

## Designing Experiments

### LabChecklist : SelfGuide

#### The Title of my Lab Report...

- describes the specific content of the lab concisely but with enough detail to get the main ideas across to the reader.

#### The Abstract of my Lab Report...

- summarizes the gist of each section of the report in a sentence (or two for an especially complex section).
- arranges the sentences in the order the sections are presented in the report, Introduction to Conclusion.
- stays within the maximum words allowed (usually 100-200 words, but if there is a different word limit for my class, I'll be sure to stay within it).

#### The Introduction in my Lab Report...

- defines the research problem by briefly describing it and stating the knowns and unknowns (what the problem gives me and what I need to find in order to solve the problem) and then gives the guiding research question (typically one paragraph).
- states in a sentence or two the scientific concept the lab is about and then describes what I know about that concept that is relevant to the lab (typically one or two paragraphs).
- Establishes the hypothesis that comes out of the research question, explains the reasoning (based on the scientific concept and logic) I used to arrive at the hypothesis, and finally briefly summarizes the experimental procedures I used to test the hypothesis (typically one or two paragraphs).

#### The Methods in my Lab Report...

- provides a concise, easy-to-follow description of the specific procedures followed in the lab.
- gives enough detail of both the materials and the procedure used so that the experiment could be repeated just as I did it.

#### The Results in my Lab Report...

- begins with a sentence or two describing the overall findings of the lab.
- contains visuals (tables or graphs or other figures) that are appropriate to the data and are arranged in an order that best tells the "story" of the data.
- consists of a paragraph for each visual and structures each paragraph by (1) summarizing in a sentence or two the overall trend shown in that visual and then (2) supporting the summary by including any specific details from the visual that are important for understanding the results.
- clearly refers to the appropriate visuals in the paragraphs (Table 1, Figure 2, etc.).
- reports the data from the experiment only, successfully avoiding any explanations or conclusions about the data.

#### The Discussion in my Lab Report...

- begins with a statement of whether or not the overall results support, do not support, or support to some extent my original hypothesis (from the Introduction).
- points to specific data from the findings as evidence for deciding whether or not the hypothesis is supported
- uses what I have learned about the scientific concept of the lab to explain in a convincing way why or why not the data support my hypothesis.
- restates the research question, presents the answer to the question as suggested by the experiment, and then shows how the experiment solved the unknowns (which led to the answer of the research question).
- restates the research problem the experiment was supposed to solve and gives the solution to the problem as suggested by the answer to the research question.
- addresses other issues that may be appropriate, such as (1) any problems that occurred or sources of uncertainty in the lab procedure; (2) how my solution to the problem compared to the solutions of other students and, or other relevant experiments and explains any differences; (3) suggestions for improving the lab.

#### **The Conclusion of my lab report...**

- directly states what I have learned about the scientific concept of the lab from doing the experimental procedure.
- gives enough details of what I have learned to be convincing.
- describes anything else I may have learned from doing the lab and writing the report (how to solve similar problems, how to design an experiment, some aspect of the lab procedure or methods of analyzing data, etc.).

#### **The References for my lab report...**

- includes all the sources I have used in writing my lab report, such as the lab manual, the textbook, and any reference books or articles I cited.
- uses the appropriate documentation style for citations and references (CBE, ACS, etc.)

#### **Overall issues: My lab report...**

- uses the correct format (titles, captions, etc.) for the tables, graphs, and drawings
- is written in a scientific style (tone should be objective; sentences should be clear and to the point).
- is clear of spelling errors (use the spell check on your computer).
- includes all the necessary headings (each section of the report should have a heading).



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