
UNIT 8 AIR, WATER AND WEATHER

Structure

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8.1 INTRODUCTION

Air and water both are essential for our survival. Air consists of many gases like oxygen, carbon dioxide and nitrogen. All these gases have their own importance in our life. Oxygen is essential for respiration in animals and plants. Carbon dioxide is essential for photosynthesis. It is the process in which green plants prepare their food in presence of sun-light by taking carbon dioxide from air and water from the roots. Nitrogen is essential as it keeps under control the combustion activity of oxygen. Nitrogen is an essential element of plant nutrition. There are natural processes by which atmospheric nitrogen is converted into soluble nitrates. These soluble nitrates are absorbed by the plants through their roots.

Water-vapour present in the air is responsible for many weather phenomenon like dew formation, cloud, fog, mist, rain; frost, etc. Water vapour in the air comes through the process of evaporation. Evaporation is affected by many factors like wind velocity, exposed surface, temperature of the air etc.

How do air and water get polluted? How we can avoid pollution of these basic sources of life? How can we obtain potable water? These are some of the questions the students are expected to answer.

8.2 OBJECTIVES

When you have completed this unit, you will be able to help the students to show by experiment:

- that air occupies space;
- that air exerts pressure;
- that air has weight;
- that air helps in burning;
- that exhaled air has more carbon dioxide than inhaled air 1/5 part of air is oxygen;
- processes of decantation, sedimentation and filtration;
- that process of rainfall;

- that evaporation depends upon;
 - a) exposed surface
 - b) temperature of the atmosphere
 - c) water vapour already present in the air
 - d) wind blowing fast the evaporating surface.

8.3 AIR—ITS COMPOSITION AND USES

Air is all around us. Pieces of paper thrown in the air fly, leaves of the trees move, kite and birds fly. These are some of the examples which show that air is all around us. Children are familiar with these experiences yet they will not believe that containers which seem to be empty contain air. They may be made to believe it by involving them in the following:

Activity 1 (All children may do it individually.)

Steps

- Take a glass tumbler.
- Take a paper sheet and squeeze it.
- Put it inside the tumbler so that it does not fall out in inverting the tumbler.
- Now press the tumbler upside down in a bucket full of water completely.
- Take the tumbler out and see whether paper put inside is dry or not. What does it show?
- Now again take the tumbler into the water and tilt it slightly.

Ask the children - What do you observe? From where are air bubbles coming?

- Children may be right or wrong. Discuss with them and establish the fact that air is everywhere and air occupies space.

Another important concept regarding air is this that it is needed for respiration by animals as well as plants. Following activity may be organised to provide first hand experience to the children.

Activity 2

Steps

- Close your nose by your fingers for a few seconds. What do you feel? Do you feel suffocation?
- Do not allow the children to do it for a longer time because it may lead to unconsciousness.

Discuss with the children and establish that air is needed for respiration.

All living beings whether animals or plants take air for their respiration and leave it with excess of carbon dioxide.

Pose a problem before the children - How do fish and other organisms living in water get air for respiration? Let us perform an activity for it.

They may not be able to reply it. Demonstrate it by the following activity:

Activity 3

Steps

- Take some water in a small vessel and put it on a tripod.
- Heat the vessel slowly.
- Observe the water in the vessel. You will find tiny bubbles of air striking to the walls of the vessel. These bubbles are of air dissolved in water.
- Now boil the water for a few minutes to remove all the dissolved air.
- Cover the vessel and allow it to cool.
- Put a small fish in it quickly and cover it immediately.
- Observe for some time. The fish becomes restless (release the fish in freshwater before it dies).

Ask the children - Why? Discuss with the children and establish that in respiration all living beings consume oxygen from the air and exhale air with more of carbon dioxide.

Ask the children - How can you test carbon dioxide gas? How can you show that exhaled air contains more carbon dioxide? Probably they won't be able to reply it. Organise an activity for the children. Each child will do it individually.

Activity 4

Steps

- Take some lime-water in a test-tube or in any container.
- Blow air through it by a glass tube or a straw from your mouth.
- Observe the change in colour.

Lime water becomes milky. It is the test of carbon dioxide.

Ask the children - What are the other uses of air? Discuss it and tell them that to understand it better it is essential to know the composition of air.

Air is composed of many gases. The main constituents of air are as follows:

Nitrogen	79%
Oxygen	20%
Carbon-dioxide	0.04%

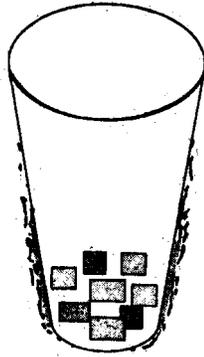
The composition of air shown above is not fixed. It changes from place to place. Ask the children, in a crowded place carbon dioxide may be more why? In a garden, quantity of oxygen may be more during the day time. Why? Discuss it with the children.

Ask the children :

How can you show that air contains water-vapour in it? Organise an activity to show it. Let the children do it in groups.

Activity 5**Steps**

- Take some ice in a glass tumbler.
- Put it on a table and observe the outer surface of the tumbler carefully.
- First the surface becomes dim and then water drops appear over it.



