

LAB REPORT WRITING WORKSHOP

Arielle Waldstein

Bio 183 Lab

Spring 2012

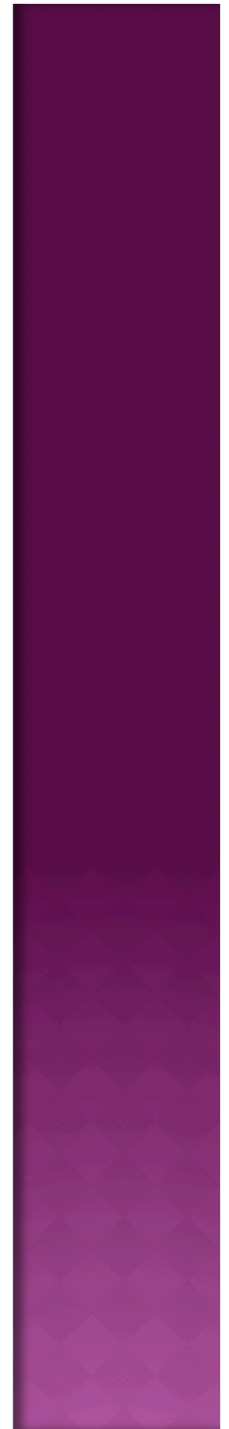


WORKSHOP OUTLINE

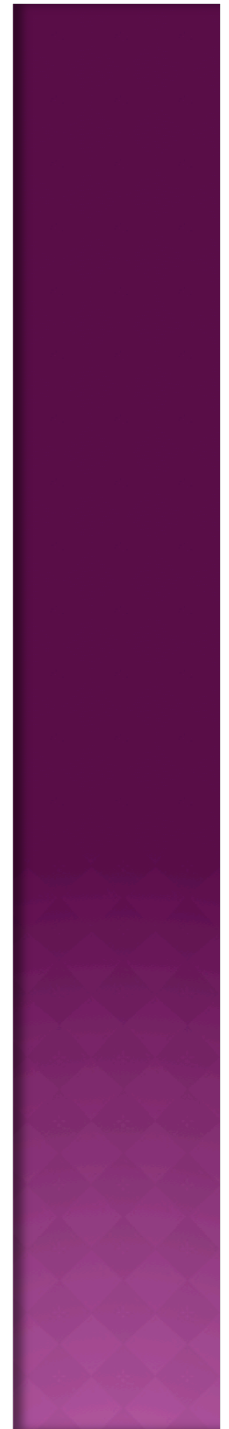
- ◉ What is the purpose of writing a lab report?
- ◉ Sections of the lab report and their contents
- ◉ Peer review of sample lab reports
- ◉ Common lab report problems



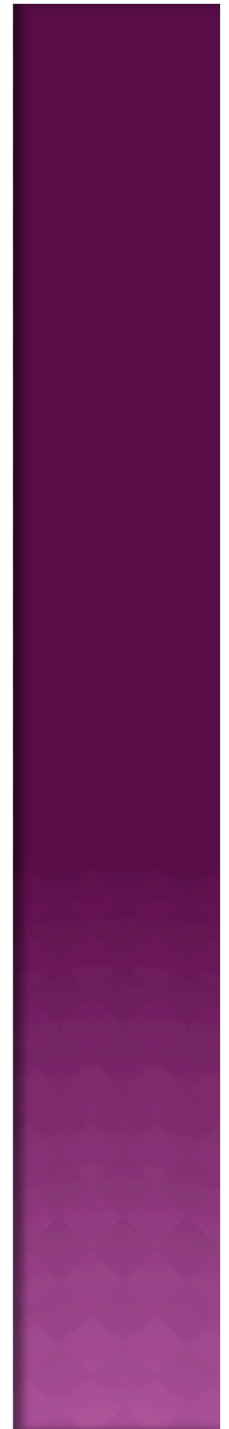
	Who Writes Them?	Who Reads Them?	What is the Format?	What is the Writing Style?
Lab Reports				
Scientific Journal Articles				



