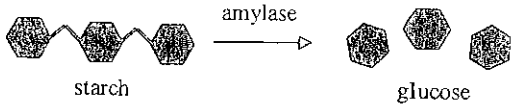
Name: _____ Date: _____

Activity Sheets
Enzymes and Their Functions

What are Enzymes?



Enzymes are compounds that assist chemical reactions by increasing the rate at which they occur. For example, the food that you eat is broken down by digestive enzymes into tiny pieces that are small enough to travel through your blood stream and enter cells. Enzymes are proteins that are found in all living organisms. Without enzymes, most chemicals reactions within cells would occur so slowly that cells would not be able to work properly. Enzymes function as catalysts. **Catalysts** accelerate the rate of a chemical reaction without being destroyed or changed. They can be reused for the same chemical reaction over and over, just like a key can be reused to open a door many times. Enzymes are generally named after the substrate affected, and their names usually end in *-ase*. For example, enzymes that break down proteins are called proteases. While lipases break down lipids, carbohydrases break down carbohydrates.

The compounds that enzymes act upon are known as **substrates**. The substrate can bind to a specific place in the enzyme called the **active site**. By temporarily binding to the substrate, an enzyme can lower the energy needed for a reaction to occur, thus making this reaction faster. The energy required for a chemical reaction to occur is known as the **activation energy**. Once the reaction between an enzyme and a substrate is complete, the substrate is changed to a **product** while the enzyme remains unchanged. The rate of the reaction between an enzyme and a substrate can be affected by different factors. Some of the factors that can affect enzyme activity are temperature, pH, concentration of the enzyme and concentration of the substrate. In living organisms, enzymes work best at certain temperatures and pH values depending on the type of enzyme.

1. What are enzymes? _____
2. What is a catalyst? _____
2. How do enzymes work? _____
3. An example of an enzyme: _____

Activity Sheets – Part 1 (B)
Enzymes and Their Functions: Lock-and-Key Activity

B. Enzymes and Their Functions – Questions

1. Match the following words with their definitions.

_____ Product
_____ Active site
_____ Enzymes
_____ Catalyst
_____ Substrate
_____ Activation energy

a. Amount of energy required for a chemical reaction to occur.
b. Substances that bring about a chemical reaction without being changed itself.
c. Substance that enzymes act upon.
d. Regions on the surface of enzymes that fit the substrate.
e. Substance formed from the substrate at the end of a chemical reaction with an enzyme.
f. Proteins that speed up chemical reactions.

2. Characteristics of enzymes

a. One characteristic of enzymes is that they are reusable. This is important because _____

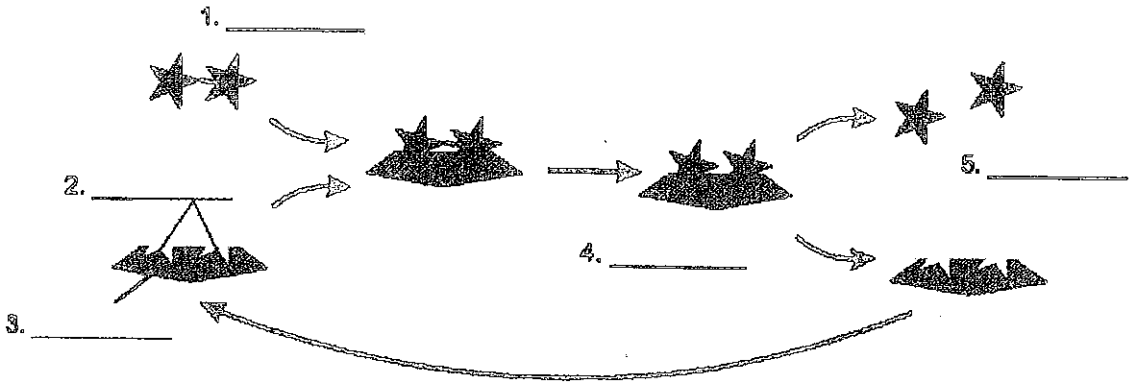
b. Name other 3 characteristics of enzymes:
1. _____
2. _____
3. _____

3. Naming enzymes

a. Enzymes names end with_____
Examples_____

b. Enzymes are named after_____
Examples _____

4. Fill in the blanks with the appropriate name.



Lock-an-key model

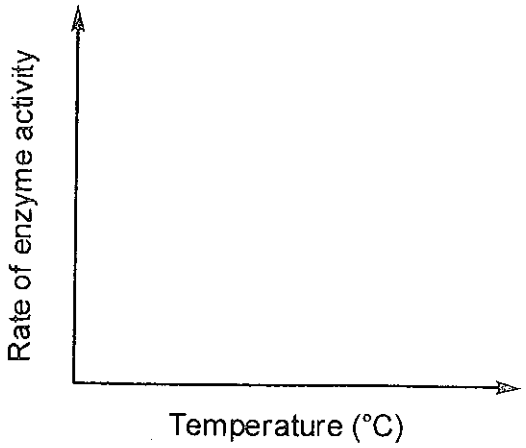
Names: product, active site, enzyme, substrate, enzyme-substrate complex.

5. **Factors affecting enzyme activity** (*use a textbook for part a-c)*

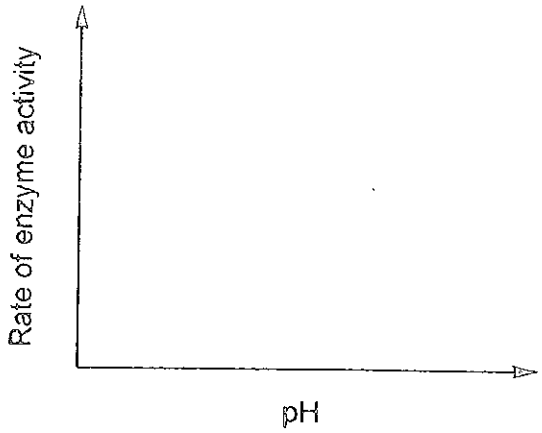
Enzyme activity can be affected by:

a. _____
b. _____
c. _____

a. The effect of temperature and pH on enzyme activity



b. The effect of pH on enzyme activity



c. The effect of enzyme and substrate concentrations on enzyme activity