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Introduction to Environment Science

Class Three

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Preface

For improving the existing quality of Primary Education in Bangladesh, National Curriculum and Textbook Board (NCTB) in collaboration with PEDP-2 initiated an extensive program for development of curriculum and teaching learning materials in 2002. In the light of this program the curriculum, textbooks and other teaching learning materials of Primary levels have been prepared, revised and evaluated.

The textbook entitled, '**Introduction to Environment: Scince**' has been prepared on the basis of attainable competencies for the students of Class Five. The subject matter of the textbook is derived from the basic issues of the religion familiar to the children through their family practices. This will facilitate our young learners to know how they can make best use of this religious knowledge & values in their day-to-day life.

The contents of the book are analyzed and explained in such a manner with practical examples, illustrations and system of planned activities, that students are inspired to study the subject with a keen interest.

This book is originally published in Bangla. From this year NCTB is publishing the English version of the textbook. English is the language of choice in today's globalized world. To facilitate the verbal and written communication skills of our future citizens and suitably prepare them for international competition, we decided to translate the original Bangla textbooks into English. It's pleasant to note that the number of English medium schools in Bangladesh is increasing very fast. In this context NCTB decided to publish all the textbooks of Primary level in English. This was a big endeavour for us. Despite our all efforts the first edition may not be totally error free. However, in the future editions we shall try to remove all errors and discrepancies.

Finally, I would like to express my heartfelt thanks and gratitude to those who have made their valuable contributions in writing, editing, evaluating and translating this book. I sincerely hope that the book will be useful to those for whom it has been prepared.

Prof. Md. Mostafa Kamaluddin
Chairman

National Curriculum and Textbook Board
Dhaka

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Chapter One

Our Environment

There are various kinds of people, animal, tree, bird, insect, plant, house and dwelling and many more things around us. We make houses on land and live there. Farmers grow crops and vegetable in their farms. As we breathe we take oxygen from the air. We can't live without water. That is why the other name of water is life.

There are many more things around us. All these things together with People, animals, trees, plants, land, air and water create our environment.

We all want to live in a nice environment. But sometimes for different reasons our environment gets spoilt. And if the environment gets spoilt it can cause harm to us.

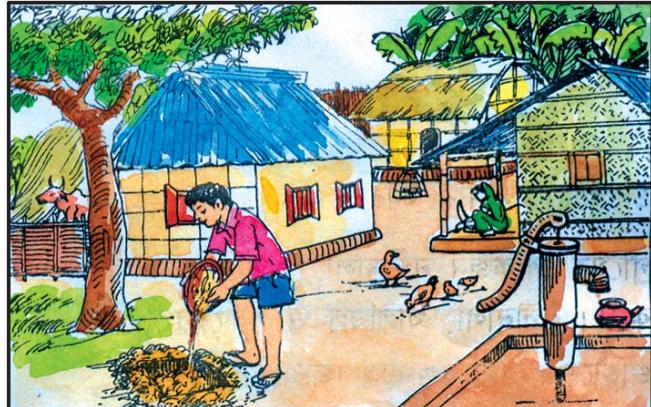


Fig: Good environment

Sound Pollution

Suppose there is a wedding party in your neighbourhood and people are playing music very loudly on the loudspeaker. Can you then concentrate on your study? You cannot. You may not even be able to sleep. These people are actually polluting the environment by playing music loudly. Similarly, the noise from

trains, planes, vehicles and factories can also pollute the environment. When the environment is polluted because of loud noise, the environment scientists call this 'sound pollution'.

Notice how noise pollutes the environment in your neighbourhood. Identify two causes for noise pollution there and describe them to your class. Discuss how you can stop this noise pollution.

Water Pollution

Take a transparent glass and fill it up with drinking water. Observe carefully if there is any dirt in it. Keep the glass on the table. Now take another glass and fill it up with water that was stored and stagnant in the fields, meadows or in some other places. Now observe carefully and you will see dirt in it. Put some soil in the water of the first glass. You will see that the water gets dirty and spoilt.

To clean the water mixed with soil particles, cover another glass with a clean piece of cloth and then strain the water by pouring it into the empty glass through the cloth. You will see that the soil have become much less.

Will you drink the water if you see dirt in it? Of course, you won't. Because you can get sick if you drink dirty water. To protect ourselves from diseases, we all should drink clean and safe water. However, for different reasons, we do not always get safe water for drinking.



Fig : Clean and unclean water

People in the villages usually get their drinking water from rivers, canals, ponds, lakes and tube-wells. Various kinds of filth and dirt fall in the water of the rivers, ponds and lakes.

Look at the picture and notice how filth and dirt is getting mixed with the pond water. Identify five causes of pond water pollution at the picture In this way the water of the ponds often get polluted. If you drink polluted water you can have different diseases and become ill. That is why doctors advise us to boil, then cool and then strain the pond water through a clean piece of cloth before drinking it.

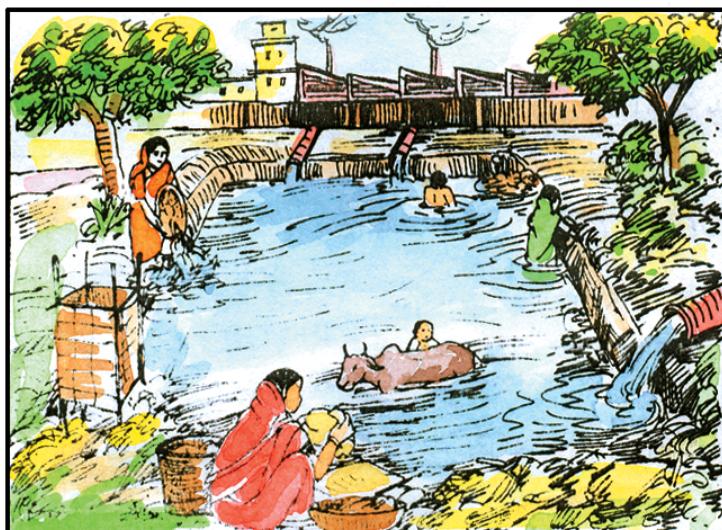


Fig : Water being polluted

Air Pollution

You may have noticed that we often pile up garbage for some one else to clean it afterwards. In cities or villages we often see such piled up garbage at different places. If these are not cleaned in time, they soon spread a very bad smell around. You may have noticed the bad smell that comes out of the piled up garbage in the wayside dustbins in the cities or from the hoard of cow-dung and filth from behind the cow-sheds in the villages. The air that smells foul is polluted air. If we breathe this polluted air for long, we may contact various diseases.

Many people try to keep the environment clean by burning these garbage and filth. But the smoke and ash that come out from the burning of the garbage also pollute the air. The black smoke that comes out of buses, cars and scooters in the cities also pollute the air.



