

6



OUR BODY - ITS INTERNAL ORGAN SYSTEM

We have learnt about the external organs of the body in the earlier lesson. Many organs are present inside our body. Let us name the different organ systems and learn about their functions.

Certain observations:

1. Why should we breathe - why oxygen is required?
2. How & why blood runs all over body?
3. What makes our body to be erect and stiff.
4. What happens to the food we eat? How we get energy to do work?
5. We get diseases if wastes are not removed from over body. How wastes are removed from our body?

6.1. Respiratory system - lungs

Close your nose for few seconds and see what happens.

We need air to live. As you know we breathe in and breathe out air through our nose. Do you know, where the inhaled air enters our body?

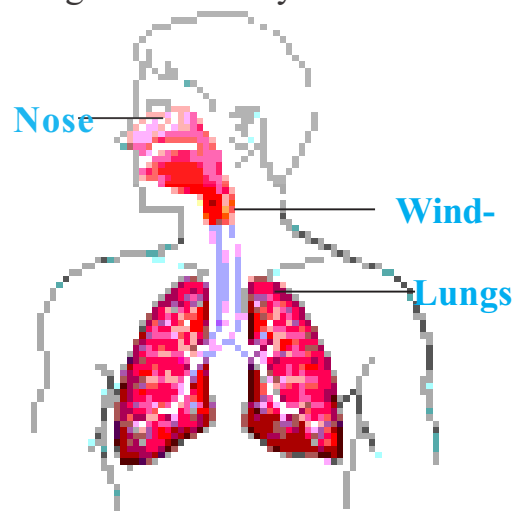
Lungs in our body, absorbs the oxygen from the air which we breathe in. Nose, wind pipe and lungs are the important organs of the respiratory systems. The air we breathe in enters into the wind pipe. The wind pipe divides itself into two, and opens into the lungs. The walls of the nostrils are wet and have tiny hair which stops the dust and dirt particles from entering into our body.

Think and say

- ◆ Which part of your body will move when you "inhale" and "exhale"?

Do This

- ◆ Using a measuring tape, measure the circumference of the chest of your classmates both when they breathe in and breathe out. Note the details in a tabular form.
- ◆ Place your hand on your chest and count how many times your inhale and exhale air in one minute.
- ◆ Compare the observations with your friends.
- ◆ Observe the lungs of a goat or sheep in a butcher's shop and write down your observations.



Respiratory System - Lungs

The air we breathe in enters into the two spongy saclike structures called lungs in our chest region. The lungs are made up of many tiny structures (pluera). The structures help in the exchange of oxygen and carbondioxide. On these walls of the pleura there are many minute blood capillaries. These help in absorbing the oxygen from the air we breathe in and supply it to all the parts of the body through blood. In the same way, they send out the carbondioxide and water vapour. The doctor who treats the diseases of the lungs is called a "Pulmonologist".