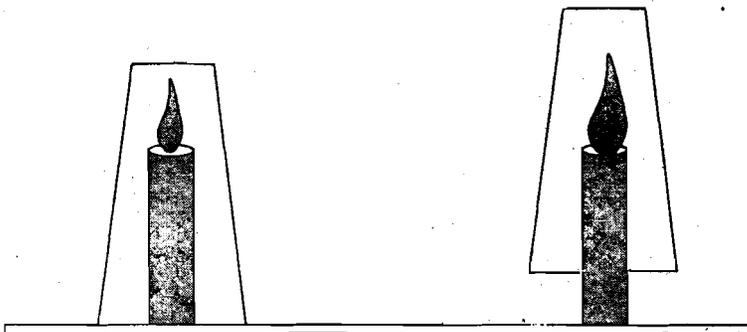
Ask the children : from where have these water drops come? Discuss it and conclude that this water has from the air, Due to cold surface water-vapour present in the air has condensed over it.

Importance of oxygen in air you have already seen. It is necessary for respiration by all living beings. Tell the children oxygen also helps in burning. It is impossible to make fire without oxygen.

Organise the following activity so that children are able to see it themselves. Ask the children to observe it carefully? Let us perform an activity for it.

Activity 6 (for demonstration by the teacher.)**Steps**

- Take a candle and fix it on a table.
- Light the candle.
- Put a glass tumbler upside down over it,
- Observe, What happens? The candle begins to extinguish.



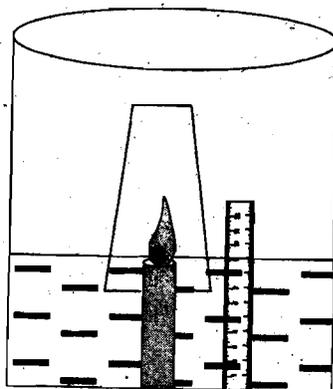
- Raise the tumbler a little. Observe, what happens. The candle rekindles again (begins to glow again) what does it show? It shows that air helps in burning. (Teacher may demonstrate this activity herself as it may be dangerous for the children to handle a burning candle).

Let the children realise that oxygen is an active component of air as it helps in respiration and burning. Ask the children - what is the content of oxygen in air? Let us see by an activity.

Activity 7 (for demonstration by the teacher.)

Steps

- Take a trough and fix a small candle in it.
- Fill some water in the trough.
- Light the candle.
- Put a glass jar upside down over it. Observe.



- The candle extinguishes and water rises in the jar.
- Measure the height of water arisen in the jar.
- What is the ratio of this height to the whole height of the jar? It is $1/5$ of the whole.

Sometimes you may find that height of water rising in the jar is more than $1/5$ of the height of the jar. This is because of the expansion of air caused by the heat of the burning candle.

To avoid this effect, a candle of small flame should be taken.

Ask the children: What is the importance of carbon dioxide in air?

Tell them that it is used by the plants for photosynthesis. It is the activity of the plants. In photosynthesis plants take carbon dioxide from air, water and minerals from the earth and prepare food in their green parts in the presence of sun-light. During this process oxygen is given off.

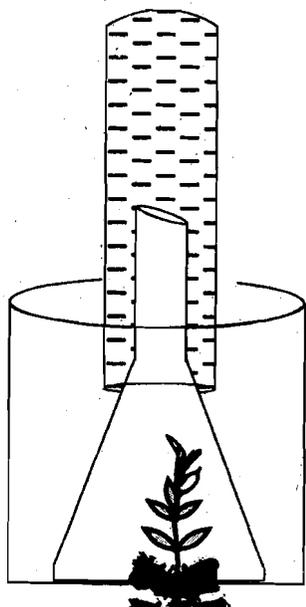
Demonstrate this process by the following:

Activity: 8 (demonstration)

Steps

- Take a trough containing some water.
- Take a Hydrilla plant (any other aquatic submerged plant e.g. vallisneria and put it in the trough.
- Put a funnel inverted over the plant

- Put a test-tube filled with water over the funnel as shown in the diagram.
- Keep the whole apparatus in Sun.
- Add a pinch of sodium bicarbonate in the water of trough for better results,



- Observe carefully.

Note: 1. Cut ends of the stem of Hydrilla should point towards the stem of the funnel.

2. Sodium bicarbonate (Meetha Soda) supplies carbon dioxide for photosynthesis.

Small bubbles will be seen rising upward from the leaves of the Hydrilla plant. These bubbles will displace water from the test-tube. When sufficient gas is collected in the test-tube lift the test-tube and bring a burning splinter near its mouth. Ask the children — What do you observe? Why does the splinter begin to burn brightly.

While performing this activity, take care that:

- The trough must have sufficient water so that the lower end of the inverted test-tube remains inside it.
- To put the test-tube filled with water inverted over the funnel, first close its mouth by your thumb. Remove the thumb only after putting it upside down over the funnel.

Ask the children: What is the importance of nitrogen in air? Discuss it and explain that it reduces the activity of oxygen.

Moreover nitrogen is an essential component of plant life. Plants can not use this atmospheric nitrogen directly. They can use it if available in the form of nitrates through the water from the roots. During lightening in the clouds nitrogen and oxygen of the air combine to form various oxides of nitrogen. These oxides dissolve in water and come down to the soil as nitrates.

Some bacteria present in the roots of some of the plants also convert the nitrogen of air into nitrates. These nitrates are taken by the plants through water.

