

Chapter 9

Respiration and Excretion in Animals

Points to be studied:

- 9.1 Respiration
- 9.2 Human Respiratory System
- 9.3 Respiration in insects
- 9.4 Respiration in aquatic animals
- 9.5 Excretion
- 9.6 Human excretory System

We perform various activities like playing, cycling, reading and drawing water from hand pump etc. in our daily life. We need energy for doing all these activities. We get this energy from food. This energy stored in food is released by the process of respiration. What is respiration? Let's learn.

9.1 Respiration:

Our body is made up of uncounted tiny cells. When we breathe in air which is rich in oxygen enters into the body through nostrils. This process is called as inhalation. Ultimately this oxygen reaches to cells. In the cells, oxygen helps in the breakdown of stored food and energy, carbon dioxide and water is formed. This carbon dioxide is released out through breathe known as exhalation.

The process of respiration is same in all the organisms. But different categories of animals have different organs for respiration so there is a difference in the mechanism of respiration. Let's learn.

9.2 Respiration in humans:

Normally we take in air through our nostrils. When we inhale air, it passes through our nostrils into the nasal cavity. From the nasal cavity, the air reaches to our lungs through the windpipe. Two lungs are present in the chest cavity of our body. This cavity is surrounded by ribs on the sides. A large, muscular sheet

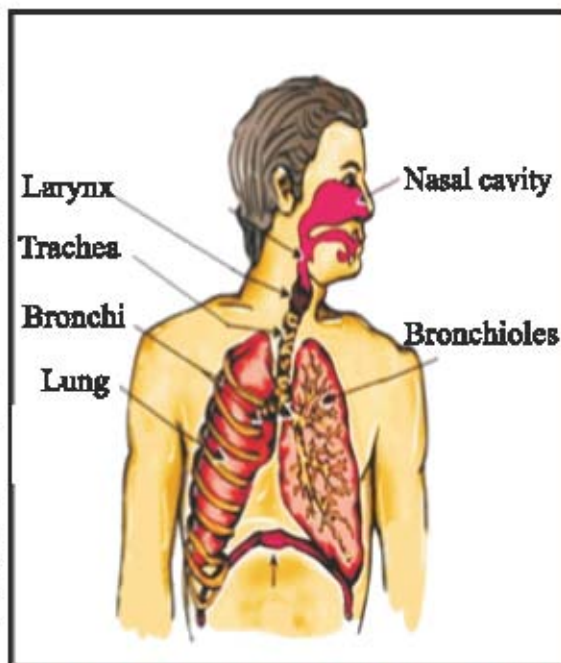


Fig 9.1: Human respiratory system

called diaphragm forms the floor of the chest cavity. During inhalation, ribs move outwards and diaphragm moves down. This movement increases space in our chest cavity and air rushes into the lungs. The lungs get filled with air. During exhalation, ribs move inwards, while diaphragm moves up to its initial position. This reduces the size of the chest cavity and air is pushed out of the lungs.

Lets do an experiment to understand the mechanism of breathing.

Activity 1

Take a wide plastic bottle. Remove its bottom. Get a Y-shaped glass or plastic tube. Make a hole in the lid so that the tube may pass through it. To the forked end of the tube fix one balloon each. To the open base of the bottle tie a thin rubber or plastic sheet using a large rubber band. Pull the rubber sheet from the base downwards. Did you see any changes in the balloons? Now push the rubber/plastic sheet up and observe the balloons.

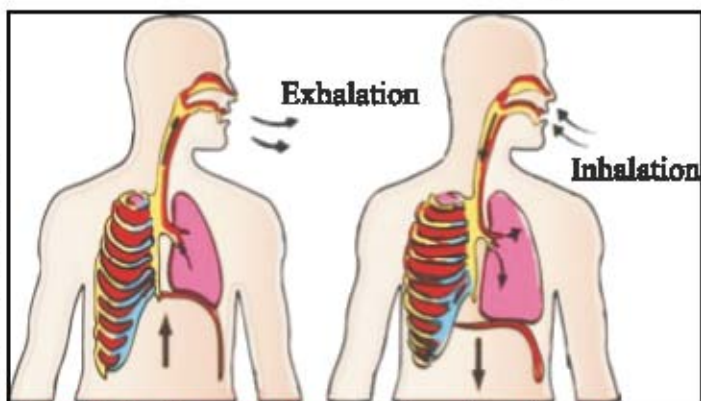


Fig 9.2: Respiration mechanism in humans

Pushing the rubber sheet downwards balloons become swelled and pulling the rubber sheet upwards, deflate balloons.

