

ZOOLOGY 430 Laboratory

Guidelines for Writing Lab Reports

All lab reports are required to be typed, and should be concise – **5 double-spaced pages** not including figures. (longer lab reports ≠ better grades). Each lab report should consist of the following sections (w/ rough page length suggestions):

Grade		
1. Title & Introduction	~1pg	15%
2. Materials & Methods	< 1pg	15%
3. Results	0.5-1pg	20%
4. Discussion	1.5-2pgs	45%
5. References/Contributions		5%

1. Title

Report titles should be concise (usually 10 words or less), straightforward, and reflect the content/purpose of the lab. E.g., “The effect of temperature on heart rate in toads.”

2. Introduction

The introduction should clearly identify the main idea of the report to a scientific audience (i.e. to other scientists).

A. *What is the physiological mechanism under study?*

1. Why is it important?
2. Use proper terminology and include important definitions.

B. *Build **argument** leading to **hypothesis**.* Make sure to cover (1) *How the physiological mechanism works* You will test the mechanism by measuring particular variables and performing treatments, so provide sufficient detail so that it is obvious why this experimental design makes sense. (2) *Background on what is known about the mechanism.* End with what is unknown/what you want to find out. Make sure that only information *directly relevant to the experiment* is included. *Remember, short, concise, focused* – irrelevant info will result in points lost.

D. *What, specifically, is being studied in the paper?* This is the hypothesis section at the end of the intro. Avoid predictions, instead the hypothesis is a statement about how the physiological

mechanism might work.

*In summary, the introduction should set up **Why this experiment was performed**.* After reading the intro, the reader should have an idea about information will be gained through the experiment and why this information is important.

3. Materials and Methods

The Materials and Methods section should briefly describe the materials and methods with enough detail that so that the reader will fully understand the experiment and be able to replicate it. *It should be obvious how these procedures test the hypotheses.* This section should be short and include:

A. *The subject* (organism, tissue, etc.) and number of individuals (sample size) used in the experiment.

B. *A brief explanation of the main experimental procedures used in the experiment.* It should illustrate the logic in approaching a test of the hypotheses. It is not necessary to describe standard procedures (like how to measure blood pressure) in detail. Just state which standard procedures you used and cite the lab manual for details. Do describe carefully any changes from the lab protocol, and any decisions or non-standard procedures.

e.g., “Blood pressure was measured using a sphygmomanometer following standard protocols (Stillman, 2005).”

Make sure that the methods clearly illustrates how the procedures relate to testing the hypotheses. Describe the experimental treatments and controls and the relevant details of their implementation. “Dive responses were simulated by facial immersion in an ice bath. Blood pressure and leg volume were measured at standard intervals: resting, after immersion for XX sec., and in recovery at XX time.”

C. *How the data were analyzed to inform the hypotheses.* This would include how you compared treatments vs. controls.

4. Results

Organize your results around the experiments or the hypotheses you tested, so that the reader can clearly see whether your hypotheses were supported. Point to specific results or trends that support or do not support each hypothesis. This section should summarize the factual findings from the experiment. **It is NOT a report of the raw data, but rather the analysis of the data.** Include:

A. A verbal description of of your findings. The general trends seen in the data or differences between treatment groups. This should be a clear and concise description of the major results of your experiment (ie. the results that answer your specific experimental questions).

B. Well organized figures and/or tables showing the important results of the experiment (see section 7). Do not repeat information in figures AND tables. Choose one format. Figures can be in-text or added on at the end, individually numbered and referred to in the text by number, for example:

Heart rate increased after 5 minutes of exercise (Fig. 1).

Figures (Part of Results)

Readers should be able to read and understand figures without referring to the text. Figures should include:

- A. A caption with brief description of what the figure shows.
- B. An explanation of any symbols or abbreviations.
- C. Labeled axes (with units).

Tables (if included) should not duplicate information in figures. Choose one or the other as appropriate to best display results. Please label columns/rows.

5. Discussion

This section should interpret the results of your experiment *relating them to the physiological mechanisms under study*. It is about finding meaning in your results and generalizing from them. You should not simply restate the results! A good discussion will:

A. Explain what the results tell us Dive into the numbers. Why did you find the results you obtained? Can you infer anything more about the relationships studied?

B. Explain what you learned or demonstrated about how the physiological mechanism works.

C. Explain how your results fit into the existing body of knowledge.

D. (Optional - If anything went wrong during your experiment, mention how it may have affected your results and conclusions. Keep this very brief.)

E. Broader Significance. Generalize - how broadly could your

results apply? Are there any further questions raised by your results? Could this be important to future research?

Note: Here and in the introduction you want to demonstrate that you *understand the physiological basis of the experiment* you just performed.

6. Literature Cited

You must cite all factual statements in-text. We do not require primary sources for lab reports, your textbook or lab manuals are fine. We expect a small, but properly formatted literature cited section: The list of sources should be alphabetical by author's last name and in the following formats:

Books: Withers, P.C. (1992). Comparative Animal Physiology. Saunders College Publishing; New York.

Article: Biewener, A.A. and Gillis, G.B. (1999). Dynamics of muscle function during locomotion: accommodating variable conditions. Journal of Experimental Biology. 202, 3387-3396.

Lab manual: Butler, M. (2015). Animal Physiology Lab, Zoology 430 Manual: Lab #1.

Each reference listed must be cited in the text. Refer to the source by the author's name and date. For example:

- a. Muscle force is proportional to cross sectional area (Withers, 1992).
- b. Withers (1992) showed that force is proportional to cross sectional area.

7. Respective Contributions

Please explain in a sentence or two what each group member contributed to the report.