Get some mosquito coils and some incense. Light the incense and you will see smoke coming out of it and mixing with the air. If you are near it, you can smell its fragrance. Many people like incense for its sweet

fragrance. The smoke from the incense or the mosquito coils pollutes the air. The smoke from the mosquito coils harms the mosquitoes. They harm human beings, too. You can often see people spitting, throwing out cough or the juice of betel leaves on the streets. There may be germs in these. When dried, the spit, cough or the juice of betel leaves get mixed with the air. The germs in these elements begin to float in the air and spread all over.

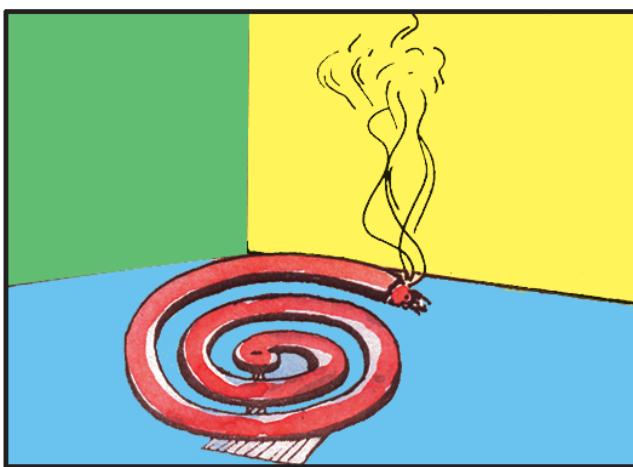


Fig : A lit mosquito coil

To keep safe from the germs floating in the air, many people now-a-days wear masks on their faces. To prevent air pollution, we all should stop spitting and throwing out cough and betel-leaf juice here and there.

Protecting the Environment

If someone makes a loud sound near your ears, you may get startled. If a cracker explodes very near, the loud noise that it would make may damage your hearing. Machinery in some factories makes a huge sound. Many workers of these factories have bad hearing. This happens because of the loud noise in their work place. Many people cannot sleep for loud noise. Blood pressure of many people rises because of loud noise. To protect our environment from pollution, we should not blow our car horns unnecessarily. We should not play the loud speakers loudly or explode crackers.

You know that if you drink polluted water, you may get many diseases. Polluted water can cause diarrhoea, dysentery, jaundice, cholera and many other illnesses of the stomach. To be safe from these diseases we should take safe drinking water. We should always keep drinking water covered.



Fig : Putting garbage under earth

We should take care not to pollute the water of ponds, canals and rivers by throwing garbage in it. Besides bad odour and smoke, there are many small particles of dirt and other germs floating in the air. When we breathe, these enter into our lungs and can cause asthma and breathing problems.

We should dig holes in the ground, put the garbage in them and then cover them with earth. Filth and garbage cannot then pollute water and air.

You know that trees and plants are our very useful friends. We get our food, fruits and vegetable from them. Trees and plants are essential to keep our environment free from pollution. When we breath in, we take oxygen in and when we breathe out, we let carbondioxide out. Trees and plants take carbondioxide



Fig : Planting trees

in and let the oxygen out. We all should take care of the trees and plants. We should plant more trees during the 'Tree Planting' programmes.

Exercise

A. Tick (✓) the correct answer.

1. Which disease is caused by noise pollution?
a. Ear diseases b. Breathing difficulties
c. Eye diseases d. Stomach ailment

2. What causes breathing difficulties?
a. Water pollution b. Noise pollution
c. Air pollution d. Soil pollution

3. What will happen if you burn the garbage?
a. Water pollution b. Soil pollution
c. Air pollution d. Noise pollution

4. When will water and air get polluted? If you -
a. burn mosquito coils
b. burn the garbage
c. put the garbage deep in the earth
d. let the garbage rot in the open

B. Fill in the blanks

1. Loudspeakers cause _____ pollution.
2. Bad odour pollutes _____.
3. The environment will not be polluted if you _____ the garbage deep in the earth.
4. Cholera is caused by _____ pollution.

C. Give short answers.

1. Mention five components of environment.
2. Write down three causes of environment pollution.
3. Write down what occurs due to air pollution.
4. Describe how water gets polluted.
5. What are the effects of drinking polluted water.
6. Mention three causes of sound pollution.
7. Write down three means of environment protection.
8. How plants keep the environment free from pollution.

Chapter Two

Living Beings and Non-Living Objects

Different Components of Environment

Around us there are plants, birds, animals, rivers, canals, houses, markets, schools, colleges, mills and factories, roads and highways and many other things. All these together form our environment.

We Generally see the doors, windows, teachers table , chair and chalkboard hanging on the wall in our clsss room. The teacher is teaching in the class. Learners are sitting on benches and reading their books. There is a play ground outside the classroom. Along the boundary wall there are some big trees. There is a garden at one corner of the ground. All these are components of our environment.

Write down in your notebook what you see in the picture here.

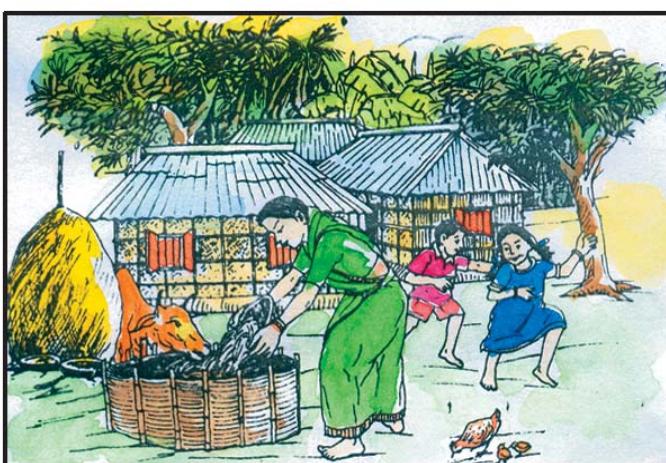


Fig: A country home

In the picture we can see some huts with doors and windows. These are non-living objects. These objects do not take food and do not move. On the other hand, hens, cows and children all move and

take food. They are living beings. So, we see that in this environment there are living beings and non-living objects. These living beings and non-living things together form our environment.

Arrange the living beings and non-living things in the picture in the table below:

Table - 1

| Living | Non-living |
|--------|------------|
| | |
| | |
| | |
| | |

Characteristics of Living and Non-living

We see cows, goats, dogs, cats and many other animals in our surroundings. They grow up from infancy to adult hood. A child also grows up gradually into an adult. A young bird when grows

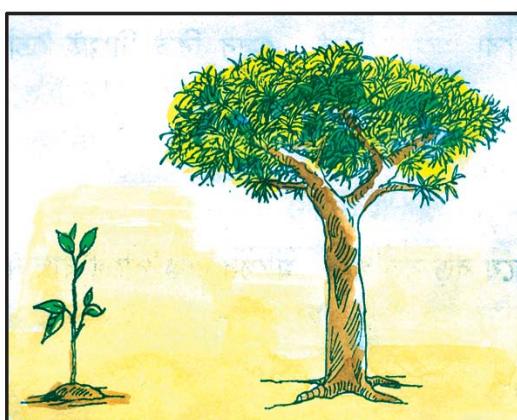


Fig : A sapling, a large tree



Fig : A child, an adult

up a little, it starts flying around. A tiny sapling grows into a large tree. Whereas, none of the houses, bricks and stones can grow by itself. In other words, living beings grow up and become bigger but non-living things do not grow up.

