21. Busy at Work - our Internal Organs

Can you recall ?

Take a large sheet of thick paper, about the height of a child in the class. Put it on the wall as shown in the picture and secure it with tapes. Ask one student to stand against it and another to draw the outline of the body.

Now get other students to point out the right places of the following organs within the outline – the brain, lungs, heart and stomach.

Now recall the following details about each of the organs.

1. In which cavity of the body is it situated ?
2. What is its function ?
3. Which are the bones that protect it ?

Can you tell ?

What bodily needs or sensations do you become aware of even though you are reading a book ?

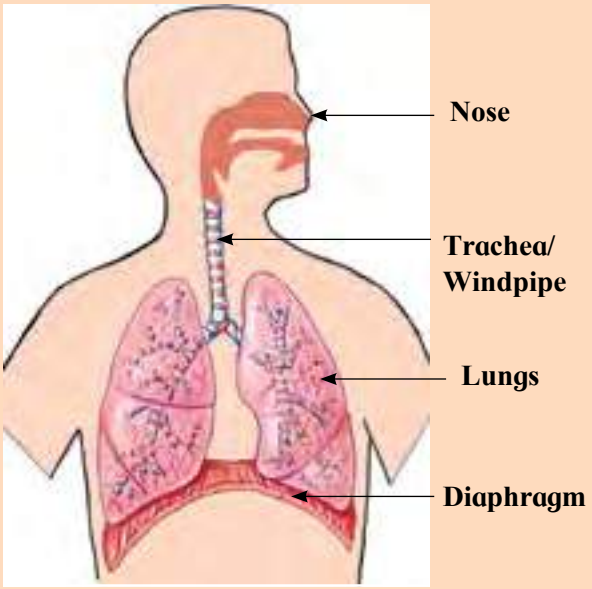
Processes like respiration, digestion go on inside the body continuously with the help of certain organs. Let us learn something about these processes and the organs that carry them out.

Try this.

Use a watch to count how many times you breathe in one minute when you are sitting comfortably. From this, work out approximately how many times you breathe in an hour.

Respiration

We need air, water and food to live. It is necessary for the body to get a continuous supply of oxygen. We get this oxygen from the air, through breathing. That is why we breathe continuously. In our body, there are organs that carry out the work of respiration. Read their names in the diagram on the next page and also their description.



The respiratory system

The diagram above shows our respiratory organs. When we inhale, the air from outside goes into the trachea and through its branches, into the lungs. In the lungs, these branches divide further into smaller and smaller branches. At the end of the last branches, there are air sacs or alveoli.

Between the thoracic cavity and the abdominal cavity, there is an organ like a flexible sheet. It is called the diaphragm.

The diaphragm and its movement

When the diaphragm moves downward, we breathe in and the incoming air fills the alveoli in the lungs.

When the diaphragm moves upwards, air in the lungs is pushed out.

Exchange of gases

When the outside air reaches the alveoli, the oxygen in it passes into the thin blood vessels around the alveoli. With the blood, it flows to all parts of the body. At the same time, the carbon dioxide that is brought by the blood from all parts of the body enters the air in the alveoli. When we exhale, the carbon dioxide is also given out with the air.

In this way, an exchange of oxygen and carbon dioxide gases takes place in the alveoli.

Do you know?

Dust and smoke particles may be present in the air in the atmosphere. There may even be disease producing micro-organisms. They are harmful for the body.

The inner lining of the respiratory organs has fine hairlike structures called cilia. On this inner lining, there is also a layer of a sticky substance called mucous. The dust and smoke particles stick to this substance. Thus, the harmful substances in the air cannot reach the lungs.

Try this.

- Count how many times you breathe in one minute just after you have run a hundred metres.
- Get someone else to count how many times you breathe in one minute while you are asleep. What is the difference in the two counts?

