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 is oxygen required?
2. Which part of the body moves when we inhale and exhale ?
3. How & why does blood run all over body?
4. What makes our body to stand erect and stiff?
5. What happens to the food we eat? How do we get energy to do work?
6. How are wastes removed from our body?

6.1. The Respiratory System - Lungs

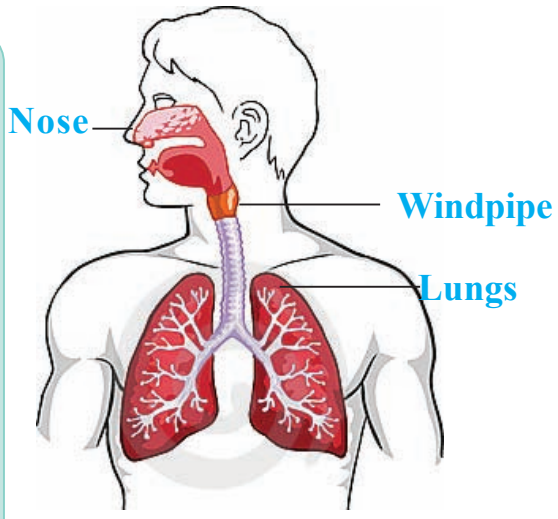
Close your nose for few seconds and see what happens.

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

Lungs absorb oxygen from the air we breathe in. Nose, wind pipe and lungs are the important organs of the respiratory system. The air we breathe in enters 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 stop the dust and dirt particles from entering the body.

Do This

- Using a measuring tape, measure the circumference of your friends chest 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 you inhale and exhale air in one minute.
- Compare your observations with those of 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 the two spongy saclike structures called lungs in our chest region. The lungs are made up of many tiny structures (alveoli). These structures help in the exchange of oxygen and carbondioxide. On the walls of the alveoli 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. The doctor who treats the diseases of the lungs is called a "Pulmonologist".

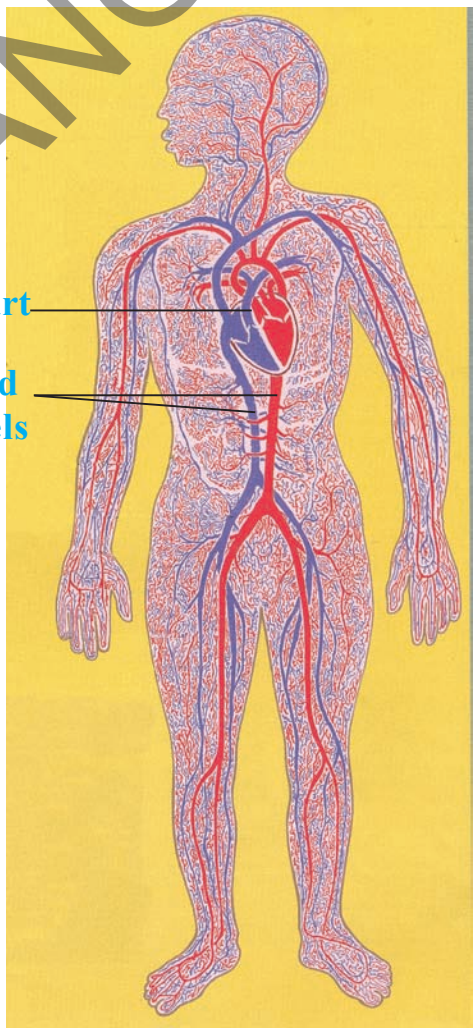
Group work

- 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 ?
- What should we do to inhale more air?

In 'Yoga' and meditation emphasis is laid on breathing. This help us remain healthy.

6.2. The 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



Ciculatory System

Group work

- Place one of your ears on your friends chest and listen to the sound carefully. Where does this sound come from? Discuss with your friends. Name that organ.
- Which instrument does the doctor use to listen to the heart beat? Prepare a model of the stethescope?
- 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 oxygen and a variety of materials obtained from the food we eat to each and every part of the body. The food we eat is sent into the blood and through blood vessels it is sent to different parts of the body and thus helps 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. 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.


Heart

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. 2/3^{rds} of the heart (two-third) is on the left side of chest and 1/3rd (one-third) is on the right side. The heart pumps blood to different parts of the body.

