OUR FOOD 7

We eat at least two or three times a day.

What would happen if we did not eat at all?

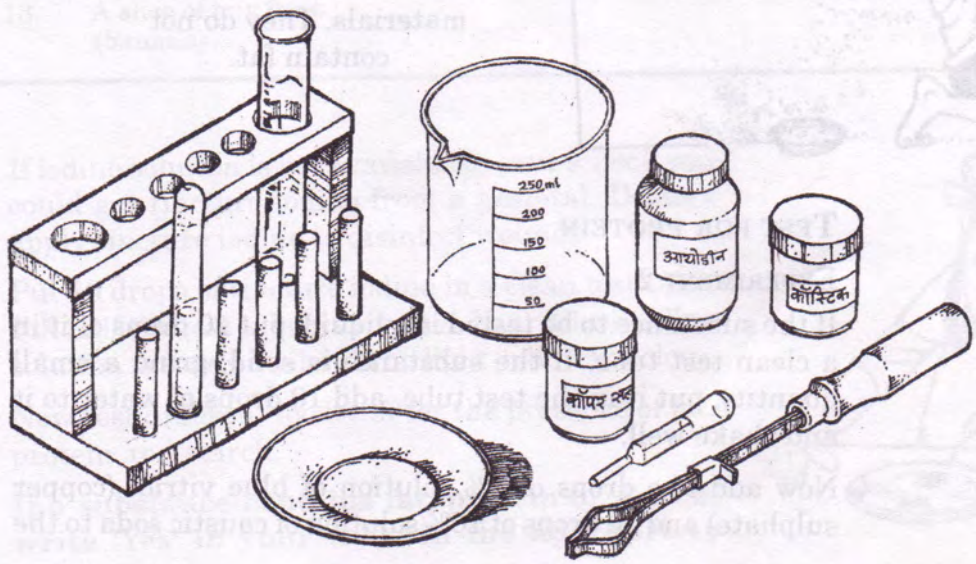
Have you ever been on a fast? If you have, describe how it feels if you have had nothing to eat for a whole day. (1)

Imagine how you would feel if you had to starve for many days. (2)

If a person does not get proper food (s)he loses weight, does not have the energy to work and is also likely to fall ill.

We eat an unbelievable variety of foods. Some people eat *chappatis* made of wheat flour with *dal* (lentils), others prefer rice. Some eat meat and fish, while others prefer vegetables. Some people drink milk everyday, while others like to eat lots of fruit.

What does our food consist of?



Whatever we eat, food basically contains three main substances called nutrients. These are fat, protein and starch. In addition, our bodies require water, salt, vitamins and sugar.

It is comparatively easy to find out whether something contains fat, protein or starch and we will now learn how to test different foodstuff for these substances.

It is not possible, at this stage, to test for minerals, vitamins and sugar, but these substances, too, are essential for our bodies.

Copy Table 1 in your exercise book and record your observations in it. (3)

Test for fat

Experiment 1

Take a small quantity of the substance to be tested and rub it lightly on a piece of paper. Let the paper dry for a while. If it becomes smooth, oily and translucent, it means the substance contains fat.

Kerosene, diesel and wax also make paper transparent, but they are not food materials. They do not contain fat.

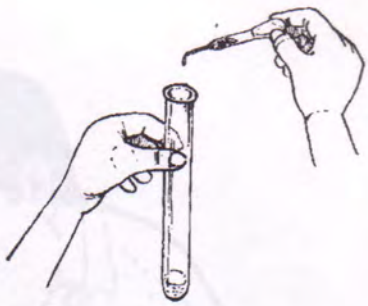
Test for protein

Experiment 2

If the substance to be tested is a liquid, put 10 drops of it in a clean test tube. If the substance is solid, grind a small quantity, put it in the test tube, add 10 drops of water to it and shake well.

Now add two drops of 2% solution of blue vitriol (copper sulphate) and 10 drops of 10% solution of caustic soda to the

test tube. Shake well. If the solution turns violet, the sample contains protein.



TEST FOR STARCH

EXPERIMENT 3

Add 2-3 drops of dilute iodine solution to the substance to be tested. If it turns dark blue or black, the substance contains starch.

TABLE-1

No.	Substance	Fat	Protein	Starch
		Present or absent	Present or absent	Present or absent
1.	Boiled rice			
2.	Water in which rice has been boiled			
3.	Uncooked rice/*kutki*			
4.	Wheat			
5.	Wheat flour			
6.	Slice of potato			
7.	Peanuts			
8.	Whole *tuar dal*			
9.	Broken *tuar dal*			
10.	*Ghee*			
11.	Milk			
12.	A slice of any vegetable (lady's finger, pumpkin)			
13.	A slice of any fruit (banana)			

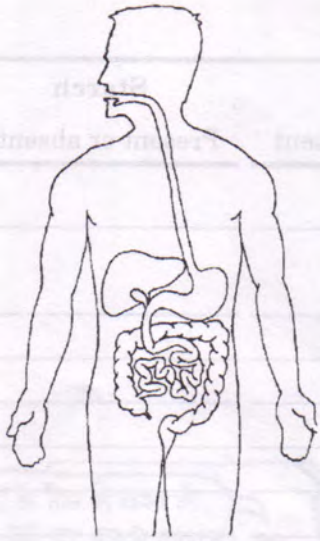
If iodine solution is not available in your school, you could get tincture iodine from a hospital. Doctors apply tincture iodine to disinfect wounds.

