fluid are just a few of these solutions. Different colors are added to these solutions to make it easier to identify the fluids if they leak. For example, antifreeze is often green and transmission fluid is red. Physical and chemical properties are the key to identifying these different substances. In this investigation, you will determine the identities of five unknown substances using your laboratory skills and knowledge of physical and chemical properties.

3. PURPOSE & HYPOTHESIS

- One/Two sentences describing the purpose/problem/question of the investigation
- One sentence stating what you think will happen during the experiment and why. Use the format (If ... Then ... Because ...)

4. MATERIALS & APPARATUS (Equipment used)

- Create a bulleted list of MATERIALS that were actually used in the Experiment (including amount, sizes, dimensions and quantities) before the Procedure: if needed, draw LABELLED DIAGRAMS of equipment set up.
- If chemicals are used, state the safety issues/WHMIS information needed

5. PROCEDURE

- This section must be clear and detailed enough that readers could duplicate the experiment if they wished to do so. So, include all possible detail to ensure your experiment is repeatable by others.
- Since the experiment has been completed by the time this procedure is written this section is written using the PAST TENSE.
 - Procedure is a numbered list of steps (much like a recipe)
 - written in the PAST TENSE, passive voice (i.e. do NOT use personal pronouns like I, we, or you)
 - Detailed and logical procedure that can be REPLICATED
 - CONTROLS should be identified within the narrative
 - Description of DATA gathered/analysis methods used should be included with the narrative

6. OBSERVATIONS & RESULTS [calculations – tables & graphs]

- Record your quantitative and/or qualitative observations in chart form.
- This section should be a straight forward report of the data gathered and the calculation methods used. **NOTE: RESULTS ARE NOT TO BE INTERPRETED OR DISCUSSED IN THIS SECTION.**
 - Tables and figures placed IN CONTEXT within the text
 - TABLES properly formatted showing all QUANTITATIVE and/or QUALITATIVE DATA and calculated STATISTICS
 - Tables are NUMBERED and TITLED at the TOP of the table in the order presented in text
 - FIGURES (i.e., graphs and diagrams) properly formatted and NUMBERED in the order presented in text
 - Figures are NUMBERED/TITLED at the BOTTOM
 - Show all formulas & units used in calculations
 - One example of a SAMPLE CALCULATION(S) when appropriate

7. DISCUSSION/ANALYSIS QUESTIONS

- Answer the "discussion questions". Use them as a guideline and answer these questions in a logical and scientific manner. Identify patterns/relationships/trends in the data where appropriate.
- Answer these in chronological order. Start a new paragraph for each new question, with the question bolded and the answer below.
- When possible, interpretations of the data should be supported by properly cited references using APA Format (author, date) or MLA format.

8. SOURCES OF ERROR

- A discussion about the possible **sources of experimental error** and their impacts upon the results must be made. Discuss the changes and suggestions you would make to the procedure in order to improve the experiment to get better results.
- What is a source of Error?
 - A source of error is issues with the procedure of a lab that may introduce errors or cannot be controlled for, but perhaps improved upon
 - Impurities (from previous experiments, or that cannot be completely rid of), human reaction time, limitations to measuring techniques (i.e. 1 drop – can you be certain that each drop size is the exact same?)
- What is NOT a source of Error?
 - avoid using human errors
 - measuring improperly
 - malfunctioning equipment
 - mistakes or oversights on the part of the scientist
 - not following procedure
 - punching numbers into your calculator incorrectly

9. CONCLUSION

- The conclusion should summarize the lab you performed and your results
- For each purpose identified in the Introduction, state the significant findings of this research.
 - Restate the PURPOSE of the Lab
 - Was your HYPOTHESIS correct or not? Explain the reasoning's.
 - State the SIGNIFICANT FINDINGS/RESULTS (include values where appropriate)

10. REFERENCES

- ALL information within the report that is not your original work or ideas should be referenced using the appropriate APA Referencing Style.
- The quality of your sources must be appropriate to the grade level.
 - Only SOURCES mentioned in the report
 - Use acceptable/standard **APA or MLA Referencing Style** – embedded references with a list of alphabetical references on the last page titled References.
 - QUALITY OF RESOURCES: course textbook(s) and other appropriate senior level sources, such as scientific magazine/journal articles
 - Do not use WIKIPEDIA as a proper reference source.
 - Try using sources within the last 5 years if possible
- Refer to library resources on the school website on how to create citations.
- Refer to exemplars below on APA references:
 1. Textbook:

DiGuiseppe, Maurice (2011). *Physics 11 University Preparation*. Toronto, ON: Nelson Education Ltd.
 2. Website
Health Canada. (2017, February). *Genetically Modified (GM) Foods and Other Novel Foods*. Retrieved March 22, 2005, from <http://www.hc-sc.gc.ca/fn-an/gmf-agm/index-eng.php>

FORMAT of Lab Report

- The lab should be neat/organized/proper format and order
- Font: 12 point, report headings use 16 point with bold
- Margins: Top 1cm, Bottom 2.5cm, left 2 cm, Right 1cm
- Line Spacing: 1 to 1.5
- Single Sided Letter sized paper using black ink
- All tables, charts, pictures & diagrams must have labels ie. [figure 2] & a title & a description of the diagram
- At the bottom of each page (excluding the title page), place a Footer including the following:

[your name lab title page number (page 3 of 7)]
- Run SPELL CHECK and check to ensure you have included all required sections in the correct order, then staple your report with one staple close to the top right corner, so that the entire report can be seen and read.

Prevent Plagiarism & Copying

- Only discuss your observations with other students with rough notes – don't work out final answers & share work!
- Make sure you are putting all your work in your own words and not copying from others!
- DO NOT SHARE your work or results or DRAFT or FINAL copies of your work – lazy people will copy your work!
- Read the rules & penalties for plagiarism