Group work

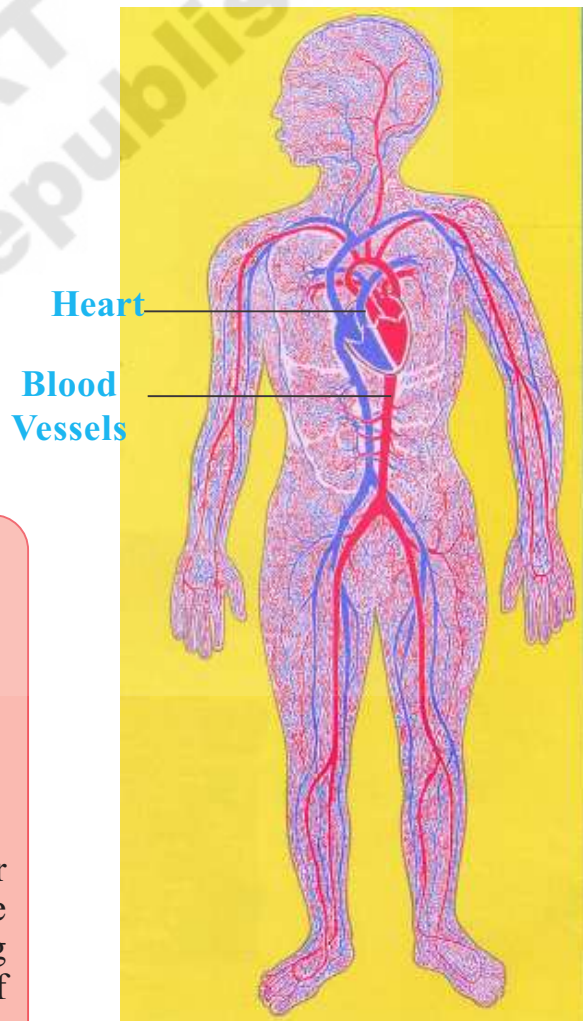


- ◆ We should cover our nose with a hand kerchief when exposed to dust, dirt and smoke. Why?
- ◆ What should we do to get fresh air & more breaths?
- ◆ What should we do to inhale more air per minute? / What should we do to increase the rate of respiration?

In 'Yoga' and meditation concentration is on the breathing. This help us to remain healthy.

6.2. Circulatory system - heart

Lubdub, Lubdub, Lubdub
 Listen, Listen, Listen
 While we walk, while we stand
 While we are asleep, while we run
 Then, now, always
 Lubdub, Lubdub, Lubdub
 Listen, Listen, Listen



Heart-Ciculatory System

Group work



- ◆ Place one of your ear on the chest of your friend and listen to the sound carefully. From where does this sound come from. Discuss with your friends. Name that organ.
- ◆ Which instrument does the doctor use to hear the heart beat? Prepare a model of the stethoscope? Using a stop-watch, count the number of times the heart beats in one minute.

Heart supplies blood to all parts of the body. Blood transports the oxygen and a variety of materials obtained from the food which we eat to each and every part of the body. The food we eat is digested in the stomach and then sent into the blood and through blood vessels it is sent to different parts of the body and thus helps to give us energy to perform our activities. Blood helps us to regulate the body temperature and to fight against the disease causing germs. Blood is a fluid tissue made of plasma, which is in liquid form. It contains three types of blood cells. They are Red blood corpuscles (RBC), white blood Corpuscles (WBC), and Blood platelets. Red blood cells carry oxygen to all the cells of our body.



White blood cells fight against the disease causing germs. Blood platelets help in coagulation of blood. The doctor who treats the diseases of the heart is called a "Cardiologist" or "Heart specialist".

Do you Know?

The size of one's heart is the same as one's own fist. Heart is situated in the chest region, $\frac{2}{3}$ is on the left side of chest and $\frac{1}{3}$ is on the right side. Heart pumps the blood to different parts of the body. Heart is a pumping organ.

Think and say

- ◆ Why is heart considered as the most vital organ of our body?

Blood must be supplied to all parts of the body properly then only we will be healthy. We should eat healthy food to have sufficient blood in our body. Peanut bar / ground nut bar, gingelly bar (Til), eggs, milk, leafy vegetables etc. must be taken to increase the quantity of blood in our body.

6.3. Skeletal system

Press your body with your hand at different places. Which places feel hard? Why? Think.

Group work



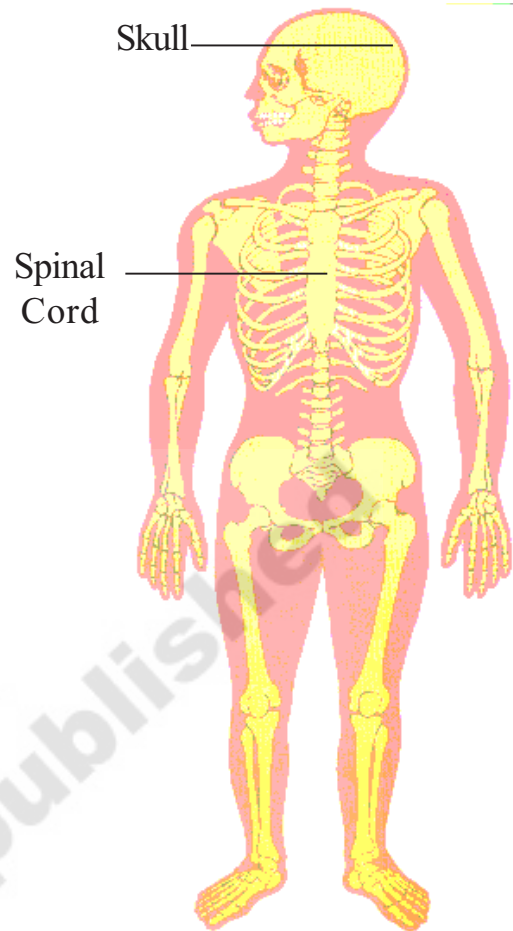
- ◆ Observe some x-ray photographs and identify which part do they belong to. Draw the diagrams.
- ◆ How do bones help us?