Human beings, cows, goats, ducks and hens are able to move. Whereas, although motor cars, rail carriages, rickshaws can move, these cannot move on their own. These are driven by human beings. Living beings can travel on their own but non-living things cannot do it. Animals, birds and human beings eat various kinds of food. Fish feeds on tiny living beings, insects, algae, etc. that live in the water. Plants too take food but not the way we do. Plants absorb water and different nutrient from the soil through their roots.



Fig: Animals are able to move from one place to another

Green leaves take Carbon dioxide from air and with the help of sunlight produce their own food it then oxygen out. But non-living things do not take any food.

Birds lay eggs and young birds are hatched out from them. Cats,

dogs and human beings give birth to young ones. New rice plant emerges from the rice seed. In this manner, every animal reproduces new ones of its own kind. Whereas, bricks, rocks or other non-living objects are unable to reproduce new ones of their own kind.



Fig: Birds pecking at the fruit

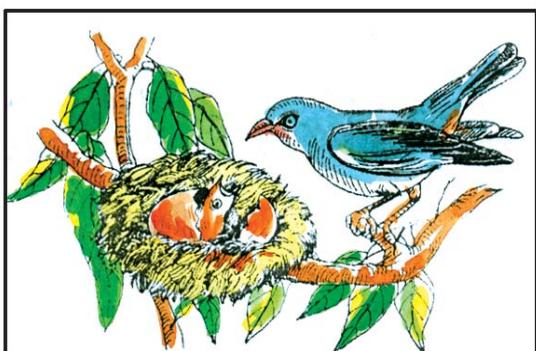


Fig : Nestling hatching out of the egg

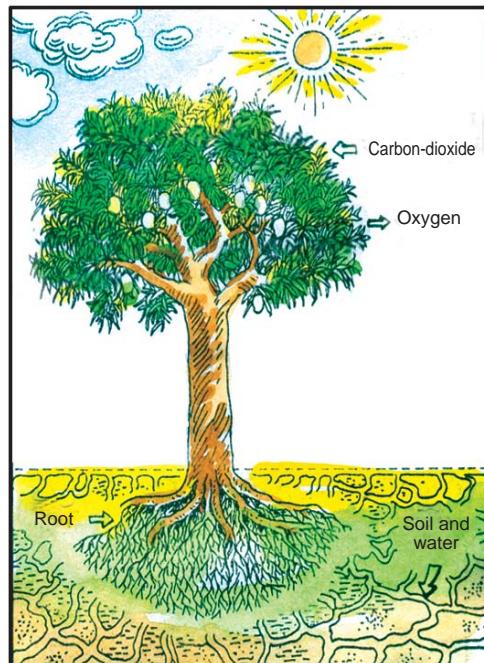


Fig: Absorption of water and minerals and manufacture of food by plants

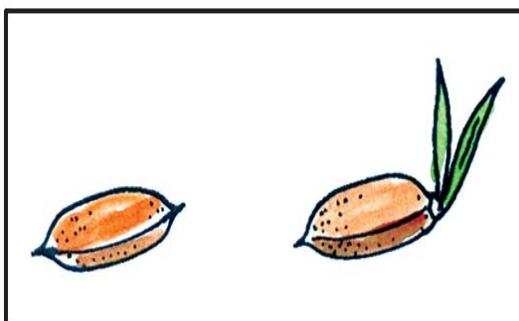


Fig: Emergence of seedling from seed

We also see that animals, birds, plants, human beings - all at some stage of life die, but non-living things do not.

Put the following words in the right column: mango tree, book, cow, cat, crow, stone, ball. Follow the example shown in the table-2.

Classification of Living Beings

Human beings, birds, fish, cows, goats, plants - all have life. They all are living beings. However, if we compare a plant with a human being or an animal or a bird, we would find some differences.

Human beings, cows and goats are able to move from one place to another. The bird can fly. But plants cannot move from one place to another.

Table : 2 classification of living and non living things.

| Non-living things | Living beings |
|-------------------|---------------|
| Book | Mango tree |
| | |

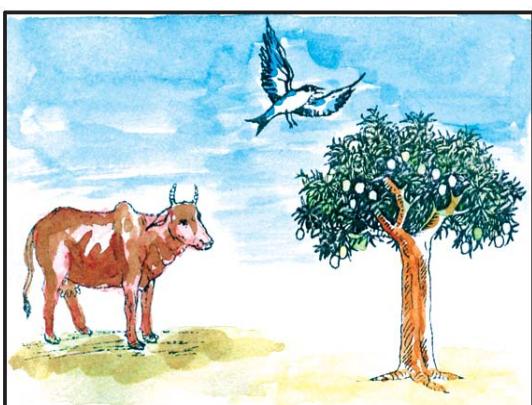


Fig: Different kinds of living beings



Fig: A child taking meal

We eat with our mouths. Do plants take their food the same way as we do? No, they don't. Plants absorb water from

the soil by roots and make their own food within the leaves. No human beings nor any other animals can make their food of their own. They depend on other plants and animals for their food.

Plants emerge from seeds. But cats give birth to kittens and birds lay eggs. This is how cats and birds reproduce. Thus we understand that human beings, cows, goats, birds, fish, insects and pests are living beings. They are called animals. Different plants and trees, grass and creepers are another kind of living beings and are called plants.

Put each of the following living beings in the right column of table-3 :

Cockroach, elephant, horse, sparrow, mango tree, bottle gourd, water hyacinth, bermuda grass, rose etc.

Table-3 : Classification
of living beings

| Name of Living Beings | Plant | Animal |
|-----------------------|-------|--------|
| | | |
| | | |
| | | |
| | | |

Classification of Animals

There are diverse kinds of animals on earth. As they differ in their appearance, they also live in different habitats. They take different foods as well.

Cows, goats, dogs, cats, buffaloes, ducks, hens, pigeons, etc. are those animals and birds whom we tend in our homes. They are known as domestic animals. The domestic animals are very useful to us. We should take care of them. Tigers, lions and the

deer live in the forests. The bird makes its nest on the trees. Fish live in water. The mice, fox and the earthworm live in holes in the ground. The camel is a beast of the desert.



Fish live in water



Cow is a domestic animal



Mice live in holes



Camel live in desert

There are some animals who feed on leaves and creepers, grasses and fruits. These animals are called herbivorous. Cows, goats, sheep and the deer feed on grass and leaves. The monkey eats tender leaves and fruits of trees. Squirrels eat guava and custard apple and such other fruits.



Fig: A squirrel eating a guava



Fig: A deer eating leaves

Tigers and lions prey on other animals. These animals have sharp teeth and claws. They live on flesh and are called carnivorous animal. Again, there are some animals which eat plants. Besides, they eat fish and meat too. They are called omnivorous

animals. Human beings are omnivorous animals.

Arrange the following animals according to their food habits in Table 4.

