

## LAB REPORT REQUIREMENTS

A formal laboratory report summarizes the experimental procedures and results from an investigation, while helping the reader understand the purpose of the study and the significance of the findings. Papers should include a descriptive title, be organized into the sections below with each written in paragraph form, and writing should be as concise (clear and to the point) as possible.

### INTRODUCTION

Discuss relevant background information including previous research, the purpose of the study, and the underlying research question that motivates the investigation. Be sure to cite any outside sources by writing the author(s) and year in parenthesis—such as (Hillis et al., 2012)—in the text, then including the full publication information in your reference section.

<p><i>A GOOD introduction:</i></p> <ul style="list-style-type: none"><li>• <i>Reviews the related biological concepts under investigation.</i></li><li>• <i>Explains the purpose of the experiment.</i></li><li>• <i>Highlights the research question(s) that you are trying to answer.</i></li><li>• <i>References specific concepts from the course textbook.</i></li></ul>	<p><i>An EXCEPTIONAL introduction:</i></p> <ul style="list-style-type: none"><li>• <i>Summarizes recent related research on the topic from reliable scientific sources.</i></li><li>• <i>Makes correct and appropriate use of in-text parenthetical citations; a references section at the end of the paper should include the full, correctly formatted bibliographic information.</i></li></ul>
---	---

### METHODS

Describe exactly what was done in the investigation, stating specific quantities (with units) whenever possible.

<p><i>A GOOD methods section:</i></p> <ul style="list-style-type: none"><li>• <i>Describes, in detail, exactly how the experiment was performed without including irrelevant details (e.g., “Beakers were obtained from the front table” is unnecessary and should not be included).</i></li><li>• <i>Is as quantitative as possible, and uses the correct units and appropriate precision (significant figures).</i></li><li>• <i>Specifies a specific experimental hypothesis.</i></li><li>• <i>Identifies independent and dependent variables, experimental and control groups, and constants (where appropriate).</i></li><li>• <i>Specifies the correctly formatted scientific names of organisms used and formulas of chemicals used.</i></li><li>• <i>Explains how data will be analyzed.</i></li></ul>	<p><i>An EXCEPTIONAL methods section:</i></p> <ul style="list-style-type: none"><li>• <i>Includes labeled diagrams that support the procedure or illustrate the setup, each with a full sentence summary caption.</i></li><li>• <i>States specific null and alternative hypothesis based on the expected experimental results.</i></li><li>• <i>Identifies any statistical tests that will be used and explains their purpose.</i></li></ul>
--	--

## RESULTS

Display your data in a table and graph, summarize relevant data stating specific quantities (with units), and identify any interesting patterns/trends in the data.

*A GOOD results section:*

- *Includes at least one data table and at least one graph, each with a full sentence summary caption.*
- *Uses correct labels, units, and scaling of axes, and plots data appropriately.*
- *Summarizes (in paragraph form) relevant data and patterns using specific quantities with units but without interpreting the meaning of such patterns (this will be addressed in the discussion section).*

*An EXCEPTIONAL results section:*

- *Highlights any important statistical values (e.g., SEM,  $\chi^2$ ) and carefully states the statistical conclusion (should we accept or reject the null hypothesis? at what probability level?).*
- *Demonstrates careful thinking about data display, finding the most appropriate way to graph data and using multiple tables or graphs when appropriate.*

## DISCUSSION

Make connections between your results and the underlying biological concepts, explain why your findings are important, describe any limitations of your study, and suggest next steps for future research. This is arguably the most important part of the paper.

*A GOOD discussion:*

- *Interprets the results by explaining the meaning of the data without simply repeating parts of the results section.*
- *Attempts to answer the research question(s) based on the data available.*
- *Connects the data to biological concepts that might help account for the results but without simply repeating parts of the introduction.*
- *References specific concepts from the course textbook.*
- *Acknowledges the limitations of the study by addressing possible inherent experimental errors (not mistakes caused by not properly following the procedure).*
- *Proposes potential next steps related to this research.*

*An EXCEPTIONAL discussion:*

- *Compares results to findings from other recent related research on the topic from reliable scientific sources.*
- *Makes correct and appropriate use of in-text parenthetical citations; a references section at the end of the paper should include the full, correctly formatted bibliographic information.*
- *Proposes potential modifications to the procedure to minimize experimental error.*

## REFERENCES

Using the correct format, list the bibliographic information of any outside sources, including the course textbook, that were cited in the paper. If a source is listed in this section, it must also be parenthetically cited within the text of the paper.