

PERIOD 15

Breathing and respiration in other animals

Teacher guided discussion

Mention the respiratory organs used by different animals like insects use spiracles and tracheae, earthworm uses moist skin; fish uses gills; amphibians (e.g., frog) use lungs and skin; birds have a unique flow system like air sacs, one-way flow adapted to thin air and flight and marine mammals like dolphin and whale have blowholes for breathing.

NEP

21st Century Skills: Ask students to co-relate how the respiratory organs of different animals are suitable to the habitat they live.

Suggested home assignment

Choose one animal and write how its respiration suits its habitat.

PERIOD 16

Revise all the topics covered in the previous lesson.

Using Resources

Refer to the corresponding chapter in the Digital Support given in the book.

PERIOD 17

Discuss the exercises given at the end of the chapter.

PERIOD 18

Assessment of understanding of the chapter could be done with the help of the given worksheet for the chapter.

TEXT BOOK ANSWERS

Objective Type Questions

1. Name the following:

- | | |
|-------------------------------|-----------------|
| (a) Peristalsis | (b) Oesophagus |
| (c) Liver | (d) Villi |
| (e) Bacteria | (f) Respiration |
| (g) Oxygen and Carbon dioxide | (h) Fish |
| (i) Haemoglobin | (j) Tracheae |

2. Fill in the following blanks with suitable words:

(a) digestive

(b) villi

(c) glucose, amino acids, fatty acids, glycerol

(d) digestive

(e) cow

(f) diaphragm, rib

(g) alveoli

(h) moist skin

3. State whether the following statements are true or false:

(a) False

(b) True

(c) True

(d) True

(e) True

(f) False

4. Match the following:

(a) (i)

(b) (iv)

(c) (v)

(d) (ii)

(e) (iii)

Subjective Type Questions

Short Answer Type Questions

1. The alimentary canal is a long tube running from mouth to anus of a human being (or other animals) in which digestion and absorption of food takes place. It is also known as gut or digestive tract.

It is a continuous canal which has many organs associated with it such as mouth (buccal cavity), oesophagus (food pipe), stomach, small intestine, large intestine, rectum and anus. Three glands associated with the alimentary canal are salivary glands, liver and pancreas.

2. When iodine solution is added to chapati pieces (test tube A) it turns blue-black because chapati, made from wheat, contains starch and iodine gives a blue-black colour with starch. Chewed chapati (test tube B) shows no blue-black colour because saliva contains the enzyme salivary amylase which break down starch into sugar, so does not respond to iodine test. Boiled and mashed potato (test tube C) will turn blue-black with iodine because potatoes contain starch and boiling does not remove the starch.
3. Liver secretes a liquid called bile which is stored temporarily in the sac called gall bladder. Bile juice is slightly basic in nature and helps in neutralising the acid of the food coming from stomach. The bile plays an important part in the digestion of fats. It converts fats into tiny droplets so that their further breakdown becomes easy.
4. Different animals have different modes of taking food into their bodies depending on their feeding habits and body structures.

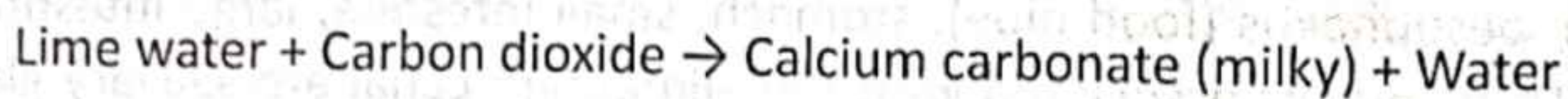
Animal	Mode of Taking Food
Frog	Chewing
Snake	Swallowing
Mosquito	Sucking
Lice	Sucking
Housefly	Sucking

Animal	Mode of Taking Food
Ant	Biting and Chewing
Snail	Scrapping

5. The inner surface of the small intestine has millions of tiny, finger-like outgrowths called villi, it located in the inner walls of the small intestine. The role of villi in the small intestine is to increase the surface area for the rapid absorption of digested food.
6. The process of breakdown of food in the cells of the body with the release of energy is called respiration. The word equation of respiration process is:



