

Writing Scientific Papers (L. Murata & H. Drossman)

Your lab report will follow the format of papers published in scientific journals. All lab reports should be typed and double-spaced. You may work together on interpreting and graphing results and formatting papers, but all written work must be original. Figures and tables should be numbered and given a descriptive title. They are referred to by number in the body of the text (such as "see Figure 2 and Table 2"). Figures and tables may be placed within the text or attached at the end of the report. For examples of scientific papers, refer to journals such as *Analytical Chemistry* or *Biochemistry*. These papers are organized into discrete sections, each of which describes a specific aspect of the report. For your report, use the following format, and label each section as such ("Abstract", etc.) in the paper. You may submit a preliminary report to me at least two days in advance of the due date for review.

I. Abstract

This is a short section (less than 200 words) that **briefly** describes the purpose of the experiment, the methods used, the important results, and conclusions drawn. Abstracts serve to **summarize** the report so that a potential reader need only read the abstract to understand the general purpose, conclusions, and implications of the experiment. Generally, only a researcher in the field (or a professor) would then go on to read the rest of the report, which contains the details of the experiment. An example is given below:

ABSTRACT

Many chocoholics feel that world production of chocolate is insufficient to meet their needs. Here, we examined the potential of newly discovered plant, *Cocolatus emmandemmus*, as a new source for chocolate candies. By varying the temperature, light intensity, and nutrient sources of *C. emmandemmus* plants, we determined growth conditions for optimal production of chocolate candies. Production was maximized at 37 °C when plants were fed a nutrient mixture of sugar dissolved in 2% (butterfat) milk. Mixing a small amount of peanut butter (5% w/v) into the nutrient mixture promoted the development of peanut-containing candies in addition to the normally-present plain candies. The color of the candy shell varied with the wavelength of light present during growth. *C. emmandemmus* has little potential as a major source of chocolate, however, since even under optimal growth conditions each plant produces only one ounce of candy per year and consumes twenty gallons of milk.

II. Introduction

This section contains sufficient **background** for the reader to understand the relevance of the experiment, its purpose, and the rationale for the experimental design. In the example above, the introduction might include brief descriptions of other chocolate-producing plants and comparisons of their productivity to that of *C. emmandemmus*, statistics on world chocolate production, a brief account of the discovery of *C. emmandemmus*, and a summary of the results of previous productivity experiments on *C. emmandemmus*. The introduction would also include a brief description of the experimental approach and

reasons why this approach is more suitable or will yield more information than approaches used in previous experiments.

III. Materials and Methods

This section describes the **methods** and **materials** used in the experiments in sufficient **detail** for another researcher to exactly duplicate the experiment. Sources and names of reagents should be given. Times, temperatures, volumes, procedures, etc. should be explicitly stated. If the experiment follows a previously published procedure, then it is sufficient to give the reference for the procedure along with exact descriptions of any changes. In the example above, this section might include the source of the *C. emmandemmus* plants, their size at the start of the experiment, methods for controlling ambient temperature, volumes and frequencies of nutrient application, and numbers of plants in experimental and control groups.

IV. Results and Discussion

This section **describes** and **interprets** the **results** of the experiment and any relevant **observations**. In the example above, this section might include a chart showing the average growth rate (including standard deviations) of each group of plants, numbers and colors of candies produced, and number of plants that died during the course of the experiments. The dependence of productivity on growth conditions would be described explicitly and possible reasons for variation would be given. Suggestions for changes in future experiments might be given.

V. Conclusions

This section, which may be presented as a list of numbered items, summarizes the overall conclusions of the experiments.

VI. Acknowledgments

This section acknowledges and thanks any outside sources of help received, including the provider of the plants, the mother-in-law who suggested the experimental design, and the guy on the bus who provided the breakthrough insight.

VI. References

Any references cited or consulted should be listed here.