Discuss with the children uses of various constituents of air as they are intimately related with the child's day to day life. Following points must be emphasised:

Uses of various constituents of air

1. **Oxygen** is essential for life. Pure oxygen is directly given to patients suffering from breathing difficulties. Oxygen cylinders are carried by mountaineers, sea divers and astronauts. Liquid oxygen is used in rockets to burn the fuels.
2. **Carbon dioxide** is used in aerated drinks, soda water and in some of the alcoholic drinks like beer. It is also used in fire-extinguishers. Solid carbon dioxide known as dry-ice is used for preserving meat, fish and other eatables. It is better than ordinary ice as it does not wet.
3. **Nitrogen** compounds are essential for the growth of plants. Earlier, only animal dung was used as manure for plants. But these days various nitrogen compounds such as urea, ammonia and other compounds of ammonia are used as fertilizers. Many nitrogen containing compounds are used as dyes and drugs.

Check Your Progress

Notes: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the unit.

1. How is nitrogen from air utilised by the plants?

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2. Conduct an experiment to show that:

a) Oxygen gas is one-fifth of the air.

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b) Plants leave oxygen in photosynthesis.

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3. Two test-tubes having lime-water were taken. In one of the test-tubes air was passed from an air pump and in the other exhaled air was passed. What difference will you notice and why?

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4. Two similar apparatuses were set for photosynthesis. One was kept in the classroom and another in the open on a sunny day. What difference will you observe and why?

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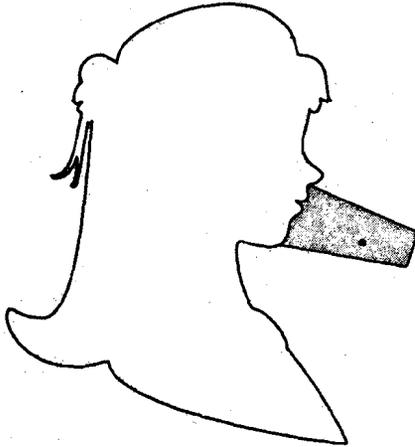
8.4 AIR PRESSURE

There are many instances in our daily life which show that air exerts pressure. You may introduce the concept with a simple activity.

Activity 9

Steps

- Take a metallic, plastic or a glass tumbler.
- Bring it close to your mouth.



- Now suck the air from the tumbler and remove your hands.
- What do you observe? The tumbler remains pressed to the mouth and does not fall down.

Ask the children: Why did the tumbler not fall down? Discuss with them and then explain: This happens because when the air inside the tumbler has been sucked, the air outside the tumbler exerts more pressure on the tumbler and keeps it pressed to the mouth.

Another simple activity may be performed to show that air exerts pressure. Children can do this individually.

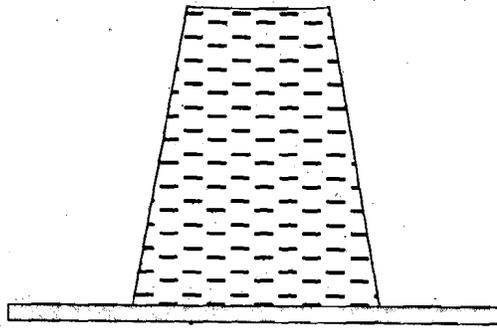
Activity 10

Steps

- Take a tumbler and fill it with water.
- Put a piece of thick paper on its mouth.
- Put a hand on the paper and invert the tumbler.
- Remove your hand.
- What do you observe?

The paper remains pressed to the tumbler and water does not fall.

Ask the children - What supports the water and the paper in the tumbler?



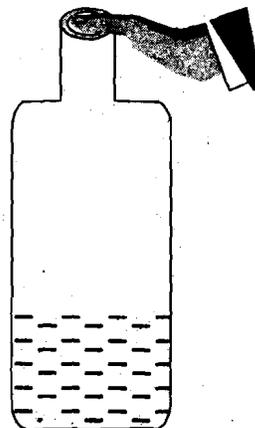
Discuss with them and explain that it is the air-pressure acting upwards on the paper which supports them.

There is one more very interesting activity based on the concept of air pressure. It is very simple and does not require any costly material. Each child can do it individually.

Activity 11

Steps

- Take a PVC bottle with a mouth that can be closed by your thumb.
- Make holes in the bottom of the bottle by touching heated nail or needle.
- Put the bottle in any container having some water.
- Fill water in the bottle.
- Put your thumb pressed on the mouth of the bottle and lift it. (Water will not come out from the holes).
- Now say 'Water out' and loosen your thumb on the mouth of the bottle. Water will begin to come out from the holes.
- Again say 'water stop' and press your thumb on the mouth of the bottle. Water will stop.



In this way, according to your directions, water will stop or will move out.

This activity appears like a magic if you do not show the holes in the bottom of the bottle to the children.

Ask the children - How does it work? Discuss and explain.

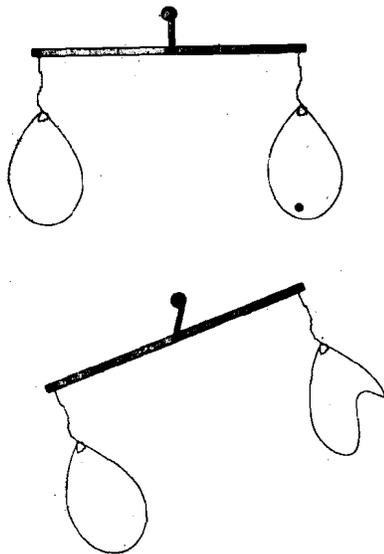
Again ask them - Why does air exert pressure?

