

WRITING SCIENTIFIC LABORATORY REPORTS¹

Other Handouts:

- Scientific Writing
- Quoting & Referencing
- Scientific Notation

All laboratory reports follow a standard format, although there may be minor variations required by particular units of study. The basic purpose of laboratory reports is to record your findings accurately and describe their significance.

A laboratory report is more than simply a copy of the results from your experimental work. You need to demonstrate how well you understand the concepts that underpin both the experiment and the data you generate. In order to convey your understanding convincingly, you will need to write clearly and order your thoughts in a logical way throughout the report.

Step 1: *WHAT* do you need to know in order to understand this experiment?

Research your topic! Most laboratory reports require an explanation of the background concepts involved in the experiment. Asking yourself questions about the purpose of the experiment before it starts will help you establish what it is you need to know from the experiment.

- What is the aim?
- Why is it important to explore this topic?
- How is this topic related to the other concepts you are examining in the unit?

Tip!

Complete your research about the lab well before it starts.

Step 2: *WHY* you are doing this experiment?

Research the scientific principle you are trying to demonstrate through the experiment. Read the relevant sections in your Study Guide and Laboratory Manual beforehand to establish what you will be doing. Read your textbooks and lecture notes to ensure you understand what results to expect (in a general sense) and why. Write a paragraph or two answering the following question:

- What scientific principles will this experiment help you explore?

Step 3: *HOW* are you going to do this experiment?

Read your laboratory manual to determine the sequence of tasks you will perform and to discover what instruments and materials you will be using. Make sure you are clear about:

- The order in which each task should be done

¹ Psychology students should refer to O'Shea, R., Moss, S., & McKenzie, W., (2006) *Writing For Psychology* (5thed.) Melbourne: Thomson.

- Whether you need to start some tasks while other tasks are continuing
- Whether you are working alone, in pairs or in groups – and if this applies to all of the laboratory session or only parts of it
- What the instruments are and what they do (e.g. if you are using a spectrophotometer do you know what it measures?)

Knowing how you will complete the experiment will make it easier to write about the process in the report. Also, these factors can have an impact on your results, so it is worthwhile keeping track of them.

Tips!

You will find it much easier to write up your report if you prepare the appropriate tables and papers for recording your results before beginning the lab.

In many undergraduate laboratory sessions you will be conducting your experiment as part of a group. It is essential that each person within this group knows exactly what they are to do.

Step 4: Create the format for your report

The following format is a template only – make sure you follow the specific guidelines requested by your instructor/tutor - the person who is marking your report.

Basic Format of a Lab Report

Title Page: Must have title of experiment & names of people in your group. Title should be short while reflecting the exact nature of the experimental study.

Abstract: Summarise in one short paragraph the reason for the study, the methodology, the results that were obtained and the conclusions that you reached.

Introduction: Explain why this study was carried out (i.e. what were you trying to explore or prove?). Summarise the relevant background information that explains existing theories or knowledge about this experiment. Finally, state your scientific objective, i.e. the hypothesis you are addressing.

Materials and Methods: List the materials used and describe *exactly* how the experiment was conducted. Often, this will already be described in detail in your Lab Manual. Many instructors/tutors will prefer you to refer your reader to this information rather than rewrite it all again in your report. Check with your instructor/tutor. Be sure to use correct referencing! (both in-text and end of text referencing). Always write your methodology in the past tense.

Results: Summarise your observations and the data of the experiment *without* interpreting them, i.e. no comments about why you got the results you did. It is

Format of a Lab Report

- **Title Page**
- **Abstract**
- **Introduction**
- **Materials & Methods**
- **Results**
- **Discussion**
- **Conclusion**
- **References**
- **Appendix**

extremely useful to present your data using tables and figures (graphs, photos, illustrations are all figures); however, you must also include a description of your findings. This can be as simple as a few sentences *and* must appear *before* the table or figure it refers to. Concentrate on the overall trends in your data, not every single detail. Sample calculations can be included in the Appendices. Always write your results in the past tense.

Reminder!

All tables and figures must have a title and number. You must use this number when describing your findings. For example, "There was a 30% increase in the rate of heating (Fig.1)."

Make sure the axes on any graphs are labelled correctly and include the appropriate units of measurement.

Discussion: Discuss the experiment by interpreting your data, explaining what your outcome means and how your results relate to the background theory already mentioned in your Introduction. A very good way to begin your discussion is with a sentence that describes your most significant results. This is also the section to discuss factors which may have influenced your results (did everything go according to plan? If not, how did it affect your results?). It may be necessary to offer possible reasons why your results did not match those of similar experiments. Where appropriate, *reference* information in the Laboratory Manual and other literature. Your discussion needs to let your reader know what can be concluded from your results. Write in the present tense.

Conclusion: Provide a statement or two about what you can accurately conclude from the results you obtained.

References: Include all material you have used to help you write this laboratory report. Ensure that you use the recommended referencing style (usually Chicago – if in doubt, ask your demonstrator/tutor).

Appendix: Include raw data here if appropriate; this might include sample calculations.

Tip!

Write the abstract last – when you know exactly what you did and what you achieved.