

## 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:

- Title
- Abstract
- Introduction
- Methods and Materials
- Results
- Discussion
- Conclusions
- References

- The following is a checklist of information required for each of the above sections

### TITLE

- The title of a scientific paper should clearly and concisely indicate exactly what was studied in the lab.
- This is to be **centred at the top of the first page** and the remainder of the report should follow immediately beneath this information.
  - Title should be <20 words total
  - Title should include the INDEPENDENT VARIABLES and DEPENDENT VARIABLES considered in the lab

### ABSTRACT

- This is a condensed summary of the entire paper that allows readers to quickly determine whether the report itself is relevant to the topic being researched.
- It is written in the same order of topics as the report and highlights the purpose, method, results and discussion sections.
- It appears immediately after the title, but is often written **after** the formal paper has been completed in order to accurately reflect the paper.
  - Should be <150 words total
  - 1-2 sentence(s) SUMMARIES of the: purpose, method, results and significant findings

### INTRODUCTION

- The introduction is intended to attract the reader's attention.
- The problem/purpose that is to be studied must be identified.
- It is important that the purpose of the paper is justified by communicating the relevance of the research to the world around us. Properly cited references to relevant past works should be included to help justify the laboratory research performed.
- The introduction should end with a clear purpose statement and a hypothesis.
  - Describe the PROBLEM/PURPOSE.
  - State the RELEVANCE of the problem to the world around us. A statement of how current research will EXPAND/CLARIFY KNOWLEDGE.
  - Include HISTORICAL and THEORETICAL background using EMBEDDED CITATIONS.
  - Give a clear HYPOTHESIS.

## **MATERIALS AND METHODS**

- This section must be clear and detailed enough that readers could duplicate the experiment if they wished to do so.
- Since the experiment will have been completed by the time this is written this section is written using the PAST TENSE.
- At post-secondary school levels (University/College) it is traditionally written as a NARRATIVE and not as a list of instructions.
  - Written in a NARRATIVE using PAST TENSE.
  - Detailed and logical procedure that can be REPLICATED.
  - State MATERIALS (including sizes, dimensions and quantities) within the narrative: if appropriate, draw LABELLED DIAGRAMS of equipment set up.
  - CONTROLS should be identified within the narrative.
  - Description of DATA gathered/analysis methods used should be included with the narrative.

## **RESULTS**

- 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 the text.
  - FIGURES (i.e., graphs and diagrams) properly formatted and NUMBERED in the order presented in text.
  - Figures are NUMBERED/TITLED at the BOTTOM.
  - One example of a SAMPLE CALCULATION(S) when appropriate.

## **DISCUSSION**

- For each purpose stated in the introduction, INTERPRET what the data means.
- Describe patterns and relationships *with reference to the data*, and explain what they mean.
- When possible, interpretations of the data should be supported by properly cited references.
- If "discussion questions" are to be answered, use them as a guideline for supplementing the Discussion section and integrate the answers to these questions into a logical discussion and answer these in chronological order.
- A discussion about the possible sources of experimental error and their impacts upon the results must be made.
- This section should conclude with a statement about any new findings and a discussion about whether the hypothesis was supported.
  - DATA INTERPRETATION via NARRATIVE using PAST TENSE.
  - Reference to each part of the PURPOSE.
  - Reference to significant TABLES and/or FIGURES. Identifying PATTERNS/RELATIONSHIPS/TRENDS in the data.
  - Integration of DISCUSSION QUESTION(S) answers where appropriate.
  - SUMMARY STATEMENT in which the hypothesis is rejected/accepted.
  - REFERENCE to the literature via EMBEDDED CITATIONS when appropriate.
  - A description of sources of EXPERIMENTAL ERROR and SUGGESTIONS FOR IMPROVEMENTS.

## **CONCLUSION**

- For each purpose identified in the Introduction, state the significant findings of this research.
  - Restate the PURPOSE.
  - State the SIGNIFICANT FINDINGS.

## **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 12 level.
  - Only SOURCES mentioned in the report.
  - Use acceptable/standard APA Referencing Style.
  - QUALITY OF RESOURCES: course textbook(s) and other appropriate senior level sources, such as scientific magazine/journal articles.