F. Answer the following questions in brief:

Q1. Give two examples to show the presence of air.

Answer: We cannot see the air but we ***may notice its presence*** through ***movement of leaves of a tree*** or ***moving of the blades of the windmill***. Winds are strong enough to uproot trees.



Q2. Write two uses of:

a. **Nitrogen**
b. **Windmill**

Answer:

Two uses of Nitrogen:

1. Nitrogen is important ***constituents of proteins***
2. Nitrogen is used in ***manufacture of drugs and dyes***.
3. Nitrogen is used for ***preservation of food***.

Two uses of windmill:

1. Windmill is used ***to generate electricity***
2. For ***pumping ground water***
3. ***Extraction of oil*** from ***seeds***

Q3. What is smoke? How is it produced?

Answer: smokes are the ***dark-coloured gases*** caused by **burning of anything.**

Smoke occurs when there is incomplete combustion (not enough oxygen to burn the fuel completely). In complete combustion, everything is burned, producing just water and carbon dioxide

Q4. Which component of air acts as supporter of burning?

Answer: The main component of air that supports burning is ***oxygen.***

Combustion is the ***process*** where a substance ***burns in the presence of Oxygen***, giving off ***heat and light*** in the process. Hence, Oxygen is the component of air that supports combustion.

Q5. State the importance of carbon dioxide for living organisms.

Answer: Carbon dioxide is required by plants to ***carry out the process of photosynthesis***. This process results in ***production of food and release of oxygen***.

Q6. Define atmosphere and state its composition.

Answer: The atmosphere is ***a mixture of gases that surrounds the Earth.***

Air is mixture of gases, consisting mainly of ***nitrogen (78%)*** and ***oxygen (21%).*** The rest of ***1 % include carbon dioxide (0.003%)*** and other ***rarer gases such as argon and neon***. The percentage of water vapour and dust particles vary with place and time.

Q7. Why do all plant require nitrogen?

Answer: The compound of nitrogen play important part role in growth of plants as ***free nitrogen can't be absorbed by plants***. ***Nitrogen*** is ***essential*** because it is a ***component of chlorophyll,*** the compound that plants use to convert sunlight energy into sugars from water and carbon dioxide (i.e., ***photosynthesis***)

(***For reference purpose:*** Nitrogen is also a key component of amino acids, which are the building blocks of proteins. Plants wither and die in the absence of proteins.)

Q8. Why is ozone layer very important for earth's atmosphere?

Answer: The presence of ozone layer is very important for the ***existence of life on the earth***. The ozone layer ***absorbs the harmful ultraviolet violet (UV) radiation*** from the sun.

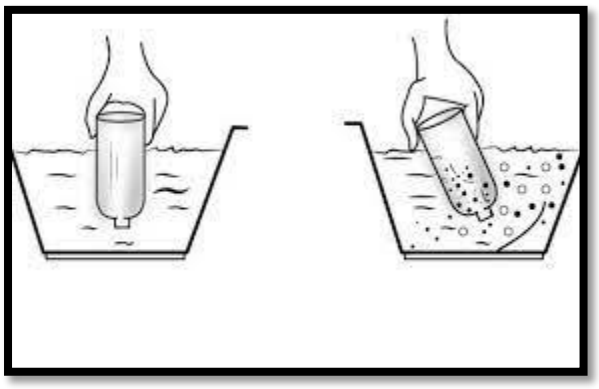
(The UV radiation can cause skin cancer and eye problems)

F. Answer the following questions in detail:

Q1. Explain why it is good to sleep under the tree during the day?

Answer: It is good to sleep under the tree during the day because at night, the ***plants and trees perform the process of respiration*** where they ***absorb oxygen and releases carbon dioxide***. (While, it is wise to sleep under the tree in the day time, as during the day time the plants perform photosynthesis where trees absorb carbon dioxide and release oxygen gas.)

Q2. How can you say that air occupies the space?

