**Enzyme Catalysis Lab**

*Directions for lab questions and information you need to know for the quiz on the Enzyme Lab*

You do NOT have to write out any answers for questions 1-2 or 6 but you should know the information and be able to answer questions about the information on a quiz.

1. **You must know:**
   (a) **The reaction being studied**
   (b) Specifically, what you were measuring in the reaction and what else you could have measured to determine reaction rates.
   (c) The purpose of the H₂S₀₄
   (d) Why KMnO₄ was used
   (e) The purpose of the KMnO₄ titration (the relationship between KMnO₄ titrated, and H₂O₂ remaining).
   (f) The purpose of the baseline, and how it is calculated
   (g) How to calculate the amount of H₂O₂ used up (the amount catalyzed)
   (h) Explain how you determined the amount of product formed during each timed trial (How did you calculate the rate of reaction for the 60 second time trial?)
   (i) Why do you use the initial velocity (rate) to compare different chemical reactions (reactions catalyzed by different enzymes)

2. **Design a graph of your results and analyze or explain the results.** Interpret means to explain any trends shown in the graph. You should refer to some (not all) important data points and calculated rates of reaction in your interpretation. You should then explain the data based on what you know about enzyme-catalyzed reactions. There is *some* information in the lab that you can use in addition to what you know already know about enzymes--so be sure to read the lab.(pgs 20-21).

**Directions for the Lab:**

1. **Complete Pg. 27.** You will be given class data to graph. Be sure to label and title your graph. Refer to the Scientific Method Packets if you are not sure how to do this.
   In the blank space at the bottom of page 27:
   a) List the experimental variable and
   b) 3 good controlled variables.
   c) Explain the difference between the graph you just drew and the graph on page 21 in your lab packet. Are they equivalent?
   d) Which section of the graph you drew could be used to compare bovine catalase to another type of enzyme? Why?

2. **Complete the rate chart on pg. 28.** You will be calculating the initial rate of the reaction (product formed over time) and the rates between each of the time points on the graph. You do NOT have to answer any of the other questions on page 28.

3. **Draw a simple rate graph (not a progress graph) below from your calculated rates of reaction above.** *Label the axes of your graph* but don’t worry about numbers. Draw a line in that indicates the general trend of the data.

   ![Graph](image)

   *You may be asked how this graph differs from the progress graph you drew on page 27.*
OPTIONAL
6. AP Test Practice Question: You are going to design an experiment where you are measuring the amount of \( \text{H}_2\text{O}_2 \) catalyzed after 10 seconds at different temperatures. In other words, you will not check it every second, just after the 10 seconds are over. The temperature range you will be measuring will be 32° F to 120° F. The catalase you are using was derived from human liver tissue.

Explain the design of your experiment. (See page 3 in Part III of the Scientific Method Notes)

Make a sample data table

Graph your results (Keep it simple: title, label axes, draw line indicating the trend in the data)

Interpret your graph and analyze your results.
Quick Question:

1. In order to keep the rate of a catalyzed reaction constant over the entire course of the trials, which of the following should be done?
   A. Add more enzyme.
   B. Gradually increase the temperature after 60 seconds
   C. Add more substrate.
   D. Add H₂SO₄ after 60 seconds
   F. Remove the accumulating product

The following question is based on this progress graph of an enzyme’s action:

2. Which of the following graphs represents the rate of the reaction shown in the graph above?