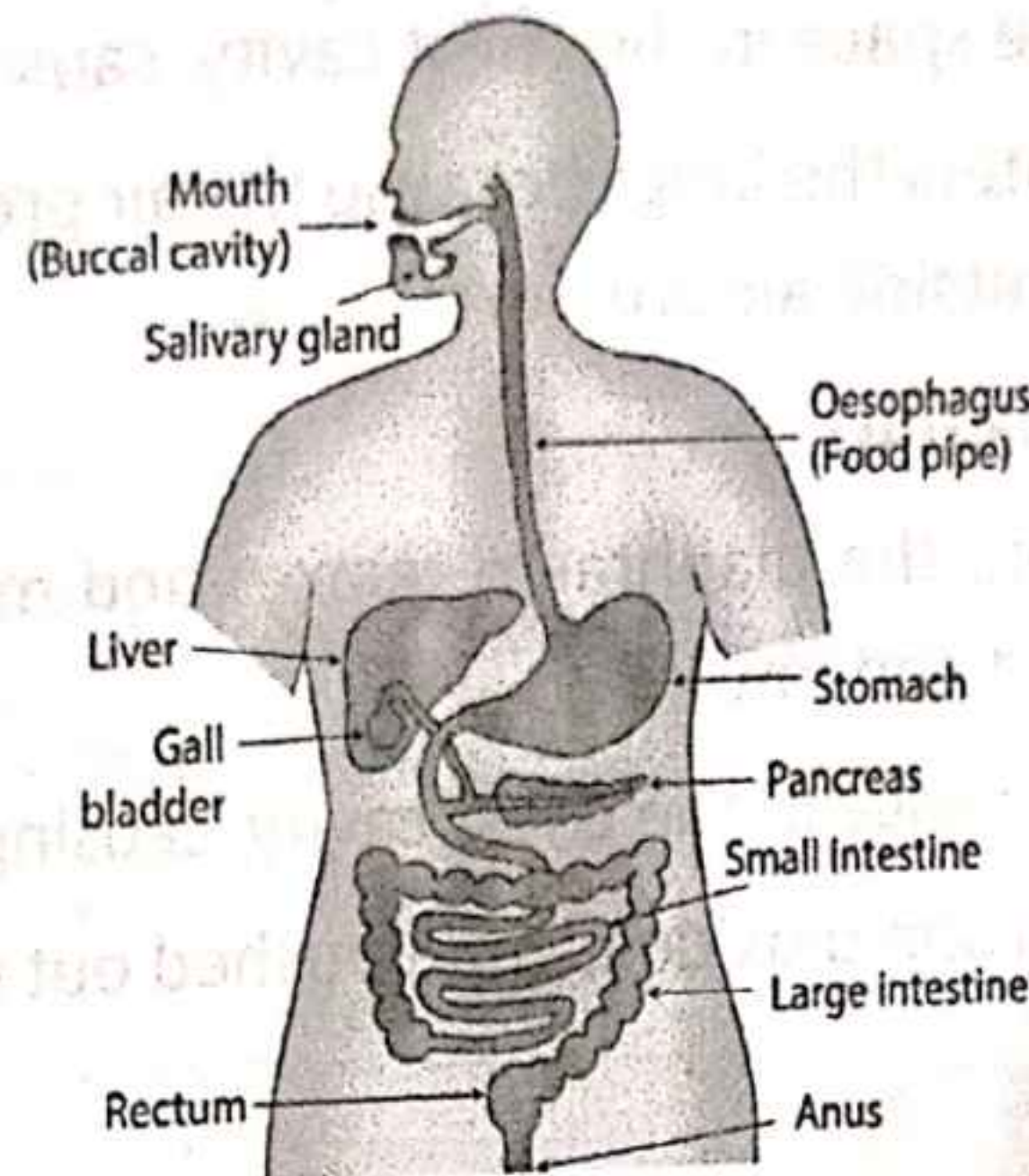
7. No, we cannot survive only on grass and raw leafy vegetables. Humans cannot digest cellulose, which is a major component of grass and green leaves. Animals like cows and goats have bacteria that help break down cellulose, but humans do not.
8. Exhaled air will turn lime water milky more appreciably than inhaled air. Exhaled air contains a higher amount of carbon dioxide (CO_2), which is produced during respiration. When carbon dioxide is passed through lime water (calcium hydroxide solution), it reacts to form calcium carbonate, a white, insoluble substance that makes the lime water look milky.