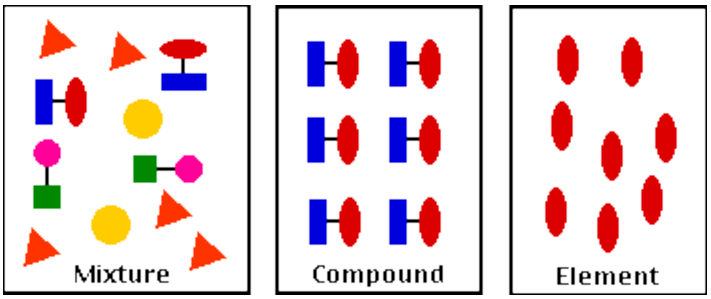


Answer: Take an empty glass bottle. Now, dip the open mouth of the bottle into a bucket filled with water. You will notice that water does not enter the bottle when it is in an inverted position, as there is no space for air to escape. This activity shows that air occupies space

(According to the definition, matter is something that occupies space and has mass. Air, a mixture of gases, shares properties with water vapour, the gaseous form of water that is part of air.)

Q3. Is air a mixture or a compound? Give reasons.

Answer: ***Air is a mixture and not a compound***. This is because ***air consists of indefinite composition of different gases and this composition can vary from place to place.*** Moreover, the different gases present in air show their individual properties which suggests that air is not a compound.

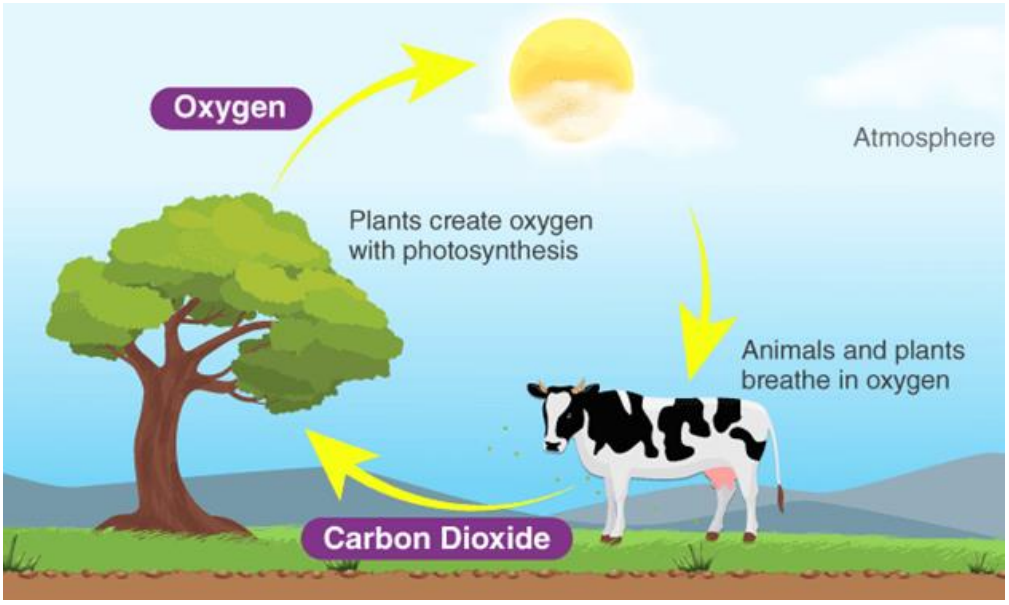


Q4. How do plants and animals help each other in the exchange of gases?

Answer:

- ***Animals take up oxygen*** and ***release carbon dioxide*** during respiration.

- ***Plants take up carbon dioxide*** from air and give out oxygen.
- Plants require ***carbon dioxide for the process of photosynthesis*** to synthesize their food.
- The balance of oxygen and carbon dioxide in the atmosphere is maintained through respiration in plants and animals and by photosynthesis in plants.



Q5. What is importance of oxygen for living beings?

Answer: Oxygen supports all living organisms on earth.

- All living organisms require **oxygen for respiration.**
- Oxygen ***burns food and release energy*** inside the body.
- ***Oxygen dissolved in water*** keeps water fresh and helps in ***respiration of aquatic plant and animals***.
- Oxygen supports ***combustion of fuels*** and ***supports burning***.