Explain that any matter, any object having weight exerts pressure. Does air also have weight? Perform a simple activity to show it.

Activity 12 (demonstration or in groups)

Steps

- Take two balloons of almost same size and fill them with air.
- Tie these balloons at the two ends of a light rod.
- Now tie a string in the middle of the beam and suspend it horizontally.
- Now pierce a sharp needle in one of the balloons.



Ask the children - What do you observe? What conclusion do you draw from this activity?

Explain to them - On piercing the needle in the balloon it bursts, air escapes out and it becomes lighter. This activity proves that air has weight.

Ask the children - What are the applications of air pressure in our life? Discuss with the children and make them aware that:

Ask the children - How air pressure helps to move the liquids?

If they are not able to explain - Show them the following activity and explain with its help.

Activity 13

Steps

- Take an eye dropper.
- Put the tip into the coloured water.
- Press the filler: Air from the eye dropper will escape out. Bubbles of air can be seen in the water.

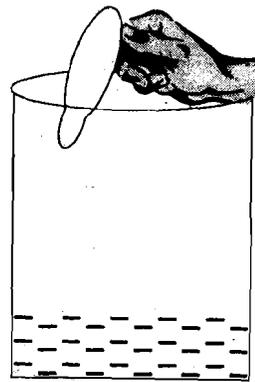
Now realise the pressure on the filler. Water rises into the dropper.

Ask the children - Why does the water enter in the eye dropper.

If they are not able to reply it, explain to them that:

After releasing the pressure on the filler, air pressure inside the dropper decreases.

Air pressure acting on the surface of the water in the container pushes the water inside.



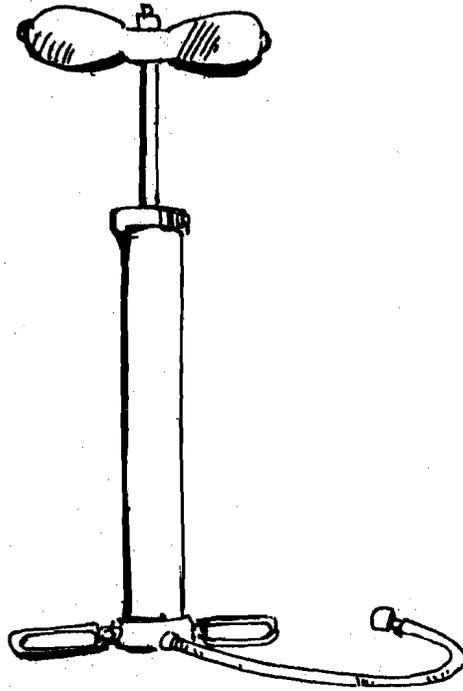
Ask the children - What are the other appliances working on the principle of air pressure?

Explain that other items like fountain-pen, syringe, kerosene-stove pump and water pump also work on the same principle of air pressure.

Ask the children - Do you know, how does a water pump work?

Explain to them - The working of water pump is a little different as it contains two valves A and B. To make the student understand its working, take a model of the water pump and explain its working.

- In the first downward stroke the piston of the pump moves upward and air inside the barrel is pushed out. Therefore pressure inside the barrel is reduced. It makes the valve 'B' open and water rises in the barrel.
- In the second upward stroke, piston moves downward. Valve B closes and valve A opens allowing the water to rise above the piston.
- In the third downward stroke, the piston moves up and lift the water out of the mouth of the pump.
- By repeated strokes, this process continues.



Ask the children - What do you understand by atmosphere. What is normal atmospheric pressure? What is the instrument for measuring it?

Discuss with the children and explain that the air covers the whole earth. This cover of air is called **Atmosphere**. We can measure the air pressure by an instrument called **Barometer**. Air pressure is not uniform at all places. It reduces as we go higher and higher from the surface of the earth. It is maximum at sea level which is equal to 760 mm of mercury pressure. This pressure of the atmosphere at sea level is called **Normal Pressure**.

Applications of air pressure in our life

- a) Air can be filled with pressure in balloons, cycle and automobile tyres, football bladder, etc.
- b) Air pressure is also used to move liquids just as in eye dropper, fountain pen, syringe, water pump, Kerosene pump stove, etc.

Check Your Progress

Notes: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the unit.

5. Using a tumbler and a thick piece of paper what experiment will you propose to prove that air exerts pressure.

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6. Tick mark the correct answer.

- a) Instrument not working on the principal of air pressure is
 - i) Thermometer
 - ii) Barometer
 - iii) Kerosene stove
 - iv) Fountain pen
- b) On pressing the filler of a dropper the air pressure inside
 - i) Does not change
 - ii) Increases
 - iii) Decreases
 - iv) Creates vacuum
- c) In a water pump when the piston moves downward.
 - i) Upper valves opens
 - ii) Lower valve opens
 - iii) Both the valves open
 - iv) Both the valves remain closed
- d) Air exerts pressure because
 - i) It is a mixture of several gases
 - ii) It occupies space
 - iii) It has weight
 - iv) It helps in burning

