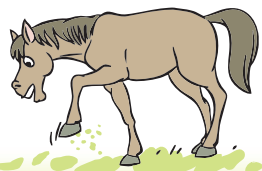
Proteins

Proteins do many things. They help the body grow and repair itself, especially after an illness or injury. They also help the body make new skin, hair, blood, etc., every day. You must have noticed that hair and nails keep growing. Similarly, blood and skin, and some other parts of the body must be made every day to replace old parts that the body gets rid of. Besides, many parts of the body, such as nails, hair, muscles and the outer layer of skin, are made up entirely of proteins. In addition, some types of proteins help the body fight against germs and other harmful things.

Now that you know how important proteins are, remember to include them in every meal. Some body-building foods, or sources of protein, are pulses, milk, paneer, cheese, meat, fish and eggs.



The fur, hooves, horns, feathers, beaks and claws of animals are made of a special type of protein called keratin. It is tough and waterproof. In case you are wondering, keratin forms our hair and nails too.

Vitamins

In general, vitamins help the body work well and protect it from diseases. Different types of vitamins are good for different parts of the body and are present in different types of food. Sour fruits, such as orange, lemon and amla, have a type of vitamin, called vitamin C. It is good for the gums and skin. It also protects the body from diseases and helps in the healing of wounds.

Foods rich in Vitamin C

Normally, we get all the vitamins we need from vegetables, fruits, cereals, pulses, milk, eggs and fish. When there is a shortage of vitamins in the body, doctors ask us to have vitamin tablets, capsules or syrups.

Explore More

Types of matter

You have learnt that everything is made of matter. But, as you must have guessed, all matter is not the same. Gold is different from iron, say, and oxygen is different from carbon dioxide. To know why this is so, we have to learn what matter is made up of.

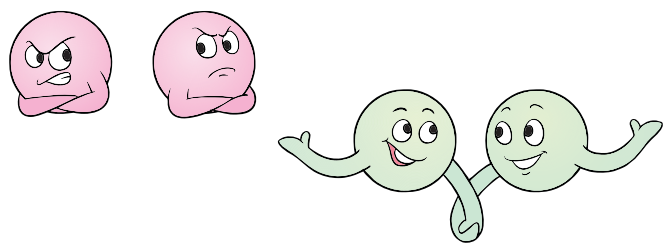
Atoms and molecules

All matter is made of tiny particles called atoms. We cannot see atoms because they are so small that millions of them fit into a tiny speck of dust. There are more than a hundred different types of atoms. These different types of atoms make up different types of substances. The atoms that make up gold, for example, are different from the atoms that make up iron. That is not all. Atoms join up to form molecules, and molecules form still other different types of substances. That is how there are so many different types of substances.

Elements

Substances that are formed of only one kind of atoms are called elements. Iron, gold, silver, aluminium, copper, oxygen, carbon, calcium and iodine are some elements. The atoms in an element can be on their own or they can join up to form molecules. But these molecules are made up of the same kind of atoms.

The atoms of some elements, such as iron, carbon, copper and gold, prefer to be on their own. The atoms of some elements, such as oxygen and hydrogen, join up to form molecules. Oxygen and hydrogen molecules are made up of two atoms each.



Atoms may remain alone or join up to form molecules.

Carbon atoms prefer to be on their own, while oxygen atoms join in pairs to form molecules.

2. The Teeth

By now you must have lost some of your milk teeth, or baby teeth. Do you remember when you started losing them? How many milk teeth do you still have? How many teeth do you have in all? You may need the help of a classmate to answer the last question. Do all of you have the same number of teeth? Ask your teacher how many teeth he or she has.

Teeth grow in stages

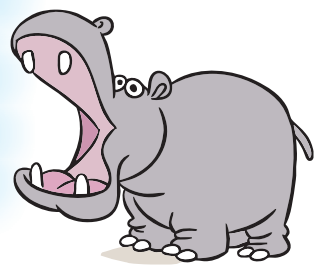
When a baby is born, it does not have teeth. Well, it does have teeth, but they do not show because they are still inside the gums. They grow, as the baby grows, and push through the gums. Later, these teeth fall off and new teeth come out.