Q6. How will you determine the proportion of oxygen and nitrogen in air?

Answer:

Nitrogen occupies nearly ***fourth-fifth of the space*** that is ***filled by the air***. 78 % of the air consist of Nitrogen.

One-fifth of the air is made up of oxygen. 21 % of air consist of oxygen.

The rest of the air that is 1 % include carbon dioxide, rare gases such as argon and neon, water vapour and dust.

Q7. Give reasons:

a. We should breathe through nose not through mouth.
b. We can see water droplets outside the wall of glass containing ice.
c. Earthworms comes out of soil in rainy season.
d. Traffic police wear mask while controlling traffic.
e. Mountaineers carry oxygen cylinders.

Answer:

a. We should breathe through nose not through mouth.

Nose breathing is more beneficial than mouth breathing. Breathing through your nose can help filter out dust and allergens, boost your oxygen uptake, and humidify the air you breathe in. Mouth breathing, on the other hand, can dry out your mouth. This may increase your risk of bad breath and gum inflammation.

b. We can see water droplets outside the wall of glass containing ice.

Ice present in glass starts melting by absorbing heat from the air around the air around the glass. As a result, moisture in the air gets condensed and forms tiny water droplets on the outer walls of the container.

c. Earthworms comes out of soil in rainy season.

Earthworms live inside the soil and get oxygen required for respiration from the air trapped in the gaps between the soil particles. In rainy season, all the spaces in soil get filled by rain water. Hence, the earthworms come out of the soil to get air for respiration.

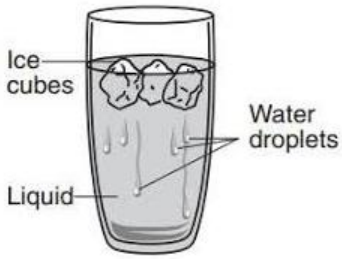
d. Traffic police wear mask while controlling traffic.

The traffic policemen wear masks to protect themselves from the smoke containing harmful gases which are emitted by the vehicles moving around them.

e. Mountaineers carry oxygen cylinders.

At higher altitudes, the oxygen content decreases which makes breathing difficult for mountaineers. That's why they carry oxygen cylinders.

Q8. Describe an activity to show the presence of water vapour in the air.



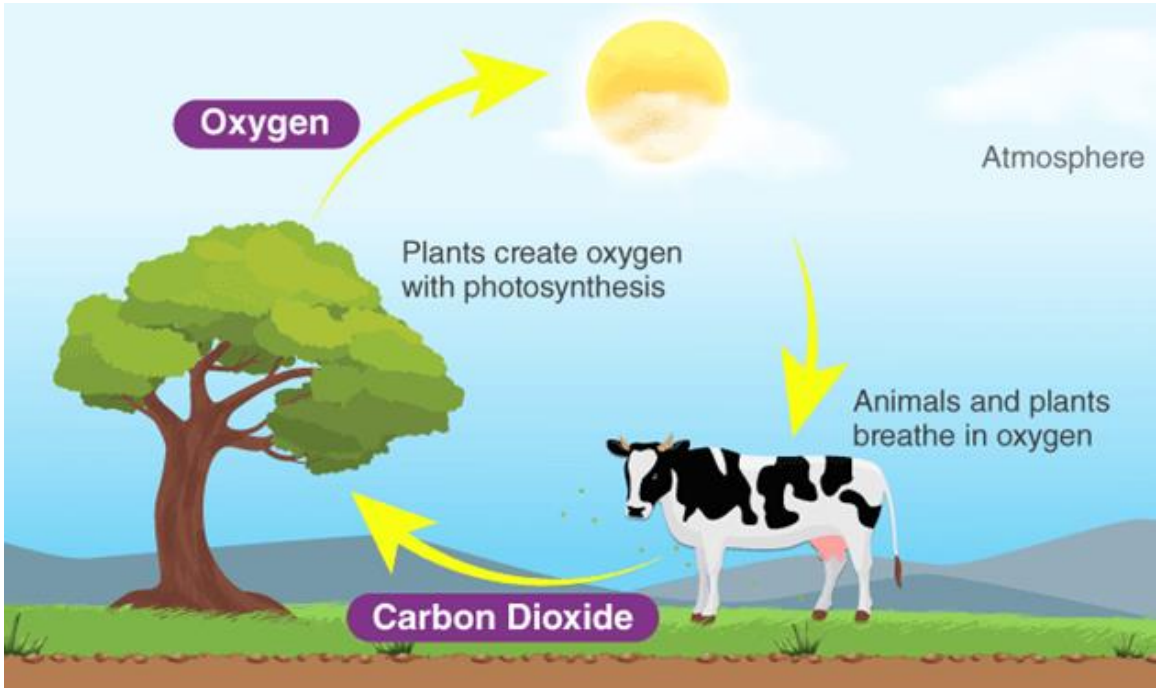
Answer: Take ice cubes in a beaker and keep it in an open place for some time. You will notice that around the beaker there are some water droplets. This droplets formed are due to condensation of water vapour around the beaker. This confirms the presence of water vapour in the air.