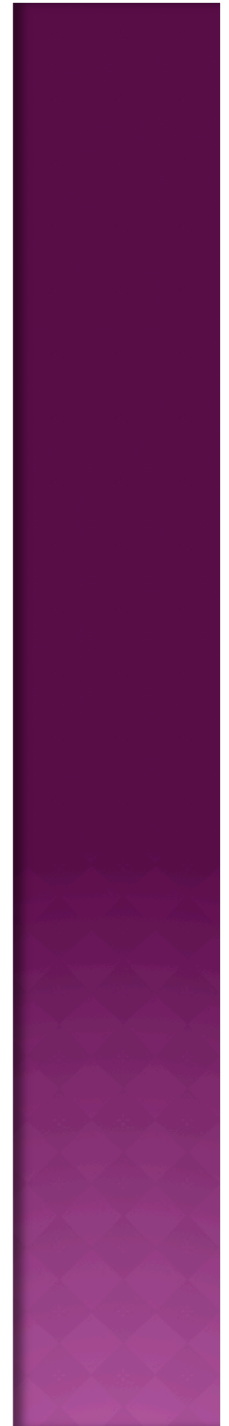
	Who Writes Them?	Who Reads Them?	What is the Format?	What is the Writing Style?
Lab Reports	Students			
Scientific Journal Articles	Scientists			



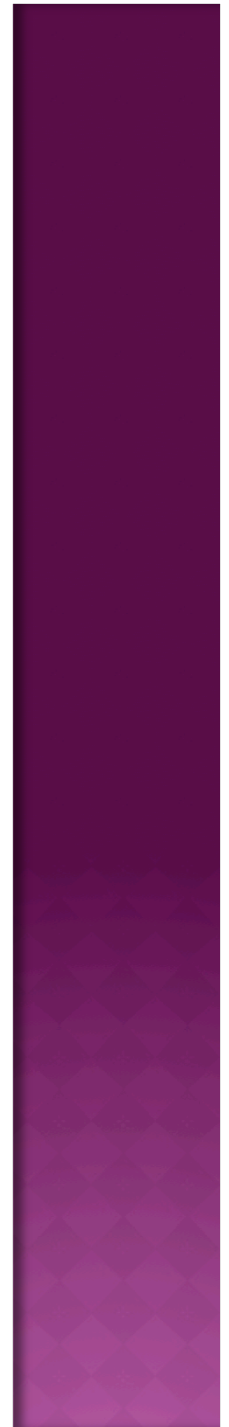
	Who Writes Them?	Who Reads Them?	What is the Format?	What is the Writing Style?
Lab Reports	Students	Teachers		
Scientific Journal Articles	Scientists	Other scientists and students		



	Who Writes Them?	Who Reads Them?	What is the Format?	What is the Writing Style?
Lab Reports	Students	Teachers	Title Abstract Intro Methods Results Discussion Conclusion References	
Scientific Journal Articles	Scientists	Other scientists and students	Title Abstract Intro Methods Results Discussion References	



	Who Writes Them?	Who Reads Them?	What is the Format?	What is the Writing Style?
Lab Reports	Students	Teachers	Title Abstract Introduction Methods Results Discussion Conclusion References	Scientific
Scientific Journal Articles	Scientists	Other scientists and students	Title Abstract Introduction Methods Results Discussion References	Scientific