7. Discuss the experiments which will show:

- i) Air occupies space

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- ii) Air has weight

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- iii) Air exerts pressure

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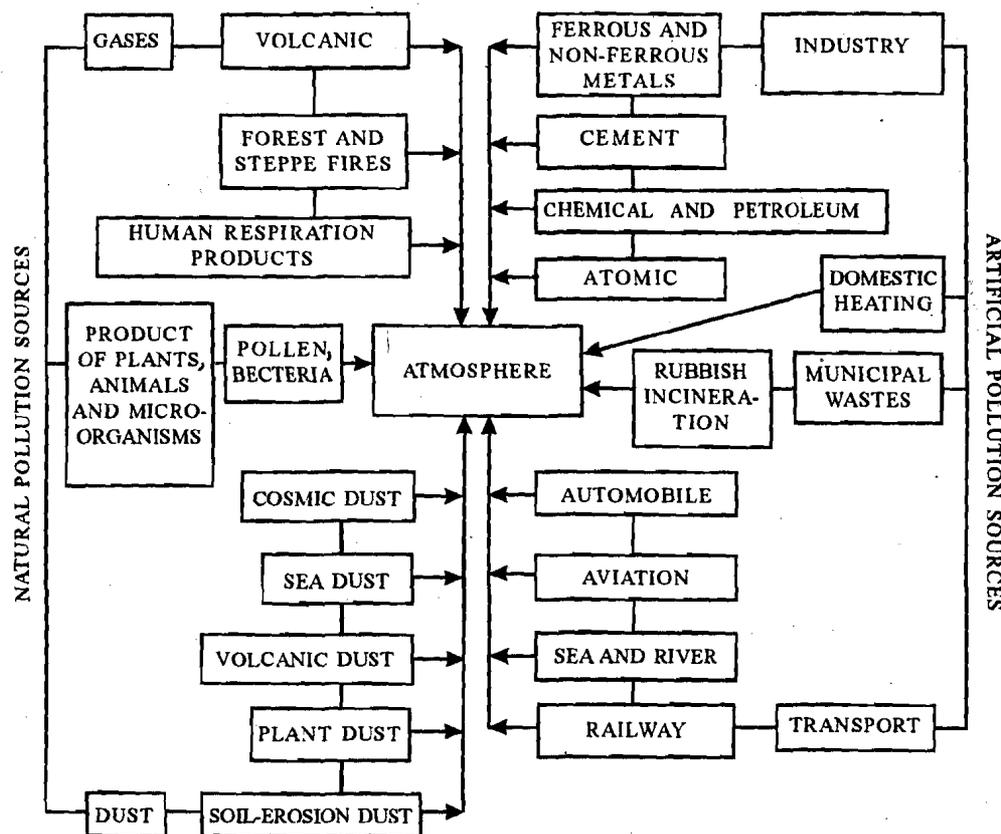
- iv) Air helps in burning

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8.5 AIR POLLUTION

The following points regarding air-pollution may be discussed with the children. It is our common experience that when we stand in a smoky place, we feel some irritation in our eyes and nose. We may also have difficulty in breathing and feel suffocation. This feeling is more severe if we inhale the smoke emitted by the exhausts of cars and buses. We may have a similar feeling when we stay in an atmosphere having gases like sulphur dioxide and other chemicals. It is all due to air-pollution. Air pollution is largely due to human activity. As the population of the country is increasing, air is getting more and more polluted. Chemical gases, dust, smoke, germs present in air are the main pollutants. Pollutants are harmful and have undesirable substances. These pollutants are harmful not only to mankind but also to other animals and plants.

Pollution created by smoke is very common. Generally it is produced by factories, power houses and running vehicles. Smoke contains particles of coal, ashes and some toxic compounds. Cigarette smoke is very injurious to health. It goes into the lungs of non-smokers also and affects their health. Burning of fire-wood and cow-dung cakes at home produces smoke which is harmful to our eyes and lungs. Vehicles such as scooters, car, buses and trucks also produce smoke by burning petrol or diesel. Such auto exhausts are major causes of air pollution.



All the fuels contain carbon. When these fuels burn completely or burn in the sufficient supply of air, they produce carbon dioxide. But when a fuel burns in insufficient supply of air, incomplete combustion takes place and carbon monoxide is produced. Production of carbon dioxide is not a major problem of pollution, as it is taken by the plants for photosynthesis. But carbon monoxide is a poisonous gas. It gets absorbed in blood and reduces its activity. If it accumulates, it becomes very dangerous and some times even fatal. Proper ventilation of houses and bed-

rooms even in winter is essential particularly when coal or wood is being burnt. Vehicles running by petrol also produce carbon mono-oxide from their exhaust. It is very essential to get these vehicles checked regularly and proper tuning of carburattor is done.

Oxides of sulphur and nitrogen are also very harmful to health. Coal and petrol contain small, amounts of sulphur which on burning gives sulphur dioxide. This is an acidic gas which affects skin, lungs and other tissues. Similarly oxides of nitrogen formed at high temperatures are also poisonous. In petroleum refineries and electric power plants it is important to remove the oxides of sulphur and nitrogen before the gases are let out. Otherwise these will be carried by the wind and rain and will produce acid rain. This acid rain may damage cement, steel, marble, bricks and living organisms.

As the population of the country is increasing, more and more industries are being set causing more pollution. We have to be more cautious in anticipating the problems caused by different types of pollution and take appropriate measures.

Check Your Progress

Note : a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the unit.

8. Fill in the blanks :

a) Gas produced due to incomplete combustion of fuels is

b) Gas taken by the plants in photosynthesis is

c) is a poisonous gas which reduces the activity of the blood.

d) Smoke contains particles ofashes and some toxic compounds.

e) gas affects skin and lungs.

