

**Enzymes: Chemical Compounds of Life**

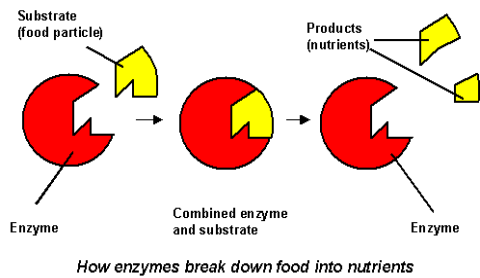
A catalyst is a substance that speeds up the rate of a chemical reaction. An enzyme is a protein that acts as a catalyst to speed up the rate of a chemical reaction *by lowering the activation energy*. Activation energy is the energy needed to start a reaction. If the activation energy can be lowered then the reaction will take less time.

Enzymes are highly specific in their activity. They attach to a certain substrate or substance at a place called the active site. Enzymes and substrates fit together like a lock and key arrangement to complete the chemical reaction. When the reaction is completed the enzyme and the newly formed reaction products separate, leaving the enzyme unchanged so that it can be used again. Enzymes are highly efficient catalysts but can be altered if the temperature or pH is changed.

**Questions:**

1. What organic compound is an enzyme? \_\_\_\_\_
2. What is a catalyst? \_\_\_\_\_
3. The substance with which the enzyme attaches to is called the \_\_\_\_\_.
4. What affect does an enzyme have on the chemical reaction? \_\_\_\_\_.
5. How does the enzyme speed up the chemical reaction? \_\_\_\_\_
6. What is the active site of the enzyme? \_\_\_\_\_
7. Is an enzyme “used up” by the reaction that it catalyzes? Explain. \_\_\_\_\_
8. Explain how enzymes are specific. \_\_\_\_\_
9. Could life as we know it exist without enzymes? Explain. \_\_\_\_\_
10. Give 2 ways that an enzymes activity level can be altered or changed. \_\_\_\_\_

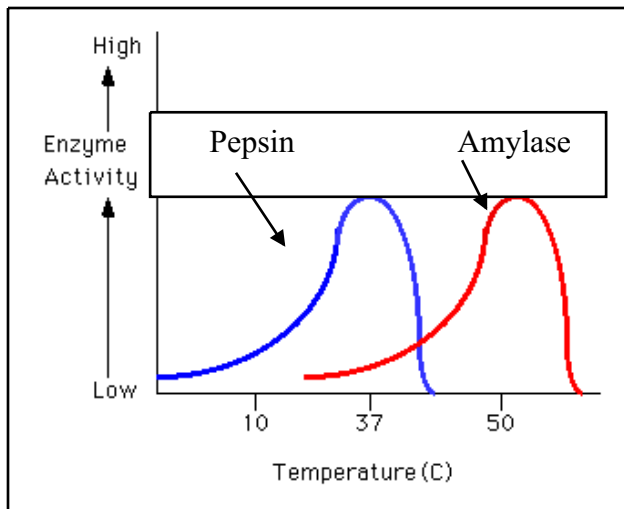
**Use the picture below to answer the following question**



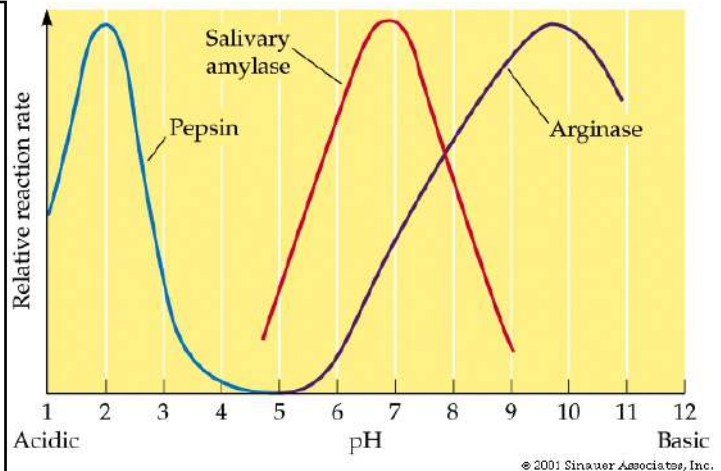
1. Explain how enzymes work as a “lock and key” component. \_\_\_\_\_

**Use the graph below to answer the following questions.**

**GRAPH A**



**GRAPH B**



1. According to graph A, at what temperature is the enzyme activity of pepsin the greatest? \_\_\_\_\_
2. What happens to the activity of pepsin as the temperature increases past 37 degrees Celsius? \_\_\_\_\_
3. According to graph A, at what temperature is the enzyme activity of amylase the greatest? \_\_\_\_\_
4. According to the graph B, at what pH is Pepsin most effective? \_\_\_\_\_
5. According to graph B, as the pH increases above 2, what happens to the effect of the enzyme Pepsin? \_\_\_\_\_
6. According to graph B, at what pH levels is the enzyme Salivary Amylase least effective? \_\_\_\_\_ and \_\_\_\_\_
7. According to graph B, at what pH level is the enzyme Arginase most effective? \_\_\_\_\_