**ENZYME LAB REPORT OUTLINE**

1. **Cover Page**
   * Running header, Centered Descriptive Title, Authors, School
2. **Background** (start with what’s enzyme and end with hypothesis- rest the order is at your discretion)
   * What are enzymes
   * What is activation energy and the relationship with reaction rate
   * What’s catalase
   * Where is catalase found
   * What does it do?
   * Explain what an ES-Complex is and why it is important characteristic for enzymes
   * Composition of enzymes
   * Factors that affect enzymes
   * Is/are there any optimal conditions for an enzyme
   * What is catalase
   * Where is it found
   * What happens when hydrogen peroxide is broken down
   * Reaction rate- what is it, how is it calculated, what does it mean?
3. **Hypothesis-** (if, then statement)
4. **Protocol**

* Tell me what you did **or did not do** in each experiment using the rules below:
* Need to provide sufficient detail to allow a reader to envision what was done and to repeat the procedures if needed.
* The difference between trivial and critical details may depend on the goals of the study.
* Sub‐sections (indicated by subtitles) may be useful for organization (e.g., field sampling and lab procedures, etc.).
* Do not list steps of procedure.
* Do not describe routine lab practice, common equipment or containers.

1. **Data**
   * Must write out results first, simply write out your observations of your data.
   * Results can be described by average trials instead of each individual trial
   * Display your results in an appropriate table or graph format with appropriate
2. **Discussion** 
   * Restate the hypothesize and what you expected to occur.
   * Answer whether it is rejected or failed to be rejected within the limits of the controlled variables
   * Must use evidence from your data to support whether you reject or fail to reject your hypothesis.
   * Are there any trends in your data? If so tell me and why did this trend occur. **Why** is your 100 % enzyme concentration faster than 25%? These are the types of questions you need to address when writing your discussion. This means you explain in detail what your results mean.
   * Must use data from your results to defend your claims. Ex. In Activity A, the 25% enzyme concentration rate had an average reaction rate of x and 100% concentration had a reaction rate of y. This is z times faster due to a…
   * How does enzyme and substrate concentration affect your reaction rate? Why?
   * How did pH affect your reaction rate? Why?
   * What is the optimal pH rate? Why?
   * Why did catalase not work in some of the pH solutions?
   * What would you expect to happen to enzymes if you manipulated temperature?
   * Name at least 2 possible sources of errors or inconsistencies in your data and explain why they were inconsistent
   * Revisit the fundamental question. Explain whether the experiment provides data to help answer the fundamental question.
   * Based on the analysis, state a minimum of 2 additional questions to investigate and/or procedures that could be changed to better understand the fundamental question
3. **References**
   * A minimum of 2 sources in APA format (one is below, now you need one more)
   * Don’t forget to include in-text citations in background and protocol/methods

How to cite the lab manual in your References.

Aitken, A. and Shin, S. (2012). General biology laboratory I manual. Dept. Biol. Sci., University of Memphis, Memphis, TN.