9. Anusha was breathing faster than Paridhi because her body needed more oxygen and had to remove more carbon dioxide after running. Two possible explanations are:
 - (a) **Difference in physical fitness:** Paridhi might be more physically fit than Anusha. A fit person's lungs and heart work more efficiently, so they can supply oxygen and remove carbon dioxide with fewer breaths. Anusha, being less fit, needs to breathe faster to meet the body's oxygen demand after exercise.
 - (b) **Difference in effort or energy use:** Anusha may have run faster, longer, or used more energy than Paridhi. Her muscles would then produce more carbon dioxide and require more oxygen, causing her breathing rate to increase to balance this demand.
10. When we inhale dust-laden air, the tiny dust particles enter our nasal passages. The possible explanations for sneezing in this case are:
 - (a) **Protective reflex action:** Sneezing is a reflex action of our body to expel dust or other irritants from the nasal cavity. When dust particles irritate the inner lining of the nose, the nerve endings send a signal to the brain, which triggers sneezing to clear the air passages.
 - (b) **Cleaning the respiratory tract:** Sneezing helps to remove unwanted particles like dust, pollen, or microbes from the nose and airways, preventing them from entering the lungs and causing harm or infection.

Answer Type Questions

- The process in which the food containing large, insoluble substances is broken down into small, water-soluble substances which can be absorbed by our body, is called digestion. Digestion makes the food soluble so that it can be absorbed and utilised by the body. The human digestive system consists of the alimentary canal and its associated glands. It is a continuous canal which has many organs associated with it such as mouth (buccal cavity), oesophagus (food pipe), stomach, small intestine, large intestine, rectum and anus. Three glands associated with the alimentary canal are salivary glands, liver and pancreas.