Squirrel, cow, elephant, horse, rabbit, deer, buffalo, tiger, lion, dog and human beings.

Classification of Plants

Note that there are three plants in the picture below. Do the three plants look alike? The bermuda grass is short. The rose plant is a little bigger and the banyan tree is the tallest.

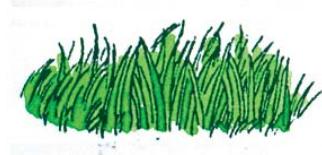


Fig: Bermuda grass



Fig: Rose plant



Fig: Banyan Tree



Fig: Tiger catching prey

Table - 4: Animal classification

| Herbivorous | Carnivorous | Omnivorous |
|-------------|-------------|------------|
| | | |
| | | |

We see various kinds of plant around us. Some are small and some are large. Besides, all these different plants do not grow in the same habitat. Rice, mango, black berry, jackfruit trees grow in soil. Does water hyacinth grow in soil? Where does it grow? Water lily, green algae, water spinach and water hyacinth, all these plants grow in water. Therefore, it is evident that some plants grow in land and some in water.

The plants which grow in land are called terrestrial plants and those that grow in water are called aquatic plants. Water lily is our national flower. It is an aquatic plant.

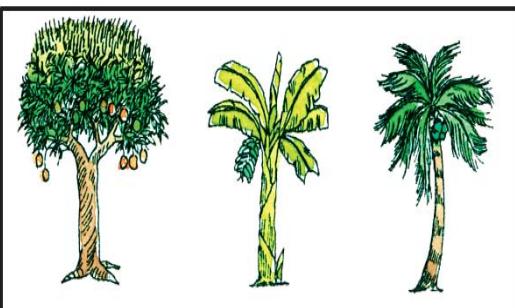


Fig: Terrestrial plants

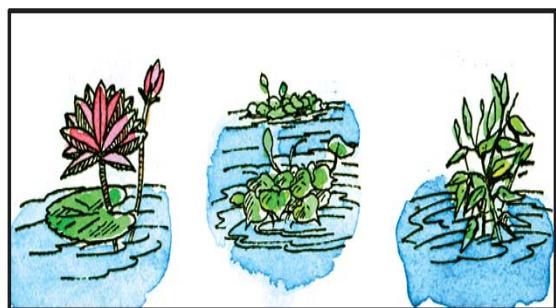


Fig: Aquatic plants

Write down the names of four aquatic and four terrestrial plants in the table here.

Table -5 : Habitat of plants

| Terrestrial plants | Aquatic plants |
|--------------------|----------------|
| | |
| | |
| | |
| | |

Soil Types

We live on land and build our houses on it. Crops grow in soil and are used as our food. All plants grow in soil. However, soil of all places are not of the same kind. And all plants are not suited to all kinds of soil.

Deserts, seacoasts and river shoals contain lots of sand. Amount of sand is higher in sandy soil. Water melon, cucumber, muskmelon, peanut, etc. grow well in this soil. Rice, jute, wheat, onion, vegetable, mustard and other different kinds of pulse grow well in the loamy soil.

Jackfruit and Gajari plants grow in clay loam soil. This soil is used in making earthen pots, utensils, toys etc.

Depending on types of soil, arrange the following crops in table 6. Water melon, rice, onion, peanut, jack fruit, lentil and spinach.

Table- 6 :Crops of different soil

| Name of soil type | Name of crop |
|-------------------|--------------|
| | |
| | |
| | |
| | |

Exercise

A. Tick (✓) the correct answer :

1. Which is a non-living thing?
 - a. Plant
 - b. Human beings
 - c. Brick
 - d. Bird
2. Which cannot move by itself?
 - a. Rickshaw
 - b. Hen
 - c. Fish
 - d. Sheep
3. What does a squirrel eat?
 - a. Fish
 - b. Flesh
 - c. Young birds
 - d. Fruit
4. Which is an animal?
 - a. Bermuda grass
 - b. Mango tree
 - c. Cockroach
 - d. Motor car

5. Which one of following grows in sand soil.

- a. Vegetable
- b. pulse
- c. Nuts
- d. Onion

B. Fill in the blanks :

1. Living and non-living things together form our _____.
2. Bricks and stone have no _____.
3. Plants make their own _____.
4. Camel is a _____ animal.
5. Lion is a _____ animal.
6. Water spinach grows in _____.
7. Banyan tree is a _____ plant.
8. Human beings are _____ animals.
9. Living beings reproduce their own _____.

C. Match the words on the left side with the words on the right side :

- | | |
|-----------------|----------------|
| 1. Human beings | a. Hole |
| 2. Mouse | b. Carnivorous |
| 3. Camel | c. Seed |
| 4. Tiger | d. Animal |
| 5. Plant | e. Desert |

D. Give short answers

1. How can you classify the environmental components?
2. Write down the names of six domestic animals.
3. Write down the characteristics of carnivorous animals.
4. What sort of plant is water hyacinth ?
5. Why are human beings called omnivorous animals?
6. Name five things made of clay soil?

E. Essay-type question

1. Name four living and four non-living things that you have in your environment.
2. Write down four characteristics of living beings.
3. Show four differences between living and non-living things with a table
4. How do plants make their food?
5. With the help of a table, show the differences between animals and plants.

Chapter Three

Water

Use of Water

Every day we use water for various activities. When we feel thirsty we drink water. We use water in almost all activities like washing our hands and faces, taking bath, washing clothes, cooking and mopping. About 70 percent of the contents of our body is water. Like human beings, cows, goats, ducks and hens drink water as well. Do you water the plants in your courtyard or in the pots? Why do you water them? Because plants also need water. With the help of roots plants absorb water and other elements from the soil. For survival human beings, animals, birds, plants and every living beings depend on water. That is why the other name of water is life.

If you carry out the following experiment, you would see for yourself that plants absorb essential elements along with water.

Experiment

Materials needed for this experiment are a transparent glass tumbler or a transparent glass bottle and a Peperomia plant. The plant generally grows near walls or in damp places. Fill the tumbler or the bottle with water.

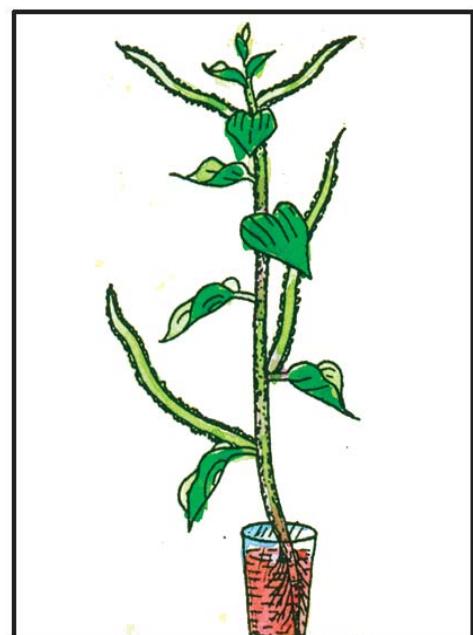


Fig : Peperomia plant immersed in a tumbler containing dyed water

Then add a little red ink or saffron powder or blue dye and mix it with water. Carefully uproot the Peperomia plant with its roots intact. Sprinkle water to remove soil particles from the roots. As shown in the picture , now immerse the basal portion of the plant in the tumbler containing dyed water. Leave the plant in the tumbler for an hour.