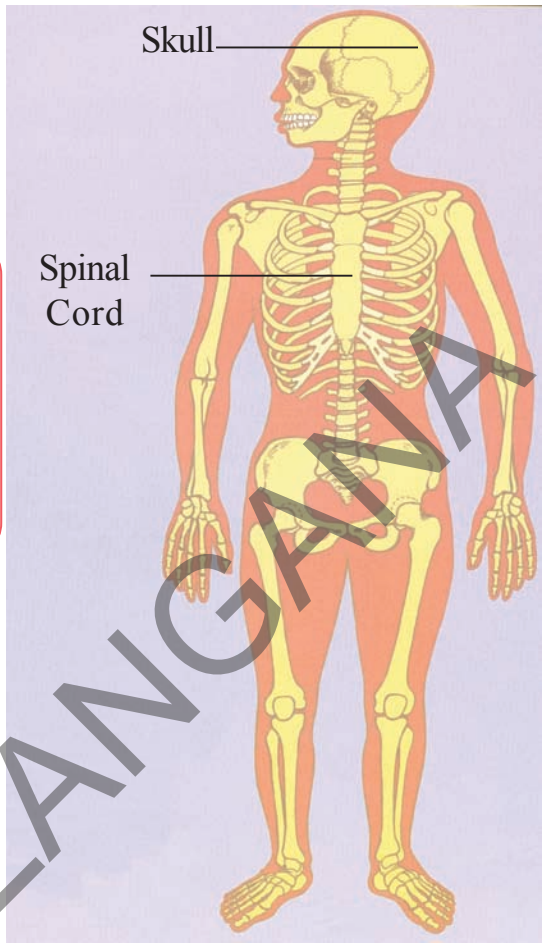
Think and say

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

We will be healthy when the blood is supplied to all parts of the body properly. 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. The 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 the part to which they belong. Draw the diagrams.
- How do bones help us?

There are many types of bones in our sketelal 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 in different parts of the body. The 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 33 vertebrae from neck to waist and is present on the dorsal side of the body. This helps the body to stand erect. It has "spinal cord" within it. Calcium helps in keeping the bones strong. We can have strong bones and 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 "Orthopaedician". The bones give shape to the body. We get vitamin 'D' when we are exposed to sunlight. Vitamin 'D' helps bones and skin in remaining 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 of the body 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 without bones.

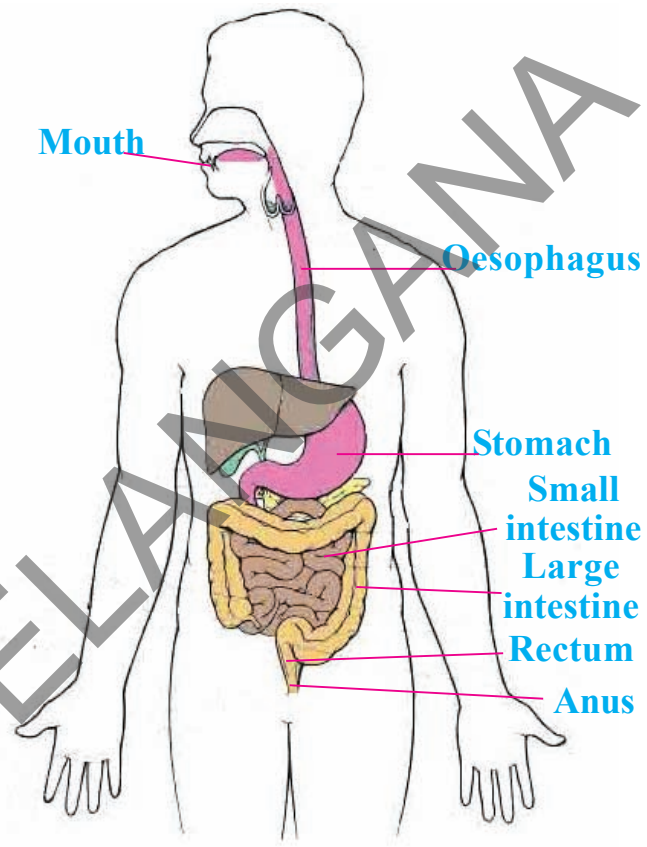
If the bones grow, we grow in height. For strong bones we should take milk, eggs and leafy vegetables. Working, playing and staying out in the sunlight is good for healthy and strong bones.

6.4. The Digestive System

Where does the chewed and swallowed food go?

You might have observed that our stomach seems to be bulged when we drink water or eat food. In the picture given below, the path of the chewed food and the water drunk is shown.

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 as we eat. It changes to 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 feaces.



