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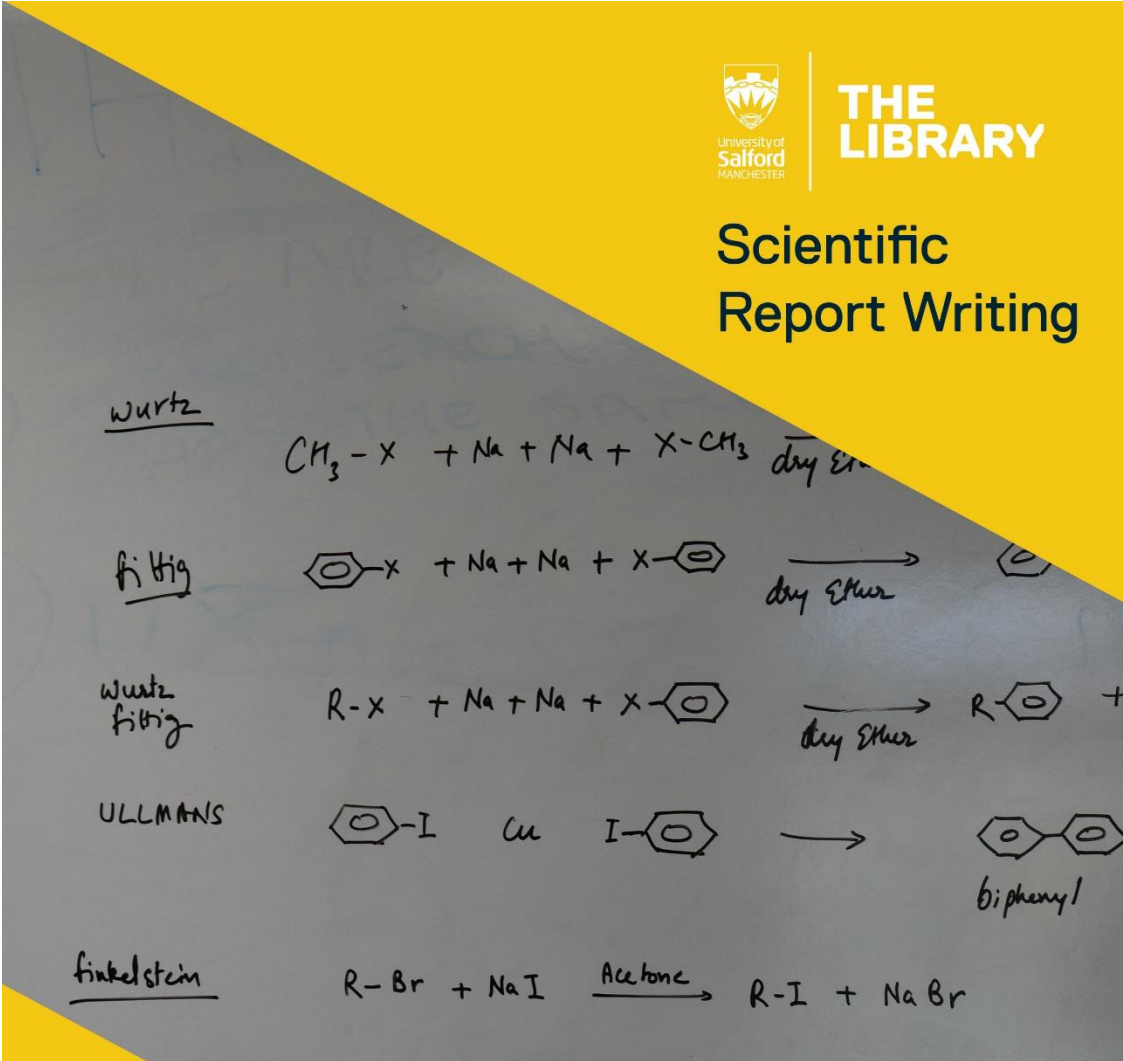
Scientific Report Writing



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Introduction

At some point in your degree (if you are studying a science or science-related degree), you may be asked to produce a science-style report. A report is the result of an investigation, experiment, or research that presents the findings in one document. You may be asked to write a short report of 1000 words, or you might undertake a research project of 20,000 words (or more).

How is a report different from an essay?

A report will be visually quite different from an essay. It will have the following:

1. Headings and distinct sections.
2. Graphs, charts, photographs, and so on if appropriate.

Depending on its length and purpose, a report may include any or all of the following:

1. Title / Author.
2. Abstract.
3. Aims / Objectives.
4. Introduction.
5. Materials & Methods.
6. Results.
7. Discussion / Conclusion.
8. Reference list.