Look at the plant. What do you see? You will find that dyed water absorbed by root has ascended up into the stem. What have you learnt from the experiment?

Can you tell in what other activities water is needed? Look at the pictures below and see for how many different purposes water is being used. Now fill in the table given below:



Fig : Pottery



Fig : A brick kiln



Fig : Transplanting paddy

Table -1

| Use of water | |
|---------------------|----|
| 1. | 4. |
| 2. | 5. |
| 3. | 6. |

Lots of water is needed in pottery, brick kiln, mills and factories and for growing crops. In our country, there is a river called Karnafuli at Kaptai in Chittagong. Water of this river is

controlled with the help of dams. The current of this water is used to generate electricity.

Sources of Water

About three quarters of the earth's surface is covered with water. Ponds, canals, swamps, rivers, seas, haors, baors, etc. are the sources of water. Besides, rain, fountains, wells and tube-wells are also the sources of water.

What different water sources are available in your locality?

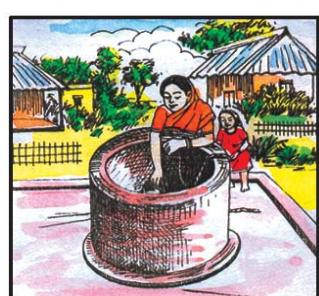
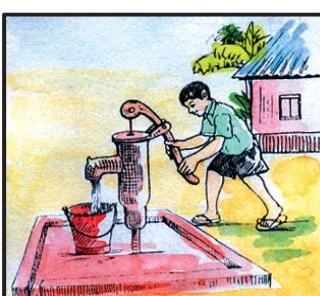
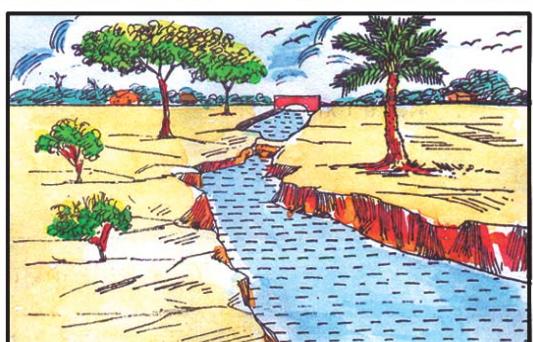
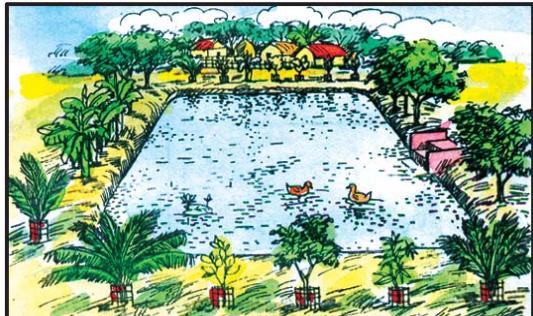


Fig : Different sources of water: rain, pond, river, canal, fountain, tube-well, well.

People excavate ponds, dig wells and sink tube-wells to meet their needs. These are man-made water sources. The sea, river, haor, swamp - all exist in nature. Human beings cannot create these water bodies at will. These sources of water are called natural sources.

The Water Cycle

Every day, because of the heat from the sun a lot of water evaporates from the river, canal, beel, and pond. This is called water vapour. Water vapour is lighter than air. Therefore, it readily rises up into the air. Water vapour is not visible. It remains mixed with air. In cool atmosphere water vapour condenses into droplets.

However, you can easily feel the presence of water vapour in the air. What happens when you hang a piece of cloth in the air? In a little while the piece of cloth becomes dry. Where has the water gone? Certainly, it evaporates and mixes with the air.

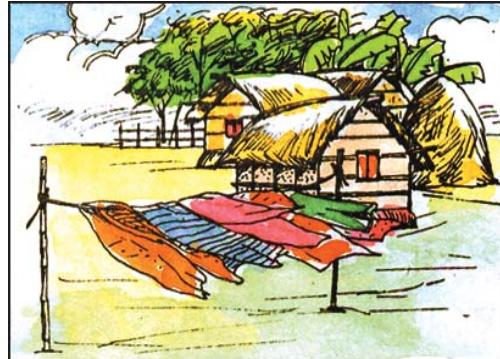


Fig : Drying of cloth in the air.

By carrying out a test you can find out the presence of water vapour in the air. Put some ice cube or cold water in a glass or in a bowl. After 15/20 minutes observe the glass. What do you see? Does water accumulate in drops on the outer wall of the glass? Where does this water come from?



Fig : Droplets of water in cold glass surface

Countless water droplets in unison drift along the atmosphere. We call it cloud. As the cloud gets more cooler the droplets turn bigger. These bigger water drops cannot float in the air any more. Then they fall down as raindrops. When water droplets become cooler, droplets join in unison and condense to form ice-like materials and then they fall as hails.

In this way, water turns into water vapour, water vapour turns into cloud, cloud forms rain and rain water falls in the ponds, canals, beels and rivers. Some water is also absorbed by the soil. In this way, water from the water bodies returns back into the water bodies. This cyclic rotation of water is termed as water cycle.

Coming in contact with the cold wall of the glass, water vapour of the air gets cooled and condenses to form water droplets. If you wipe up the glass wall, you will see water droplets gathering there again. What have you learnt from the experiment?

The more the water vapour rises up, the more it becomes cooler. Finally, water vapour condenses to form water droplets.



Fig : Hailstorm

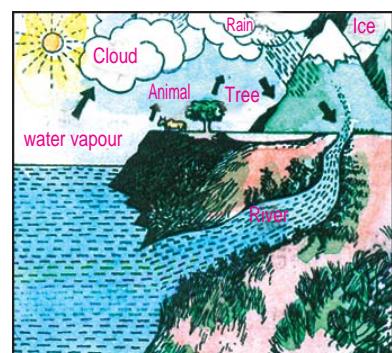


Fig : Water cycle

Sometimes, clouds drift up above the peak of mountains and accumulate there. Up there in cold the clouds condense into ice. With the heat of the sun, ice starts melting. Due to thawing, water runs down the mountain in the form of fountain. It gives rise to river. River flows down to the sea. Hence, sea is the major sources of water.

We have learnt that water remains in three diverse locations such as, on earth surface, in underground and in the atmosphere. Ponds, canals, rivers, haors, baors, etc. are the sources of surface water. Wells, tube-wells, deep tube-wells are the source of underground water. The water vapour, cloud, rain are the source of atmospheric water.

Three States of Water

Certainly, you have seen ice cube. When water is cooled in an ice factory or in a refrigerator, water turns into ice. Ice is as hard as brick. Have you seen hailstorms? In fact, those hailstones are ice. Ice is the solid state of water. Ice has shape and volume.