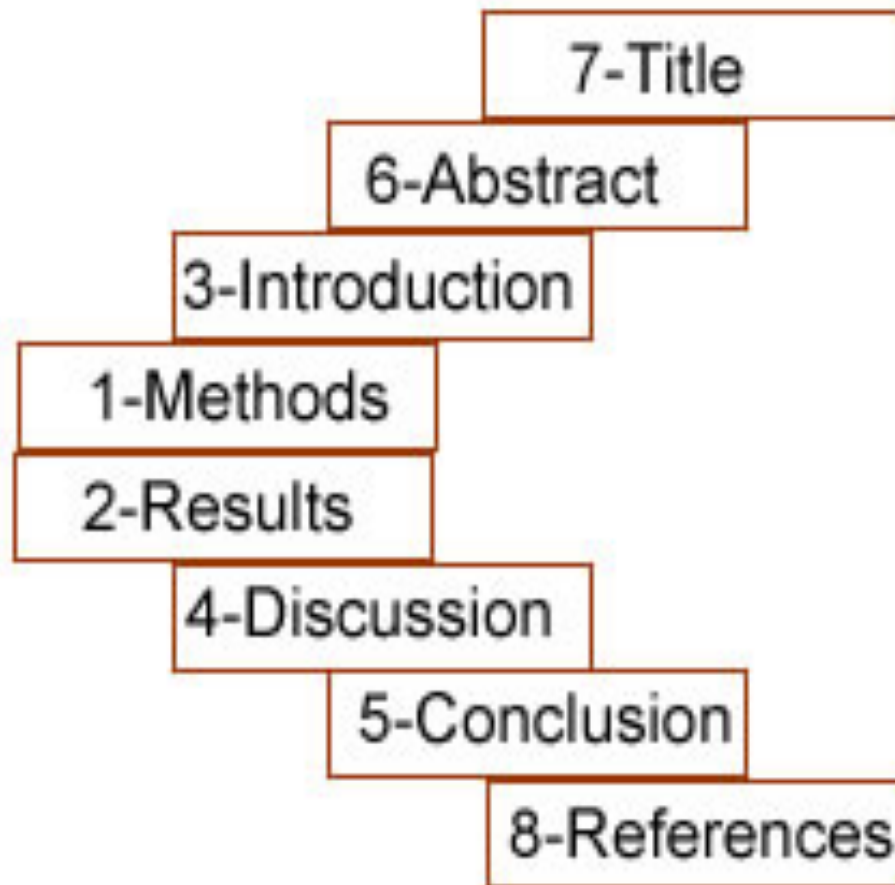
SECTION OF A LAB REPORT IN ORDER OF FINAL PRESENTATION

- ◉ Title
- ◉ Abstract
- ◉ Introduction
- ◉ Methods
- ◉ Results
- ◉ Discussion
- ◉ Conclusion
- ◉ References



INSIDE-OUT METHOD OF WRITING

THIS CAN BE FOUND IN YOUR LAB MANUAL: APPENDIX B



METHODS

◉ Activity 1:

- Form groups of 3
- Teach each other how to make a peanut butter and jelly sandwich
- Write down what you come up with in paragraph form (no bullet points!) and we will share some with the class

METHODS: TYPICAL PROBLEMS

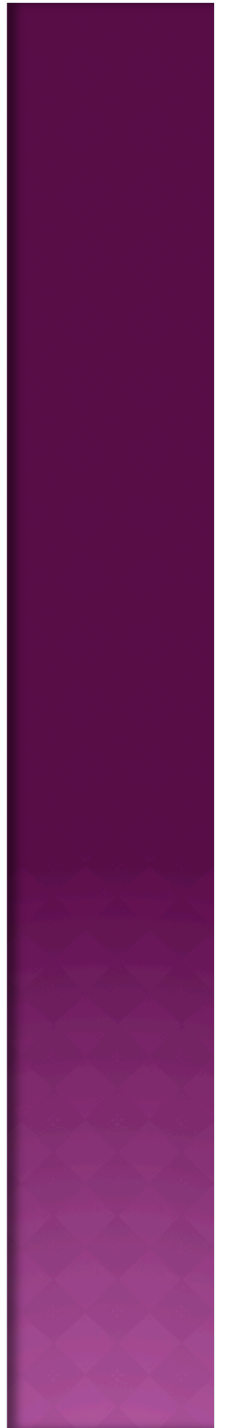
- ⦿ They **MUST** be in your own words and in paragraph form
 - Never directly copy the lab manual!
- ⦿ Give a report of what you did, not instructions
 - Past tense, passive voice OR first person report
- ⦿ Be broad, no need to be overly detailed
- ⦿ Be scientific, not conversational
- ⦿ Do not use direct quotes, summarize
- ⦿ Cite the source the methods came from

METHODS

◉ Activity 2:

- In your groups of 3 - Read through the 3 sample methods given to you
- Discuss what you like or do not like about each sample
- Write your own perfect version of these methods

A catecholase extract was prepared by mixing 30.0 g of diced potato with 150 ml of distilled water in a blender for two minutes. The resulting solution was filtered through four layers of cheese cloth. Four spectrophotometer tubes were filled with 1mL of buffer pH 7, a 0.1% catechol substrate (0mL, 0.5mL, 1mL and 2mL respectively) and 1mL distilled water. The spectrophotometer was set to 540 nm and calibrated at zero absorbance. One milliliter of the catecholase extract was pipetted into each tube immediately before each tube was inserted into the spectrophotometer. Absorbance was recorded each minute for 10 minutes for each tube (Johnson et al. 2009).



RESULTS

- ◉ Results section should have both Text and Figures/Tables
- ◉ Open with an overall statement (summary) of what your results were
- ◉ Follow-up with graphs or tables and text to present them
- ◉ Proper graphs!
- ◉ Label graphs as “Figure” below the graph and tables as “Table” above the table

Beaver Selection of Trees Based on Tree Species

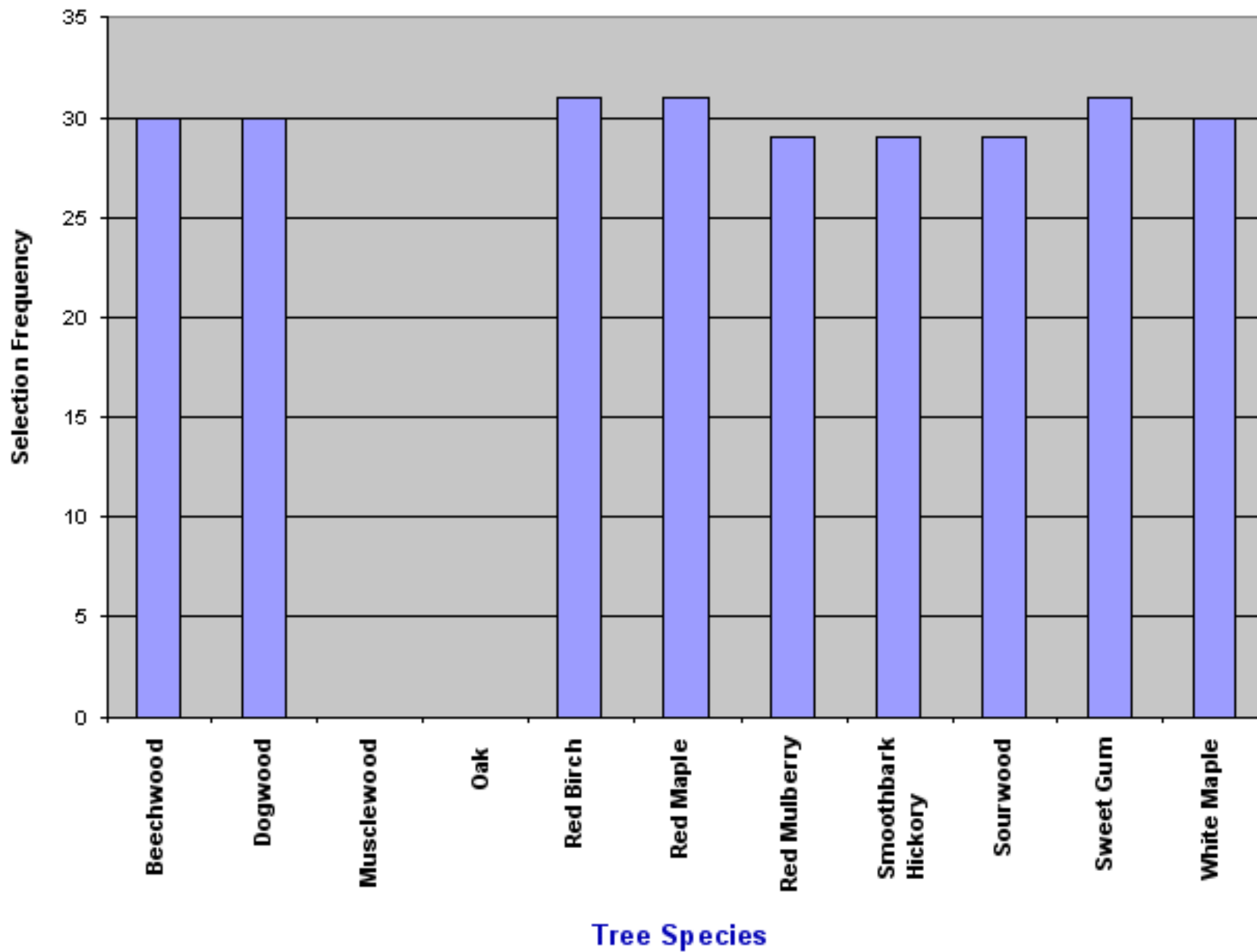


Figure 1.

Table 1: Number of Chewed and Not-Chewed Trees by Circumference (cm)

Tree Circumference (cm)	Number Chewed	Number Not-Chewed
0	0	10
2	1	15
6	3	10
10	15	5
15	15	3
20	18	2

INTRODUCTION

- ◉ State the objectives and purpose for the experiment - what concepts were you exploring?
- ◉ Give background from references (textbook, lab manual, primary references)
- ◉ Introduce at least one similar study that you found from a primary reference
- ◉ State your hypothesis explicitly: “My hypothesis is...”

The purpose of this experiment was to explore the properties of enzymes and determine what effect substrate concentration has on the rate of an enzyme catalyzed reaction. Enzymes are catalytic proteins which function to accelerate reactions by lowering the activation energy (Campbell et al. 1996). An enzyme is very specific in the reactions in which it undergoes: it contains an active site that allows only certain reactants, known as substrates, to bind to it (Campbell et al. 1996). In this lab we examined the rate of reaction of catechol and oxygen to form benzoquinone when the amounts of the substrate (catechol) were varied. Similar studies tested the effect of hydrogen peroxide concentration on the reaction rate of the enzyme catalyzed reaction to break down hydrogen peroxide into water and oxygen (Aune et al. 2011). We hypothesized that substrate amount affects reaction rates and thus we expected that reactions with increased amounts of substrate will have a greater rate than those reactions with a lesser ratio of enzyme to substrate.