The effects of smoking

If one keeps smoking over a long period of time, the toxic substances in the smoke collect in the respiratory tract. As a result, the air that enters the lungs is not sufficiently purified and the impurities in the air begin to accumulate in the lungs. As a result, the efficiency of the lungs is reduced. The likelihood of getting diseases of the lungs increases.

The solid particles in the tobacco smoke from the cigarette or bidi form a sticky layer inside the alveoli. This reduces the amount of oxygen supplied to the body. In addition, some toxic substances in the tobacco also enter the alveoli. These ill effects lead to diseases of respiratory organs including life-threatening diseases like lung cancer.

Passive smoking

If there are people around us who smoke, then we may have to face the consequences of smoking even if we do not smoke ourselves.

That is why, there is now a ban on smoking in public places.

A new word :

Gland - An organ that secretes a certain substance.

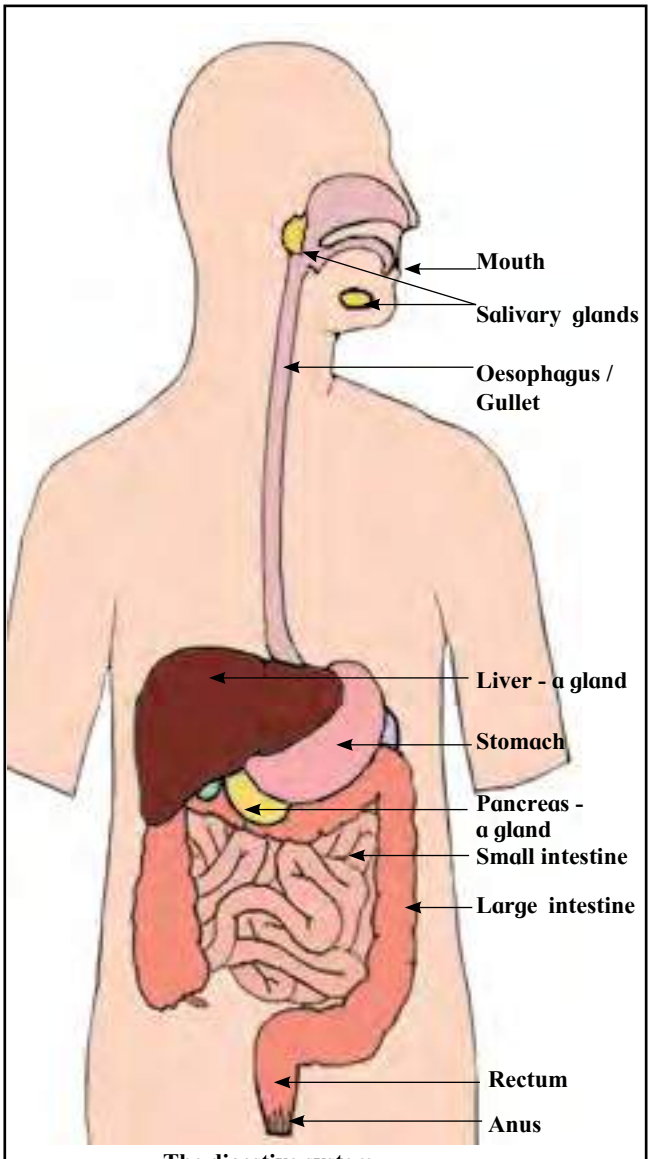
Digestion

Let us now learn something about the alimentary canal, the digestive organs and their functions.

The alimentary canal

The food we eat is digested in our body. That is, substances that can mix with the blood are formed from the food. This process takes place in different parts of a long and flexible tube inside our body. This tube is called the alimentary canal. The upper end of this tube is the mouth and the lower end is called the anus.

Even if there is a continuous tube going from the mouth to the anus, the shape of this tube is not the same in all its parts.



The digestive system

The different parts of the alimentary canal have different structures and functions. These different parts are called the digestive organs. Certain glands outside the alimentary canal assist the process of digestion.