Put some ice cube in a bowl and wait for 20/25 minutes. You will find that ice melts into water. At normal temperature ice melts into water. Ice and water is the same compound. We call water a liquid. It has no definite shape of its own. It assumes the shape of the container where it is kept. If water is kept in a glass it will take the shape of a glass or, if kept in a bowl it will assume the shape of the bowl.



Fig : Solid, liquid and gaseous state of water

When water is boiled in a cooking pot, thin smoke like things are seen above the pot. Do you know, what these are? In fact, they are tiny droplets of water. Water droplets turn into water vapour and rises upwards. Vapour is invisible and remains mixed with air. When water vapour gets cool enough it changes back into tiny water droplets.

Experiment

Let water boil in a cooking pot and then take help of a senior to bring down the pot containing boiled water off the stove. Use a lid to cover the pot. When water has cooled enough, remove the lid. What do you see? Drops of water have accumulated on the inner surface of the lid, haven't they? Water has accumulated in drops as the vapour has cooled down. Therefore, we learnt that ice, water and water vapour are three states of the same compound. Water vapour is the gaseous state of water.

Cloud, fog, dew and hailstorms originate from water. Already, you have learnt about clouds and hailstorms. Now let us learn about fog and dew.

Fog

In winter, we see some thing like smoke in the air. Do you know why this is so? Air temperature falls in winter and water vapour

condenses on the particles of dust as tiny droplets of water. These dusty droplets drift along in the air. These are called fog. In dense fog, we cannot see a thing that is only a little away from us.

Dew

Early in the morning in winter grass, creepers, herbs and roofs remain covered with droplets of water. These droplets of water are called dew. At winter nights the ground surface becomes very cold. Coming in contact with this cold surface the water vapour in the air condenses into droplets of dew.

Sweet Water and Saline Water

What is the taste of water that you drink? It is very pleasant to drink, isn't it? Water from the sources that are pleasant to drink is called fresh water or sweet water. Water of ponds and rivers is tasty. Seawater tastes salty. That is why this water is not drinkable. Other sources of water also contain salt but because the amount of salt is very little there, it is satisfying to drink water from these sources.

Polluted, Pure and Safe Water

Water containing dirt, faeces, litter, germs of diseases and mud is called polluted water. The water of ponds, canals, ditches and rivers contain microorganisms that are not visible to the naked eye. The water from these sources polluted. Pure water is clean and germ free. Drinking and use polluted water may spread different sorts of disease such as, skin disease, dysentery, diarrhoea, cholera, typhoid, jaundice etc. Since these diseases are spread by water, they are called water-borne diseases.

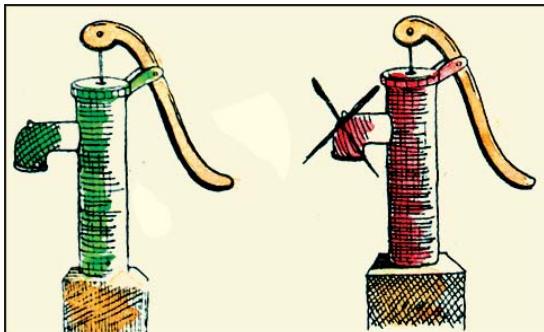


Fig : Arsenic free and Arsenic contaminated tube well

Arsenic is not a disease-carrying germ but a poisonous substance. Therefore, if tube-well water is found to have arsenic in it, it should not be used as safe drinking water.

The tube-wells marked with a cross in red colour are contaminated with arsenic. The tube-wells marked with green colour indicate that the water of these tube-wells is safe for drinking. A tube-well marked with green colour contains pure and safe water. In order to keep yourself healthy and disease-free you must stop drinking and using polluted water. Instead, you should drink and use pure and safe water.

Causes of Water Pollution

Have you ever noticed how water in your locality is being polluted? Discuss with your peer and fill in the table given below:

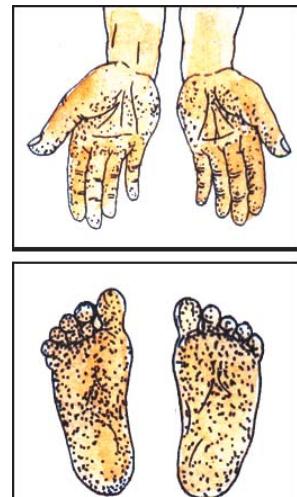


Fig : Arsenic related diseases (showing nodules on palms and soles)

| Causes of water pollution in the locality | |
|---|----|
| 1. | 3. |
| 2. | 4. |

Littering, washing of household utensils and clothes and bathing cattle pollute water. Dead bodies of animals, human faeces, droppings of poultry also contaminate water. Chemical fertilizers and insecticides are used in crop fields. These are carried with the rainwater and fall into water bodies. Thus water becomes polluted and poisonous. Fish dies in this water and this water harms other aquatic animals. Chemical waste from industries sometimes flows into water bodies and thus water gets polluted.



Fig : Water pollution

Prevention of Water Pollution

What are the preventive measures to keep water free from pollution? Discuss the issue with your peer and seniors to prepare a list.

| Measures to keep water free from pollution | |
|--|----|
| 1. | 3. |
| 2. | 4. |

Measures to Prevent Water Pollution

- ❑ Household litters, dirt and dead bodies of animals should not be thrown into water.
- ❑ Pond water is used for cooking and drinking must not be used for washing clothes. If necessary, one has to lift water from the pond for the purpose and not wash clothes in the pond.
- ❑ Water used for taking bath, washing and mopping must not run directly into the preserved pond.
- ❑ Latrine must not be built on the bank of the water bodies.
- ❑ Ground around the well or tube-well should be covered with concrete platform.
- ❑ Industrial waste materials must not be allowed to flow into the water.

Methods of Water Purification

We have learnt that drinking impure water causes different water-borne diseases. To keep us healthy, we must drink germ-free water. Water can be purified and made germ-free by using different methods such as, filtration, sedimentation, boiling and using water purifying tablets.

Filtration

Pond, canal, marsh and river water is mixed with mud and dirt particles. By filtering it through a thin piece of cloth or a sieve

we can clean this water. Water thus obtained and filtered appears clean but is not actually free from germs of diseases. Now-a-days, there are filter machines available in many households in urban areas. Water kept for some time in a filter machine will give pure water. This water is safe to drink and use.

