Air Around Us 15

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- *What is air ?*
- *Air is a mixture*
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INTRODUCTION

You can fly our kites because of the moving air. When the leaves rustle and clothes hanging out move away, we say that the air is moving.

Have you seen air ? Nobody has, but you can feel it and know so many things about it.

Activity Time

To know about the pressure of air.

Do the following steps to know about the air pressure :

1. Hold the stick of the firki and place it in different directions in an open area.
2. Move it a little, back and forth. We observe that the firki rotates due to the moving air.

WHAT IS AIR?

Air is a mixture of several gases. It consists mainly of nitrogen, oxygen, carbon dioxide, ozone, neon, water vapour and dust particles.

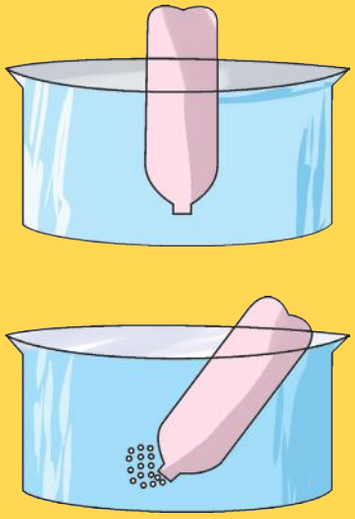
The air around us also contains harmful gases and other substances produced by automobiles and smoke from industries, which spoil the quality of air. Those man-made substances are called pollutants of the air.

AIR IS PRESENT EVERYWHERE AROUND US

Air is everywhere in our surroundings but we cannot see it. It has no colour, odour or taste and one can see through it. It is transparent gas.

Activity Time

To know air occupies space.



Take an empty glass bottle. Now dip the open mouth of the bottle into the bucket filled with water as shown in the figure alongside. Now tilt the bottle slightly. Does the water enter the bottle? yes ! The bottle is not empty now. It was filled completely with air even when you had turned it upside down. That is why you notice that water does not enter the bottle when it is in inverted position as there was no space for air to escape. When the bottle was tilted the air was able to come out in the form of bubbles and water filled up the empty space that the air had occupied.

This shows that air occupies space.

USES OF AIR

1. The envelope of air protects all living beings from the effects of harmful ultraviolet radiations coming from the sun.
2. Moving air helps in the dispersal of seeds and pollens of different kinds of plants.
3. Air is compressed in the tyres of vehicles which makes their movement smooth.
4. Fast moving wind helps in the movement of sailing boats and gliders.
5. Wind is a means of travel for all flying birds.
6. Air helps in the transmission of sound. Without air we cannot hear. It is also useful for wind based musical instruments.

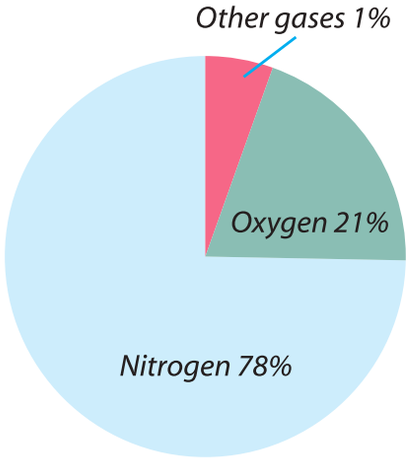
AIR IS A MIXTURE

Until the eighteenth century people thought that air was just one substance but it is a mixture of several gases.

Nitrogen Gas

Nitrogen is the most abundant gas present in the atmosphere. It is a colourless, odourless and tasteless gas.

Living things need nitrogen to make proteins but most of them are not able to use it directly from the air like they use oxygen gas. It is necessary to convert nitrogen gas present in the air to a usable form by living organisms. The process of converting nitrogen from the air into nitrates is called nitrogen fixation.



The composition of air

Some amount of nitrogen is fixed when lightning strikes.

Most nitrogen fixation is done by particular types of bacteria. Such bacteria live in the soil and in the root modules of plants such as peas and beans. The nitrogen – rich substances fixed by the bacteria mix with the soil. Plants absorb these substances along with water from the soil with the help of their roots.