There are many types of bones in our skeletal system. There are 206 bones in our body. Some bones are small, some are big, some are wide, some are sharp, some are curved with different shapes and sizes at different parts of the body. Skeleton gives shape and support to our body. It protects the important organs of the body. The bony, frame work in the head is called the "Skull". This protects the brain. Back bone is made up of small bones from neck to waist. This helps the body to stand erect. It is also called the "Spinal Cord". Calcium helps in keeping the bones strong. We can have strong bones & muscles if we play, walk, run etc. Milk and milk products and leafy vegetables are rich in calcium. We should maintain correct erect posture while sitting and walking. The doctor who treats diseases of the bones is called a "Orthopedition". The bones give shape to the body. We get vitamin 'D' when we are exposed to sunlight. Vitamin 'D' helps bones and skin to be healthy.

Think and say

- ◆ Move the head, hands, legs, knees, elbows in different directions. Are we able to move all the parts in the same way? Why? Think. Discuss with your friends.
- ◆ Which parts move in one direction only? Try and see.
- ◆ Joints help in moving and bending the bones. Identify the places where joints are located. Imagine and say, how the body, would be with out bones & without joints.

If the bones grow, we grow in height. For strong bones we should take milk, eggs and leafy vegetables. Working, playing and staying out in the sunlight is good for healthy and for strong bones.



6.4. Digestive system

Where does the food chewed and swallowed in mouth enter?

You might have observed that our stomach seems to become bulged when we drink water or eat food. In the figure given below the path of the chewed food is shown. Food changes into liquid form i.e., Chyme and passes through the different parts as shown in the figure.

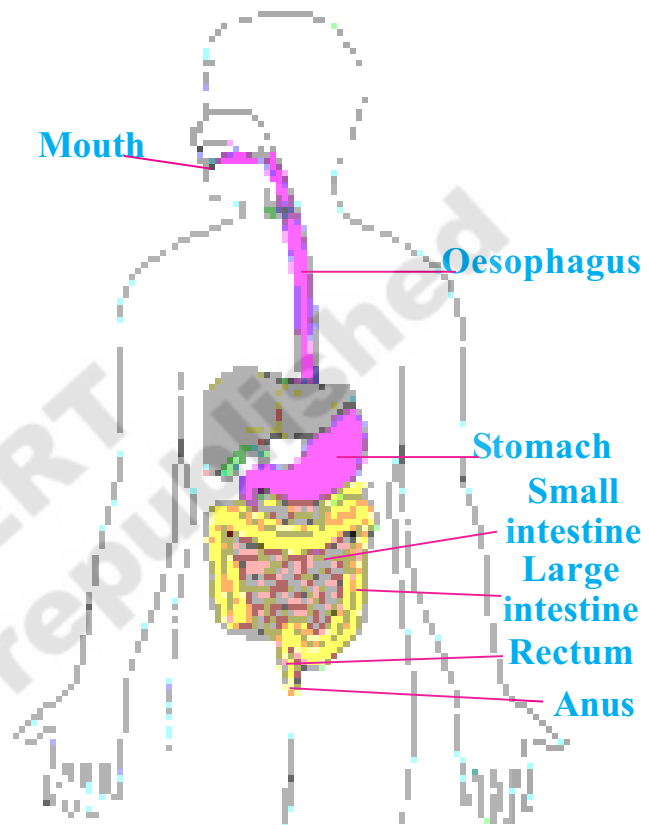
The food we eat changes its form in our mouth. The food supplied to different parts of the body is not in the same form in which we eat. It changes into different forms. The solid and liquid foods change into simple substances and finally get absorbed into the blood. This process of changing starts from the mouth. The absorbed food is utilised by the body and the remaining waste materials are sent out of the body in the form of feces and urine.