9. Give five measures to prevent different types of air pollution.

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10. How is acid-rain caused? How does it harm?

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11. From pollution point of view, which is more dangerous - burning of diesel or petrol?

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8.6 WATER

Water is the most common and important substance around us. We use water every day for bathing, washing, drinking and several other purposes. Water is used in agriculture and industries. It is important for all living beings. If water is not available to plants, animals and human beings, they will die. Water is an essential component of all living bodies. The human body has about 70 per cent water by weight.

Animals drink water from ponds, streams and rivers. Plants take water from the soil through their roots. The plants and animals use this water for their life processes.

Water is a good solvent. It dissolves many things such as sugar salt and several minerals. It not only-dissolves solid substances but also liquids and gases. In liquids milk and spirit can be dissolved in water. Many gases like carbon dioxide, sulphur dioxide and oxygen also dissolve in water. There are many things which do not dissolve in water but remain suspended if these are in the form of fine particles.

To provide first hand experience to the children arrange the following activity. It may be demonstrated by you.

Activity 14

Steps

- Take water in two containers.
- Dissolve sugar in one and turmeric powder in the other.
- Leave them undisturbed for some time.
- Now observe carefully.

Children will observe that turmeric powder settled down in the bottom while sugar does not.

It shows that while sugar is soluble in water, turmeric powder is not soluble.

Water when flows through rocks, sand and soil can carry many substances, big and small alongwith it. All these substances cause impurities in water. Also certain germs and bacteria contaminate the water and make it harmful for drinking. Many diseases are caused by drinking water having germs. Some water-borne diseases are diarrhoea, typhoid and jaundice. We have already discussed about them in Unit 6 of this Block. Before drinking water you must ensure that water is clean and free from germs.

Many processes are involved in making water fit for drinking. To understand these processes, you should perform some activities involving the children.

Activity 15

Steps

- Take some muddy water (may be from a river or a pond).
- Keep it undisturbed for some time.
- Observe the water at its surface and also at its bottom.
- Now remove the floating things like straw, leaves, saw dust, charcoal etc., from the surface by a spoon.

- Now transfer the remaining water into another container without disturbing the things settled at the bottom. (This process is called decantation.)
- Add some **alum** to the water which has been transferred into the other container. Observe carefully.
- Fine particles suspended in the water cluster together and settle down at the bottom. (This process of settling down is called **sedimentation**)
- Again remove the settled impurities by decantation.

For further purification of this water, which still contains fine particles, following activity may be organised. Involve children in performing it.

Activity 16

Steps

- Take a funnel (like the one used for pouring out kerosene into a bottle).
- Arrange a cotton pad in the funnel just above the outlet of the tube.
- Pour the water in the funnel.
- Collect the filtered water in a container. Is this water cleaner than the one poured into the funnel?
- What do you see over the cotton pad in the funnel?

This process of removing impurities is called filtration.

The clear water obtained by the above method may still contain the germs. These germs are not visible to the naked eye but can be seen under a microscope. These germs can cause many diseases. These can be killed by the following methods:

- By boiling:** Boiling the water for at least three minutes kills most of the germs and makes the water safe for drinking.
- By adding chemicals:** Certain chemicals like potassium permanganate and chlorine are added to water to kill the germs. Killing germs by adding chemicals is a convenient method but it gives a different taste to water.

Rain water collected after a few showers is also dust free and germs free and may be used for drinking. Such very pure water may not be good in taste. The taste of natural water is because of some dissolved minerals and gases. Some of the minerals apart from adding taste to the water are useful for our health.

8.7 WATER CYCLE IN NATURE

You know from your experience that when water is heated it turns into water vapour. Water vapour on cooling forms water again. The change of water from one form to another over and over makes the water cycle in nature.

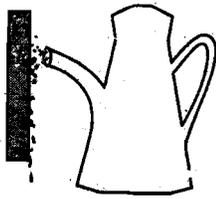
You may perform the following activity to show the change in water from one form to another.