The milk teeth

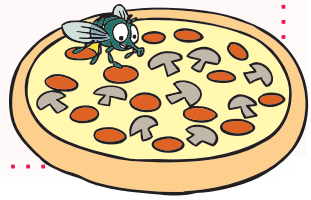
The front teeth begin to push through the gums when a baby is about six months old. In the next year and a half or so, a child gets a full set of 20 baby teeth. These teeth are called baby teeth or milk teeth because they fall off later to make place for permanent teeth.

The first milk teeth to come out are the front teeth, called the incisors. These are sharp and are meant for biting or cutting. There are four in the upper jaw and four in the lower jaw (eight in all). Then come the canines and molars. The pointed teeth between the incisors and molars are the canines. There are two in the upper jaw and two in the lower jaw (four in all). They are for tearing, not that we really need to tear food the way, say, tigers do. The molars are the large teeth at the back. There are four in the upper jaw and four in the lower jaw (that makes eight). They are for chewing and crushing.

People generally think that canines are for tearing flesh. But that is not all. Many animals that eat plants also have very large, scary ones. The hippopotamus, for example, has canines (lower ones) that can grow up to 50 cm. It uses them for fighting, and not eating. Musk deer have very large upper canines for fighting, and so do walruses. Walruses are not plant-eaters, but they do not use their sharp canines for eating. The tusks of elephants, by the way, are large incisors.



The kind of mouth and digestive system an animal has is related to the kind of food it eats. A fly, for example, has a very simple digestive system because it digests its food outside the body. When it sits on something, it tastes the stuff with its legs. If it likes the taste, it vomits saliva onto the stuff. The saliva mixes with the food (a bit of a fruit or pizza, perhaps) and digests it. The fly then sucks up the digested food with its strawlike mouth.



New Words

moisten	make wet
contract	tighten
slush	partly melted snow or wet mud
absorb	take in
faeces	solid waste thrown out of the body by an animal

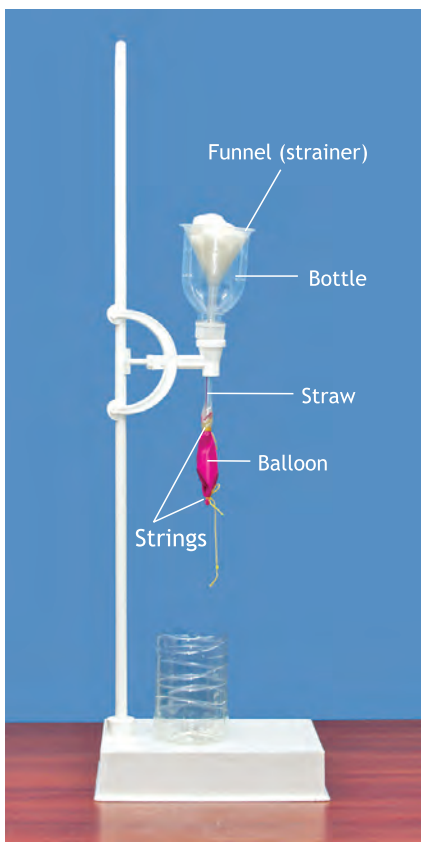
Main Points

- Organs that work together to help the body do a particular job form an organ system.
- Digestion is the process of breaking down food into a form that the body can use.
- The digestive system is made up of the mouth, food pipe, stomach, liver, small intestine and large intestine.
- In the mouth, the teeth break down food into little pieces and saliva moistens it to help us swallow. Saliva also starts the process of digestion by breaking down food into a simpler form. Another job saliva does is to protect the mouth from germs.
- The food pipe carries food from the mouth to the stomach. Muscles in its wall contract to push the food down.
- The stomach contracts and relaxes to mash the food further and to mix it with the digestive juices made by it. Among the juices is an acid.
- From the stomach, food passes into the small intestine, where digestion is completed by juices made by the small intestine and liver.
- The wall of the small intestine absorbs the useful part of the digested food and blood carries it to the rest of the body.
- The waste from the small intestine passes into the large intestine, which absorbs water from the waste. Finally, the waste stored as faeces in the rectum leaves the body through the anus.

Do this activity in class in groups of five or six. Let each group make a model of the excretory system. Here are some ideas, but you can think of some yourselves. When all the groups have finished, vote to choose the best model. Voting is a way of showing your choice. You can do it by raising your hands.

