

****Record the color at the beginning for all data tables below.****

A1 Procedure: Characteristics of the Enzyme Reaction

1. Data Table 1: Tyrosinase Enzymatic Activity

Tube	Color	A ₄₇₅ after 5 minutes
1		
2		
3		

- What were the enzyme, substrate and product of the enzymatic reaction?
- Which tube was the control?
- Why is it important to have controls?
- What do the results of tube 3 demonstrate?
- Explain if tube 3 really proves "substrate specificity"?

A2 Procedure: The Effects of Enzyme Concentration

7. Data Table 2: The Effects of Enzyme Concentration

Tube	Enzyme Concentration	Color	A ₄₇₅ after 3 minutes
1			
2			
3			

- How does changing the concentration of the enzyme affect the rate of the reaction?
- If you start with 1 ml of substrate and add no more, but you continue to add amounts of enzyme (say 1 ml every 5 minutes), what would happen to enzymatic activity? Graphically illustrate what would occur below:

A3 Procedure: The Effects of Substrate Concentration

10. Data Table 3: The Effects of Substrate Concentration

Tube	Substrate Concentration	Color	A ₄₇₅ after 5 minutes
1			
2			
3			

- Why does increasing the concentration of the substrate promote enzyme activity?
- If you allowed the reaction to continue until all the substrate was converted to product and then you added more substrate but did not add any more enzyme; **explain** if a reaction would occur.

B. THE EFFECTS OF ENVIRONMENTAL CONDITIONS ON THE ACTIVITY OF ENZYMES

B1 Procedure: The Effect of Temperature on Enzyme Activity

13. Data Table 4: The Effects of Temperature on Enzyme Activity

Tube	Temperature	Color	A ₄₇₅
1	0 C		
2	22 C		
3	40 C		
4	60 C		
5	100 C		

- Construct a graph using Excel for the temperature data and indicate the optimal temperature for this reaction to occur.
- If the tube incubated at 100 C was placed back in the optimum temperature, would a reaction occur? **Explain.**

B2 Procedure: The Effect of pH on Enzyme Activity

16. Data Table 5: The Effect of pH on Enzymatic Activity

Tube	pH	Color	A ₄₇₅
1	3		
2	5		
3	7		
4	9		
5	11		

17. Using Excel, construct a figure of the results of this experiment to show the optimum pH for this reaction.
18. Why does the enzyme reaction fail to occur at very low and very high pH?
19. Explain what “optimum” means. Do all enzymes have the same optimum pH?
20. What would be the adaptive advantage of maintaining a constant blood pH?

B3 Procedure: The Effect of Inhibitors on Enzyme Activity

21. Data Table 6: The Effects of Enzyme Inhibitors

Tube	Contents	Color	A ₄₇₅
1			
2			
3			
4			
5			
6			
7			

22. Which of the substances used (phenylthiourea or tyrosine) was an inhibitor for the reaction?
23. Tyrosine is a competitive substrate. Do your results support this? Explain.
24. Based on the results of all experiments, type a paragraph summarizing the optimum conditions for this enzymatic reaction and whether or not these conditions are the same for every enzyme. Put the two graphs (using Excel) and the paragraph on the same page.