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 appeared a large hole in the stomach. 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. Dr.Beamont experimented on Martin's stomach for about nine years!

At that time scientists did not know how food got digested. How do the disgestive juices in the stomach help in digestion? Do they just soften the food or associated with this process? Are they helpful in any other way? No one knew if there were any other organs.

Dr.Beamont took out a small quantity of fluid from Martin's stomach and put it into a glass jar, to find out if the food kept in a glass jar digests by 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 Martin 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 30^0C. 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 in the glass jar filled with digestive juice. He gave Martin food at the same time and 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.	Raw 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?***

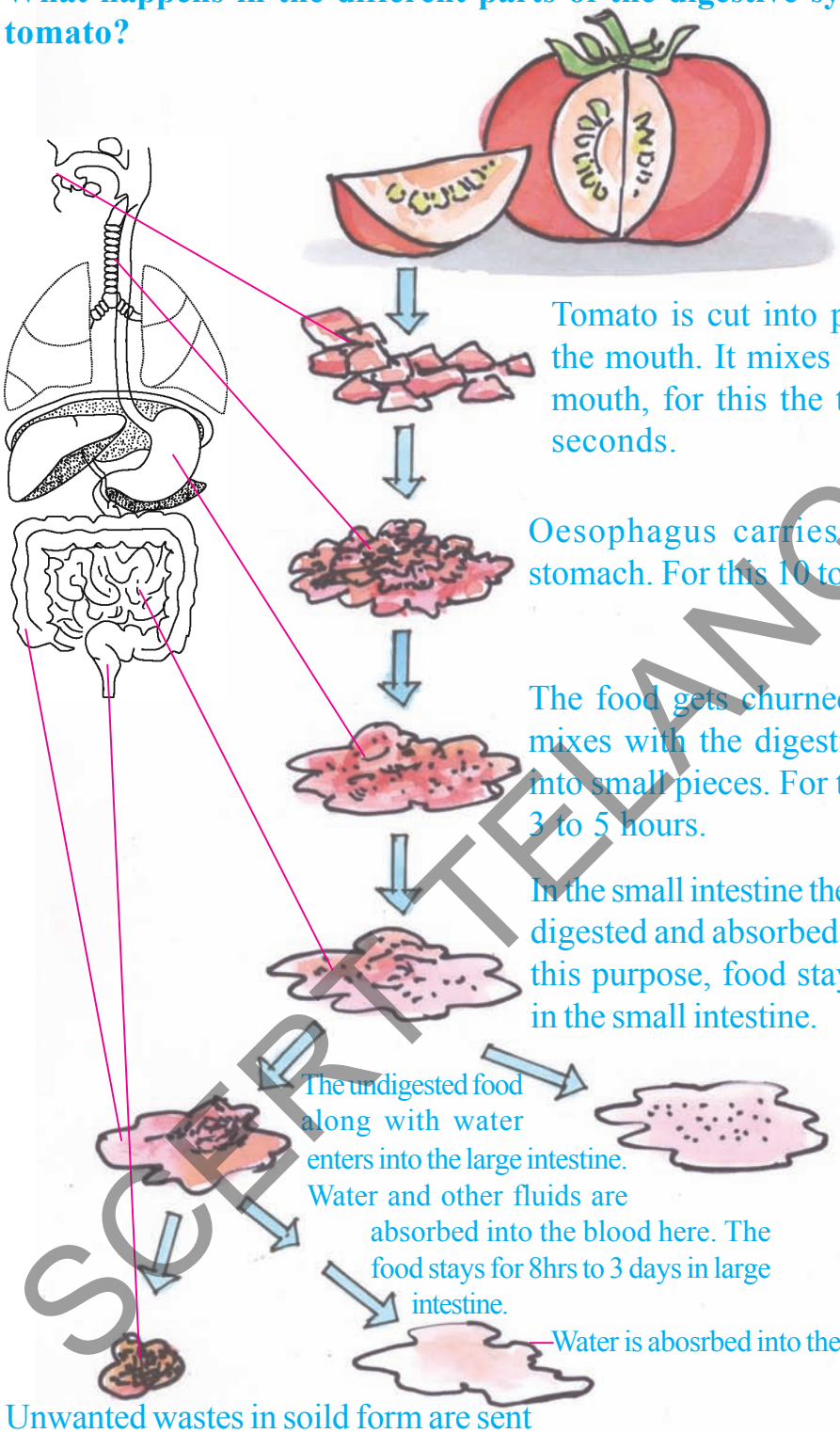
Dr.Beamont discovered many secrets of the digestive system by conducting many experiments. He found that food is digested quickly in the stomach than when placed out side the body. Did you observe the same thing in the table given above?

