



Scientific Lab Report Handout

Adapted from Warren D. Dolphin's "Writing Lab Reports and Scientific Papers"

Scientific papers, especially lab reports, are generally very structured, concise, and written in third person. The following is an outline of the sections (and material to be included within each section) necessary to have a complete lab report. Remember, the length of your report will depend on the amount of information you intend to cover, and with the exception of the Abstract, there is no word requirement.

Title

The title should be less than ten words and should reflect the factual content of the paper. Scientific titles are not designed to catch the reader's fancy. A good title is straightforward and uses keywords that researchers in a particular field will recognize.

Abstract

The purpose of an abstract is to allow the reader to judge whether it would serve his or her purposes to read the entire report. A good abstract is a concise (100 to 250 words) summary of the purpose of the report, the data presented, and the author's major conclusions. *Keep in mind that professors often have their own preferences, so you should ask your professor if you want to double-check this requirement.*

Introduction

The introduction defines the subject of the report. It must outline the scientific purpose(s) or objective(s) for the research performed and give the reader sufficient background to understand the rest of the report. Care should be taken to limit the background to whatever is pertinent to the experiment. A good introduction will answer several questions, including the following:

Why was this study performed?

This may encompass or replicate the "purpose of the experiment(s)" that was included in the abstract

What knowledge already exists about this subject?

The answer to this question must review the literature, showing the historical development of an idea and including the confirmations, conflicts, and gaps in existing knowledge.

What is the specific purpose of the study?

Include your hypothesis (or hypotheses, if you are reporting about multiple experiments).

Materials and Methods

As the name implies, the materials and methods used in the experiments should be reported in this section. The difficulty in writing this section is to provide enough detail for the reader to understand the experiment without overwhelming him or her. When procedures from a lab book or another report are followed exactly, simply cite the work, noting that details can be found in that particular source. However, it is still necessary to describe special pieces of equipment and the general theory of the analyses used. This can usually be done in a short paragraph, possibly along with a drawing of the experimental apparatus. Generally, this section attempts to answer the following questions:

What materials were used?

How were they used?

Where and when was the work done? (This question is most important in field studies.)

Results

The results section should summarize the data from the experiments without discussing their implications. The data should be organized into tables, figures, graphs, photographs, and so on. However, data included in a table should not be duplicated in a figure or graph.

All figures and tables should have descriptive titles and should include a legend explaining any symbols, abbreviations, or special methods used. Figures and tables should be numbered separately and should be referred to in the text by number, for example:

1. Figure 1 shows that the activity decreased after five minutes.
2. The activity decreased after five minutes (fig. 1).

Figures and tables should be self-explanatory; that is, the reader should be able to understand them without referring to the text. All columns and rows in tables and axes in figures should be labeled. See appendix B for graphing instructions.

This section of your report should concentrate on general trends and differences and not on trivial details.

Discussion

This section should not just be a restatement of the results but should emphasize interpretation of the data, relating them to existing theory and knowledge. Speculation is appropriate, if it is so identified. Suggestions for the improvement of techniques or experimental design may also be included here. In writing this section, you should explain the logic that allows you to accept or reject your original hypotheses. You should also be able to suggest future experiments that might clarify areas of doubt in your results.

Literature Cited

This section lists all articles or books cited in your report. It is not the same as a bibliography, which simply lists references regardless of whether they were cited in the paper. The listing should be alphabetized by the last names of the authors. Different journals require different formats for citing, and this also may be influenced by your professor. When in doubt, ask your professor for clarification!

When citing references in the text, do not use footnotes; instead, refer to articles by the author's name and the date the paper was published. For example:

1. In 1988, Fox investigated the hormones on the nest-building behavior of catbirds.
2. Hormones are known to influence the nest-building behavior of catbirds (Fox, 1988).

When citing papers that have two authors, both names must be listed. When three or more authors are involved, the Latin *et al.* (*et alia*) meaning "and others" may be used. A paper by Smith, Lynch, Merrill, and Beam published in 1989 would be cited in the text as:

Smith et al. (1989) have shown that...

This short form is for text use only. In the Literature Cited, all names would be listed, usually last name preceding initials.