

# How to Write a Scientific Laboratory Report

## BEFORE YOU BEGIN YOUR LAB REPORT

Confirm your data with the lab instructor or your lab partner before you begin to write your report. Many scientists begin with writing the Results and Discussion sections. This helps them later write the Introduction, Materials & Methods, and Abstract. Often, the title is created last. Once you have confirmed the data and written a draft of the different sections, present your report in the following order:

## SECTIONS OF A LAB REPORT

### Title

Be direct and descriptive. State main topic studied (e.g., experimental organism, type of mineral or chemical system).

### Abstract

Put this first but write it last. An abstract is a one to two paragraph summary of your research. It should contain your hypothesis and a brief justification, a summary of your findings, and a summary of the conclusions you drew from them. **Consider the following questions:**

- What questions did you address (Introduction)?
- Why do you care about these questions (Introduction)?
- How did you address these questions (Methods)?
- What were the answers to these questions (Results)?
- What are the implications of these answers? Are the data consistent with the hypothesis (Discussion)?
- Why do we care about these answers (Discussion)?

### Introduction

Introduce your reader to the topic, giving the background information necessary to understand your experiment or research project and *why it matters*. If you are experimenting with organisms, give their scientific names. You must also include your hypothesis and a justification of it in this section. If you have done a good job providing background information, only a sentence or two should be necessary to clarify your justification. Sometimes you may also need to include your null hypothesis in this section. **Consider the following items:**

- Summarize findings from previous experiments with appropriate references, but avoid direct quotations.
- Catch the reader's attention with a surprising fact or a pressing issue.
- Refer to an organism by using the entire Latin name the first time you refer to it, then abbreviate the first half of the name subsequent times:

1<sup>st</sup> mention: *Strongylocentrus purpuratus*

2<sup>nd</sup> mention: *S. purpuratus*

- State your hypothesis (what is predicted to happen). Be sure to distinguish your hypothesis from your results.

### **Materials and Methods** (sometimes separate sections)

Written in paragraph form, an explanation of how you conducted your experiment or research, clear enough that someone could read this section and replicate your experiment. Make sure to mention all equipment used and specify: equipment models and sizes, amounts of things, sizes of trials and numbers of samples, etc.

### **Results**

This section is used to present findings in a clear and concise manner; it is not a place to explain or interpret data. Present your results briefly but **do not analyze** them. This is (generally) the place for graphs and tables. Label each graph (as Figure #) or table (as Table #) in the order they appear in your report. As part of each figure/table label, write a brief sentence as description. Following your graphs and tables, write a brief summary of your results, without analyzing them. Draw attention to trends in data. It may be appropriate to note if there were significant differences in your data, by citing p-values of t-tests. As you summarize your data, put (Figure/Table #) in parentheses at the end of sentences referencing data from the corresponding figures/tables.

*Ex. There was a significant difference in the deer populations between sites A and B ( $p = 0.023$ ) (Figure 3).*

### **Discussion**

This is the section used to interpret data. This section should be detailed but as concise as possible. Discuss possible significance, trends, or correlations of your results. Explain whether or not you accept or reject your hypothesis and why, using you analyzed data as support. Also discuss potential sources of error in your experiment/research and how they could have affected your results. **Consider the following questions:**

- Do the results support the hypothesis? Why or why not?
- How do the results compare to previous work? (Refer back to information cited in the introduction.)
- What went wrong? What could have been done better? What are possible sources of error?
- What future experiments should be conducted?
- Have you presented the data to which you are referring in the results section?

### **Conclusion** (sometimes combined with discussion section)

Explain any broader implications of your study/experiment. Suggest further research that could be done to expand on your work.

### **Literature Cited**

An alphabetized list of all of your sources, cited properly, in the format specified by your instructor.

## GENERAL CONVENTIONS

- Be sure you know whether to write in passive or active voice. Professors tend to feel very strongly about their preferred voice.
  - Ex. Passive voice: "The data was analyzed."
  - Ex. Active voice: "We analyzed the data."
- Write in present tense for the introduction, discussion, and conclusion.
- Write in past tense for the abstract, results, and materials and methods.
- Give your lab report a clear title, descriptive of what your study/experiment is.
  - Ex. Petiole Abscission of *Phaseolus vulgaris* in Response to Ethylene and Abscisic Acid Treatments
- Express large or small numbers in scientific notation.
- Table labels go *above* tables; figure labels go *below* figures. Labels should clearly describe what is depicted in the table or figure.
- For in-text citations, use author and publication year format.
  - Ex. (Doe 2011)

## CONVENTIONS BY BRANCH OF SCIENCE

### Biology

- List organisms' names in full the first time they appear in text. Use binomial nomenclature (genus and species names), capitalizing the genus name and putting the entire name in italics. For all following references abbreviate to the first letter of the genus name and the full species name.
  - Ex. *Drosophila melanogaster*, then *D. melanogaster*.

### Chemistry

- Draw out chemical mechanisms and list reagents. Make sure chemical structures are clearly aligned. Figure legends must include full names of substances or processes and, like table titles, should give a general overview of what is shown.
- Citations are footnoted, rather than in-text.

### Environmental Studies

- Include a description of your sampling sites in the methods section.
- Put all of your figures and tables in a section labeled "Figures and Tables" at the end of your report, after the literature cited. Put all of the tables together before all of the figures.