Chemistry lab reports

Academic Tip Sheet

This academic tip sheet:

- outlines the guidelines for writing a laboratory report; and
- looks at what you should write in each section.

Guidelines for writing lab reports

Laboratory reports are a written version of the experiments that you performed in the lab. While individual departments may adopt a preferred structure for lab reports, there is clearly a general format that is the norm. It includes the following sections: Title, Abstract, Introduction, Materials and methods, Results, Discussion, Conclusion, References, and Appendices. However, your lab reports may not need to include all of these headings. Check with your demonstrator or lecturer as to what is required. You are required to use the following headings:

- Title
- Introduction
- Materials and methods
- Results and discussion
- References

Further guidelines are provided on each of the above sections within your lab report.

Title

The title for the lab report may be provided by your lecturer. If not, you will need to make up your title. It should be brief, informative, and interesting. It is not usually a sentence. You should aim to provide just enough information in the title to avoid it being overly general. The key is to be concise and meaningful.

Check with your lecturer if you need to include a title page and ensure all the relevant information is supplied. This will include your name, student number, date of the experiment, the demonstrator's name and the group you belong to.

Introduction

The introduction should be clear and concise. It should tell the reader what to expect in the report. An introduction generally includes the following elements:

- Problem – State the issue investigated by the experiment.
- Background – Briefly summarise previous research on the topic and narrow the scope of the study.
- Objectives – State the aim of the experiment and state the methods used.
- Hypothesis – If this is not already given, you must formulate this in unambiguous terms.

The introduction is written in the past tense following the scientific style of writing.

Materials and methods

This section should contain a clear enough explanation of how you conducted the experiment so that someone wishing to replicate the procedure may be able to do so. Here you should describe the experimental design, the treatments and the apparatus you used. You should follow the rules for the conventional descriptions of chemicals. The standard practice is not to use trade names for chemicals. Instead you should use the generic or chemical names. Standard apparatus should be described in proper technical terms. Also, you should describe the procedures and methods of measurement you used. At the end of this section you should provide details of how you analysed the data. If this involved lengthy statistical calculations, these should be attached as an appendix.

Results and discussion

This section should be organised in a systematic way such that you first present the results and then discuss them.

To report on results you should describe what happened. This is perhaps the most important section of your report because it is where you report the data upon which your conclusions are based. Accuracy, clarity of expression and systematic presentation of the data (e.g., use of tables, graphs, figures, diagrams, etc.) are key factors here. Take note that tables and figures do not simply repeat information given in the text – they are meant to summarise, amplify, or complement it. You should report first the results that bear directly on the title of your lab report. Any other interesting findings should follow this. If the experiment had more than one hypothesis, you may want to organise your results in a way that reflects this. A key principle is never to falsify the results, even if the results did not support a well-accepted hypothesis.

Once you have reported the results of the experiment you need to discuss them. This requires analytical thinking to enable you to explain the results. The discussion section should have clear connections with what you said in the introduction and to relevant literature on the topic. You need to say whether or not the results supported the hypothesis. If not, you should provide possible reasons. At this stage you may also comment on issues such as problematic methodology (i.e., design and procedures) or reliability.

This section should end with a concluding paragraph (or statement) about the significance of your findings, and where applicable suggest further steps in the scientific process (e.g., that it may be advisable to repeat the experiment with slightly different procedures, or that future researchers could explore a different dimension to the design).

References

All information (i.e. ideas and words) from other sources used in your report must be accurately cited in-text and the full bibliographic information supplied in the reference list at the end. Do not include sources that you have not cited in the reference list. In adopting a particular referencing system, you need to follow the rules consistently throughout your report.

Appendices (occasionally)

These are not included in all lab reports. They should be used when you need to include detailed information to support/substantiate something you have said in the report. For example, it might include the raw data of your results. If there are several appendices, they need to be numbered with clearly indicated headings. When you make reference within your report to where the reader may find the detailed information, you should refer to the appendix by number (as you would do for tables and figures).

Laboratory report checklist

- **Have you put your name, student number, date of the experiment and the demonstrator's name on your lab report?**
- **Were you clear about the hypothesis you were testing?**
- **Have you included all the appropriate sections in your lab report?**
- **Are your charts, figures and graphs drawn in the correct format?**
- **Are all sources correctly in-text and end-text referenced?**
- **Did you hand in your lab report on time and in the correct format?**
- **Did you keep a copy of your report for your own records?**

Acknowledgements

This material was modified from source documents prepared by Kuki Singh, ECU, September 2007. Editor: Trevor Bennett.