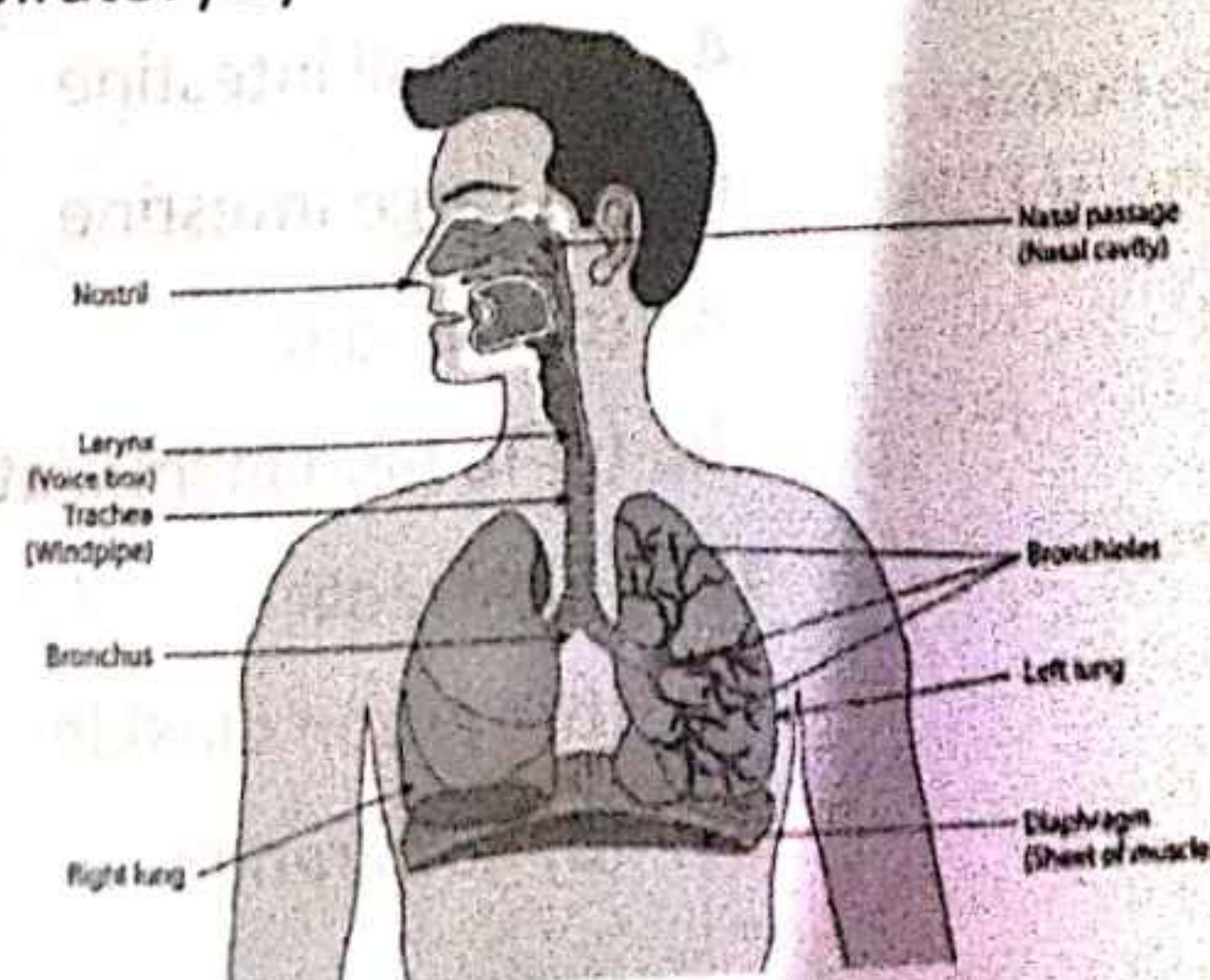


- Rumination is the process in which some animals bring back the swallowed food from the stomach to the mouth to chew it again. This helps in better digestion of tough plant material like grass. Animals that show this habit are called ruminants. Examples: Cow and deer.

- Cows can digest grass due to the presence of cellulose-digesting bacteria in their stomach, while humans cannot because they do not have these bacteria or a rumen.

- In human beings, many organs take part in the process of respiration. We call them organs of respiratory system. The main organs of human respiratory system are: Nose, Nasal passages (Passages in the nose), Trachea, Bronchi, Lungs and Diaphragm.

- The human respiratory system is:



4. Breathing is the process of taking in air (inhalation) rich in oxygen and giving out air (exhalation) rich in carbon dioxide. It is a part of respiration, which supplies oxygen to the body and removes carbon dioxide produced from the body.

Mechanism of Breathing

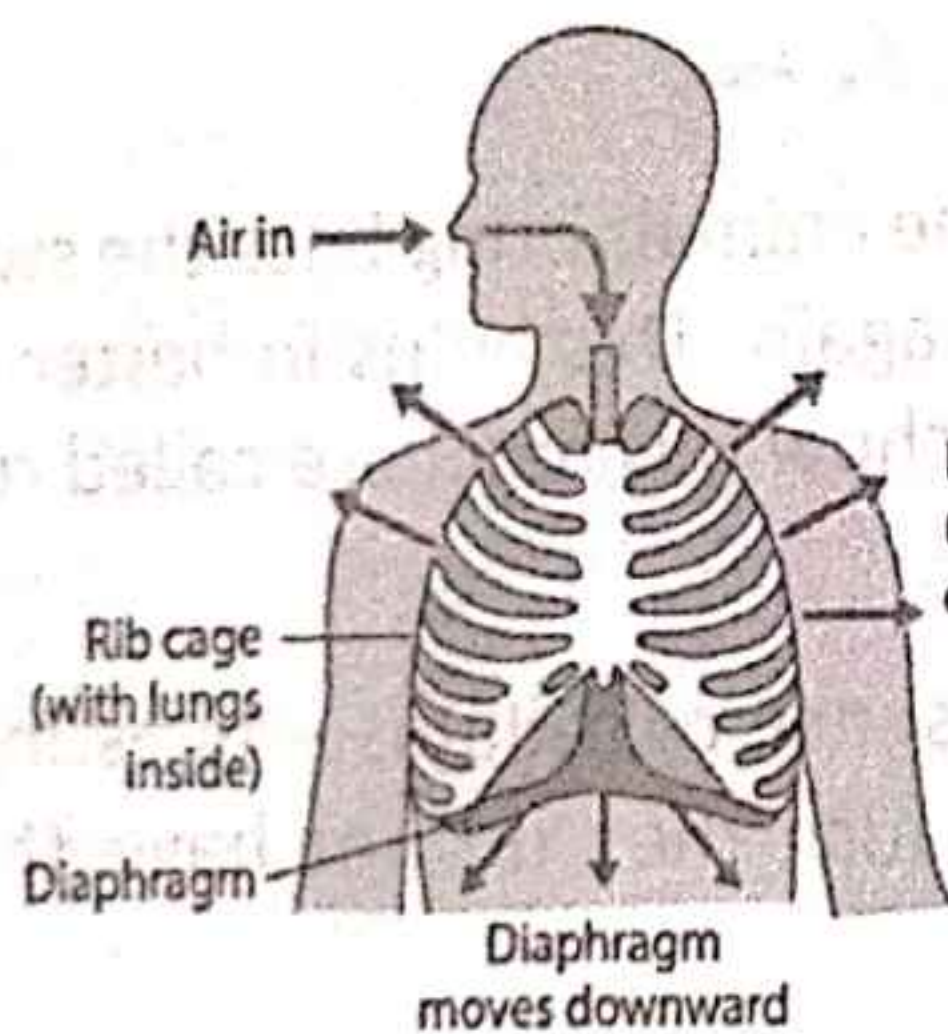
Breathing involves two main steps which are inhalation and exhalation.

