

Learning Objectives

After completing this lesson students will be able to:

- know about different organ systems of human body.
- indentify different organs.
- understand the functions of different organs.

Introduction

We get energy for our daily activities from the food we eat. How is the food broken down into simpler forms? It is through the process called digestion. After we eat the food, waste products are removed from the body. The process involved in this is called excretion. We need oxygen to survive. Our body gets oxygen through the process called respiration. These processes are carried out by different organs in our body. Different organs together form an organ system. In this lesson we will study about different organ systems in our body and their functions.

I. Digestive System

The food we eat consists of complex compounds like carbohydrates, proteins and fats. They have to be converted into simpler molecules like glucose, amino acids, fatty acids and glycerol respectively. These simpler molecules are then assimilated either by blood or lymph in order to give us energy. The process of conversion of complex food molecules into simpler molecules is called digestion. The digestive system can be divided into two.

1. Digestive tract 2. Digestive glands

1 Digestive tract (Alimentary canal)

It is a coiled muscular tube extending from the mouth to the anus. It is about 6-9 metres long and consists of many specialized divisions. They are sequentially arranged as mouth, buccal cavity, pharynx, esophagus, stomach, small intestine, large intestine, rectum and anus.



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Three important digestive glands associated with the process of digestion are:

- 1. Salivary glands
- 2. Pancreas
- 3. Liver

Salivary glands secrete saliva which moistens food. Saliva contains enzymes which break down complex molecules into simple molecules. Pancreas produces pancreatic juice which contains digestive enzymes for digesting fats, proteins and carbohydrates. Liver produces bile for the digestion of fat.



Mouth

Buccal Cavity

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The airway includes the nasal cavity, pharynx, larynx, trachea, bronchi and bronchioles. It carries air between the lungs and the surrounding.

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2 The Lungs

The lungs are the primary organs of the respiratory system. They are paired, cone-shaped organs. They are located in the thoracic chamber (rib cage) on both sides of the heart.

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3 Muscles of respiration Muscles of respiration include diaphram and intercostal muscles. They help to push the air in and out of the lungs during breathing. Air pollution causes many respiratory diseases. Smoking can cause lung cancer.

In this system blood is circulated to transport oxygen and nutrients to every part of the body. Circulatory system consists of the following:

2. Blood vessels

1. Heart

3. Blood



1 Heart

The heart is a hollow, muscular organ. It is somewhat conical in shape. It is covered with double walled membrane called pericardium. The space between the membranes is filled with pericardial fluid. The pericardial fluid protects the heart from shock. Heart is placed inside the thoracic chamber (rib cage) in between the two lungs.



The heart is divided into four chambers. Two upper chambers are called atria or auricles (Singular-atrium). Two lower chambers are called ventricles. The upper and lower chambers of the heart are separated by a muscular wall or tissue known as the auriculo-ventricular septum of the heart. The right side of the heart receives deoxygenated blood from various parts of the body and pumps it to the lungs for oxygenation. The left side of the heart receives oxygenated blood from the lungs and pumps it into different parts of the body.

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2 Blood vessels

Blood vessels consist of arteries, veins and capillaries. Arteries carry oxygenated blood (except pulmonary artery which carries deoxygenated blood from the heart) and veins carry deoxygenated blood (except pulmonary vein which carries oxygenated blood to the heart).

Capillaries are thin blood vessels which connect the arteries and veins. They help in exchange of materials between circulatory system and body tissue.

3 Blood

Blood transports nutrients, oxygen, wastes and hormones. The volume of blood in human adults is 4-5 litres. It regulates water level and the body temperature. Blood is pumped through

out the body by the heart. It takes oxygen to tissues and cells and finally reaches the lungs to take oxygen again.



There are some animals like lobsters and crabs that have blue blood. Cockroach has colourless or white blood.

Activity 2

Locate your pulse points either on wrist or neck. Place your right index and middle finger on the palm side of your left wrist. On the neck the pulse point is located beneath the ear and jaw bone. Count the number of beats for 15 seconds. Multiply this by four (15 * 4 = 60). This shows how many times the heart beats in one minute.

IV. Excretory System

Excretory system removes the waste products from the body. It also regulates water and electrolyte balance. Kidneys, lungs, liver and skin together function as excretory organs. Excretory system consists of the following.

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1. Kidneys

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- Ureters
- 3. Urinary bladder

1 Kidneys

The kidneys filter the blood to remove waste and produce urine. The kidneys are a pair of dark red, bean shaped organs placed behind the abdomen on either side of the vertebral column. The average adult's kidney measures about 12 cm in length, 6 cm in width and 3 cm in thickness. Right kidney is slightly lower than the left kidney. Each kidney is covered by a fibrous membrane called capsule.

The kidneys are made up of millions of excretory units, called Nephrons, which are the structural and functional units of the kidneys.



2 Ureters

Two ureters connect the kidneys with the urinary bladder. Urine formed from each kidney reaches urinary bladder through ureters.