Our stomach churns the food items and digests the food. Beamount found that when Martin was unhappy, the process of digestion was slow. He also found that the digestive juices present in stomach are acidic in nature. Have you ever heard people complaining of "acidity" or burning sensation in the stomach or chest region when they do not eat food properly or food is not digested ?

Thanks to Dr.Beamonts experiments, the process of digestion has been understood. After his experiments, scientists conducted 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 the story of our stomach? What do you say?

What happens in the different parts of the digestive system when we eat a tomato?

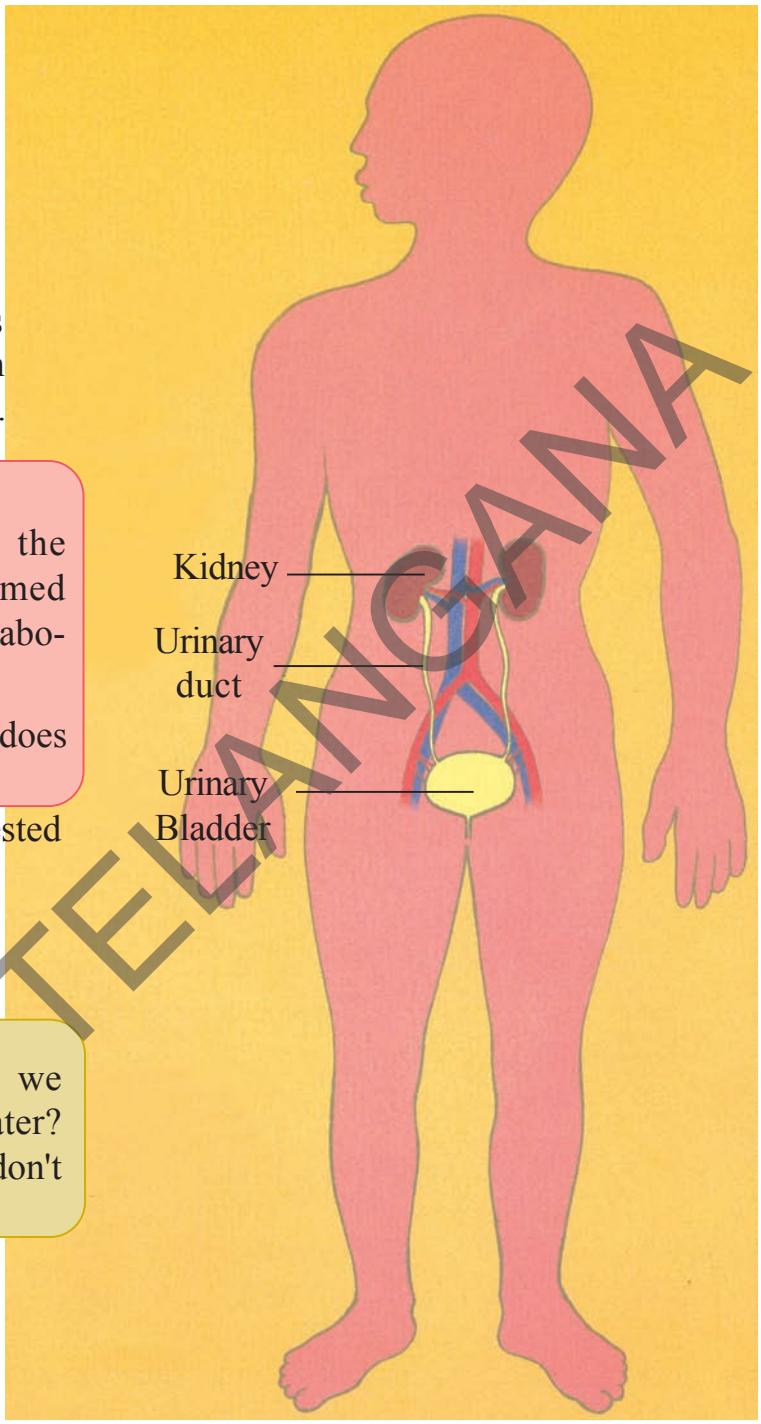


We should never over eat. and 25% of the stomach must be kept empty. The wastes are sent out easily from the digestive tract, if we drink enough water. The doctor who treats diseases of digestive system is called a '**Gastroenterologist**'.