Window of the stomach (Dr. Beamont's Experiment):

In 1822 Dr. Beamont had to treat a soldier named Martin who was injured by a bullet in the stomach. Martin was 18 years old at that time. Martin was healthy before the injury. Dr. Beamont dressed the wound and treated him. The wound healed after one and half years. But there was a large hole. The aperture was covered by a loose layer of skin. We could look into the stomach by pressing this layer. The doctor not only used to look into the stomach through this hole but also used to take out the fluid from the stomach with the help of a tube. With this, the doctor got an opportunity for his experiments.

Scientists did not know how food gets digested? How do the digestive juices in the stomach help in digestion, or how food is converted to chyme? No one knew if there were any other organs, that helped in the process of digestion. Do you know for how many years Dr. Beamont experimented on Martin's stomach? For nine years.

Dr. Beamont took out a small quantity of fluid from the stomach and put it into a glass jar, to find out if the food kept in a glass jar gets digested itself or does this



fluid bring any change in the food? He wanted to test this. For this he performed an experiment. He took a small amount of digestive juice from the stomach with the help of a tube and placed twenty pieces of fish in a glass jar filled with 10ml. of digestive juice at 8.30 am in the morning. He kept the glass jar at the same temperature that is maintained by the stomach i.e. at about 30°C. Then he examined the pieces of fish at 2.0' clock in the afternoon. They had dissolved.

Dr.Beamont did this experiment with different food items. He used the same food given to Martin and kept it into the glass jar filled with digestive juice. He gave Martin food at the same time she put the food into the glass jar kept out side the body. He compared the time taken by the food to digest. He tabulated his observations.

Let us observe a part of Dr.Beamont Observations given below:

Sl.No.	Food Item	Time taken for digestion	
		Stomach	Glassjar with digestive juices
1.	Unboiled milk	2 hrs. 15 min.	4 hrs. 45 min.
2.	Boiled milk	2 hrs.	4 hrs. 15 min.
3.	Boiled eggs	3 hrs. 30 min.	8 hrs.
4.	Half boiled eggs	3 hrs.	76 hrs. 30 min.
5.	Skimmed egg	2 hrs.	4 hrs. 15 min.
6.	Unboiled egg	1 hr. 30 min.	4 hrs.

