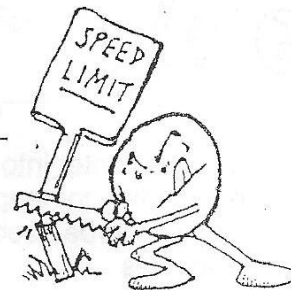


Name _____ Date _____ Period _____

What is an Enzyme? ^②

1. Made
by living
things

Enzymes (en-zymz) are proteins that make it possible for the chemical reactions of life to go on inside living cells.



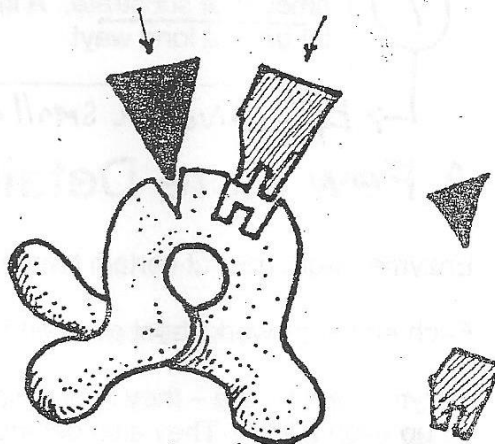
The substance that an enzyme acts upon is called its substrate (sub-strayt). The names of enzymes usually end with the suffix -ase and the remainder of the name is often based on the name of the substrate. For example, the enzyme that splits lactose (the sugar in milk) into glucose is called lactase.

How Do Enzymes Work?

Without an enzymes present, two molecules might accidentally bump into each other and have a chemical reaction. However, an enzyme increases the chances that the two molecules will meet.

An enzyme is a "matchmaker" – it brings chemicals together so the reaction will happen more quickly. ^③

Different enzymes have different shapes and affect different chemical reactions.



- ^④ The specific 3-D shape of each enzyme is ideally suited to bring together two specific molecules, line them up, and introduce them to each other. The enzyme may even twist them around a bit to get them together.

The theory of enzyme action in which the enzyme and the substrate fit together at the active site is called the lock and key model. The notched surface of a key can only open one lock. In a similar way, the shape of the active site of an enzymes fits the shape of a certain substrate. Thus, each enzyme can speed up a reaction of only its own substrate.

6

Enzymes are not physically changed as a result of the reaction.

Enzymes enter into a chemical reaction on temporarily – just long enough to cause the reaction to happen. Enzymes are not changed by the reaction. They are available to be used again and again for the same chemical step with other molecules.

6

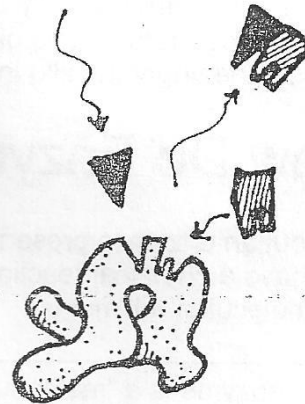
A single enzyme can act thousands of times. - *Reusable*

So ...

7

Small amounts of an enzyme can be used on a large amount of substrate. A little bit goes a long way!

→ *Effective in small amounts*



A Few More Details!

Enzymes work best at certain temperatures.

Each enzymes works best at a certain pH.

Enzymes are fragile – they lose their shape (denature) if the temperature or acidity go up even a little. They also denature in alcohol.

Biotechnology

Designing new and better enzymes is just one part of the work being done today in the field of biotechnology. By altering their shapes, we may be able to make enzymes that are sturdier and able to function under harsher conditions.

1. Explain the function of enzymes in a cell. _____

2. Describe the lock-and-key model of enzyme action. _____

3. What is the meaning of the word substrate? _____

4. What is the meaning of the word denature? _____

5. Amylase is a chemical found in human saliva. Could amylase be an enzyme? What makes you think so?

6. At what temperature would you expect a human enzyme to be most effective? Why

7. List the seven characteristics of an enzyme.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

g. _____