



→ Many chemical reactions are speeded up by catalysts.
A catalyst is a substance that increases the rate of the reaction and is not changed by the reaction.

→ Almost every chemical reaction is controlled by catalysts called enzymes.

Enzymes are proteins that function as biological catalysts.

Enzymes ensure that rates of metabolic reactions are great enough to sustain life.

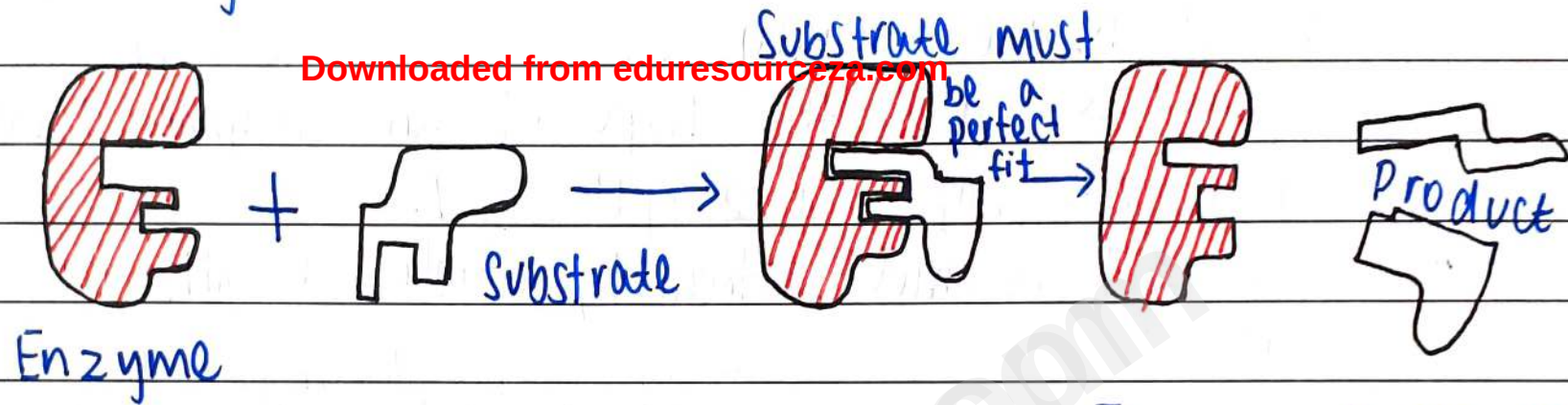
→ Starch is digested to the sugar maltose by an enzyme called amylase.

Protein is digested to amino acids by protease.

→ Another enzyme that speeds up the breakdown of a substance is catalase.

For instance: it breaks down hydrogen peroxide to water and oxygen.

How an Enzyme Works



The enzyme changes the substrate into new molecules.

This is known as the lock and key mechanism.

Properties of Enzymes

- All enzymes are proteins
- Enzymes are made inactive by high temperature
- Enzymes work best at a particular rate
- Enzymes work best at a particular pH.
- Enzymes are catalysts.
- Enzymes are specific.

Temperature and Enzyme Activity

- Most chemical reactions happen faster at higher temperatures. This is because the molecules gain kinetic energy.
- Enzyme, with more energy, will bump into the substrate more often. However, enzymes are damaged by high temperatures.
- The active site no longer fits perfectly with the substrate. The enzyme is denatured. It can no longer catalyse.
- The temperature at which the enzyme works fastest is known as its optimum temperature.
- Human digestive system has enzymes that have an optimum temperature around 37°C .
- Enzymes from plants have optimums of 28°C to 30°C .

pH and Enzyme Activity

- pH solution affects the shape of an enzyme. Most enzymes are their correct shape at a pH of 7.
- If the pH becomes extremely acidic or alkaline, the enzymes are denatured.
- Some enzymes have an optimum pH that is not neutral. For instance, pepsin. It has an optimum pH of 2.