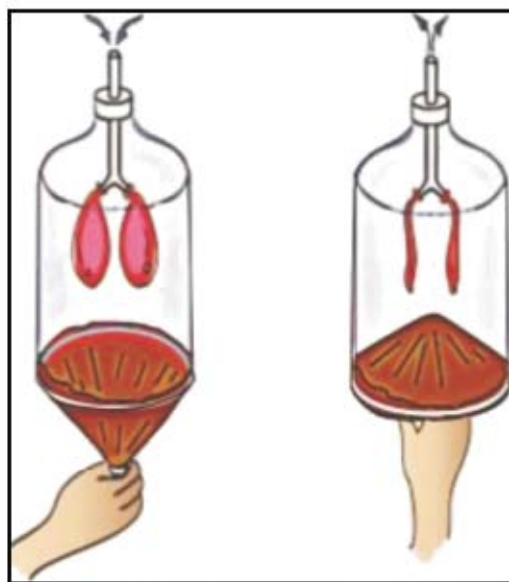


Fig 9.3 : Model to show mechanism of respiratory system in human

Animals such as cows, goats, snakes, birds, lion's have lungs like the human beings.

Do all living organisms have lungs?

Different groups of organisms have special type of organs for the respiration in place of lungs. Let's study about these special type of organs.-

9.3 Respiration in insects:

Spiracles:

A cockroach and insects have small openings on the sides of its body. These openings are called spiracles. Insects have a network of air tubes called tracheae for gas exchange. Oxygen rich air rushes through spiracles into the tracheal tubes, finally reaches to cells. Similarly, carbon dioxide from the cells goes into the tracheal tubes and from there moves out through spiracles.

9.4 Breathing under water:

Clome or Gills

Aquatic animals like fish have gills or clome. Gills are found out of the skin. Clome absorbs oxygen dissolved in water. Gills are well supplied with blood vessels. Exchange of gases takes place in these blood vessels.



Fig 9.4 : Respiration in fish by gills

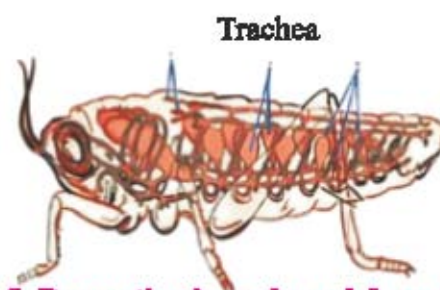


Fig 9.5: Respiration in cockroach by spiracles

Earthworms, leeches etc. respire through their moist and slimy skin.

Respiration in plants:

You have already learn tin previous class that the leaves of the plants have tiny pores called stomata. In plants the exchange of gases takes place through stomata.

Do roots of plants also respire? Let's know -

Activity 1:

Carefully remove an unwanted plant with roots grown in the field and observe its roots. There are so many soil particles sticking with root hairs. Roots



take up oxygen from the air spaces present between the soil particles. In this way respiration process takes place in the root of plants.

9.5 Excretion

We know, we sweat after playing or hard work. This sweat comes out through tiny pores of skin. The excretion of additional water and salts takes place through skin in the form of sweat.

In this chapter you also know that carbon dioxide is removed as waste from the body through the lungs during exhalation. The undigested food is removed as stool and toxic products (Urea and Uric acid) are removed from the body by urine. Carbon dioxide, sweat & stool, urine are excretory products of our body. When our body cells perform various types of bio chemical processes, certain waste, products are released. These waste products are toxic and hence need to be removed from the body. The process of removal of wastes produced in the cells of the living organism is called **excretion**. The organs involved in excretion forms the excretory system.