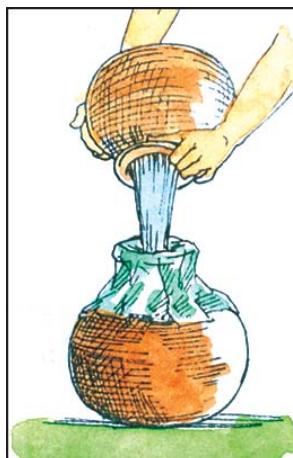


Fig : Filtration with cloth

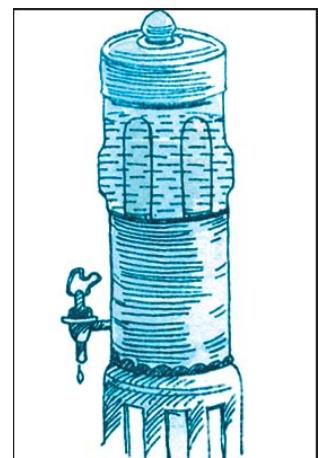


Fig : Filter machine

Sedimentation

When water is kept in a pitcher for sometime, sediment settles down at the bottom. Clear water from above is then slowly poured into another pitcher. In this way, clear water is separated from sediments. This process is called decantation. When a small piece of alum is added to the water rapid sedimentation occurs. Adding alum in pitcher water also gives germ-free water.



Fig : Water purification by decantation

Boiling

Water of pond, river and tap has to be boiled to make it free from germs. Keep on boiling water for 20 minutes after it begins bubbling in a boiling state. Then cool this boiled water and filter it. The water is now ready for drinking. You may ask your senior for help to purify water by boiling. Water from arsenic contaminated well cannot be purified by boiling. Therefore, water from tube-wells that are arsenic free should be used and consumed. Otherwise, water from other sources has to be boiled and used.

Water Purification by Chemical Method

Sometimes due to storm, flood and tidal bore, it is not possible to boil water. In such situations, water can be purified by adding required amount of alum, bleaching powder etc. Sometimes, halogen tablets are used to free water from germs. Water then becomes safe for drinking.

We have learnt about many aspects of water. There is a lot of water in the earth. Still there is scarcity of pure water. Therefore, we must not misuse water. We must not pollute it either. Human beings, animals, birds and plants cannot live without water. Hence, water is a valuable resource.

Exercise

A. Tick (✓) the correct answer

1. Which one is the major source of water?
a. Pond b. River
c. Sea d. Canal
2. What do you see over a pot when the water in it is boiling?
a. Smoke b. Dust particle
c. Water droplets d. Water vapour
3. Which kind of compound is water vapour?
a. Liquid b. Solid
c. Gaseous d. Jelly like
4. Which one is the water source in atmosphere?
a. Pond b. Spring
c. Hailstorm d. Irrigated water

B. Fill in the blanks :

1. The other name of water is _____.
2. Seawater is _____.
3. Power of water current is used to generate _____.
4. Water vapour is lighter than _____.
5. The heat of the sun turns water into _____.
6. Arsenic contaminated water is _____.
7. Tube-well with _____ coloured cross mark indicates that its water is not safe for drinking.
8. About _____ of the earth surface is covered with water.

C. Give short answers :

1. Name five water sources.
2. What are the different states of water? Give an example of each and explain.
3. How does water become polluted? Give five reasons.
4. What do you understand by safe water?
5. What do you understand by pure water?
6. Name four water-borne diseases.
7. How can we prevent water pollution? Name three ways.
8. How can you know that air contains water vapour?
9. Explain the water cycle with the help of a diagram.
10. Why does hailstorm occur?
11. What is dew?
12. How does cloud form?
13. What is fog?
14. What happens for drinking arsenic contaminated water?

Chapter Four

Air

A breath of air on a sultry day relieves us. Is this air visible? No, it is not visible. We cannot even hold or touch air. We can only feel it. There is air all around us. Even, invisible layer of air surrounds the earth. This layer of air is called atmosphere.

Existence of Air

How can we realize the existence of air in the atmosphere? The cool breeze refreshes our body and mind. It causes leaves to move, clouds to blow away and crops to swing. The wind drives sailing boats through water and raises waves in the river water. Sometimes, air blows at a violent speed and causes storm. Violent strom sometimes uproots trees and blows away rooftops of tin shed houses. And with breeze clothes flutter, hair blows and kites fly. These are some examples of how we feel the existence of air. You too can give some similar examples of your own.

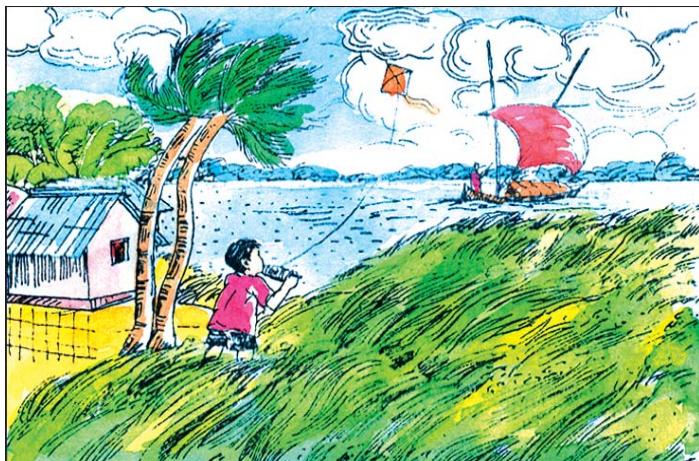


Fig : Existence of air

Constituents of Air

Air contains mainly two different gases. These are nitrogen and

oxygen. In addition, there is small amount of other gases. Through experiments scientists have found that nitrogen constitutes about 78 percent of air and oxygen about 21 percent. Other gases such as, carbon dioxide, argon, helium, water vapour together constitute about one percent.

Various gases that are present in air are called the constituents of air. Nitrogen, oxygen, argon, water vapour, carbon dioxide, helium, neon are the constituents of air.

These constituents remain mixed in air. So, air is a mixture. The constituents of air can be separated and put to different uses.

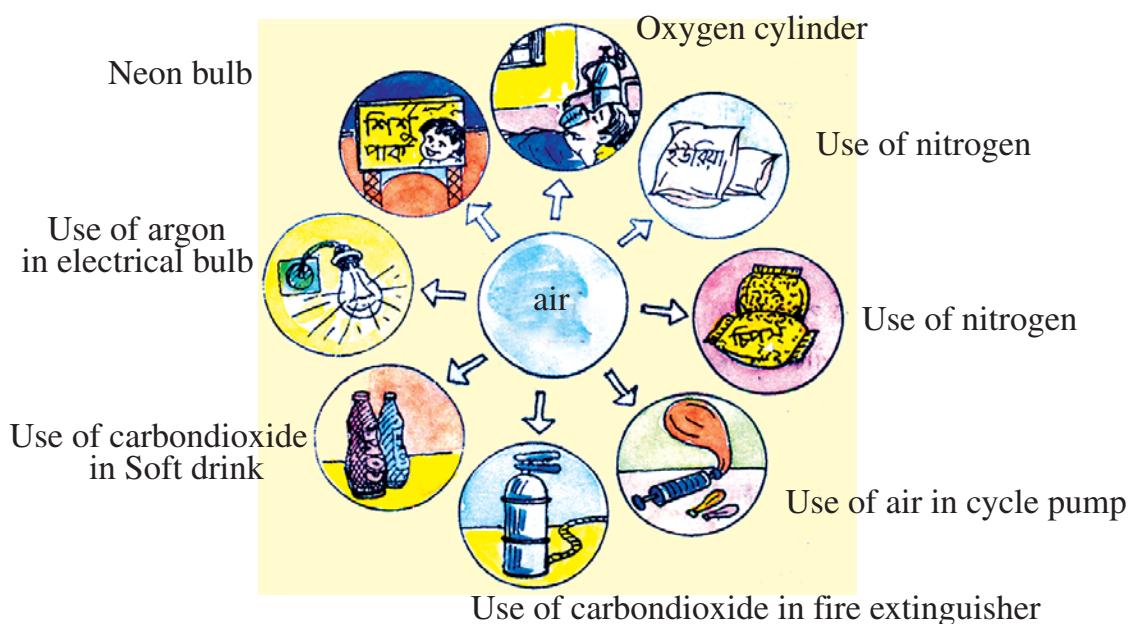


Fig : Various uses of the constituents of air

Usefulness of Air

While breathing, every second we inhale oxygen from the air and exhale carbon dioxide into the air. Like us, all living organisms, including animals and plants, depend on air for their