- *Now, say what is the function of our stomach?*

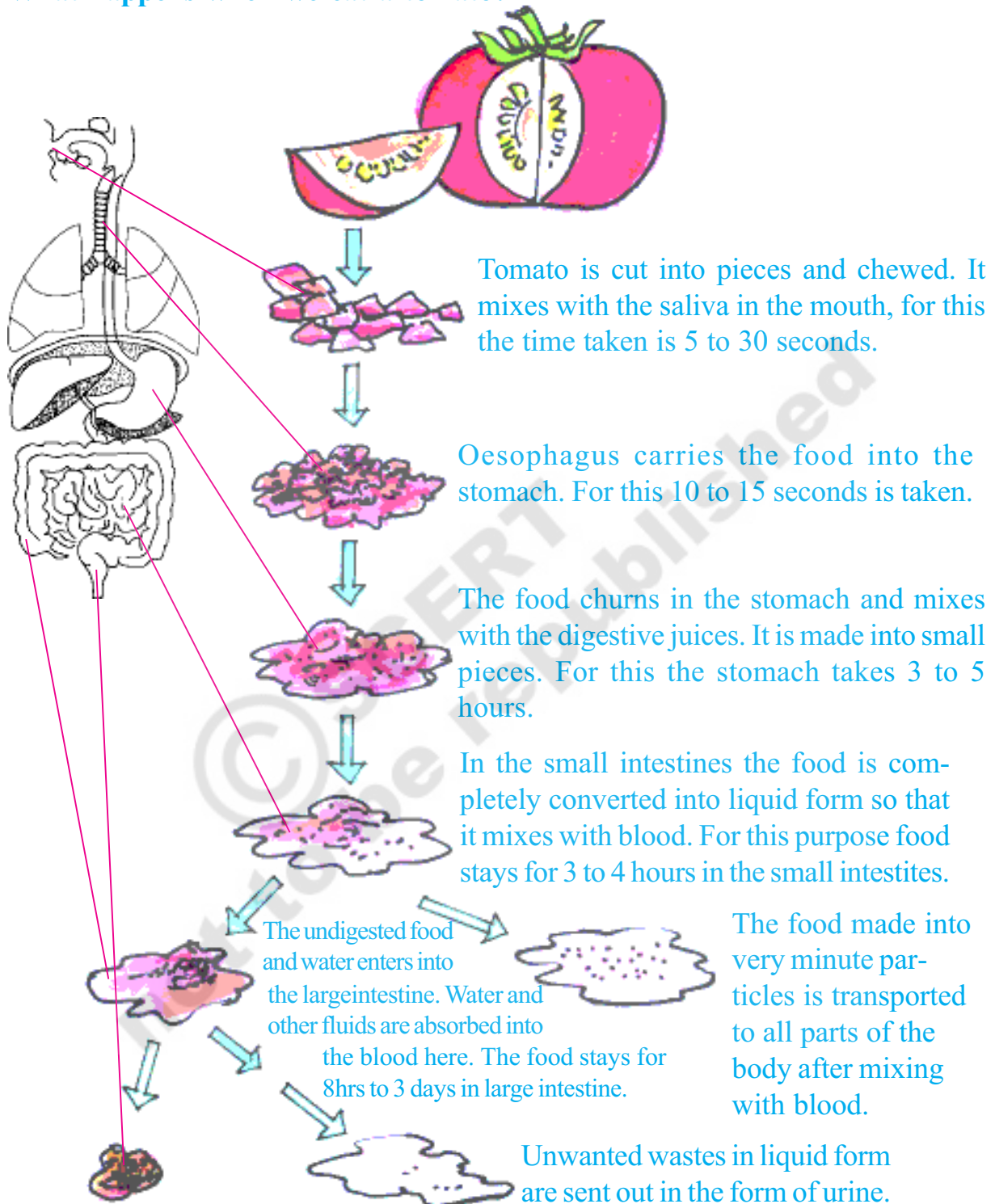
Dr.Beamont discovered many secrets of the digestive system by performing many experiments. He found that food is digested quickly in the stomach than when placed out side the body. Did you observe the same thing in the table given above?

Our stomach churns the food items and digests the food. Martin found that when he was unhappy, the proces of digestion was slow. He also found that the digestive juices present in stomach are acidic in nature. If someone does not eat food properly or when food is not digested it leads to acidity. Have you ever heard people complaining about. "acidity" or burning sensation in the stomach or chest region?

Thanks to Dr.Beamonts experiments, the process of digestion has been understood. After his experiments scientists performed many other experiments, without waiting for patients with bullet injury or people with hole in the stomach. These scientists observed the internal organs using other scientific methods.

Did you enjoy the story of Martin? Can we call this a story of our stomach? What do you say?

What happens when we eat a tomato?



Unwanted wastes in solid form are sent out through the anus (faeces).

We should never over eat and 25% of the stomach must be kept empty. The wastes are sent out easily from the digestive tract, if we drink enough water or eat watery fruits like citrus fruits etc.,

6.5. Excretory system

In our body many life processes go on continuously. Through these processes many wastes / harmful substances are formed.

The unwanted wastes formed in this way from different processes are sent out as they are formed.

Group work



- ◆ Where are these wastes formed due to metabolism sent?
- ◆ When and from where does sweat come out?

If the food we eat is digested we get energy. The food left after digestion is sent out in the form of 'faecal matter'.