6.5. The Excretory System

Many life processes are carried out continuously in our body. During these processes many wastes / harmful substances are formed.

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



Group work

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

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?

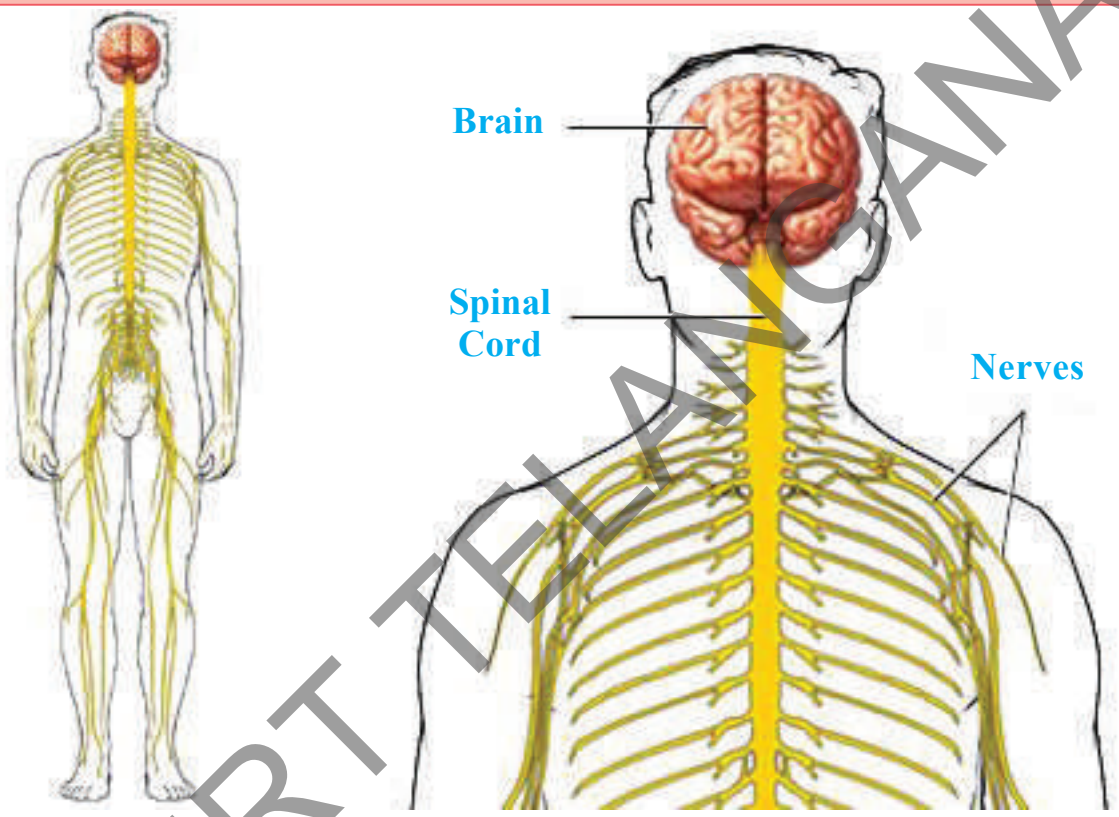
A pair of kidneys are situated at the back in the waist region. One on either side of the vertebral column, (the back bone) in our body. They filter the blood and separates impurities from it. These impurities are sent out in the form of urine. The skin is also an excretory organ. It sends out the wastes in the form of sweat.

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

6.6. The Nervous System

Group work

- How do you know that a thorn pricked your foot?
- How can you recall things that happend long ago
- What do you do when you get hurt on foot? Who orders the parts of the body to do so?
- How do we know when we get a pain ? Think.



Observe the pictures.

Each and every part of our body has nerves. They pass on the information obtained from the sense organs to the brain. The Brain analyzes the information and instructs the parts of the body through nerves. For example, when a dog barks at you, the brain co-ordinates with the different parts of the body and orders the nerves to take the necessary action. Brain functions properly when you take nutritious diet. The doctor who treats the diseases related to the nerves and brain is called a 'Neurologist'.

The external organs of the body and many internal organ systems see that life processes are carried out properly. For this, the body needs a balanced diet and a healthy life style. We need to follow healthy habits given below to have a healthy body.

