INDIAN SCHOOL AL WADI AL KABIR		
Class: VII	**DEPARTMENT: SCIENCE-2021-2022**	**DATE: 13.12.2021**
WORKSHEET NO.: 13 WITH ANSWERS	**TOPIC: RESPIRATION IN ORGANISMS**	**NOTE: A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC:**	**ROLL NO.**

I.VERY SHORT ANSWER (1M):

1. How do living organisms obtain energy from food? [Hint: As we breathe, we inhale air that is rich in oxygen. This oxygen when transported to our cells, helps in breaking down the food and we get energy.]

2. What are the two steps of respiration? [Hint: The two steps involved in respiration are (i) Breathing and (ii) Cellular respiration.]

3. What are anaerobes? [Hint: Organisms that can exist in the absence of air are called anaerobes. They get energy through anaerobic respiration. E.g. yeast]

4. Write word equations for anaerobic respiration in human beings and anaerobes.
[Hint: Anaerobic respiration in Human beings.

Glucose (in muscle) $\xrightarrow{\text{in the absence of oxygen}}$ lactic acid + energy.

Anaerobic respiration in Anaerobes

Glucose $\xrightarrow{\text{without use of oxygen}}$ alcohol + carbon dioxide + energy.

5. Differentiate between inhalation and exhalation.

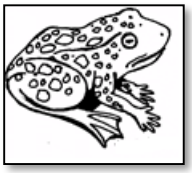
Inhalation	Exhalation
The taking in of air rich in oxygen into the body while breathing is called inhalation	Giving out of air rich in carbon dioxide while breathing is known as exhalation.

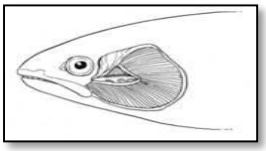
6. Define breathing rate. [Hint: Breathing rate can be defined as the number of times a person breathes in a minute. An adult human being at rest breathes in and out 15-18 times in a minute.]

7. How do plants respire? [Hint: Leaves have small pores called stomata for exchange of oxygen and carbon dioxide. Root hairs take up air from airspaces present between soil particles. Woody stems have small opening on their bark called lenticels for breathing.]

8. How does a frog survive in water as well as on land? [Hint: Frogs have dual mode of breathing. They take oxygen through their skin by diffusion in water. They respire through lungs on land]

9. Identify the organs used for breathing in the following organisms.


(A)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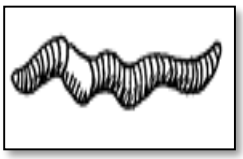
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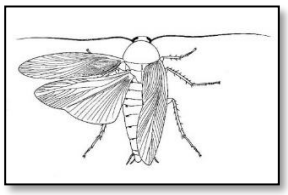

(D)

[Hint: (A) Frog- skin and lungs; (B) Fish- gills; (C) Earthworm- moist skin; (D)-Cockroach/ insect- spiracles.]

10. Why do we sneeze when we inhale a lot of dust laden air? [Hint: When we inhale dust laden air, the dust particles may sometimes, get past the hair in the nasal cavity and irritate the lining of it. This causes sneezing.]

For the question numbers 11, 12 and 13, 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 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

11. **Assertion (A):** In plants each part can respire independently.
Reason (R): In plants the roots take in air present in soil.
ii) Both A and R are true but R is not the correct explanation of the assertion.
12. **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.
13. **Assertion (A):** Dust and gases cannot enter our body through our nose.
Reason (R): Hair and mucous in the nose filters dust and germs.
i) Both A and R are true and R is the correct explanation of the assertion.

II. PASSAGE BASED QUESTIONS:

Read the following passage and answer the questions.

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 our lungs through the windpipe. Lungs are present in the chest cavity. This cavity is surrounded by ribs on the sides. A large, muscular sheet called 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 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 diaphragm moves up to its former position. This reduces the size of the chest cavity and air is pushed out of the lungs.

i) 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 → Lungs → Trachea

ii) Which of the following statement is correct?
a) Exhaled air contains more oxygen and less carbon dioxide.
b) Exhaled air contains less oxygen and less carbon dioxide.
c) Inhaled air contains equal amount of carbon dioxide and oxygen.
d) Exhaled air contains more carbon dioxide and less oxygen.

iii) What will happen when diaphragm relaxes and curves upwards?
a) Air is forced out of the lungs.
b) Air is forced inside the lungs.
c) The rib cage goes up and outward.
d) The rib cage goes up and inward.

iv) Which of these forms the floor of the chest cavity?
a) Lungs b) Ribs c) Trachea d) Diaphragm.

