Lab Report Guide

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This guide will provide you with information on the proper formatting and content for laboratory reports. Your lab report is a description of a study that you performed. An effective lab report conveys to the reader why the study was conducted, how the study was conducted, what you found during the study, and what those findings mean. Lab reports typically contain 4 sections:

1. Introduction – contains background information, justification for the study, and the author's hypotheses

2. Materials and Methods – contains details about the procedures followed during the study

3. Results – contains a summary of the data collected during the study including figures and tables

4. Discussion – contains the author's interpretation of the results of the study

Introduction The introduction provides the reader with the context surrounding your study. A good introduction summarizes necessary background information and establishes why the information gathered in the study will be valuable to those interested in the subject. The introduction should build up to the author's hypotheses.

Materials and Methods The materials and methods section provides the reader with a detailed description of how the study was performed. You should include all of the relevant information that is needed to evaluate the results of your study. It is often difficult to find the point where sufficient detail becomes unnecessary and confusing detail. When you are considering whether a piece of information should be included in the materials and methods section ask whether that information answers a potential question raised by the results. For example, consider the following excepts from the materials and methods describing a study performed in the pond at the DePauw Nature Park:

1. In order to collect fish for the experiment we accessed the pond at the DePauw Nature Park by driving out of town on Walnut Street and then transferring our sampling

equipment to a golf cart that we could drive to the northwest lake shore. Fish were sampled using a 5 m long net with 2 cm mesh. The net was anchored to shore at one end with a stick that we found in the greenhouse. I held the stick on the shore while another member of the sampling team put on waders and walked out into the lake holding the other side of the net. This person pulled the net out tight and then walked in a semi-circle collecting fish in the net. When the other person got back to shore the fish in the net were placed in a plastic bucket that I filled with water from the pond. We then measured the length of each fish with a plastic ruler by holding the fish still and counting off the number of marks on the ruler that corresponded to the fish's length. We then weighed the fish on a digital scale that we brought from the lab. The fish was placed in a pan on the scale after the scale was set to zero and then the fish weight was determined by reading the numbers on the scale when the fish was on it. We then identified the fish using the descriptions of the fish species in Johnson (2001).

2. Fish were collected along the northwest shore of the pond in the DePauw Nature Park using a 5 m long net with a 2 cm mesh. One end of the net was anchored to the lake shore and the fully extended net was towed in a semi-circle around this anchor. Each fish was identified following Johnson (2001). Mass and length were determined with a digital balance and plastic ruler respectively. All fish were kept alive in a bucket filled with pond water during processing.

Notice that the second example contains all of the details that might come up when evaluating the study: Where were the fish collected? How were the fish collected? What measurements were taken? etc. . . but does not include many of the unnecessary specifics of the sampling and equipment use. The decision as to what to include and what to omit can often be difficult. Writing good materials and methods sections takes practice!

Results   The results section contains all of the findings of the study including any figures and tables. Although the results section is usually organized around the hypothesis presented in the introduction, the meaning of the results should not be discussed until the discussion section. For example, if our study was testing the hypothesis: "The Bluegill Sunfish in the Nature Park pond consume more snails than the Green Sunfish" – our results section would include statistical summaries (mean, plus some measure of variation) for the number of snails in each fish's diet, plus summaries of any supporting information we collected (e.g., fish length and mass). These summaries should be easy for the reader to interpret without a lot of explanations . Typically the material is summarized in tables or figures (i.e., graphs) (see your Graphing Guide handout). The results section also needs to include the results of statistical tests for differences among the means (see the Data Analysis Guide handout).

Discussion   The discussion section is where you argue whether your results support or refute your hypothesis. Using the data and statistical tests in the results for support, you need to explain to the reader what the results mean. Typically the discussion will be organized

around the same context that you present in the introduction. Your discussion should also address results that do not conform to the predictions of your hypothesis and what factors may have contributed to this. Finally the discussion should address any new questions that are raised by your results.