3-2 How the body uses food

Nutrients are the substances required by the body to produce energy, to grow new tissues and repair those that are damaged, and to regulate all the processes that keep a person healthy. These nutrients are grouped into carbohydrates, proteins, fats, and vitamins and minerals, which are all supplied by food.

The body cannot use food in the form in which it is eaten. It has to be broken down into molecules that are small enough to pass out of the intestine and into the bloodstream, which is where they are needed. This process of breaking down food is called digestion.

1. Digestion begins in the mouth, where the teeth break the food into much smaller pieces. Substances in the saliva start breaking down the carbohydrates (the starches and sugars) into small sugar molecules. The molecules pass into the blood vessels where they are carried to the cells that use these simple sugars to produce energy.

2. Proteins are made up of long molecules consisting of small units called amino acids. When the food reaches the stomach, gastric juices break down the protein molecules into amino acids. These are small enough to pass into the bloodstream which carries them to where they are needed.

3. A green substance called bile is produced in the liver and enters the intestine immediately below the stomach. Its function is to help break down fats into fatty acids and glycerol. It also helps the body to absorb vitamins A, D, E and K.

4. Pancreatic juice is produced by the pancreas and intestinal juice is produced by the walls of the intestine. These juices also enter the digestive system below the stomach. They are mixtures of substances that continue breaking down the partly digested proteins, carbohydrates and fats.

5. When the amino acids reach places where they are needed, they recombine into other proteins that can become new tissues or repair damaged tissues.

6. When the simple sugars reach the cells, they react chemically with oxygen to produce carbon dioxide and water. This chemical reaction in which energy is released is called respiration.
1. Put a plain, unsalted 'dry' biscuit or 'water cracker' in your mouth and chew for 2–3 minutes without swallowing. Try to detect any change in the taste of the biscuit.
   - How did the teeth help to break up the biscuit? Which teeth did the grinding?
   - What was your tongue doing while you were chewing?
   - Did the flavour become sweeter?
   Use the information in the diagram on the previous page to explain what was happening to the biscuit.

2. Colour each box of information around the body outline in a different colour. Then find the body area where each step is happening. Lightly colour that area to match the colour of the box. Remember, nutrients are transported to all cells in every part of the body. Draw arrows connecting each of the first four boxes with its correct location.

3. Imagine you are a cold meat or salad sandwich that someone is about to eat. You are made up of a slice of cold meat or a mixture of salad, placed between two slices of bread that have been lightly spread with butter. Write an imaginative story describing exactly what happens to each part of you as you are eaten and digested.

4. Complete the crossword.

Across
1. A type of food needed for growth and repair of tissue (P)
2. An everyday word that means nutrients (F)
3. Liquid that starts digestion and is produced in the (S) mouth
5. What the body needs to keep it operating correctly (N)
11. Type of food needed for energy (C)
12. Found in the mouth, break food into smaller pieces (T)
13. A fat found in milk (C)
14. The main reason we need carbohydrates (E)
17. The main reason children need protein (G)
18. Process of breaking food into simpler substances (D)
19. Blood vessel that carries food to the cells (A)
20. Process in the cells that changes food into energy (R)

Down
1. Organ that produces pancreatic juice (P)
2. Food that breaks down into fatty acids (F)
4. A small unit that makes up a protein molecule (A)
6. Groups of cells in the body (T)
7. The longest part of the digestive system (I)
8. A type of carbohydrate found in grains and bread (S)
9. The gas used up during digestion (C)
10. The organ in which gastric juices are produced (S)
15. The place where digestion starts (M)
16. Green liquid produced in the liver (B)