State purpose/objectives, Give background information, Introduce similar studies, Explicitly state the hypothesis

DISCUSSION

- ◉ Open with statement of support of hypothesis (either accepted or rejected)
- ◉ Back up the statement of support of hypothesis with examples from the results you collected
- ◉ Discuss what that means in terms of the topic and the background information you presented in the introduction
- ◉ Compare results to the study you introduced in the introduction (primary reference!)
- ◉ Talk about possible sources of error

The results of this experiment supported the hypothesis that the rate of conversion of the substrate would increase with increased amount of substrate. We observed that Tube 2, which had the highest concentration of substrate, catechol, also had the highest absorbance level which indicates the greatest rate of conversion of catechol and oxygen to benzoquinone. A similar experiment done looking at the effect of substrate concentration on the breakdown of hydrogen peroxide by catalase found that increases in hydrogen peroxide concentration increased the rate of reaction (Aune et al. 2011). This increase in reaction rate is likely caused by the increased concentration of substrate causing more frequent contact between the enzyme molecules and substrate molecules in solution. We observed a decrease in the absorbance for tubes 6 and 8 which was unexpected. The settling of the substrate to the bottom of the test tube could have caused the enzyme to become less efficient and it could not attack the substrate as well. Further experiments, involving the constant stirring of the solution, could be performed to test this possibility.

Open with statement of support of hypothesis, Back that statement up with data you collected, Compare your results from the results of another studies, Explain what your results mean biologically, Discuss sources of error.

ABSTRACT

- ◉ Summary of entire lab report
- ◉ Should include ONE summary sentence from the 4 main lab report sections
 - Introduction
 - Methods
 - Results
 - Discussion

This experiment was performed to determine the factors that positively influence enzyme reaction rates in cellular activities. We compared catecholase enzyme activity through its absorption rate in samples with varying substrate concentrations. The samples with the highest substrate concentration had the greatest absorption rate. This suggests that a higher concentration of substrate leads to a greater product production rate.