Oxygen Gas

Most living things use oxygen from the air to live. Plants also use oxygen. Air enters a plant through tiny pores called stomata. Most land animals obtain oxygen directly from the air mainly with the help of lungs. The air we breathe in collects into the lungs. The oxygen from the air in the lungs is absorbed by the blood and is supplied to the whole body.

Fish, dog and any other animals that live in water breathe oxygen that is dissolved in water.

Oxygen is used to burn things. Burning of things is called combustion.

Carbon Dioxide Gas

Living things including humans produce carbon dioxide during the process of respiration. Plants use carbon dioxide, water and sunlight to make food.

The air we breathe out contains more carbon dioxide. Carbon dioxide is also produced when things burn.

Smoke

Drying of clothes

Water Vapour

Water vapour is the gaseous form of water. In nature, water from the ponds, lakes, rivers and oceans evaporates to form water vapour. Water evaporates faster on a warm sunny day then when it is cloudy.

Plants also add water vapour into the air. The process through which plants release water vapour is called transpiration.

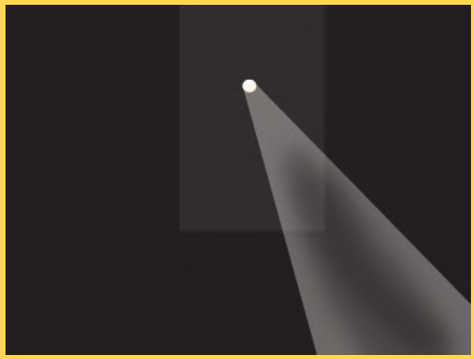
Dust in the Air

Air also contains dust particles. If you observe rays of sunlight entering a room, you will see tiny dust particles floating in the air. Air contains particulate matter such as dust, pollens and fibres. It can also have ash, coal, oil, petrol and diesel particles from industries and automobiles.

Dust

Activity Time

Find a room where sunlight is coming through a door or window. Close all the doors and windows with curtains pulled down to make the room dark. Can you see a beam of light entering into the dark room from a small hole or slit ? If not, open a door, or pull up the curtain, just a little, so as to allow sunlight enter. You will see some tiny shinning particles floating or moving in the path of sunlight. These are dust particles. Thus air contains dust.

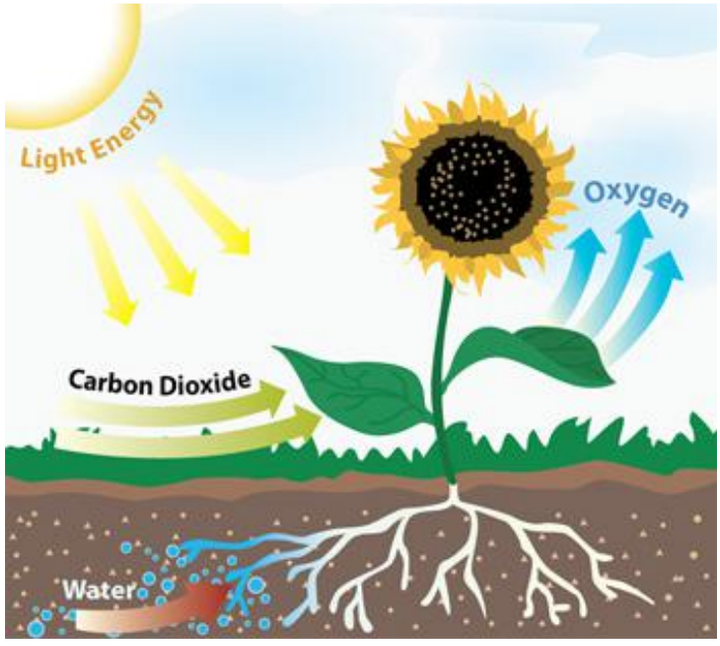


How is the Oxygen in the Atmosphere Replaced ?