1. Inhalation (Breathing in)

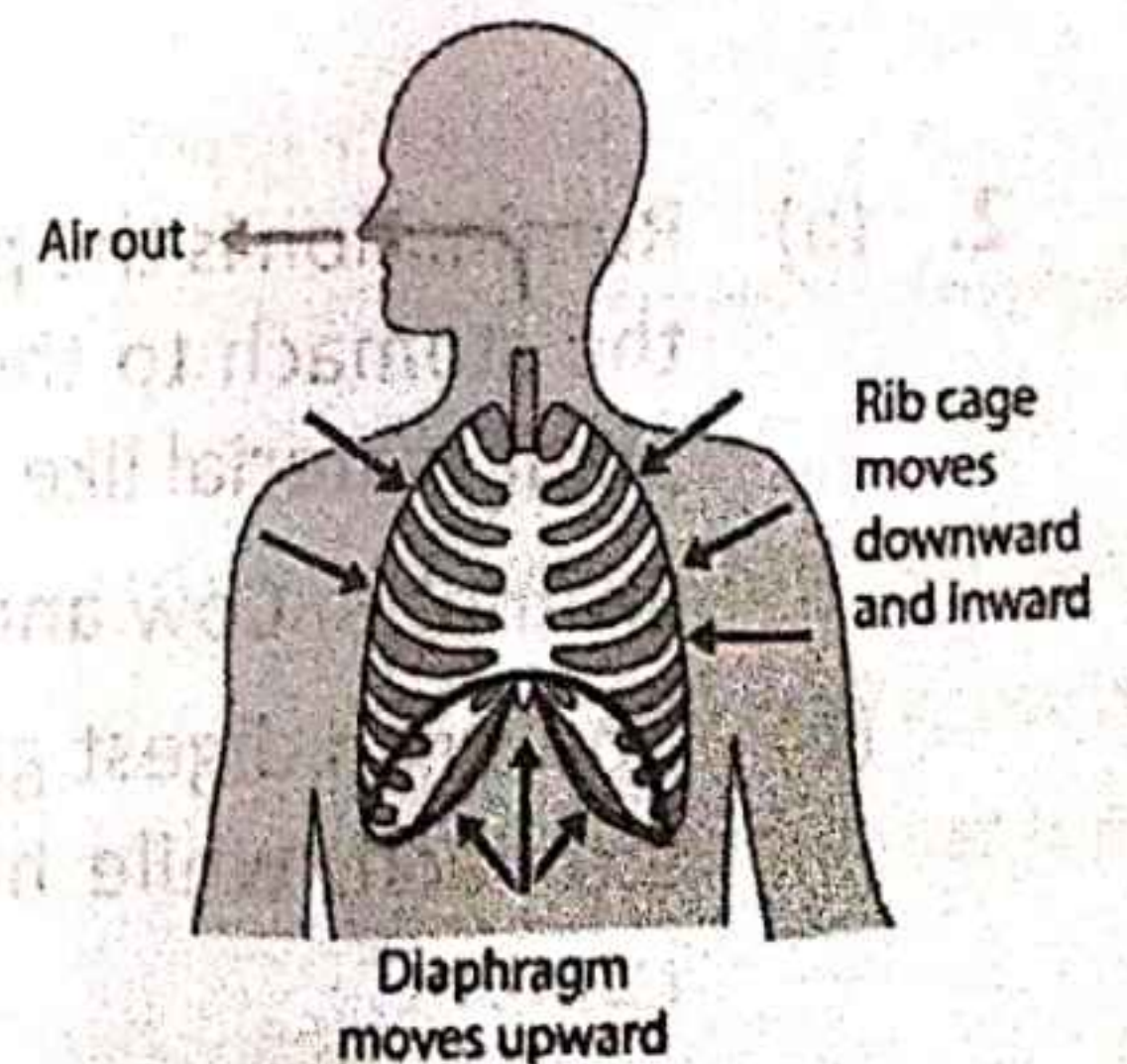
- (a) During inhalation, the diaphragm contracts and moves downward, and the rib cage moves upward and outward.
- (b) This increases the space in the chest cavity, causing the lungs to expand.
- (c) As a result, air enters the lungs because the air pressure inside the lungs becomes lower than the outside air pressure.

