

Food

We need to eat a wide variety of foods to provide our bodies with all the substances that are needed. When we do this, we are said to have a balanced diet. Carbohydrates, proteins, fats, vitamins and minerals are nutrients, which means that they provide the raw materials for making other substances that the body needs.

Substance needed	Examples	Why it is needed	Good sources
carbohydrate	starch, sugars	for energy	pasta, bread
protein		for growth and repair	meat, beans
vitamins	vitamin C	for health	fruits and vegetables (e.g. oranges contain lots of vitamin C)
minerals	calcium	for health	fruits, vegetables and dairy products (e.g. milk contains a lot of calcium)
fibre		for health (helps to stop constipation)	wholemeal bread
water		for health (water dissolves substances and fills up cells)	

We can do tests to find out which substances are in foods. For example, starch makes iodine solution go a blue-black colour.

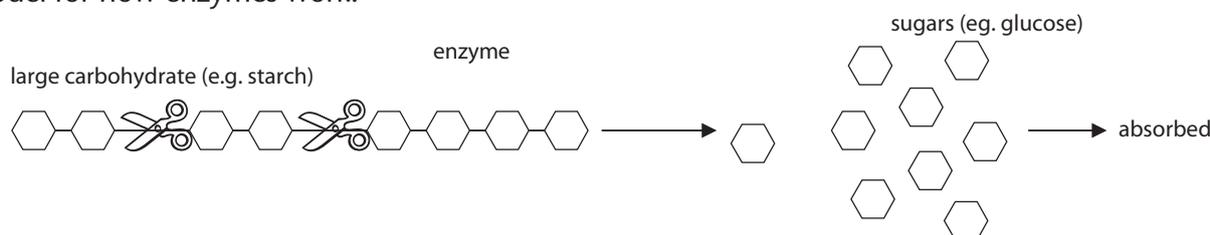
Nutrition information labels on foods tell us what the food contains. The labels also tell us how much **chemical energy** is stored in the food. The amount of energy is measured in **kilojoules (kJ)**. Food labels may also have **health claims** on them.

Eating too much or too little can cause problems. Too much fat may cause **heart disease** and make you overweight. People who are very overweight are **obese**. People starve and become weak if they eat too little.

Digestion

Digestion turns large **insoluble** substances into small **soluble** ones. The organs of the **digestive system** help us digest food. Many of them produce **enzymes** (chemicals that break up food).

We can use a **model** to make it easier to think about how something complicated works. Here is a model for how enzymes work:



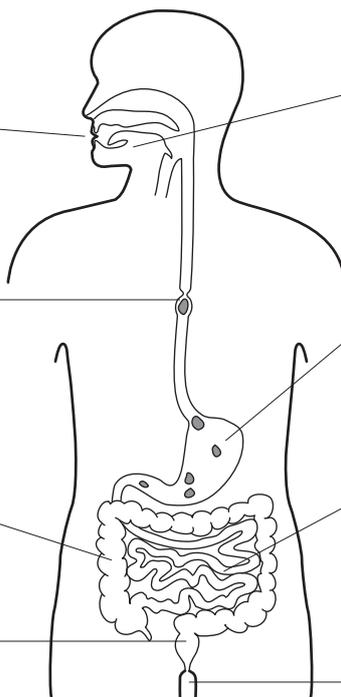
Food is digested in the **gut**.

Putting food in the **mouth** is called feeding or **ingestion**. The teeth grind up the food and mix it with a **digestive juice** called **saliva**. Digestive juices contain enzymes.

Food is swallowed down the **gullet** (or **food pipe**). The muscles above the swallowed food get smaller (they **contract**) pushing the food down.

The **large intestine** removes water from the food that cannot be digested.

Food that cannot be digested forms **faeces**. Faeces are stored in the **rectum**.



Saliva is produced by the salivary glands. Saliva breaks down starch into sugar.

In the **stomach**, strong acid is added to the food and more digestive juices are added to break down proteins into amino acids.

In the **small intestine** more digestive juices are added. Carbohydrates are digested into sugars. Sugars and amino acids are small and so can be taken into the blood stream in the small into the blood stream in the small intestine. The food substances are **absorbed**.

Faeces are eventually pushed out of the **anus**. This is called elimination or **egestion**.

To help absorb the digested food, the wall of the small intestine is thin and covered with **villi**. These increase the surface area.

The digested food substances are carried around the body by the **circulatory system**. The blood travels through **blood vessels**. **Arteries** carry blood away from the **heart**. **Veins** carry blood towards the heart. The smallest blood vessels are **capillaries**. Cells in **tissues** get the substances they need from **tissue fluid**, which leaks out of capillaries.

Uses of digested food

Cells need food substances to:

- release energy
- make new substances.

Cells use a chemical reaction called **respiration** to release energy from a sugar called glucose.