Put 10 drops of tincture iodine in a clean test tube. Fill half the test tube with water. Your dilute iodine solution is ready. It should be light yellow in colour.

Now test different foodstuff for the presence of fat, protein and starch.

If a substance contains fat, protein or starch, write 'Yes' in your table in the appropriate

column; if does not, write 'No'. (4)
Were fat, protein and starch present in all the foodstuff you tested? (5)
Would it be correct to say that a foodstuff may contain more than one nutrient? (6)
Is there any difference in the reactions of iodine with whole wheat and wheat flour? If yes, what are these differences? (7)



Digestion of food

Most nutrients in food cannot be directly assimilated by the body. It is necessary to first convert them into substances which can. This process is called digestion.

Digestion takes place in the internal organs of the body. Ask your teacher to point out the organs responsible for digestion in the body of the dissected rat.

You cannot actually see food being digested by these organs. However, you can observe the digestion of starch which begins in our mouth when we chew food.

Try this and think about it

Slowly chew some beaten rice *poha* or a piece of *roti*.

Does the taste change after a while? If yes, what is the new taste like? What could be the reason behind this change in taste?

You can perform an interesting experiment to find out.

First step in digestion

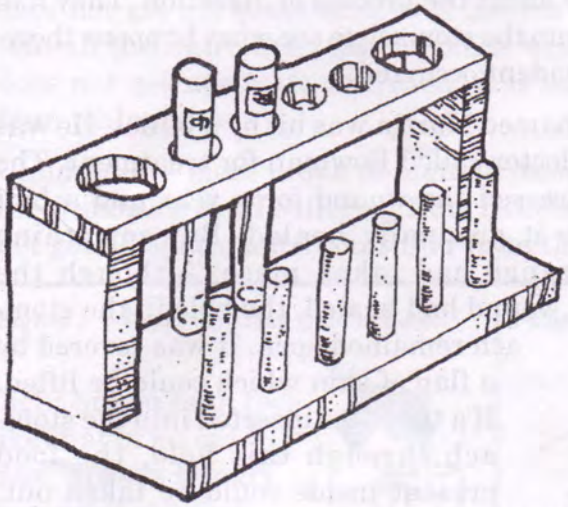
Experiment 4

Take a beaker and fill it one fourth with water. Put a half tablespoon of wheat flour in the beaker and shake well. Pour 10-12 drops of this solution into a test tube.

Add two drops of iodine solution to the test tube and see if the contents turn blue or black. Paste paper labels on two clean test tubes and mark them 'A' and 'B'.

Pour 25 drops of the wheat flour solution from the beaker into each of the test tubes.

Bring test tube 'A' near your mouth, as shown in Figure 2, and spit into it. The quantity of saliva should be roughly equal to the quantity of solution in the test tube. Shake the test tube well after adding saliva.



Do not add saliva to test tube 'B'.

Let both test tubes stand for half an hour. Then add two drops of iodine solution to each of them.

Copy Table 2 in your exercise book and record your observations in it. (8)
Describe the effect of saliva on starch. (9)

The action of saliva on starch is the first step in digestion.

Why are we advised to chew our food well? (10)

TABLE 2

Test tube	Saliva added or not	Whether blue/ black colour obtained	Starch present/absent
A			
B			

Food chewed in the mouth reaches the stomach through a tube which passes through the chest. The stomach is in turn connected to a long tube called the intestine. Fat, protein and the starch remaining after the action of saliva in the mouth are digested in the stomach and intestines.

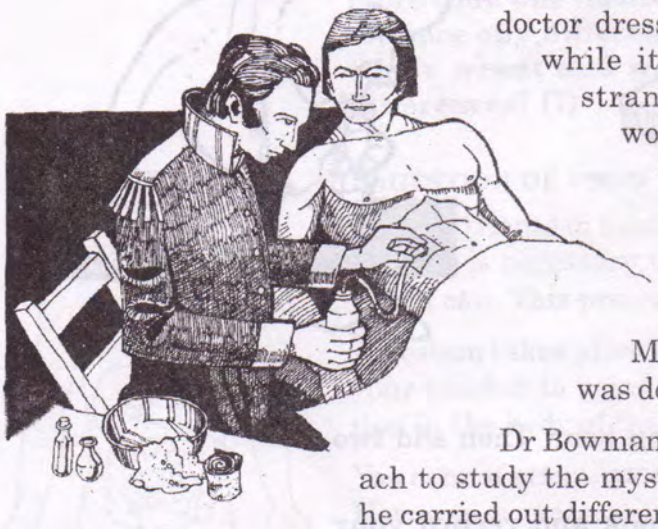
Where are the stomach and intestines situated in the body? What do they look like? Locate them in the body of the dissected rat. You can ask your teacher to help you.