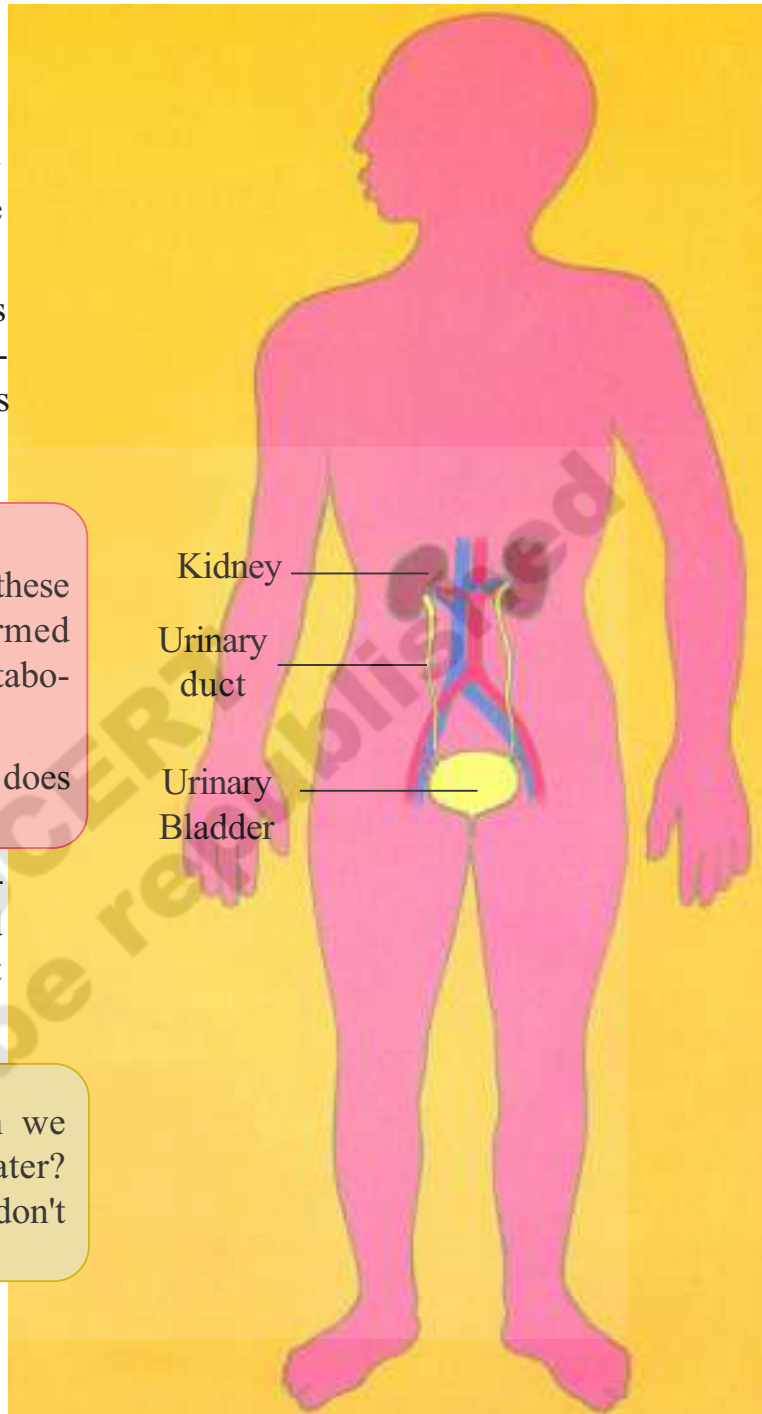
Think and say

- ◆ What happens when we drink plenty of water? What happens if we don't drink water?

Two kidneys are situated at the back in the waist region. One on either side of the spinal cord the back bone in our

body. They filter the blood and separates impurities from it. These impurities are sent out in the form of urine. Skin is an excretory organ. It sends out the wastes in the form of sweat.