By laying it out with headings and sub-headings, the reader can locate specific pieces of information without trawling the whole document. It should be easy to navigate through. A good report will show

clear purpose and objectives and have a logical structure.

Where do I begin?

Planning is essential when writing a report. Working out a timescale and planning strategy will help you complete the report in time for handing in and avoid rushing things at the end. One good way of helping you plan is to use a diary.

1. Divide the report into stages and allocate time for each stage.
2. Plan time to collect information, carry out experiments or your own research, read previous research, and collate your own notes.
3. Set aside time to proof read and amend it before you hand it in.
4. Printing and binding (if necessary) can all take time?
5. If you are working as a group, arranging agreed meeting times is essential.

You could create a hypothesis to work from in your report. A hypothesis often makes some sort of statement regarding the subject of the report. It can

state an assumption made to aid your argument or objective. In many cases, you will be expected to build your own “question” to answer, and this will feed your hypothesis.

What about the Purpose?

When planning your report, you need to consider what its purpose is. Think about the following two questions:

1. The Objective. What is the purpose and objective of the report? Why is it being written and what does it intend to do?
2. Scope/limits. What should you include/exclude?

What will I need to collect?

It can be difficult knowing what information will be useful to you in your report. By keeping your topic and areas of research in mind, you can sift through much of what you don't need logically. If you set yourself questions that you need the answers to for your report, you can then find the answers in the information to hand.

Where do I look for relevant information?

There are many places where you will find useful and relevant pieces of information for your report. This list gives some examples but is not exhaustive.

1. Your own lecture notes and lecture handouts.
2. Scientific Information search engines, e.g. PubMed.
3. Your own survey/experiment/research carried out.
4. Journals.
5. Books.

6. Websites (BUT treat with caution, not peer reviewed. Anyone quoting Wikipedia *etc.* should not expect a high mark. Should be used for technique specific information, *e.g*. manufacturer's instructions for kits.)

My own survey/experiment/research sounds complicated.

Results can be given in tables or graphs to illustrate your findings.

Different types of data can be measured in your research. These are generally either quantitative or qualitative data. It depends on the subject of the research as to which type you will produce.

Scientific research will usually give quantitative data. This can be measured and counted and involves numerical results that can be put into graphs and charts. It is often considered objective and more accurate than qualitative data. This research generally involves experiments, closed question surveys (yes/no answers only), or structured interviews.

Before you begin writing the report itself, run through this checklist to make sure you will have everything you need.

1. You must be clear about the report's purpose and aims.
2. Have all the relevant literature you intend to include.
3. Have your own research ready with results.
4. Decide on the type of charts/graphs/diagrams you will use.
5. Have a reasonable conclusion in mind.

How do I format my report?

A report structure is usually based on the following format, but you should always check with your tutor in case they expect something different.

1. **Title page:** explains what the practical was about.
2. **Author**: explains who did the work.
3. **Abstract**: this should be a full, but succinct, summary of the whole report. Check it is required by your tutor.
4. **Introduction:** this sets the scene for the reader. It gives background information on the subject of the report and explains why the work was done and indicates the central hypothesis.

5. **Materials and Methods:** explains how the work was done and should contain sufficient detail to allow another student to repeat the work.
6. **Results:** must include a written explanation of the results of the study with graphs, diagrams or tables to display the data obtained. Remember to accurately label and number your charts, graphs or diagrams for easy reference in the text.
7. **Discussion / Conclusions:** used to discuss the results, their meaning and importance, and to compare with those of other published work, either in textbooks or scientific articles and reviews. You will need to refer back to your introduction and, if you have one, hypothesis to write your conclusion. It should be clear and to the point, detailing the conclusion your report has come to.
8. **Reference list:** this should be a formatted list of any texts you have used in construction of the report, as with any academic assignment. Please check with your tutor which style you are required to use.

Do not forget to put page numbers on your work!

What about writing style?

You should be careful about the style of writing in your report.

The language you use should be clear and straightforward. It needs to be written in an academic style without unnecessary adjectives and adverbs, and it should be punctuated correctly. Try not to use long-winded phrases such as “at this moment in time” or “owing to the situation that.” You should use “now” or “because” instead. These statements are too wordy and will not help you get better marks.

Also, avoid a too “chatty” style of writing or colloquialisms. Your report needs to be business-like and professional.

As with all academic writing, avoid using contractions such as “don’t” and “shouldn’t.”

Similarly, as with all academic writing, you should remain objective throughout the report unless you have been specifically told to include your own opinions and thoughts.