Q9. Explain oxygen cycle in brief:

Answer: The ***percentage of oxygen*** in the ***air remains almost constant*** even though it is being ***continuously used for respiration and combustion***. This is because during photosynthesis plants release oxygen.

The ***amount of oxygen*** in the ***atmosphere is sufficient for respiration for animals*** as well as ***human beings***. This ***cycle of consumption and release of oxygen in nature*** is called **oxygen cycle.**

Photosynthesis and respiration are the ***two main processes*** responsible for ***maintaining the balance of oxygen in air.***



Q10. Air is a mixture and its composition keeps on changing from one place to another. Justify your answer with the help of any two examples?

Answer: ***Air is a mixture and not a compound***. This is because ***air consists of indefinite composition of different gases*** and this ***composition can vary from place to place***. (Moreover, the different gases present in air show their individual properties which suggests that air is not a compound.)

The composition of air varies from place to place because ***the density and temperature*** of air ***keep changing from place to place***. The two examples are:

1. The air in cities contain more carbon dioxide and mono oxide due to vehicles and factories as compared to villages.
2. The air in a coastal area having high amount water vapour than the air in the in land area.

Q11. What will happen if we keep fish in a closed container without any aquatic plants? Give reasons for your answer?

Answer: Fish, in a ***closed container without any aquatic plant will die*** after sometime. Aquatic plants, through the process of ***photosynthesis could supply oxygen to the fish***, if these were present in that closed container along with the fish.

Additionally, ***plants play an important role in removing nitrogen waste*** produced by the ***fish and other inhabitants of the tank***, so their absence can lead to an ***accumulation of toxic levels of waste in the water***.

Q12. What will happen to the density of envelope of air if we go up? Explain.

Answer: The ***density of the blanket of air*** that ***surrounds us*** becomes **thinner** as we go up.

As altitude increases, the density decreases with a decreasing rate. The ***atoms and molecules in air are held close to the earth by gravity*** since it has a greater effect close to the surface. The ***farther away from the surface***, the ***fewer particles there are***; so ***the density is lower.***

The ***higher up you go*** in the ***atmosphere***, the ***fewer the molecules there are above you i.e density of air decreases***. At higher altitudes, the oxygen content decreases which makes breathing difficult for mountaineers.

(**For the reference purpose only:** The gravitational force which attract every object towards the surface of the earth, also attracts the air, which makes the air denser on the surface of the earth. As the air moves up, i.e., away from the surface of the earth, the lesser gravitational force causes the air to be less dense or thinner. So at higher altitudes, air molecules can spread out more, and air density decreases.)

Q13. Explain how air is used to generate electricity?

Answer: Air can be used to generate electricity ***through windmills***. A windmill has ***big blades*** that ***generates power*** by ***turning*** when the ***wind blows***.

Windmills use the ***wind energy to convert wind energy into electrical energy.*** The winds generated from the air can be used to rotate the blades of the windmills. ***The rotation of these blades generates electricity through a dynamo.***