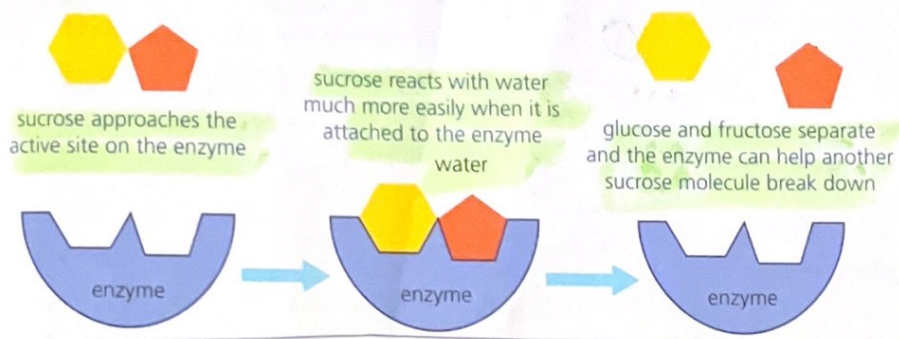


How enzymes work

Enzymes speed up chemical reactions by making them happen more easily.

The sugar we get from sugar cane is sucrose. Its molecules contain glucose and fructose. If you eat sucrose, enzymes along the walls of your small intestine break it down and release the two smaller sugars.

The sucrose binds to the part of the enzyme called its **active site**. This is shaped to fit the sucrose and hold it in place. Every enzyme has a different shape and most enzymes will only speed up one sort of reaction.



This enzyme breaks down sucrose by speeding up the reaction between sucrose and water.

Sucrose needs to react with a water molecule to split into glucose and fructose. The enzyme makes this reaction much easier. As soon as the reaction has finished, it lets the separate glucose and fructose go. The enzyme is left unchanged and ready to bind to another sucrose molecule.

Enzyme-catalysed reactions are fast. Each enzyme molecule breaks down thousands of sucrose molecules per second. A small amount of enzyme can make huge quantities of a chemical react.

All the enzymes in your digestive system break large molecules down by helping them to react with water. Most of the enzymes used in industry do too. But enzymes can also speed up other types of reaction. They can help build large molecules as well as break them down.

Why use enzymes?

Microbes make a huge variety of enzymes. They make impossible chemical reactions possible and expensive reactions cheap. They are *nature's gifts to us*. More than 3000 different enzymes have been identified and that number is growing all the time. The right enzyme can help us to make anything we need.



1 Copy and complete this table:

Type of enzyme	Use in food manufacture
carbohydrase	
protease	
lipase	

- Maltose is a sugar. It contains two glucose molecules joined together. Draw diagrams to show how an enzyme could break it down.
- Explain why enzymes are only needed in small amounts.
- Scientists all over the world are investigating the enzymes different microbes produce. Explain why this work is important.



- Enzymes are used to make cheese, produce sugar, and improve foods.
- Every enzyme has an active site that binds the molecules it works with.
- Enzymes don't change during reactions. They can be used over and over again.