Activity 17

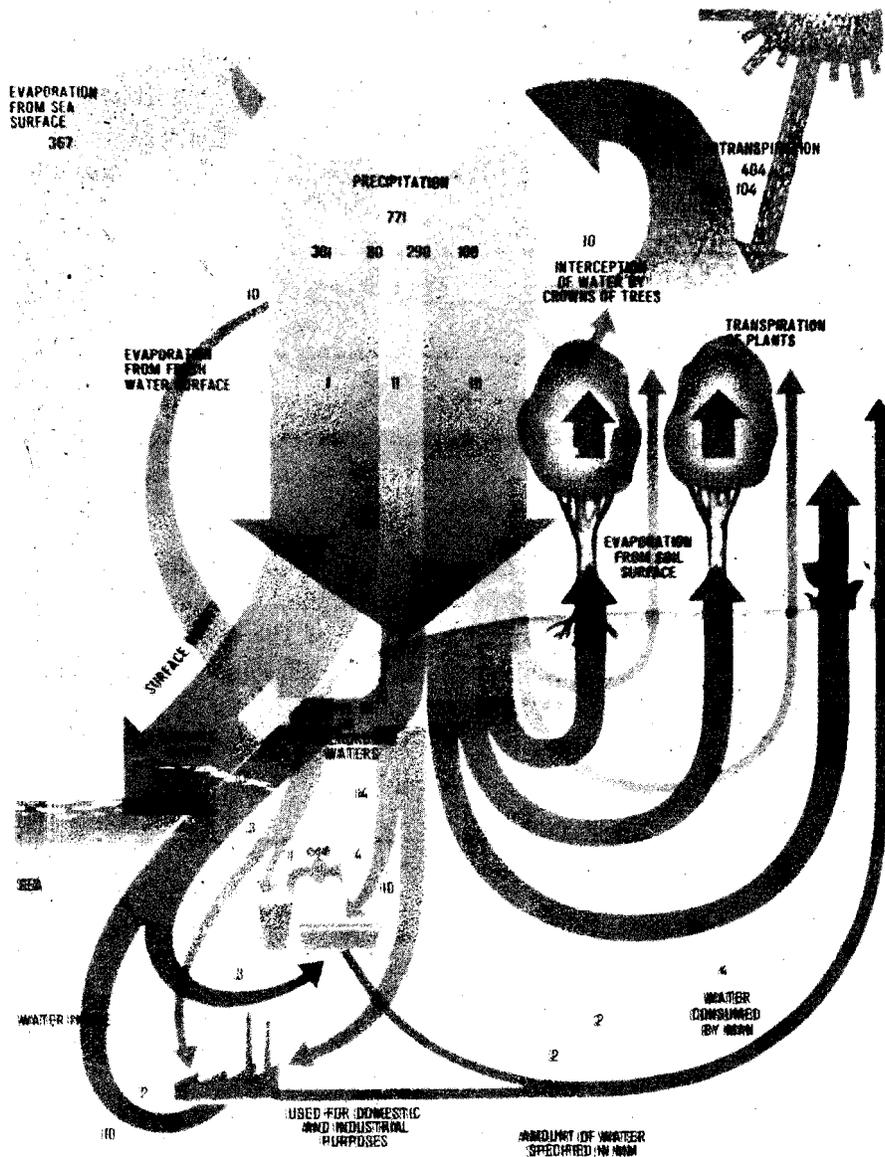
Steps

- Take some water in an aluminium kettle.
- Heat the kettle till water starts boiling.

- When the water vapours begins to come out from the spout, hold a metal plate near it.



- Observe carefully the surface of the metal plate.
- You will find water drops falling from the plate.
- A similar process takes place in nature on a large scale.



Ask the children about water cycle in nature. Discuss and explain in the following way. The sun warms the water in oceans, ponds, lakes and rivers. The water from these sources evaporates into the air all the time. Water also evaporates from plants through transpiration. The heat of the sun warms up the air near the surface of the earth. This air containing water vapour rises up. The temperature of the atmosphere falls down with the height. When water vapour cools at higher altitudes, minute water droplets are formed. These water droplets form clouds. When these water droplets come together, they form drops of water. These drops of water may fall as rain. If air cools to a great extent, the water droplets freeze into snow particles. These particles combine to form snow flakes which fall in colder regions.

Ask the children - Can you make clouds? You can demonstrate the process of cloud formation by the following activity:

Activity 18

Steps

- Breathe out on a cold day through your mouth..
- Observe carefully. You will see water vapours coming out in the form of a minicloud
- Now breathe out on a mirror.
- You will see some water droplets on the mirror. This is how rain is formed from the clouds.

8.8 WEATHER

Ask the children - What is weather? Discuss with the children - it is our common experience that some times it is very cold in the morning, but next day it is not so. The morning may be warmer. Some times it rains and sometimes it remains dry. All these are the conditions of weather.

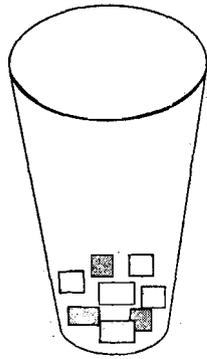
Again ask them - What are the factors on which weather depends? They may not be able to reply it. Begin a discussion on it in the following manner - you have already learnt about air pressure. It is one of the most important factors determining the weather. Humidity in the air is another important factor. Humidity is never constant. It is always changing. Ask the children - Can you show by an experiment that air has humidity or water-vapour? You can perform the following activity for clarifying it:

Activity 19

Steps

- Take a glass tumbler and ensure that it is dry from outside.
- Put some ice pieces into it.
- Observe its outer surface carefully.

Ask the children what have they observed. Discuss it.



They will observe that first the outer surface of the tumbler becomes dim and then drops of water appear over it.

Ask them - from where have these water drops come? Certainly these water drops cannot come from the tumbler. These drops have come from the air surrounding the tumbler. The water vapour present in the air has condensed on the cold surface of the tumbler. Ask the children - from where does the water vapour come in the air? Discuss with them and explain.

It is our common experience that when we spread wet clothes in air, clothes become dry after some time. Evaporation from the surface of the clothes changes the water into vapour state.

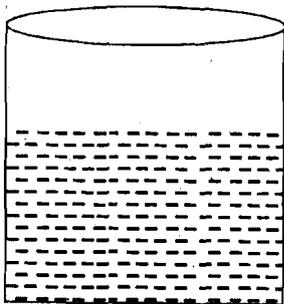
Similarly evaporation takes place from the surface of ponds, rivers, lakes and oceans. Water vapour formed from all these sources mixes with air. There are many conditions to cause the evaporation. Ask the children - where is the rate of evaporation more, in sun or in the shade?

