

Name: _____ Period: _____ Date: _____

Ms. Randall LE
Enzyme Webquest

This web quest was designed to help you understand the purpose, and function of enzymes. Use the following websites provided to answer the questions below.

Part 1: Introduction

http://www.phschool.com/science/biology_place/labbench/lab2/intro.html

1. _____ catalyze reactions by lowering the _____ necessary for a reaction to occur.

Key Concepts

2. _____ catalyze reactions by lowering the _____ necessary for a reaction to occur. The molecule that an enzyme acts on is called the _____. In an enzyme-mediated reaction, _____ molecules are changed, and _____ is formed. The _____ molecule is _____ after the reaction, and it can continue _____.

3. Each _____ is _____ for the _____ it will catalyze. In this laboratory,

Enzyme = catalase, found in your liver
Substrate = hydrogen peroxide (H_2O_2)
Products = water and oxygen

4. DRAW THE REACTION THAT TOOK PLACE ON THE LEFT IN THE SPACE BELOW. LABEL THE SIDE OF REACTANTS, AND THE SIDE OF THE PRODUCTS THAT ARE PRODUCED. CIRCLE THE NAME OF THE ENZYME THAT IS FACILITATING THE REACTION.

Concept 1: Enzyme Structure

5. Enzymes are globular _____. Their folded conformation creates an area known as the _____ . The nature and arrangement of _____ in the _____ make it specific _____.

6. DRAW A MODEL OF AN ENZYME, ACTIVE SITE, AND SUBSTRATE BELOW:

Concept 2: Binding Specificity

7. Even when different _____ molecules are present, only those that have the _____ to the _____ are able to bind with the enzyme's _____.

Concept 3: Induced Fit

8. When an enzyme binds to the appropriate _____, subtle changes in the _____ occur. This alteration of the _____ is known as an _____. Induced fit enhances catalysis, as the enzyme converts _____ to _____.

9. Observe the INDUCED FIT ANIMATION and describe what happens below:

10. Release of the _____ restores the enzyme to its _____ form. The enzyme can _____, as long as _____.

Concept 4: Some Factors That Affect Enzyme Action

11. The conformation of an enzyme is maintained by interactions between the various _____ that compose it, and this conformation is sensitive to _____. Two important influences are _____ and _____. When an enzyme's _____ is significantly altered because of _____ or _____ variation, the enzyme may no longer _____. An enzyme is said to be _____ when it loses its functional shape.

Concept 5: pH and Enzyme Function

12. Each enzyme functions best within a _____. For example, the enzyme _____, which works in your stomach, functions best in a strongly _____ environment. Lipase, an enzyme found in your _____, works best in a _____ environment.
13. When the pH changes, the active site _____ and affects _____. What happens to catalysis when an enzyme is subjected to a pH far from its optimum range?
14. WATCH THE ANIMATION AND DESCRIBE WHAT YOU SEE BELOW:
15. In the presence of either excess _____ or excess _____, the _____ is altered. The _____ is _____ and the enzyme cannot _____.

Concept 6: Temperature and Enzyme Function

16. Chemical reactions speed up as _____ is increased, so, in general, _____ will _____ at higher temperatures. However, each enzyme has a temperature _____, and beyond this point the enzyme's _____ is lost. _____ temperatures will _____ most enzymes.

Part 2: Go the following website for this section

http://glencoe.mcgraw-hill.com/sites/dl/free/0078695104/383930/BL_11.html

17. What are the two **variables** you will be experimenting with on this site?
18. If you click on the “Information” button, it is stated that “enzymes are **organic catalysts**.” What does this mean?
19. What kind of mechanism is the enzyme-substrate complex often compared to?
20. First, add the same amount of substrate to every test tube and keep the pH constant. Click the computer monitor to see the data. What is your dependent variable? In other words, what is it that you are measuring?
21. What was the number of molecules of product formed per minutes when you added the same amount of substrate to each test tube?
22. Hit Reset. Now, add the amount of substrate laid out in front of each test tube. What happens to the number of molecules of product formed per minute when you increase the amount of substrate? What does this tell you about the reaction rate?
23. Hit Reset. First, change the levels of the pH too: **3, 5, 7, 9, and 11**. Then Add the **SAME** amount of substrate to **ALL** the test tubes. What happens when you increase the pH? What happens when you decrease the pH? Does the enzyme suffer more from an acidic solution or a basic solution?