Introduction, Methods, Results, Discussion

REFERENCES

- ◉ All references in the text must be written out using a full citation in the References Section
- ◉ Likewise all references listed in the References Section must be cited parenthetically in the text
 - (Last name Year)
 - (Last name et al. Year) ← if more than 2 authors
- ◉ Use CBE style only
 - No MLA or APA
- ◉ Ask your TA to email you the CBE style guide

Authors (last name first followed by first and middle initial)



Norton, J.E., Ashley, M.V.

Year



2004.

Article Title



Genetic variability and population structure among wild Baird's tapirs.

Anim Conserv.

7:

211-220.

Page range



Volume number

Journal Title

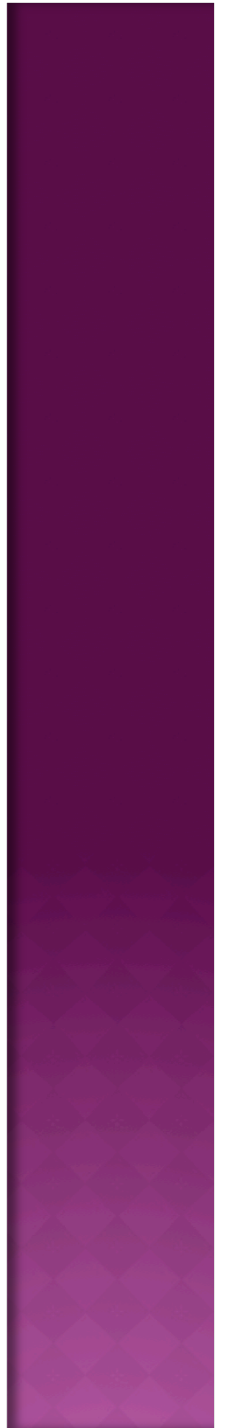


RESOURCES TO HELP YOU

- ◉ LabWrite Website

- <http://labwrite.ncsu.edu>
- Use PostLab link
- There are sample lab reports available under “Additional Resources”

- ◉ Appendix B in Lab Manual (pgs. 177-181)



ACTIVITY 3

- ◉ Form groups of 6
- ◉ Read through the sample lab report given to you
- ◉ Identify the problems with that lab report and grade it using the provided rubric
 - This is the same rubric we will use for your lab reports this semester!
- ◉ We will discuss your findings as a class

COMMON LAB REPORT PROBLEMS

◉ Title:

- Not descriptive enough (doesn't mention the independent and dependent variables in the experiment)

◉ Abstract:

- Incomplete: summary sentence for each major section not present

COMMON LAB REPORT PROBLEMS

◉ Introduction:

- Hypothesis not explicitly stated in introduction
- Objectives/purpose not stated in Introduction
- No references
- Back up all statements with fact (reference)

COMMON LAB REPORT PROBLEMS

⦿ Methods

- Written as instructions
- Methods plagiarized from lab manual
- Lab manual not cited

⦿ Results

- Incorrect graphs (axes not labeled, no title...)
- Figures/Tables not names correctly
- No text summary
- Figures/Tables not referred to in text
- Explanation of what results mean (this belongs in the Discussion section)

COMMON LAB REPORT PROBLEMS

⦿ Discussion:

- Does not open with statement of Hypothesis Support
- Uses “Prove” instead of “Accept”
- Does not back up statement of hypothesis support with data
- Does not tie back to background presented in Introduction
- No discussion of other, similar studies
- No primary references cited
- Inadequate discussion of sources of error

COMMON LAB REPORT PROBLEMS

⦿ Conclusion:

- Too short, not enough information about what you learned

⦿ References:

- Not in proper CBE style
- References cited here that do not appear parenthetically in the text OR references missing that WERE cited parenthetically in the text
- No primary references cited
- Lab manual not cited.

QUESTIONS?