To clarify perform an activity before them.

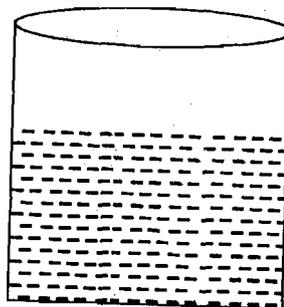
Activity 20

Steps

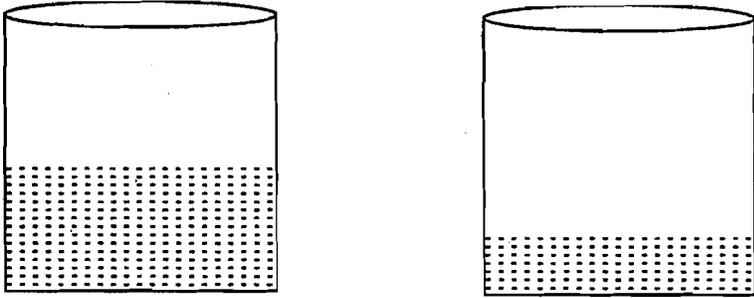
- Take two similar vessels with wide mouth,
- Take equal amount of water in them.
- Mark the surface of water on the vessels.



(i)



(ii)



(iii) (iv)

- Put one vessel in the sun and the other in the shade.
- Marks the levels of water in both the vessels in the evening.

Pose another problem - where does more evaporation take place, in the wind or in the absence of the wind? Discuss this point based on their common experience.

It may be our common experience that when we spread our washed clothes in the wind, they get dried earlier. Sometimes we shake our clothes in air to make them dry earlier. As more air comes in contact with, the clothes, more evaporation takes place.

It is also our common experience that clothes take more time to dry during rainy season, why? Evaporation also depends upon the condition of air with respect to water vapour already present in it. If the air is more humid, rate of evaporation is slower.

Many conditions of weather like rain, clouds, mist, fog, dew formation, etc., depend upon humidity present in the air.

Weather affects our lives in many ways. We wear our clothes according to the weather condition. During cold weather, we wear warm clothes. During hot weather we like to wear cotton clothes.

Weather conditions are closely related to our crops. Rainy weather is good for crops but heavy rains sometimes damage our crops.

Bad stormy weather may not be suitable for air flights and also the ships. Weather forecast is very helpful for all of us.

Check Your Progress

Notes: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the unit.

12. Give an experiment to show that air surrounding us contains water-vapour.

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13. What are the factors affecting the rate of evaporation? Mention three factors.

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14. Fill in the blanks:

- a) Rate of evaporation is if wind is more.
 b) Rate of evaporation is if air is more humid.
 c) Rate of evaporation is in shade.
 d) Rate of evaporation is in hot weather than in cold weather.

15. Give an experiment to show that evaporation takes place more rapidly in the sun than in a shady place.

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16. What are the different processes involved in purification of water? Describe them.

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8.9 LET US SUM UP

- Air occupies space. All containers which seem to be empty have air in them.
- All living beings, plants and animals, both take air for their respiration. They consume oxygen and leave carbon dioxide in this process.
- Carbon dioxide turns lime water milky.
- Oxygen helps in burning.
- Oxygen occupies 20% or 1/4 of the air.
- Plants take carbon dioxide gas from the air for food. This activity takes place in the presence of light, hence it is called photosynthesis.
- Air exerts pressure. It has many application in our daily life, water pump, air pump, syring and dropper work on the principle of air pressure.
- The cover of air surrounding the earth is called Atmosphere.
- Air pressure decreases as we go higher and higher from the surface of the earth.
- Main pollutants of air are chemical gases, dust, smoke and germs.
- Carbon mono-oxide and sulphur dioxide are the main chemical pollutants.

- Water is a good solvent. It dissolves many substances including solids, liquids and gases.
- Potassium permanganate and chlorine are the main chemicals used for killing the germs of water.
- Nature has provided a water cycle involving rain, rivers, oceans, clouds. It is important because it provides sweet water to us.
- Air has moisture or water vapour which comes by evaporation from the rivers, ponds, lakes or from drying clothes.
- There are many factors affecting the rate of evaporation like wind, presence of water vapour, temprature of air etc.
- Rain, clouds, fog, mist, dew are all caused due to water vapour present in the air.
- Weather affects our lives in many ways.

ANSWERS TO CHECK YOUR PROGRESS

1. Soluble nitrates are absorbed through the roots of the plants. Discuss how.
2. Open-end question.
3. The one with exhaled air will turn milky after contact with carbon dioxide.
4. Oxygen is released from the one kept in the sun. Discuss further.
5. Invert the tumbler's mouth to the paper, the paper remains pressed to the tumbler.
6. a) (i), b) (iii), c) (ii), d) (i), 7 (i)
7. Open-end question.
8. a) carbon mono-oxide, b) carbon dioxide, c) carbon mono-oxide, d) coal, e) sulphur dioxide.
9. Open end question.
10. By oxides of sulphur and nitrogen carried by the wind and rain.
11. Burning of diesel.
12. Air contains water vapour which comes from evaporation. Demonstrate this. (Tumbler experiment)
13. Temperature, humidity, wind.
14. a) more, b) less, c) less, d) more.
15. Keep two vessels with equal amount of water — one in shade and the other is the sun. What happens?
16. Decantation, Sedimentation, etc.