- Cut off the bottom of a plastic bottle and make a hole in its cap. (You may ask your teacher to help you with this step.) Pass a straw through the hole and seal the hole with modelling clay or chewing gum.
- Pass the other end of the straw into the mouth of a balloon and secure it with a rubber band or a bit of string. Make a small hole at the other end of the balloon. Tie the balloon just above the hole with a bit of string or a rubber band.
- Place a funnel with cotton wool in it over the open end of the bottle. This makes a strainer. One of you will have to hold the funnel and bottle in place. Another can pour a mixture of haldi and water into the strainer. (You can also fix the funnel and bottle to a stand, if your class has one.) Go slow, else the balloon may become too heavy or the mixture may spill out of the strainer.
- When the balloon is somewhat full, remove the string or rubber band from the lower end of the balloon.

Which is the kidney in the model you have made? What about the ureter, urinary bladder and urethra?



5. Adaptations in Animals

To adapt means to adjust to the conditions around one. A child who joins a new school, needs to adapt to his/her new surroundings, classmates, etc. Similarly, living beings adapt to their surroundings to make the best use of them or to live in the best way possible. The features (characteristics) and behaviours that help a living being fit in well with its surroundings are called adaptations. Remember though, that when we speak of adaptations in living beings we mean features that developed (grew) a long time ago. So long ago that now they are a part of the living being, for example, the fins of a fish or the feathers of a bird.

Explain how temporary changes, such as people getting used to a different climate or time zone, are not adaptations, and that adaptations are inherited, while temporary changes such as getting tanned are not.

Adaptations related to habitat

The habitat of a living being is the place where it lives naturally, for example, the habitat of a tiger is a forest. In this chapter, we will talk about adaptations in animals.

Many animals have adaptations that help them camouflage, or blend in with their surroundings. Some need to blend in to avoid being seen and eaten by predators. Others use camouflage to sneak up and attack their prey. To take one example, some insects look like leaves or twigs. This makes it hard to spot them among the branches and leaves of trees.

Animals that live in water

Let us start with fish. They have many adaptations that help them live in water.

- Their gills help them take in oxygen from water. They take in water through their mouth and push it out through their gills. As the water flows over the gills, oxygen is absorbed and carbon dioxide passes out.

The desert rain frog, found in a very dry stretch of the coasts of South Africa and Namibia, spends the day in a burrow and feeds on insects at night. It gets nearly all the water it needs from the fog that blows in from the sea nearby. Its eggs and tadpoles can do without water because it covers its eggs in a jelly. The tadpoles grow in the jelly and come out only as frogs. Find Namibia and South Africa on a map of Africa in your atlas.

