

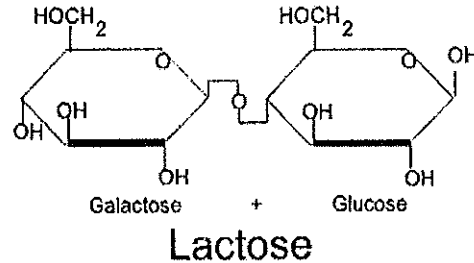
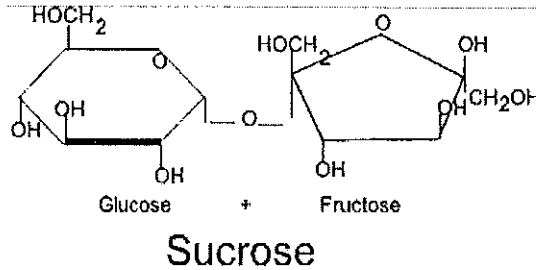
Enzymes Help Us Digest Food¹

Introduction to Sugars and Enzymes

The food we eat contains many different types of molecules, including two types of sugars: **monosaccharides** and **disaccharides**. For example, fruits contain the monosaccharides, glucose and fructose, and the disaccharide, sucrose.

★ In the diagrams below: - circle the name of each monosaccharide

- use arrows to indicate the names of the disaccharides.

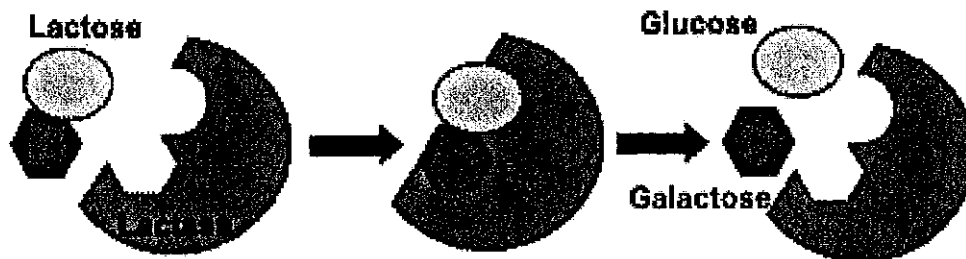


★ What is the difference between a monosaccharide and a disaccharide?

Monosaccharides from the food you eat are absorbed from your gut into your blood and carried to all the cells in your body where they are used for energy. Each disaccharide molecule must be broken down or **digested** into its monosaccharide components before it can be absorbed into the blood.

★ When a sucrose molecule is digested, which monosaccharides are produced?

The digestion of the disaccharide lactose to the monosaccharides glucose and galactose occurs very very slowly unless there is an **enzyme** to speed up the process. The enzyme that speeds up the digestion of lactose is called **lactase**.



Lactase and most other enzymes are proteins. Each enzyme has an **active site** where a **substrate molecule** binds. For example, the substrate lactose binds to the active site of the enzyme lactase. Notice that the **name** of the enzyme lactase was created by adding the suffix **-ase** to part of the name of the substrate lactose.

Circle the active site of the enzyme.

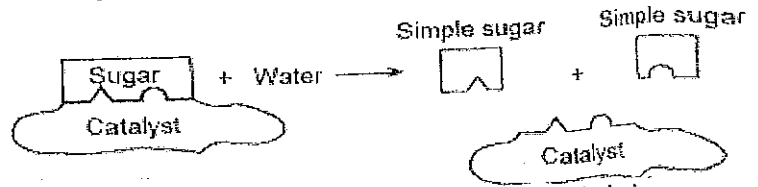
Put a star next to the substrate.

What type of organic molecule is lactose? _____

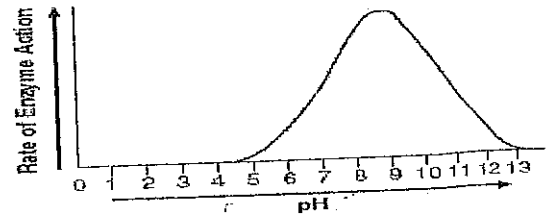
What type of organic molecule are glucose and galactose? _____

Enzyme practice problems

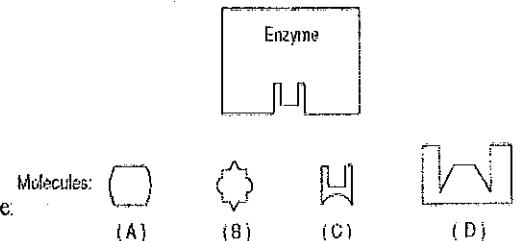
- The diagram illustrates a biochemical process that occurs in organisms. The substance labeled "catalyst" is also known as
 - Hormone
 - b. antibody
 - c. enzyme
 - d. inorganic compound



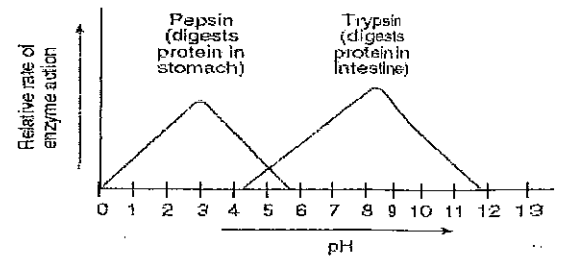
- A characteristic of hormones and enzymes that allows them to work effectively with other organic molecules is their
 - Specific shape
 - b. small size
 - c. ratio of H and O atoms
 - d. high energy bonds
- The effect of pH on a certain enzyme is shown in the graph. At what pH would the enzyme be most effective?
 - above 10
 - b. between 5 and 7
 - c. between 8 and 10
 - d. below 5



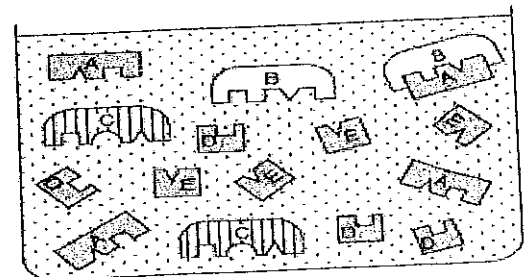
- An enzyme and four different molecules are shown in the diagram. The enzyme would most likely affect reactions involving
 - Molecule A only
 - b. Molecule C only
 - c. Molecules B and D
 - d. Molecules A and C



- According to the graph, pepsin works best in which type of environment?
 - Acidic
 - b. Basic
 - c. Neutral
 - d. Both acidic and basic
- Using the same graph, answer the following question. Neither enzyme works at pH
 - 1
 - b. 5
 - c. 3
 - d. 15



- The diagram to the right represents a beaker containing a solution of various molecules involved in digestion. Which molecules represent an enzyme-substrate complex?
 - Molecules A and E
 - b. Molecules A and B
 - c. Molecules B and C
 - d. Molecules D and E



- Using the same graph, which molecules represent products of digestion?
 - Molecules A and E
 - b. Molecules A and B
 - c. Molecules B and C
 - d. Molecules D and E

- Enzymes have an optimum temperature at which they work best. Temperatures above AND below this optimum will decrease enzyme activity. Which graph below best illustrates the effect of temperature on enzyme activity?