Digestive organs

The process of digestion begins as soon as food is taken into the mouth.

The teeth, tongue and saliva all help to convert food into a soft moist ball called a bolus which is easy to swallow. The bolus passes through the oesophagus into the stomach.

The stomach is shaped like a bag. Here, the food is churned. The digestive juices in the stomach bring about some digestive processes. At the same time, some disease producing germs in the food are also destroyed. The food changes into a thin slurry in the stomach. Then it passes into the small intestine.

The small intestine of an adult is about 7 metres long. The digestive juices in the intestine bring about several digestive processes. The secretions of some glands also help the process of digestion. As a result of all these digestive processes, certain substances are produced. These are useful to the body and can mix with the blood. In the small intestine, they are absorbed into the blood. The remaining substances pass into the large intestine.

The large intestine of an adult is about one and a half metres long. Here, much of the water in the remaining substances is absorbed into the body and what remains are the faeces or stools.

The faeces collect in the rectum for some time. Later, they are expelled from the body through the anus.

Do you know?

1. A sufficient quantity of water is necessary for the processes of digestion to take place properly as well as for the food to keep moving through the alimentary canal. If one does not drink enough water, one becomes constipated, i.e. one passes hard stool or does not pass it regularly.

   None of the other tasks in the body can go on without water. The water that is absorbed during digestion is the water that is used for all other processes in the body. That is why it is so important to drink adequate quantities of water.

2. The upper ends of both the oesophagus and the windpipe open in the throat next to each other. When food is swallowed, the windpipe remains closed. But, when we eat in a hurry, the food may enter the windpipe and cause us to choke on it. That is the reason why we must not eat in a hurry. We must also avoid speaking and eating at the same time.

Do you know ?

- If we want healthy teeth, we need to look after them. Every tooth has a covering of enamel which protects the delicate inner parts of the tooth. Enamel is the hardest substance in our body. But, if we do not keep our teeth clean, even this enamel corrodes and teeth decay.

- While having our meals, we enjoy many different tastes and flavours. We sense them using our tongue and nose. But, sometimes we find that a food item tastes or smells bad. It may be because the food is spoilt. One should pay attention to such changes in food. In case the food has really gone bad, one can avoid eating it.

Can you tell ?

Name the organs that bring about respiration.

Systems in the body

You have seen how several organs work together to bring about respiration. If even one of these organs does not function properly, the process of respiration will not be completed. A group of organs which work together to carry out a function of the body is called a system. Thus, the nose, trachea, lungs and the diaphragm together make up the respiratory system.

Use your brain power !

Name the organs of the digestive system.

Energy for the body

As a result of respiration, oxygen enters the blood in the body and spreads to all parts of the body.

Substances formed in the process of digestion also mix with the blood and reach all parts of the body. Of these, some substances act as fuel for the body.

When the oxygen in the blood reaches the different parts of the body, it helps the slow burning of these substances, giving energy to the body. The body uses this energy to carry out all its tasks.

Circulation of blood

The blood carries the oxygen obtained from the air and the energy-giving substances in our food to all parts of the body. But, what keeps the blood flowing ?

You know that the heart continually contracts and relaxes for this very purpose. A network that consists of tubes or 'vessels' that carry blood away from the heart and those that bring blood back to the heart is spread throughout the body.

The process of keeping the blood flowing through all parts of the body is called 'blood circulation'. Innumerable substances are carried from one part of the body to another all the time. That too is made possible by the circulation of blood. The heart and the network of blood vessels together form the 'circulatory system'. As long as we are alive, the process of blood circulation goes on continuously, day and night.