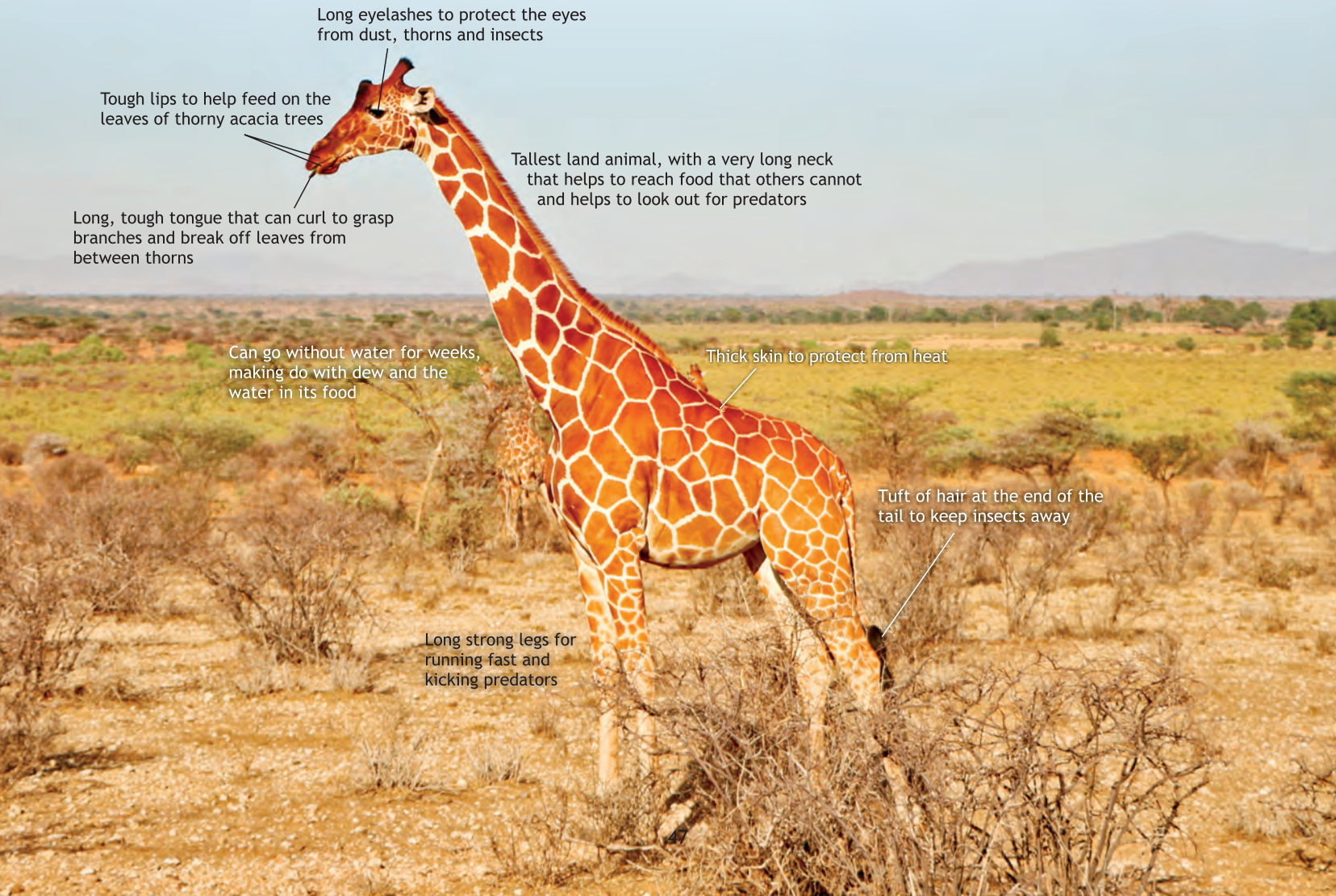
Animals that live in very cold places

Polar bears live in the northernmost part of the world, called the Arctic, which is covered in snow and ice for a large part of the year. They have many adaptations to cope with their surroundings.

Do you know why having large feet helps camels walk on sand? Or why the large feet of polar bears help them walk on snow? You may have noticed that thin, pointed or sharp things, such as nails and knives, go into things easily. Broad, flat things do not. You cannot cut vegetables with a butter knife, for example. The feet of camels and polar bears, being flat and broad, do not sink in as they walk on soft sand or snow.

If you watch Animal Planet or National Geographic on TV, you may come across many adaptations of animals living in different habitats. Note down anything that you find interesting in your scrapbook . You can search the Net too.

Giraffes live in African grasslands, where summers can be very hot. They like to feed on the leaves of thorny acacia trees that grow rather tall. This is helpful because there is very little competition for such thorny food that grows so high up. The picture shows some adaptations that help giraffes cope with their surroundings.



Making Connections

Here is how you can make a pinwheel or phirki.

Make lines on a square piece of paper by drawing or folding.

Make cuts halfway down the lines. Fold the edges and fix them to the centre with glue.

Push a pin through the centre. Then pass it through two or three beads and push it into a straw.

The pinwheel will spin in the wind.

Moving air is called wind. In olden days, windmills were used to crush grain or pump water. The blades of the mill moved with the wind the way the blades of the phirki moves. They made an axis attached to them turn and this movement was used to crush grains or pump water. These days, wind turbines (a turbine is a machine that turns with the movement of air or water) are used to make electricity.