The doctor who treats the diseases related to the kidneys or renal system is called an 'Urologist'

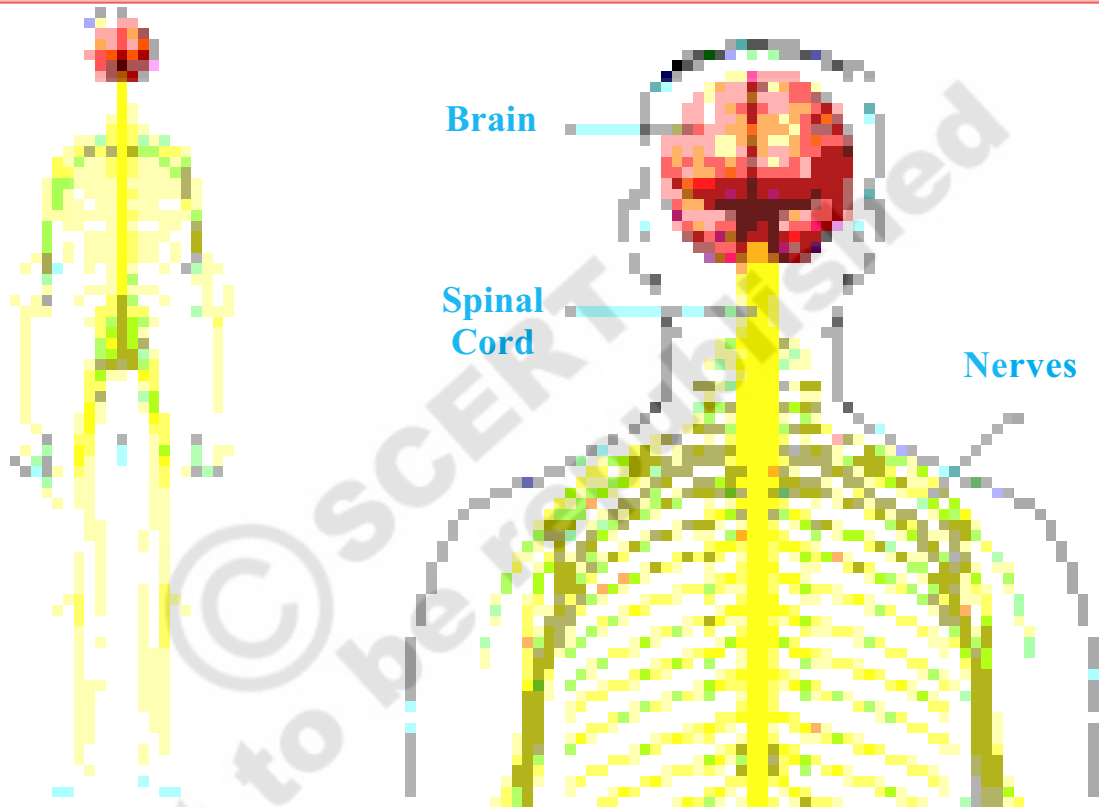


6.6. Nervous system

Group work



- ◆ How do you know that a thorn pricked the foot?
- ◆ How can you recall things after many years?
- ◆ What do you do when you get hurt? Who orders the parts of the body to do so?
- ◆ How can we feel the pain? Think.



Observe the above pictures.

Each and every part of our body has nerves. They pass on the information obtained from the sense organs to the brain. Brain analyzes the information and gives instructions to the parts of the body through nerves. For example when a dog barks at you (or) when you ride a bicycle, immediately, the brain co-ordinates with the different body parts and it orders the nerves to take necessary action. Brain functions properly only when you take nutritious diet i.e., all types / kinds of food must be taken in right amounts. The doctor who treats the diseases related to the nerves and brain is called a 'Neurologist'.

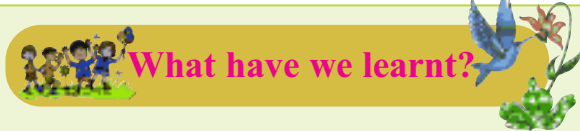
The organs visible outside maintain the metabolism of various organ systems present inside the body. For this the body needs a balanced diet and healthy life style. We need to follow the healthy habits given below to have a healthy body.

Healthy habits:

- Wake up before sunrise.
- Exercise daily, play, run, spend sometime in the sunlight.
- Wash hands neatly with soap before eating and after the toilet.
- Eat clean and healthy food. See that the food we eat must contain fruits, vegetables, leafy vegetables, pulses etc.
- Milk, eggs, fruits are important for the growth and health of the body. Take local and seasonal fruits and vegetables for good health.
- Care must be taken to prevent diseases.
- Keep the surroundings clean & neat.
- Have meals on time.
- Do not eat excess food. Drink plenty of water, when you are thirsty.
- Do not eat too much of chutneys / pickles, which contain salt.
- Do not eat burgers, pizzas, samosas etc as they spoil our health or eat them sparingly.
- Do not buy and eat food sold on the road side, chances of catching diseases increase with this type of food.
- Do not take soft drinks (beverages), instead drink coconut water, fruit juices and buttermilk which are good for health.