The circulatory system

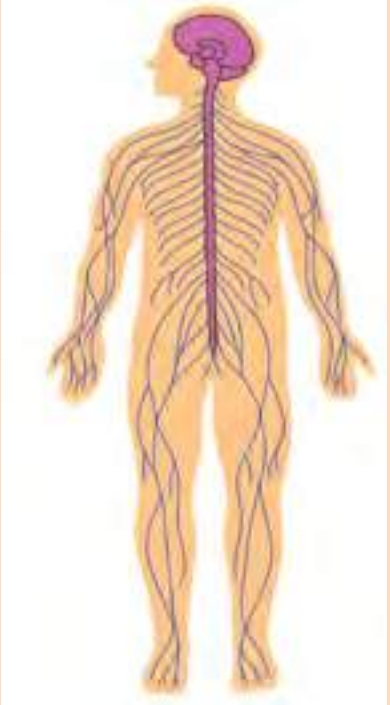
Can you tell ?

1. How do we know that we are hungry and that we should now eat ?
2. How do the salivary glands come to know that there is food in the mouth and it is time to secrete saliva ?
3. What makes respiration and blood circulation go on all the time, and the processes of digestion happen at the right time ?

The nervous system

The functions of the respiratory, circulatory and digestive systems are vital for the body. They have to be carried out ceaselessly. There are some tasks that we carry out only when we like, for example, speaking, running, studying, playing, etc.

You have learnt that co-ordination means paying attention to all the different functions and ensuring that they all occur at the right time and in the right manner. Maintaining this co-ordination is the function of the brain. There is a network that connects the brain with all the different parts of the body. This is a network of nerves that carry messages to and fro between the brain and the parts of the body. The brain and the network of nerves are together called the nervous system. The nervous system functions to co-ordinate all our bodily functions.



The nervous system

Do you know?

Drinking alcohol has many ill effects on the body. It affects the nervous system leading to loss of control over the movements of the body and lack of co-ordination. That is why, it is dangerous to drive after drinking alcohol.

If one keeps drinking alcohol for a long period of time, it causes ulcers on the inner lining of the digestive organs. It can also seriously affect the functions of the liver and kidneys.

Use your brain power!

Which systems work together to provide the body with energy?

Other systems in the body

We have learnt something about the respiratory system, the digestive system, the circulatory system and the system that co-ordinates the functions of all the systems – the nervous system. Besides these, there are several other systems in our body.

For example, the skeletal system gives support and shape to the body and protects the important organs inside it. The excretory system expels the waste substances that are formed in the body.

The working of all these systems is extremely complex, but it is important to have information about them.

Always remember –

If the function of any one of our systems is disturbed, it affects all the other systems in the body too.

What we have learnt –

- A group of organs that together carry out some function of the body is called a system.
- The nose, trachea, lungs and diaphragm are organs of the respiratory system.
- The mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus and certain glands outside the alimentary canal are the organs of the digestive system.
- Other systems like the circulatory system, the skeletal system, the excretory system also take care of other important functions of our body.
- The nervous system co-ordinates all the functions of the body.
- For us to lead a healthy life, all our systems must function smoothly.

Exercises

1. What's the solution ?

A person has fainted and a crowd of people has surrounded him.

2. Use your brain power !

(a) Why do we sometimes choke suddenly while eating ?

(b) How is the air that we inhale purified in our body ?

3. Fill in the blanks.

(a) ..... gas is transported to all parts of the body.

(b) The stomach is like a ..... .

4. Match the following.

Group A	Group B
(1) Lungs	(a) Circulation
(2) Stomach	(b) Respiration
(3) Heart	(c) Co-ordination
(4) Brain	(d) Digestion

5. Answer the following questions

(a) Name the systems that carry out the different functions of the body.

(b) Describe how the exchange of oxygen and carbon dioxide gases takes place in the lungs.

(c) Why do we call saliva a digestive juice ?

6. Choose the appropriate word from the brackets.

(circulation, trachea, diaphragm)

(a) Respiration takes place because of its up and down movement.

(b) The process of keeping the blood flowing continuously throughout the body.

(c) Air that enters through the nose passes into this tube.

Activity

Arrange a quiz competition in the class based on the names of organs and their functions.

* * *