2. Generally, the solubility of a solid in water _____ when water is heated.
   a. increases b. decreases c. remains the same

3. Which of these is not an alloy?
   a. Steel b. Brass c. Copper

4. The process of pouring a liquid from one container to another to separate out a sediment is
   a. decantation b. sedimentation c. filtration

5. A soluble substance can be separated from water by
   a. filtration b. decantation c. evaporation

D. Write short answers.

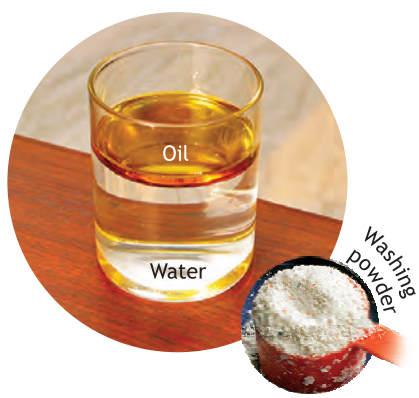
1. What is a solution?
2. Name two solvents used to dissolve things that are insoluble in water.
3. Name one metal that is used to make steel.
4. Water is an excellent solvent. How is this useful? Write any three uses.
5. What is solubility?

E. Explain briefly.

1. How is salt made from seawater?
2. How would you separate soil from a mixture of soil and water?

Do you know why we add washing powder to water when we wash clothes? This activity will tell you why.

Add two tablespoons of oil in half a glass of water. Stir well to make a mixture and wait for a while. As you know already, the oil will separate from the water and float over it. Then put some washing powder into the glass and stir again. This time the oil will mix with the water.



Use a paper clip to fix a rubber band to the mouth of an empty plastic jar. Hang the jar from the rubber band. Fill up the jar with colourful stones, pebbles, batteries, etc. The greater the mass of the things in the jar, the greater is the earth's pull on it, so the more the rubber band will stretch. Another way of saying this is, the greater the mass of the things in the jar, the heavier it is and the more it will stretch the rubber band. Do you get the connection between mass and weight now? Things with greater mass are pulled with a greater force by the earth, so they weigh more, or feel heavier.

People who deliver cooking gas cylinders or those who collect waste paper from people's houses often use a spring balance. A spring balance works the same way as the rubber band in the activity. It has a spring inside that stretches when you hang something from the hook at the bottom. It also has a pointer that moves when the spring inside stretches. There are markings on the balance to show the mass of the body that you hang from the hook. The mark that the pointer points to gives you the mass of the body.

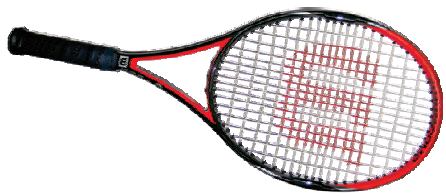
Magnetic force

Hold a magnet or a magnetic sticker (the kind you stick on a refrigerator) near some paper clips. The clips will get pulled by the magnet and stick to it. Explore a little more and answer these questions.

- Does the magnet have to touch the clips to pull them?
- Does it pull other things, for example, pins and nails, pencil shavings, erasers, plastic, paper and cloth?

People learnt to 'make' fire by rubbing pieces of wood or stone thousands of years ago. This was a big step forward because it allowed them to cook, stay warm, drive away animals, and so on. You could say that when we learnt to make use of fire, we set out on a journey that set us apart from other animals.

Discuss these pictures with your classmates. Why do tyres and the soles of shoes (especially sports shoes) have grooves? Why are the scrub pads we use to clean utensils rough? What about the handle of a bicycle or a cricket bat or a badminton racket? Is it smooth and slippery or a bit rough?

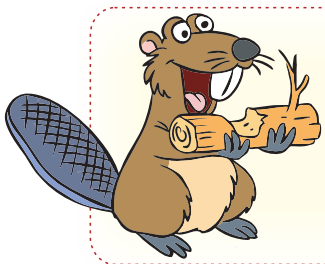


All these are examples of things in which we need to increase friction.

Is friction always useful?

The answer is, "No."

- Friction wears down things, for example, it wears down the tip of a pencil, so you need to sharpen it. It wears down tyres and the soles of shoes, so you need to change them. It wears down moving parts of machines and even teeth.



Rats, mice, squirrels, guinea pigs, hamsters, beavers, etc., belong to a group of mammals (animals that have their mother's milk when they are babies) called rodents. An interesting thing about these animals is that their incisors keep growing, so they have to keep chewing things to wear them down. Otherwise, the teeth would pierce through their jaws.