The process of eating and digestion is called nutrition.

A STOMACH WITH A WINDOW

Till about a hundred and fifty years ago, scientists did not

know what happened to food after it reached the stomach. They did not know about the process of digestion. They had no way of looking into the stomach to see what happens there. Then a strange incident occurred.



In 1822, a soldier named Martin was hit by a bullet. He was taken to a doctor called Bowman for treatment. The doctor dressed the wound for a year and a half while it gradually healed. But something strange had taken place. Although the wound had healed, the hole in the stomach remained open. It was covered by a flap of skin which could be lifted. If a tube was inserted into the stomach through this hole, the food present inside could be taken out. Martin did not feel any pain when this was done and was fit and healthy otherwise.

Dr Bowman decided to use Martin's unusual stomach to study the mystery of digestion. For nine long years he carried out different experiments in this stomach with a window and gathered a host of new information.

Dr Bowman first took out some digestive juice from the stomach, poured it in a small bottle and put some food in it. He noticed that the digestive juice dissolved the food within a few hours. Thus, he came to know that digestion is not a magical process. It is the juices in the stomach that actually help digest food.

Dr Bowman came to the conclusion that a chemical reaction takes place between the digestive juices and the food in the stomach. He had duplicated this reaction outside the stomach in the bottle.

Nutrition: quantity and quality of food

It is commonly believed that if a person eats a full meal regularly, (s)he will get proper nutrition. But this is not correct. For example, eating a lot of just one type of food does not provide all the nutrients that the human body requires for remaining healthy. It is essential to eat a variety of foods.

A meal should consist of different types of food. Only if such meals are eaten regularly does one get proper nourishment. A diet contain-

ing all the nutrients is called a balanced diet. If a person does not get adequate food, or if her/his diet does not contain all the nutrients, (s)he becomes weak. When the body does not get adequate nutrition, it is said to be suffering from malnutrition.

Children are more prone to malnutrition than adults. Figure 3 shows a child suffering from rickets. Children who do not get adequate nutrition suffer from this disease.

Figure 3 : Child suffering from rickets

Light brown hair, face like that of an old man, always hungry, distended stomach, under weight and skinny, very little flesh on bones.

Figure 4 : Child suffering from protein deficiency

Swollen face, swollen limbs, discoloured skin and hair, upper arms thin (circumference less than 13 cm)

Sometimes a child gets enough to eat, but the food does not contain enough protein. Figure 4 shows a child suffering from protein deficiency.

Have you ever seen a child suffering from rickets or protein deficiency? If yes, then find out what and how much food this child eats in a day. (11)
Why does this child not get enough food? Discuss in the class. (12)

A weak person is prone to illness. A person who falls ill tends to become even weaker. Malnourished children fall ill frequently. They tend to become even more malnourished as a result of the illness. Thus, they are trapped in a vicious circle of illness and malnutrition. In order to help such children, it is necessary to ensure that they get a balanced diet and enough food to eat.

A child suffering from malnutrition does not require expensive medicines and tonics. The only remedy for malnutrition is an adequate and balanced diet. Such a diet is certainly not as expensive as medicines and tonics.

If lentils (*dal*), rice, *roti*, green vegetables and a bit of jaggery are eaten regularly and in enough quantity, they will provide all the nourishment the body requires. In addition, if we eat beans, tomato, carrot, guava, cucumber, lemon, ripe

papaya, *amla* etc our body will also get all the essential vitamins and minerals it needs.

The following recipe, if eaten regularly, will cure a child of malnutrition.

Mix groundnut, wheat and gram in equal quantities and grind into flour. Lightly roast this flour in a little oil and add jaggery to it.

Whenever possible, this should be given to the child even after (s)he is cured.

Questions for revision

1. On the basis of the information you have filled in Table 1, find out which of the following sentences are right or wrong:
   a. Eating only rice is enough to fulfil the nutritional requirements of the body.
   b. If a person eats only *ghee* (clarified butter), there is no need to eat anything else.
   c. A balanced diet consists of a variety of foods.
2. Why should we chew our food properly during meals?
3. In Experiment 4, you added saliva to test tube 'A' but not to test tube 'B'. Can you suggest why the flour solution was also added to test tube 'B'? Write the answer in your own words after discussing it with your teacher and classmates.

New words

nutrition	energy	fat	protein
starch	minerals	vitamin	digestion
malnutrition	rickets	balanced diet	nutrient
stomach	chemical	reactions	digestive juices