9.6 Human Excretory System:

In human two kidneys, ureters, bladder and urethra form the excretory system. The removal of waste substances present in the blood takes place in two kidneys. The wastes dissolved in water are removed as urine goes into the urinary bladder through tube-like ureters. A muscular tube is attached with ureters. It is called urethra. Urethra opens outside the body through a pore which is called urinary opening. From the urinary bladder urine is passes through urethra removed out by urinary opening.

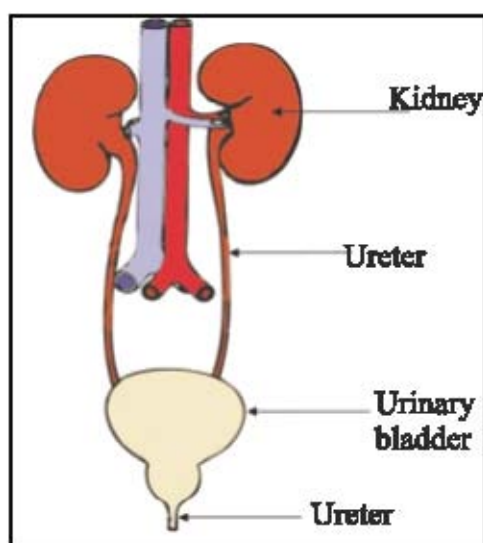


Fig. 9.6: Human Excretory System

YOGA

In today's environment, we can make our lives healthier and happier by yoga. In today's polluted environment Yoga is a mode, which has no adverse effects (side effects). Many yoga postures and the KAPAL BHATI, ANULOM-VILOM and BHRAMARI PRANAYAM make us free from many diseases. Yoga and Pranayam make mind calm, SHAWASAN makes our high blood pressure normal, VAJRASAN helps us in tackle digestive disorders. In today's era of computers, whole day work on computer causes back and neck pain. TADASAN and SHALABHASAN give us freedom from pain relief medication. Adopting many postures of yoga in life, can stay away us from diseases and can fit our health. Yoga gives the body strength to fight with diseases. It increases resistance power in body.

Yoga is profitable of our physical, mental and spiritual health. It makes our life stress free. Gift of Rishi tradition, Yoga is accepted by all over the world. As a result of which the proposal made by our honorable Prime Minister in UN of celebrating International Day of Yoga on June 21 was passed by the 177 countries within a very limited time. On 21 June, 2015 the first International Yoga Day was celebrated all over the world.

It is written in the Gita, 'Yoga itself is a journey through self-reach themselves'.

Let us make a success of life by joining the trip.

What have you learnt

1. The intake of air rich in oxygen into the body is called inhalation and giving out of air rich in carbon dioxide is known as exhalation.
2. The respiration is a process in which breakdown of food with the release of energy takes place.
3. Cockroach and other insects respire through their spiracles.
4. Earthworms, leeches etc respire through their moist and slimy skin.
5. In human two kidneys, ureters, bladder and urethra form the excretory system.
6. The process of removal of wastes products from the body is called excretion.



□□□

Exercises

Choose the correct option -

- (i) Which organ is helpful in utilisation of oxygen dissolved in water -
 (a) Clome (b) stomata
 (c) Mouth (d) nostrils ()
- (ii) Respiratory organ in insect is -
 (a) Skin (b) Clome
 (c) Lungs (d) nostrils ()
- (iii) Which organism respire through skin -
 (a) Human (b) fish
 (c) cockroach (d) earthworm ()

