

## GUIDELINES FOR PREPARING FORMAL LABORATORY REPORTS

### I. Planning the Report

A scientific written report of an experiment is an integral part of your investigation or research and represents a record of work done, results observed, and conclusions drawn. You and your readers will both benefit from accurate, clear, and concise writing.

Most scientific papers contain 5 main sections which are: (1) **Abstract**; (2) **Introduction**; (3) **Methods and Materials**; (4) **Results**; and (5) **Discussion**.

1. The first step in planning the report is to organize your background material, observations, results and conclusions into the 5 main parts of the paper. Prepare a short outline of each section.
2. Remember that the **Abstract** is a short summary of your paper. The **Introduction** gives the background of the problem. **Materials and Methods** and **Results** deal specifically with your experiments, and the **Discussion** relates your experiments to the problem introduced in the **Introduction**.
3. Prepare a tentative title for your report. When you have completed your report, re-examine your title and rewrite it if necessary to make it clearly representative of your experimental work. This is also the time to write an abstract, if required.

### II. Writing the Major Sections

#### A. **Abstract**

1. Describe the problem you are investigating in a few sentences.
2. State your results concisely.
3. The abstract should be no longer than one paragraph.

#### B. **Introduction**

1. Include a brief presentation of background information or previous studies relevant to your problem. A review of literature relevant to your problem is appropriate in this section.
2. Clearly identify the subject area and state or define the problem your investigation was designed to solve.

#### C. **Methods and Materials**

1. Describe your methods and materials in sufficient detail to enable another investigator to evaluate your work or to duplicate your research procedure. Do not, however, load your report with unnecessary detail.

2. Well-known techniques or instrumentation can simply be named without great elaboration in most cases. However, for lab reports the principles involved in utilizing certain techniques or procedures should be briefly discussed. When possible, indicate any advantages or limitations of the methods you used in your investigation.
3. Other comments pertinent to this section.
  - a. Flow diagrams may be useful as a means of summarizing long procedures.
  - b. If you departed from the instructed procedure, note this and explain why.

#### D. Results

1. Present the results of your investigation in orderly and coherent sequence. Include only such data and illustrative material as are pertinent to the subject of your paper. Do not omit important negative results. In this section **avoid extensive discussion**.
2. Organization of data in Tables and Figures is recommended (see IIIB. Tables and Figures).
3. Provide **enough narrative** to make your data presentation understandable.
4. Identify controls in your data.

#### E. Discussion

1. This section concentrates on the interpretation of your results, not merely a restatement of them.
2. Explain each of your results. Be careful to give a hypothesis as to why you found the result you did. Support your hypothesis by using references.
3. Suggest briefly other experiments which might extend or modify conclusions reached during the experiment.
4. Discuss significant trends or departures from trends, and a reasonable explanation of them.
5. Well-thought-out speculation is permitted in this section.
6. Conclusions should be brief and include only conclusions that can be validly drawn from and supported by your data. Do not place discussion or speculation in this section.

#### F. Literature Cited

1. Follow the accepted format for citations in scientific literature:

Boorman, L.A. and S.R.J. Wodell. 1966. The topograph, an instrument of measuring in microtopography. Ecology 47:869-870. (article)

Jones, J.A. 1985. The Genetics of Arthropods. Wadsworth Publishers, Belmont, California. (book)

### III. Other Guidelines

#### A. Citing reference material in body of text

1. Use name and year system as indicated by these examples:

One author: Bellrose (1950) or (Bellrose 1950)

Two authors: Bellrose and Lowe (1950) or (Bellrose and Lowe 1950)

Three or more authors: Bellrose et. al. (1950) or (Bellrose et. al. 1950)

2. The placement of the parentheses depends on sentence structure.

Bellrose et. al. (1950) reported that wood ducks were once abundant in Illinois

Wood ducks were once abundant in Illinois (Bellrose et. al. 1950).

#### B. Tables and Figures

Each table or figure must be able to stand by itself (i.e., each must have a heading or caption that makes it understandable to the reader without reference to the text).

1. Tables. Headings should be placed above tables. Each heading should be brief and concise, but explain the content of the table. Subheadings and units should be placed at the top of columns. Tables should be numbered consecutively throughout the report, but separately from figures. Table numbers should precede the heading. An example table is shown below:

Table 1. Energy associated with light at various wavelengths.

Wavelength (A)	Color of light	Cal/Einstein
3950	violet	71,800
4900	blue	57,880
5900	yellow	48,060
6500	red	43,480
7500	far-red	37,800

2. Figures. Captions should be placed beneath figures. Each caption should be brief and concise, but explain the content of the figure. Both the abscissa and ordinate on graphs should be identified with labels and units. Figures should be numbered consecutively throughout the report, but separate from tables. Figure numbers should precede the caption.

An example figure is shown below:

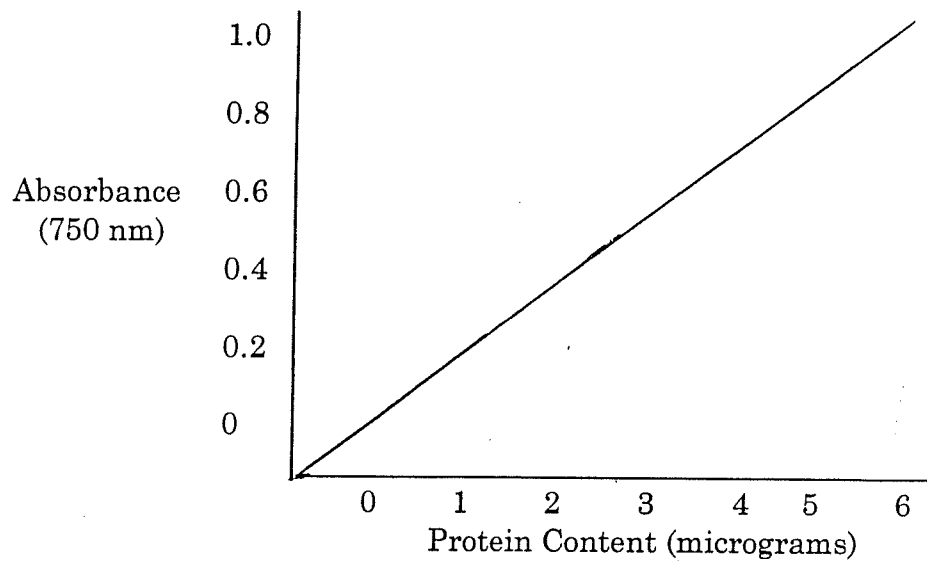


Fig. 5. A standard curve for protein concentration obtained by the Lowry method. The protein used was bovine serum albumin.

### C. Style

1. Person. Decide early which person -- first, second, third -- you will adopt for each of the various phases of your writing. The first person (I, we) is natural for relating what you did. The second (you expressed or you not expressed but understood) is convenient for giving directions. The third (he, she, it, they, or a substantive) has definite advantages for telling what happened.
2. Tense. Follow a logical pattern of tenses. Record observations and completed procedures in the past; write directions, generalizations, and references to stable conditions in the present tense.