Keywords

Organ systems of the body	Respiratory System	Bones
Circulatory system	Lungs	X-Ray
Heart	Blood Vessels	Digestive system
Red blood corpuscles	Respiratory organs	Process of digestion
White blood corpuscles	Oxygen	Excretory system
Blood platelets	Wind pipe	Nervous system
	Skeletal system	Life processes
	Carbondioxide	Nerves
	Kidneys	



1. Conceptual understanding

- What are the different organ systems of our body?
- What are the organs of the digestive system?
- What are the uses / functions of blood in our body?
- What function does the lungs perform?
- Write the stages in the process of digestion in order.
- What are the organs of the excretory system? What is their use & function?

2. Questioning and hypothesis

- Raheem is suffering from stomach ache. What would be the reason? What questions the doctor may ask Raheem when consulted?
- Observe the patients of the heart, digestive system and nervous system. What questions would you ask to know about the disease - discuss in the class?

3. Experiments - field observations

- Place your hand on the heart and listen to the heart beat carefully. Run and listen again after running. Did you find any difference. Write the differences & why?
- When does the Heart rate increase. Observe and write.

4. Information skills, projects

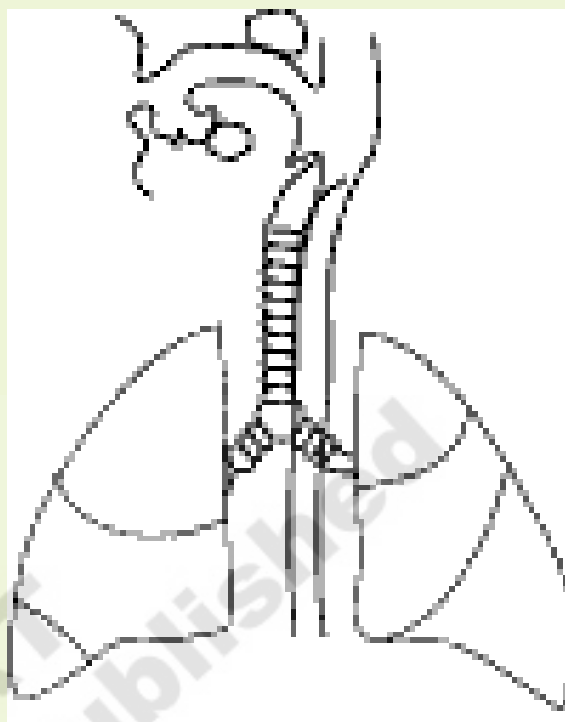
- Visit a doctor or health volunteer near by. Find out the rate of heart beat for the different age groups of people. Tabulate the information.

	Age	Rate of heart beat
Infants		
Children		
Adults		
Old people		
Athletes		

Whose heart beat rate is more? Whose heart beat rate is less? Find our the reason?

5. Communication through mapping skills, drawing pictures and making models

- Draw a diagram of the heart and colour it.
- Prepare a model of the Renal System and draw it.
- Make a model of the stethoscope.
- Draw the organs in the figure given beside and write their names.



6. Appreciation, values and creating awareness towards bio-diversity

- A blood donation camp is organised in Rangapuram village. We can save many lives by donating blood. Write slogans on blood donation.
- Heart which is the size of one's own fist pumps blood to different parts of the body day & night. How do you appreciate the function of the heart?

Can I do this?

- I can explain the different organ systems of our body. Yes / No
- I can question enquire and know about the in different organ systems. Yes / No
- I can draw diagrams of the excretory & circulatory systems. Yes / No
- I can tabulate the information regarding the rate of heart beat of different age group by consulting a doctor or health volunteer. Yes / No
- I can explain the good healthy habits and also follow them. Yes / No