

I. OBJECTIVE-TYPE QUESTIONS

1. The image shows a child who is blowing foggy air out of her mouth. Which terminology would be most appropriate for defining the act of blowing air out?

- a) Breathing
- b) Exhalation**
- c) Inhalation
- d) Respiration



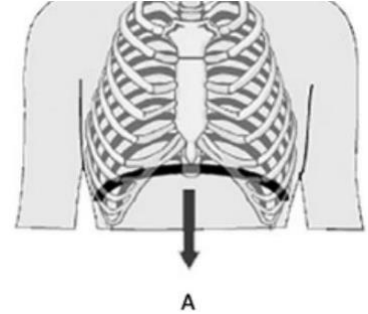
2. Which of the following is the correct path of oxygen in humans during inhalation?

- a) Nostrils -----→Nasal cavity---→Trachea----→Lungs**
- b) Nostrils. -→ Trachea --→ Nasal cavity---→ Lungs
- c) Lungs---→ Trachea--→Nasal cavity--→ Nostrils
- d) Nostrils---→ Nasal cavity--→ Trachea ---→Lungs

3. A food stall owner was preparing dough for making bhaturas. He added a pinch of yeast and sugar to the dough and left it in a warm place. After a few hours, the dough had risen with a sour smell. Why did the dough rise?

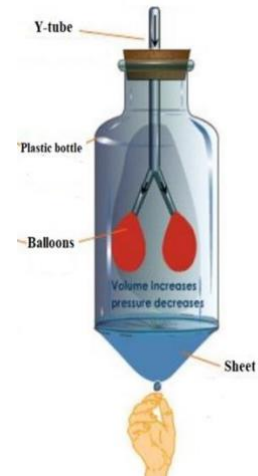
- a) Due to anaerobic respiration in yeast.**
- b) Due to aerobic respiration in yeast.
- c) Due to anaerobic respiration in bacteria.
- d) Due to aerobic respiration in bacteria.

4) The image shows part of the human respiratory system. A structure, labelled as 'A' in the image is forming the floor of the chest cavity. What is this structure referred to?



- a) Lungs
- b) Diaphragm**
- c) Nasal cavity
- d) Chest cavity

5. Study the given experimental set-up. Which of the following statements holds when the rubber sheet is pulled down?



- i) Air pressure inside the bottle increases.
- ii) The balloons inside the bottle expand.
- iii) This is similar to the expansion of the lungs during inhalation.
- iv) This is similar to the contraction of the lungs during exhalation.

- a) (ii), (iii) and (iv)
- b) (ii) and (iii)**
- c) (i) and (iv)
- d) (i), (iii) and (iv)

6. For which activity does a person require maximum energy?

- a) Reading
- b) Cycling**
- c) Walking
- d) Sleeping

For the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below.

- i) Both A and R are true and R is the correct explanation of the assertion.*
- ii) Both A and R are true but R is not the correct explanation of the assertion.*
- iii) A is true but R is false.*
- iv) A is false but R is true*

7. **Assertion (A):** During physical exercise, the breathing rate of a person increases.

Reason (R): Our body requires more oxygen during physical activity.

- i) Both A and R are true and R is the correct explanation of the assertion.**

8. **Assertion (A):** During heavy exercise, anaerobic respiration may take place in our muscle cells.

Reason (R): When the supply of oxygen to our muscle cells is insufficient, food breaks down in the absence of oxygen.

i) Both A and R are true and R is the correct explanation of the assertion.

9. **Assertion (A):** In plants, each part can independently take in oxygen and give out carbon dioxide.

Reason (R): Roots take up air from the air spaces present between the soil particles.

ii) Both A and R are true but R is not the correct explanation of the assertion.

10. **Assertion (A):** Insects have a network of air tubes called tracheae for gas exchange.

Reason (R): Frogs can breathe only through their skin.

iii) A is true but R is false.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

1. What are anaerobes?

Ans. Organisms that can exist in the absence of air are called anaerobes. They get energy through anaerobic respiration. E.g. yeast

2. Write word equations for anaerobic respiration in human beings and anaerobes.

Ans. Anaerobic respiration in Human beings

In the absence of oxygen

Glucose \longrightarrow lactic acid + energy

Anaerobic respiration in Anaerobes

Without the use of oxygen

Glucose \longrightarrow Alcohol + Carbon dioxide + energy

3. Define breathing rate.

Ans. Breathing rate can be defined as the number of times a person breathes in a minute. An adult human being at rest breathes in and out 15-18 times in a minute.