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3 Urinary bladder

It is sac-like in shape and acts as a temporary storage organ of urine. Urine entering the urinary bladder from the ureters slowly fill the hollow space inside the bladder. Urine is expelled from the body through the urethra. **Do you know?** Every minute, kidneys receive approximately 1.250 litre of blood.

V. Nervous System

Nervous system is an integration of nerves and they are composed of specialised cells called Neurons. The human nervous system is divided into the following.

- 1. Central Nervous System (CNS)
- Peripheral Nervous System (PNS)



Central nervous system

Central nervous system consists of the brain, the spinal cord and the nerves.

* Brain

We use our brain to think, read and write. The brain is covered by three membranes called meninges. They are dura mater, arachnoid membrane and pia mater. The meninges protect the CNS from mechanical shock. It is made up of eight immovable bones. The brain is made up of millions of functional units called Neurons.

Human brain is divided into three major parts.

- Fore Brain
- Mid Brain
- Hind Brain

Fore Brain

- \rightarrow The fore brain consists of cerebrum. thalamus and hypothalamus.
- → It is the largest part of the brain.
- \rightarrow It is the centre of human memory.
- \rightarrow It is responsible for intelligence, imagination and reasoning.

Mid Brain

- \rightarrow It lies behind the cerebrum.
- → It co-ordinates the movements of the muscles of the body.
- → It regulates vision, hearing, sleep and body temperature.

Hind Brain

- → The hind brain comprises of pons and medulla oblongata.
- → It is also called the brain stem.
- → It is called 'vital knot' because it controls breathing, heart beat and other involuntary muscles.
- \rightarrow It connects the brain to the spinal cord.



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Brain (Cerebrum)



Spinal Chord

Cerebellum

Somatic

(Muscle movement)

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Spinal cord

Spinal cord is along a tube like structure which extends from the brain. It lies within the back bone of our body.

2 Peripheral nervous system

Peripheral nervous system consists of nerves extending from the spinal cord to all parts of the body. It is made up of two parts.

- Somatic nervous system
- → Autonomous nervous system

Somatic nervous system carries sensations from the organs to the brain and take messages from the brain to the organs for movements. Autonomous nervous system controls the nerves of the inner organs of the body.



I. Choose the correct answer.

1.	What	is th	he length	۱ of	the	alimentary	canal?	
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a) 3-5 m	b) 5-6 m	c) 9-11 m
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- 2. Which organ is involved in respiration?a) Kidneyb) Lungsc) Heart
- 3. How many kidneys do we have?
 - a) 2 b) 3 c) 1



d) 6-9 m

d) Brain

d) 4

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4. Functional unit of brain is										
	a) Neuron	b) Nephron	c) Brain stem	d) Nerves						
5.	Blood is pumped by									
	a) Lungs	b) Heart	c) Kidneys	d) Bones						
II. Fill in the blanks.										
1.	1. A group of organs together make up an system.									
The process by which the body removes waste is called										
3. The number of chambers in human heart are										
4. The functional unit of kidney is										
5.	5. The human nervous system is divided into parts.									
III. Say True or False.										
1.	1. The circulatory system is made up of the heart, blood and blood vessels.									
Important function of the heart is to transport blood with nutrients, oxygen, waste and hormones.										
3.	The brain is protect	ed by the rib cage.								
4.	The functional unit	of kidney is neuron.								
IV. Circle the odd one.										
1.	a) Mouth	b) Buccal cavity	c) Pharynx	d) Lungs						
2.	a) Nostrils	b) Nasal cavity	c) Pharynx	d) Stomach						
3.	a) Mouth	b) Esophagus	c) Stomach	d) Kidney						
4.	a) Taste	b) Hear	c) Think	d) Smell						
5.	a) Cerebrum	b) Cerebellum	c) Medulla Oblongata	d) Nephron						
V. Match the following.										
۷.	Match the following	g.								
V.	Match the following Digestive System	g. _	Kidney							
V.	Match the following Digestive System Respiratory system	g. - -	Kidney Brain							
۷.	Match the following Digestive System Respiratory system Circulatory system	g. - -	Kidney Brain Alimentary canal							
۷.	Match the following Digestive System Respiratory system Circulatory system Excretory system	g. - - -	Kidney Brain Alimentary canal Heart							

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VI. Answer briefly.

- 1. Name the salivary glands in our mouth?
- 2. What is respiration?
- 3. What is the function of pericardial fluid?
- 4. Name the chambers in human heart?
- Arrange the excretory system in correct sequence. (Urinary bladder, Ureter, Kidney, Urethra).
- 6. What are the two parts of peripheral nervous system?

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7. What are the functions of blood?

VII. Answer in detail.

- 1. List out the functions of the digestive system.
- 2. Explain the main parts of the circulatory system.
- 3. Explain three major parts of human brain.
- 4. Label the diagram given below.



VIII. Questions based on higher order thinking (HOT).

- 1. Why it is important to wear helmet while riding a bike?
- 2. Eating fast-food ad junk food affects our health. Justify.

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