**Enzyme Self-Designed Experiment** AP Biology

DESIGNING AND CONDUCTING YOUR OWN INVESTIGATION

You now have the basic information and tools needed to explore enzymes in more depth on your own. In this part of the lab, you will do just that. You will have the chance to develop and test your own hypotheses about enzyme activity. To help you get started, read the following questions, and write your answers in your laboratory notebook.

**Pre-Lab Questions** (before designing experiment):

1. In Procedure 1 (Day 1 of Lab), was the limiting factor of your base line reaction: The enzyme or the substrate? How do you know? (Justify your response)
2. What are 3-4 factors that vary in the environment in which organisms live? Which of those factors do you think could affect enzyme activity? How would you modify your basic assay (first day lab) to test your hypothesis?

Design and conduct an experiment to investigate an answer(s) to one of the questions above or another question that might have been raised as your group conducted the 1st investigation.. Remember, the primary objective of the investigation is to explore how biotic and abiotic factors influence the rate of enzymatic reactions. Write a step by step Procedure in your lab notebook of the investigation. This must include details like concentration(s), temps, # of trials, etc. along with other specifics (refer to the Day 1 lab procedures for guidance). Final Write-Up: Use formal lab format (given in class). Must include at least one table and one graph. Perform relevant rate calculations (show work). Omit “Introduction” and “Works Cited” sections.

**Analysis Questions**

Record the following in your lab notebook:

1. Depending on your experiment, the underlined words for this question (#1) will need to be changed (this one is an example if enzyme concentration was the independent variable in your investigation: How does rate of enzyme activity vary with enzyme concentration? At which concentration was enzyme activity optimal? How do you know? *\*This information should be incorporated in the Discussion and/or Analysis part of the formal lab.*
2. What do you think would happen if you increased the substrate concentration to 40.0% hydrogen peroxide?
3. How did changing the substrate concentration on Day #1 compare to changing the variable you chose in this independent investigation?
4. Although the enzyme was kept in an ice bath, all reactions took place at room temperature. Predict the effect on enzyme activity of having these reactions take place at 0oC and at 90oC.
5. Evaluate the effect of the variable you selected on the enzyme’s reaction rate. Did your variable have an effect? How do you know? Relate your answer to enzyme structure/denaturation where applicable. *\*This information should be incorporated in the Discussion and/or Analysis part of the formal lab.*