Healthy habits:

- Wake up before sunrise.
- Exercise daily, play, run and spend sometime in the sunlight.
- Have meals on time.
- Eat clean and healthy food. See that the food you eat contains fruits, vegetables, leafy vegetables, pulses, etc.
- Milk, eggs, fruits are important for the growth and health of the body.
- Care must be taken to prevent diseases.
- Keep the surroundings clean and neat.
- Wash hands neatly with soap before eating and after using the toilet.
- Do not eat food in excess. Drink plenty of water.
- Do not eat too much pickles. Take less salt and chilli.
- Avoid eating burgers, pizzas, samosas etc., as they spoil our health.
- Do not buy and eat food sold on the road side.
- Do not take soft drinks (beverages), instead, drink coconut water, fresh fruit juices or butter milk which are good for health.

Keywords

organ systems of the body
circulatory system
heart
Red Blood Corpuscles
White Blood Corpuscles
Blood Platelets
respiratory system
lungs
blood vessels
respiratory organs
oxygen
wind pipe
skeletal system
carbondioxide
kidneys
bones
X-ray
digestive system
process of digestion
excretory system
nervous system
nerves
brain

What have we learnt?

1. Conceptual Understanding

a) What are the different organ systems in our body?

b) Name the organs of the digestive system?

c) What are the functions of blood in our body?

d) What function do the lungs perform?

e) Write the stages in the process of digestion.

f) What are the organs of the excretory system? What are their uses and functions?

2. Questioning and Hypothesis

a) Raheem is suffering from stomach ache. What could be the reason? What questions might the doctor ask Raheem when consulted?

b) Observe the pictures of heart, digestive system and nervous system. What questions would you ask to know about them? Discuss in the class?

3. Experiments - Field Observations

a) Place your hand on the heart and listen to the heart beat carefully. Run for some time and listen again. Do you find any difference. Write the differences and give reasons.

b) When does the heart beat increase? Observe and write.

4. Information Skills, Projects

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

	Age	Rate of heart beat
Infants		
Children		
Adults		
Old people		
Athletes		

Whose rate of heart beat is more? Whose is less?

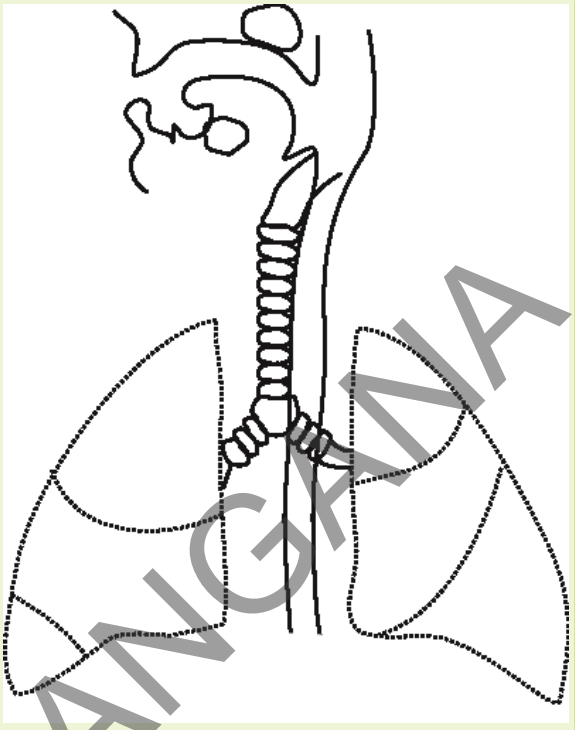
5. Communication through Mapping Skills, Drawing Pictures and Making Models

a) Draw and colour the diagram of digestive system.

b) Prepare a model of the excretory system.

c) Make a model of stethescope.

d) Colour the picture of lungs in the given diagram ?



6. Appreciation, Values and creating Awareness towards Bio-diversity

a) A blood donation camp is organised in Rangapuram village. We can save many lives by donating blood. Write slogans on blood donation.

b) Human heart (in the size of one's own fist) pumps blood to different parts of the body, day and night. How do you appreciate the function of the heart?

I can do this

1.	I can explain the different organ systems of our body.	Yes / No
2.	I can question, enquire about the different organ systems.	Yes / No
3.	I can draw diagrams of the kidneys and heart.	Yes / No
4.	I can tabulate the information regarding the rate of heart beat of different age groups by consulting a doctor or health volunteer.	Yes / No
5.	I can explain healthy habits and also follow them.	Yes / No