III. CASE STUDY BASED QUESTIONS:
Read the following passage and answer the questions.

1. 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 few hours, the dough had risen. There was a sour smell too.
i. 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.

ii. Why did the dough smell sour?
a. Due to the production of sugar in the respiration process by yeast.
b. Due to the production of alcohol in the excretion process by yeast.
c. Due to the production of water in the respiration process by yeast.
d. Due to the production of alcohol in the respiration process by yeast.

iii. Why was sugar added to the dough?
a. sugar acts as food for amoeba.
b. sugar acts as food for bacteria.
c. Sugar acts as food for yeast.
d. sugar gives a sour smell.

iv. Which of the following statement is true, if the dough was kept in the refrigerator, soon after it was prepared?

a. Yeasts will multiply and respire and the dough will rise and become sour.
b. Yeasts will not multiply and respire because of which the dough will not rise and will not become sour.
c. Yeasts will not multiply and respire because of which the dough will rise and become sour.
d. Yeasts will multiply and respire because of which the dough will not rise and will not become sour.

IV.a) SHORT ANSWER TYPE QUESTIONS (2 M):

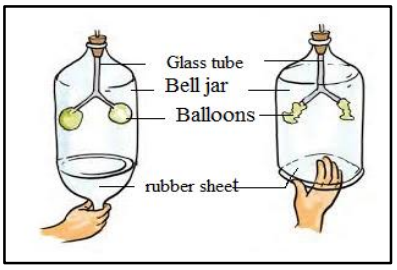
1. Name the following:
a) The part of respiratory system where air is filtered and warmed. [Hint: Nasal cavity.]
b) Yeast respire anaerobically to produce: [Hint: alcohol]
c) The air tubes of insects. [Hint: Tracheae.]
d) In human beings exchange of gases takes place in: [Hint: Alveoli]

2. Which gas present in air is essential for aerobic respiration? What is the role of oxygen during respiration? [Hint: 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 → Carbon dioxide + Water+ Energy.]

3. On a very cold morning, Boojho and Paheli were talking with each other as they walked down to their school. They observed that the air coming out of their mouth looked like smoke. They were amused and wondered how it happened. Help them find the answer. [Hint: When the climate is cold, warm and moist air exhaled by us condenses into mist as it comes in contact with the cold air of the atmosphere. This looks like smoke coming out of our mouth.]

4. Whenever we feel drowsy or sleepy, we start yawning. Does yawning help us in any way? [Hint: 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 keep awake.]

5. Observe the figure given alongside and answer the questions that follows.



a) What does this model demonstrate? [Hint: 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

6. Why do we feel hungry after doing a physical activity like walking or running?

[Hint: When we do a physical activity the food that is present in our body is converted into energy. Since all the food gets consumed in generating the energy we start feeling hungry. Hence in order to gain more energy we need to eat more food.]

7. Differentiate between breathing and cellular respiration.

Breathing	Cellular Respiration
It is the process in which oxygen-rich air is taken inside the body and carbon-di-oxide rich air is expelled from the body with the help of respiratory organs.	It is the process of breakdown of food in the cell with the release of energy is called cellular respiration.
No energy is released.	Energy is released.

8. How do fishes breathe underwater? [Hint: Fishes that live underwater have special respiratory organs called gills. Gills are projections of the skin. They are well supplied with blood vessels for exchange of gases.]

IV.b) SHORT ANSWER TYPE QUESTIONS (3 M):

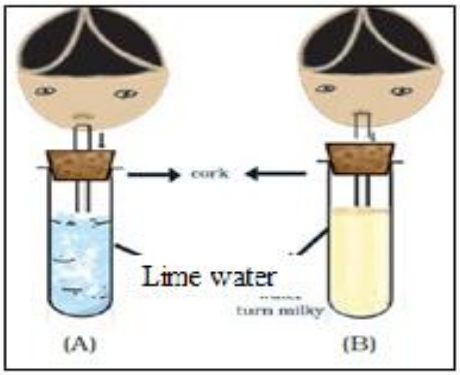
1. Write the composition of inhaled and exhaled air.

Components	Inhaled air	Exhaled air
Oxygen	Contains 21% oxygen	Contains 16.4% oxygen
Carbon dioxide	0.04% carbon dioxide	4.4% carbon dioxide.
Water vapour	Contains less water vapour	Contains more water vapour.

2. Is breathing rate always constant in human beings? Justify your statement. [Hint: 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 change up to 25 times a minute.]