2. Exhalation (Breathing out)

- (a) During exhalation, the diaphragm relaxes and moves upward, and the rib cage moves downward and inward.
- (b) This reduces the space in the chest cavity, causing the lungs to contract.
- (c) The air rich in carbon dioxide is then pushed out of the lungs.



(a) Breathing in : chest cavity becomes bigger, air is sucked into lungs



(b) Breathing out : chest cavity becomes smaller, air is pushed out of lungs

Multiple Choice Questions (MCQ)

1. (c) Amoeba
2. (d) Buccal cavity
3. (b) Stomach
4. (b) Small intestine
5. (c) 7.5 m
6. (d) Large intestine
7. (d) Proteins
8. (d) B and D
9. (d) None of these
10. (c) To help in inhalation and exhalation
11. (c) Spiracles
12. (b) Alveoli
13. (c) Fish
14. (b) Carbon dioxide
15. (c) Frog
16. (d) Respiration

1. (a) (i) P (ii) Q (iii) R (iv) S (v) T, and (vi) U are:

Symbol	Substance/Organ
(i) P	Small intestine
(ii) Q	Bile
(iii) R	Glycerol
(iv) S	Fatty acids
(v) T	Glucose
(vi) U	Amino acids

- (b) The sac in which liquid Q (bile) is stored temporarily is the gall bladder.

2. (a) (i) W, (ii) X, (iii) Y, and (iv) Z are:

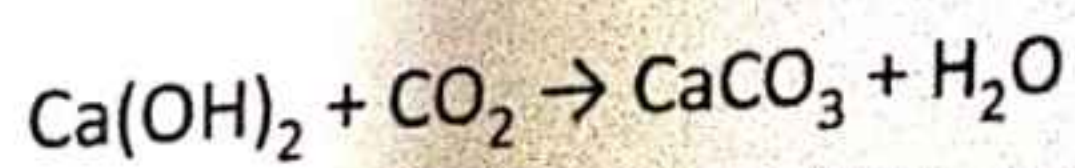
Symbol	Organ/Structure
(i) W	Villi
(ii) X	Large intestine
(iii) Y	Rectum
(iv) Z	Anus

- (b) The process in which undigested waste is thrown out of the body is called egestion.

3. Yadu wanted to test the action of saliva (salivary amylase) on starch. Rice flour contains starch. When iodine solution is added to a substance containing starch, it turns blue-black in colour. In test tube A, no saliva was added, so starch remained unchanged, the solution turned blue-black on adding iodine. In test tube B, saliva was added, which contains the enzyme amylase. This enzyme breaks down starch into simple sugars. Since starch was digested, the iodine solution did not turn blue-black, which shows that the starch was no longer present.

4. Rakshita wanted to test whether the air exhaled during breathing contains more carbon dioxide than the air we inhale.

Lime water is a solution of calcium hydroxide. When carbon dioxide (CO₂) gas passes through lime water, it reacts to form calcium carbonate (CaCO₃), which makes the lime water turn milky.



- (i) The inhaled air (test tube A) contains very little carbon dioxide, so lime water turns milky slowly or not at all.

- (ii) The exhaled air (test tube B) contains a higher amount of carbon dioxide, so the lime water turns milky faster.

Rakshita can compare the two test tubes: If lime water in test tube B turns milky faster, it confirms that exhaled air has more carbon dioxide than the inhaled air.

5. (a) The space inside the bell jar represents the chest cavity or thoracic cavity of the human body.
- (b) The two balloons inside the bell jar represent the lungs.
- (c) The rubber sheet tied over the open end of the bell jar represents the diaphragm, which is a dome-shaped muscle that helps in breathing by moving up and down.

Class: Date:

Name:
A. Case Based Questions

Riya was studying the chapter Nutrition in Humans. She learned that the human digestive system consists of the alimentary canal and associated glands. The alimentary canal is a long tube, running from the mouth to the anus. Digestion begins in the mouth where teeth, tongue and salivary glands play an important role. The tongue mixes saliva with food and helps in swallowing the food to go down into the oesophagus.