4. Which gas present in the air is essential for aerobic respiration? What is its role during respiration?

Ans. Oxygen present in air is essential for aerobic respiration. Oxygen breaks down the food into carbon dioxide and water to release energy. Energy is required by all the organs to function properly. Glucose + Oxygen \rightarrow Carbon dioxide + Water+ Energy.

5. Whenever we feel drowsy or sleepy, we start yawning. Does yawning help us in any way?

Ans. During drowsiness, our breathing rate slows down. The lungs do not get enough oxygen from the air, resulting in yawning. Yawning brings extra oxygen into the lungs and removes more carbon dioxide and thus, helps us to stay awake.]

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. Is the breathing rate always constant in human beings? Justify your answer.

Ans. The number of times a person breathes in a minute is termed as the breathing rate. The breathing rate is not always constant in human beings. We breathe faster when our body needs more energy, for example, while exercising. This is because the body needs more oxygen to break down the food and produce more energy. An average adult breathes 15 to 18 times in a minute. While exercising, this rate can increase to 25 times a minute.

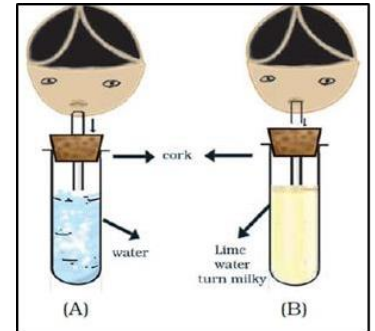
2. Observe the given figure and answer the following questions.

a) Which process is being tested in the activity?

Ans. Effect of carbon dioxide on lime water/ Carbon dioxide is given out during exhalation.

b) What is the result of the activity? Give reasons.

Ans. The lime water in test tube 'B' turns milky but the water in test tube 'A' remains unchanged. It is because carbon dioxide present in the exhaled air, mixes with lime water in test tube 'B' and the lime water turns milky white due to the formation of calcium carbonate.



3. Explain the process of exchange of gases in insects.

Ans. Many insects like cockroaches have small openings called spiracles present on the sides of their bodies. They also have a network of air tubes called tracheae that allow the exchange of gases. Oxygen-rich air enters the body through the spiracles and diffuses in the cells through the tracheal tubes. Similarly, carbon dioxide from the cells enters the tracheal tubes and moves out of the body through spiracles.

4. Observe the figure given alongside and answer the questions that follow.

a) What does this model demonstrate?

Ans. Mechanism of breathing

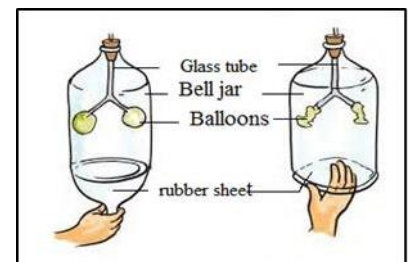
b) What does the following in the model correspond to in our human respiratory system?

i) Glass tube- **Trachea**

ii) Balloons- **Lungs**

iii) Rubber Sheet- **Diaphragm**

iv) Bell jar- **Chest cavity**



5. Label the parts marked in the figure alongside.

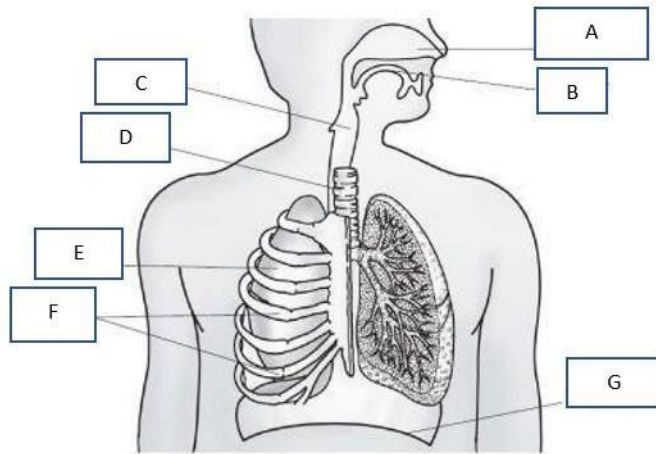


Fig 10.4 Human respiratory system

[Hint: A - Nasal passage
 B - Oral cavity
 C - Pharynx
 D - Trachea
 E - Lungs
 F - Ribs
 G - Diaphragm]