3. Insects and leaves of a plant have pores through which they exchange gases with the atmosphere. Can you write two points of differences between these pores with respect to their position, number and extension into the body? [Hint: Spiracles in insects and stomata on leaves of a plant are pores through which gaseous exchange takes place. Differences between spiracles and stomata are as follows:
(i) Spiracles are present on the sides of insects' body while stomata are present on the lower surface of leaves.
(ii) Spiracles are fewer in number as compared to stomata.
(iii) Spiracles lead to an extensive network of tracheal system which is absent in the leaves.]

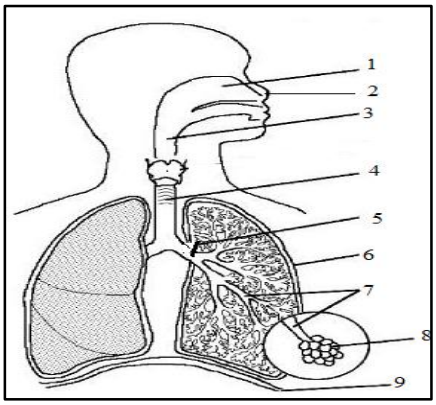
4. Observe the given figure carefully and answer the following questions.



a) Which process is being tested in the activity? [Hint: Effect of carbon dioxide on lime water.]
b) What is the result of the activity? Give reasons. [Hint: The lime water in test tube 'B' turns milky but water in test tube A' remains unchanged. It is because carbon dioxide (CO_2) present in the exhaled air, mixes with lime water in test tube 'B' and the lime water turns milky white.]

5. Explain the process of exchange of gases in insects. [Hint: 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 trachea that allows the exchange of gases. Oxygen rich air enters the body through the spiracles and diffuses in the cells via the trachea. Similarly, carbon dioxide from the cells enters the trachea and moves out of the body through spiracles.]

6. Label the parts marked in the figure alongside.



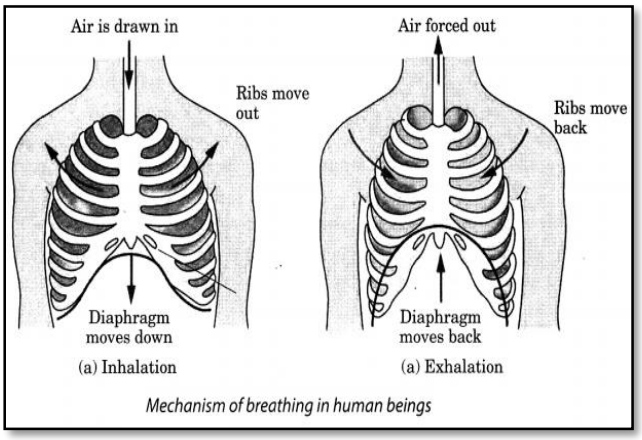
[Hint: 1- nasal cavity; 2- nose/nostrils 3- pharynx; 4- trachea; 5- bronchus 6- lungs 7- bronchioles; 8- alveoli; 9- diaphragm]

V. LONG ANSWER TYPE QUESTIONS (5M):

1. Differentiate between aerobic and anaerobic respiration.

Aerobic respiration	Anaerobic respiration
Takes place in the presence of oxygen.	Takes place in the absence of oxygen.
End products are carbon dioxide (CO_2) and water (H_2O).	End products are carbon dioxide (CO_2) and alcohol or lactic acid.
Produces a large amount of energy.	The energy released is less when compared to aerobic respiration.
It occurs in most plants and animals.	Occurs in yeast and some bacteria

2. Explain the mechanism of breathing. [Hint: During inhalation, air passes through nostrils into nasal cavity. Then it moves through the windpipe and reaches the lungs. The lungs are located in the chest cavity which are surrounded by the ribs. On the floor of the chest cavity lays a muscle sheet called diaphragm.
During the breathing process, the movement of the ribs and diaphragm takes place. This is so 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 when releasing out air (exhalation) from the body moves the ribs down and inward while the diaphragm moves into its original position.]



Mechanism of breathing in human beings

3. Paheli participated in a 400 m race competition held at her school and won the race. When she came home she had mixed feelings of joy and pain as she had cramps in her leg muscles. After a massage she was relieved of the pain. Answer the following questions related to the situation.
(a) What can be the possible reasons for the pain in her legs? [Hint: 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.]
(b) Why did she feel comfortable after a massage? [Hint: The massage gave her relief because it improves the circulation of blood resulting in increased supply of oxygen to the muscle cells which helps in complete breakdown of lactic acid into carbon dioxide and water.]

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