Photosynthesis is the process where plants make their own food and oxygen is produced along with it. Plants also consume oxygen for respiration, but they produce more of it than they consume. That is why we say plants produce oxygen.

It is obvious that animals cannot live without plants.

Plants cannot survive for long without animals. They would consume all the carbon dioxide in the atmosphere. We can see that both need each other, as the balance of oxygen and carbon dioxide in the atmosphere is thus maintained. This shows the interdependence of plants and animals.



Photosynthesis

The wind makes the wind mill rotate. The windmill is used to draw water from tube wells and to run flour mills. Windmills are also used to generate electricity. Air helps in the movements of sailing yachts, gliders, parachutes and aeroplanes. Birds and insects can fly due to the presence of air.

Know the Keywords :

Gills : Organs of gaseous exchange in aquatic animals

Lungs : Pair of sack – like organs which bring air into contact with blood in humans and many other vertebrates.

Stomata : Opening or pore in the plant epidermis and leaves through which gaseous exchange occurs.

Point to Remember

- Air is the mixture of several gases. It consists of nitrogen, oxygen, carbon dioxide, ozone, neon, water vapour and dust particles.
- The oxygen from the air in the lungs is absorbed by the blood and is supplied to the whole body.
- Plants use carbon dioxide, water and sunlight to make food.

EXERCISE TIME

A. Answer the following questions :

1. What is the layer of air around the earth called ?
2. Name the gases present in air.
3. Why do plants need carbon dioxide ?
4. Describe carbon dioxide gas?
5. Why do plants need oxygen ?
6. Describe the use of air.

B. Write 'T' for true and 'F' for false statements :

1. Atmosphere has only nitrogen. ( )
2. Gases cannot dissolve in water. ( )
3. Some trees such as the banyan tree and mangrove plants have special roots that help them to breathe. ( )
4. At night plants let out oxygen. ( )
5. Oxygen present in air helps in burning. ( )

C. Encircle the odd one.

1.	Nitrogen	oxygen	water	carbon dioxide
2.	Air pollution	water pollution	forestation	soil erosion
3.	Sailing boats	dispersal of seeds	drought	winnowing
4.	Nitrogen	oxygen	dust particles	carbon dioxide

D. Tick (✓) the correct option :

1. Air is a mixture of :
   - (i) colourless gases ( )
   - (ii) oxygen and hydrogen ( )
   - (iii) liquids ( )

2. The major constituents of air is :

   (i) nitrogen ◯ (ii) carbon dioxide ◯ (iii) oxygen ◯

3. Which one of the following gases is used by plants to make their food from air ?

   (i) carbon dioxide ◯ (ii) oxygen ◯ (iii) argon ◯

4. Which one of the following gas is released by animals during respiration ?

   (i) oxygen ◯ (ii) carbon dioxide ◯ (iii) nitrogen ◯

Creative Work

- **Make a chart of the various ways in which animals breathe air, like through moist skin, through gills, through holes in their bodies and through lungs. Find out examples for each group.**
- **How to make a wind vane ?**

Wind vanes are also known as weather vanes, because they use the wind to move. They are placed on rooftops. Weathervanes are now found on top of some buildings as well. You can make a wind vane and fix it to your rooftop or in any open area of your house.

Things needed : Drinking straw, plastic cup, thin card, pencil with a rubber on the top, dressmaking pins, glue, blue–tag, marker pen, thick card for base.

Method :

1. Cut a slot at each end of the drinking straw.
2. Use the thin card to make two triangles and insert them into the slots in the drinking straw. Glue the triangles in place.
3. Insert a pin through the straw into the pencil eraser. Make sure that the swings freely.
4. Support the pencil in a youghurt pot of drinking cup. Anchor this to the thick card with a thick tag.
5. Mark N, E, S and W on the card. These letters stand for North, East, South and West.
6. Take the vane outside and find out which way the wind is blowing!

Tips :

Weather vanes show which direction the wind is blowing from. So, if the weather vane points towards the North, the wind is coming from the North.