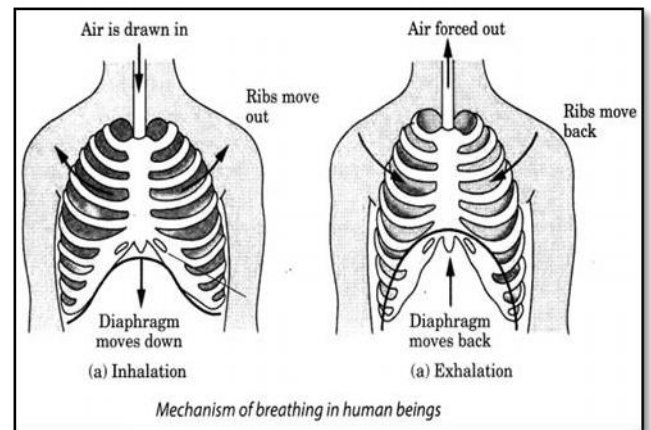
IV. LONG ANSWER TYPE QUESTIONS. (5M)

1. With the help of a neat labelled diagram explain the mechanism of breathing.

Ans. During inhalation, air passes through the nostrils into the nasal cavity. Then it moves through the windpipe and reaches the lungs. The lungs are located in the chest cavity which is surrounded by the ribs. On the floor of the chest cavity lays a sheet of muscle called the diaphragm.

During the breathing process, the movement of the ribs and diaphragm takes place. Because the lungs expand and contract during breathing. As we take in the air (inhalation) it fills up the lungs. This moves the ribs up and outwards while the diaphragm moves downwards.

The lungs while releasing out air (exhalation) from the body, move the ribs down and inward while the diaphragm moves into its original position.



2. Describe respiration in organisms through the skin.

Ans. The skin of earthworms and frogs is moist, and slimy and helps in the exchange of gases. Blood capillaries are present below the skin. During breathing oxygen diffuses into the skin and enters the blood capillaries. Blood carries oxygen to every cell. The carbon dioxide produced by the cells is collected by the blood and transported to the blood capillaries. From the capillaries the carbon dioxide is diffused out of the body through the skin.

V. SOURCE-BASED/ CASE STUDY-BASED QUESTIONS

1. When Paheli participated in a 400 m race competition held at her school she had cramps in her leg muscles. After a massage, she was relieved of the pain.

Answer the following questions related to the situation.

i) What are the possible reasons for the pain in her legs?

Ans. The pain in her legs could be due to the accumulation of lactic acid in the muscles. During heavy exercise, our body does not get enough oxygen to produce the required energy. To get the additional energy, the muscle cells respire anaerobically. During this process, partial breakdown of glucose occurs to produce lactic acid which on accumulation causes muscle cramps.

ii) Why did she feel comfortable after a massage?

Ans: Because massage improves the circulation of blood in that area resulting in an increased supply of oxygen to the muscle cells which helps in a complete breakdown of lactic acid into carbon dioxide and water.

2. Read the following passage and answer the questions.

We breathe in air through our nostrils. The air passes through our nostrils into the nasal cavity and reaches our lungs through the windpipe. Lungs are present in the chest cavity which is surrounded by ribs on the sides. A large, muscular sheet called a diaphragm forms the floor of the chest cavity. Breathing involves the movement of the diaphragm and the rib cage. During inhalation, ribs move up and outwards and the 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 down and inwards, while the diaphragm moves up to its former position. This reduces the size of the chest cavity and air is pushed out of the lungs.

i) What forms the floor of the chest cavity?

Diaphragm

ii) What does the exhaled air contain?

Exhaled air contains more carbon dioxide and less oxygen.

iii) What will happen when the diaphragm relaxes and curves upwards?

Air will be forced out of the lungs.