Structure

Abstract

Check that an abstract is a requirement for any report. If it is not required, do not include it (as it would be a waste of word count). It should cover all aspects of the report, including the purpose, methods, results and discussion/conclusions. Despite this, it needs to be succinct, usually about 200 words. Being able to write a good abstract shows that you know the fundamental reasons for the study, and also that you can select the most important results and findings.

Introduction

An introduction sets the whole report going for the reader and also for you too. It allows you to get to grips with what you intend to do in the report and can be referred back to at any point to make sure you are staying on track. If you have created a hypothesis statement, this is where you can put it.

Materials & Methods (or Methodology)

The Materials & methods section is simply an explanation of what you have done to acquire your results. If you conducted experiments, then give details of exactly what you did. For laboratory experiments, be sure to include volumes, amounts or concentrations used, and make sure you know the difference between each of these terms.

Be careful to present the details in a logical order, arranging the information into sub-sections and presenting them from the most important to the least. Report on those actions that have been completed using the past tense, but generally write in the present tense. Always be consistent in your use of tenses otherwise your writing may confuse the reader.

Results section

A written report on the outcome of your experiments or research. Remember to interpret the results for the reader so they are not left guessing the conclusions. Results are often based around information displayed in graph, table or diagram format and marks are easily lost when students omit to label these correctly.

Choose concise terminology making sure that you do not use 15 words where 7 will suffice. For that reason, consider whether you need to write words such as ‘clearly’ and ‘significantly’.

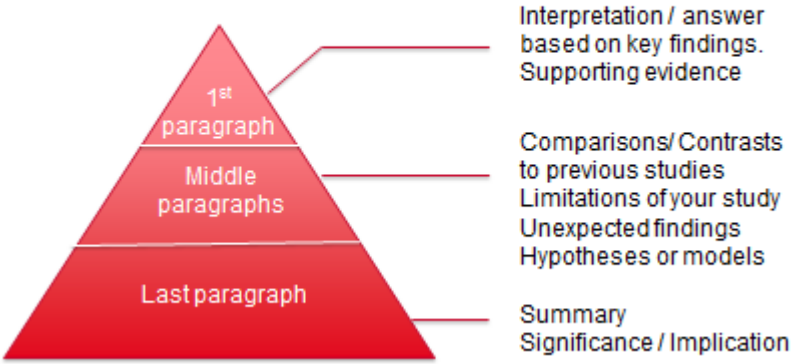
When labelling images, give them a title that allows interpretation of the information they contain. Figure titles and legends should be placed beneath the Figure, while titles of Table should be above the table they refer to.

Remember:

- **T**able title goes at the **T**op of the table
- **F**igure titles go at the **F**oot of the figure

Discussion / Conclusions:

Hofmann, (2010), recommends that the discussion be organised in a pyramid structure:



Next, you need to write your conclusion and any recommendations that have arisen as a result of your research. Your conclusion should be clear and not too long. It should refer back to your initial aims and objectives to see whether you have done what you set out to do. It should not include any new information nor should it answer any questions not raised in the main body.

General advice for report writing

Proofreading is essential as with all academic work. Read over your work after every section and reword it if necessary. You should get through two or three drafts of your report, and each one should be proofread thoroughly. You may find that you have drifted away from your aims and objectives. Proofreading each draft can steer you back onto the correct path. While drafting, don't worry too much about layout and presentation: you can play around with that once finished. Once you are happy with the wording, perform a careful read through, paying close attention to grammar, syntax, clarity, and layout.

Here is some advice on layout and presentation:

1. Use a standard font (either Times New Roman or Arial) in 12 point.
2. Have a one inch margin to all sides.
3. Use double or at least space and a half spacing.
4. Indent the second and subsequent paragraphs if a section goes over one paragraph long.
5. Think about using colour, however, stick to black for the text.

6. Use bold for headings and sub-headings but be consistent with size.
7. Check whether your module handbook contains any specific information about the required layout and formatting of your report.

And finally…

Depending on the length of your report, you can present it in different ways. A plastic wallet with metal clasp for standard hole-punched paper may be enough, but you can have a longer report spiral bound by a professional company. This is really up to you, but that sort of thing will cost money. A booklet made up of plastic pages can look good and also keeps the pages clean and tidy. However, your tutor may want it simply stapled together, so make sure you are aware of any requirements regarding this.

Other Study Basics guides which you may find useful:

Study Basics Poster Presentations; Study Basics Scientific Writing; Study Basics Writing a Scientific Paper; Writing Your Dissertation.

References

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Updated July 2019