Fill in the blanks -

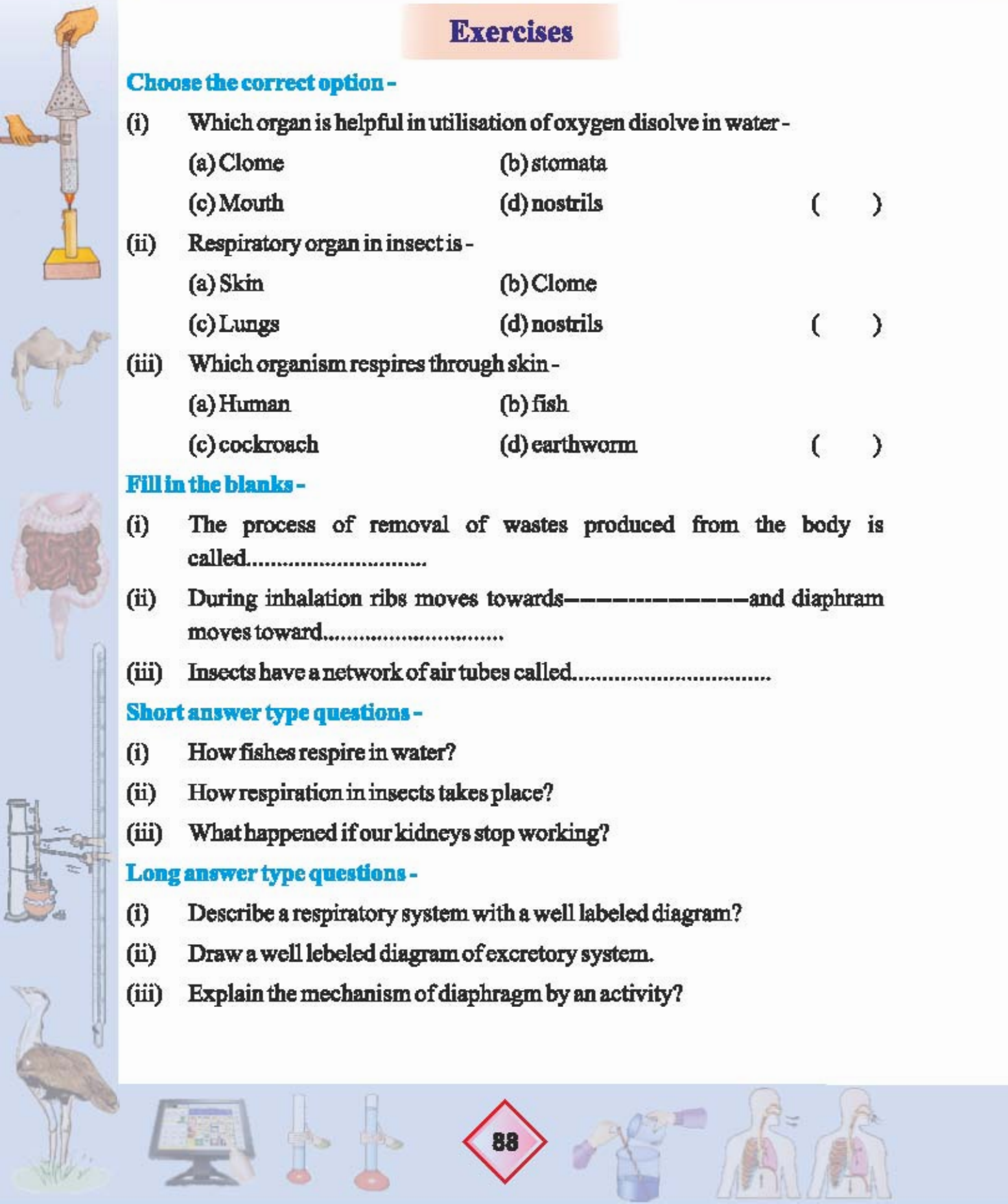
- (i) The process of removal of wastes produced from the body is called.....
- (ii) During inhalation ribs moves towards-----and diaphragm moves toward.....
- (iii) Insects have a network of air tubes called.....

Short answer type questions -

- (i) How fishes respire in water?
- (ii) How respiration in insects takes place?
- (iii) What happened if our kidneys stop working?

Long answer type questions -

- (i) Describe a respiratory system with a well labeled diagram?
- (ii) Draw a well labeled diagram of excretory system.
- (iii) Explain the mechanism of diaphragm by an activity?



Activities:

- (i) Prepare a model of respiratory system with the help of thermocol?
- (ii) Take a measurement of chest of your friends after inhalation and exhalation, note down in the table given below.

S.NO.	Name of Friend	Measurement of Chest	
		After Inhalation	After Exhalation
1			
2			
3			
4			
5			



Fig 9.7: Measurement of chest

- (iii) Prepare a model of mechanism of human respiratory system with the help of waste material.
- (iv) Prepare a model of human excretory system with the help of waste material and plaster of paris.
- (v) Count respiration process doing in one minute in students of class.
- (vi) Act role play on "Danger of smoking".