1. What do you understand by digestion?
2. Name the glands associated with digestion and the juice they secrete.
3. What is the function of saliva?
4. Name the organs associated with alimentary canal.

B. Assertion-Reason Based Questions

Given below are the options for the set of four questions that follow comprising of two statements labelled A (Assertion) and R (Reason). Choose the correct option appropriately.

- (a) A and R both are correct and R is the correct explanation of A.
- (b) A and R both are correct but R is not the correct explanation of A.
- (c) A is correct but R is incorrect.
- (d) A is incorrect but R is correct.

1. Assertion: Ruminants can digest the cellulose carbohydrate present in plants.

Reason: Cellulose-digesting bacteria are present in the ruminants.

2. Assertion: The small air sacs called alveoli are present in the lungs.

Reason: Gaseous exchange takes place across the walls of alveoli.

3. Assertion: Breathing rate of a person increases after physical exercise.

Reason: Very less amount of air goes into the lungs.

4. Assertion: The process of digestion is completed in the large intestine.

Reason: The large intestine absorbs water from the undigested food material.

5. Assertion: Dolphins breathe through nostrils.

Reason: Dolphins are mammals.

Remarks

Teacher's signature

Name: Class: Date: M.M.Y.

A. Objective Type Questions

1. Name the following:

- The enzyme secreted by the pancreas that digests proteins.
- The tiny finger-like projections that increase intestinal surface area.
- The structure in a bird's digestive system that grinds food with the help of swallowed grit.
- The thin muscular sheet that separates chest cavity from abdominal cavity.

2. Fill in the blanks:

- The wave-like muscle movement that pushes food along the alimentary canal is called _____.
- Bile is stored temporarily in the _____.
- The respiratory openings on the sides of an insect's body are called _____.
- The semi-liquid mixture of partly digested food that passes from stomach into small intestine is called _____.

3. Write true or false:

- Ruminants have bacteria in their rumen that help digest cellulose.
- Alveoli have thick walls to protect them from dust.
- Pancreatic juice contains enzymes that act on carbohydrates, proteins and fats.
- Birds have a one-way flow of air to make gas exchange efficient.

4. Classify each animal into the correct category as Herbivore / Carnivore / Omnivore / Ruminant:

- Human
- Cow
- Lion
- Crow

5. Match the following:

Column A	Column B
(1) Villi	(a) Prevents food entering the windpipe
(2) Epiglottis	(b) Structure in insects for gas entry
(3) Gizzard	(c) Increases absorption area in small intestine
(4) Spiracle	(d) Muscular grinding chamber in birds

B. Subjective Type Questions

1. Short answer type questions

- (a) Why is emulsification of fats important in digestion?
- (b) Give two adaptations of alveoli that help efficient gas exchange.
- (c) What role do salivary glands play besides releasing amylase?
- (d) How does rumination help a cow extract nutrient from grass?
- (e) State one reason why drinking and smoking together is harmful to respiratory health.

2. Long answer type questions

- (a) Describe the journey of a piece of bread from mouth to the bloodstream, mention major organs, secretions, and where major digestion and absorption occur.
- (b) Explain the mechanism of breathing in humans. Include the role of diaphragm, rib muscles, changes in chest cavity volume, and how these lead to inhalation and exhalation.
- (c) A swimmer holds their breath underwater for a long time. Explain why CO_2 build-up, rather than lack of oxygen, is usually what forces them to breathe.
- (d) A child accidentally swallows a small stone and a bird also similarly swallows a small stone. Predict and explain two possible effects on digestion depending on where the stone lodges.

C. Multiple Choice Questions

1. Which organ produces bile?
(a) Pancreas
(b) Liver
(c) Gall bladder
(d) Small intestine
2. In humans, most absorption of nutrients takes place in the:
(a) Stomach
(b) Large intestine
(c) Small intestine
(d) Oesophagus
3. During inhalation, the diaphragm:
(a) Relaxes and moves upward
(b) Contracts and moves downward
(c) Stays still
(d) Becomes thicker
4. The most important reason why alveoli are surrounded by capillaries is to:
(a) Keep them warm
(b) Supply digestive enzymes
(c) Allow exchange of gases efficiently
(d) Prevent dust from entering
5. Which of the following animals uses spiracles for breathing?
(a) Fish
(b) Frog
(c) Insect
(d) Bird