existence. For this reason, air is also called life. We can not survive without it. If you hold your breath for a few seconds you would realize its need for our survival.

The fire we use in cooking also needs air. Oxygen helps fire to burn. Without oxygen fire does not burn. You can test it by doing an experiment.

Experiment

Place a candle in the middle of a bowl. Put some water in the bowl. Now light the candle with the help of your teacher or a senior student. What do you see? The candle is burning well in the presence of oxygen in the air, isn't it? Now, take a glass as shown in the picture below. Turn the glass upside down over the candle and cover it. Wait for a while. What do you see? Has the candle extinguished? Some amount of water also rose up inside the glass. Can you tell the reason behind it? The candle burned a while after it was covered with the glass. This is because the oxygen present inside the glass to burn and water rose up inside the glass take up the empty space left by the oxygen.

The remaining part of the glass contains other components of air and these do not help fire burn. Now, put a mark on the glass at the level to which water has risen. With the help of your teacher, measure it with a ruler. You will find that $1/5$ of the glass was occupied by oxygen.

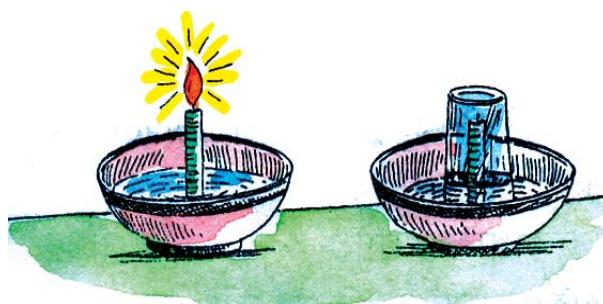


Fig : Presence of oxygen in air

Use of Oxygen

Human beings and living creatures need oxygen to breathe. The patients with breathing problem use liquid oxygen supplied from a cylinder. Perhaps, you have seen in pictures that high mountain climbers carry oxygen cylinder with them. Do you know why they need additional supply of oxygen? The higher you climb up from the earth surface the lesser amount of oxygen you get in the air. For this reason, aeroplane pilot and air passengers who travel in higher altitude require additional supply of oxygen. While diving for some thing in the river or ocean bed the divers carry oxygen cylinders with them. This is because breathing is not possible while staying under water.



Fig : Use of oxygen in breathing

Use of Nitrogen

Certainly, you have heard about urea, a kind of fertilizer. Nitrogen is the major component of this fertilizer. Nitrogen is used in preserving perishable goods like fish, meat and fruit. You like to eat chips and crispy. The packets that contain these are much inflated, aren't they? There is nitrogen inside these packets too. It prevents decay of materials inside the packets.

Use of Carbon dioxide

Big buildings, cinema halls, mills and factories are equipped with fire extinguishers. Fire extinguishers have in-built mechanism of producing carbon dioxide. Carbon dioxide

prevents oxygen from air to come in contact with the fire and so it puts the fire out.

Carbon dioxide gas is used in soft drinks. that you often drink. As soon as the bottles or cans are opened, bubbles of carbon dioxide gas escape. Plants, too, use carbon dioxide from air to manufacture its food.



Fig : Fire extinguisher



Fig : A boy and a girl having a drink

Unlike human beings, birds and animals, plants cannot move from one place to another. It can not collect its food. Green leaves make food for the plants they belong to.

The food is prepared in the leaves. During day time, in presence of sunlight, green leaves manufacture food. To do that, it requires carbon dioxide and water from the air. Plants absorb essential elements along with water from the soil.

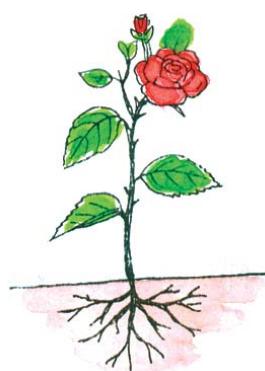


Fig : A flower plant

Air pressure

Air has pressure. It exerts pressure upward, downward and in all directions. To prove that air has pressure, carry out the task described below. To run the test you will need a glass, a thin flat paper card and water. Fill up the glass to the brim with water. Now place the card on the brim of the glass as shown in the picture. Hold the glass with one hand. Place the other hand on the card and hold the card firmly so that the card exerts equal pressure all around the brim of the glass. Now invert the glass and remove the hand from the card. Does water fall down? No, it does not. Why does not water fall down? What do you learn from this? On inversion of the glass, air below the glass exerts upward pressure on the card. Due to this pressure water does not fall down from the glass. From this experiment we learn that air has upward pressure.



Fig : Experiment on upward pressure of air

We apply air pressure in various applications. You may have heard about parachute or seen it in pictures. Often, the parachute is used for emergency landing from the aeroplane.

When parachute begins its descent towards ground, air exerts upward pressure on it. This upward pressure of air makes its descent

smooth and safe to land on the ground.

Now let us take another example. Wheels of a cycle contain tubes in it. When air is pumped inside a tube, the tube becomes inflated. The air within the

tube exerts pressure outside. This pressure is so high that it can bear not only the weight of a cycle, but also of a human body.



Fig : Air is pumped into the cycle tube



Fig : Landing with parachute

Polluted Air

Carbondioxide emits from automobiles and brick kilns. Besides this , polluted air mixed with carbonmonoxide, nitrogen oxide, sulphur dioxide and other gases can also emit. Sometimes, lead remains mixed with combustion fuels. Lead particles are also released in air through black smoke of vehicles,. We inhale these poisonous gaseous materials into our body and they affect our lungs. Infected lungs cause diseases like cough, cold, breathing trouble and headache. Children are mostly infected with these diseases. Lead particles inhibit intellectual development of the children.

To keep air pure we must stop black smoke comming out from the cars. We have to refrain from coughing and spitting here and there. We have to dispose of all these in a certain fixed place or otherwise, we have to use handkerchieves or paper napkins. Household garbage has to be disposed of in a dustbin.

Some people dispose of garbage outside the dustbin. Stray dogs and crows rummage through these garbage and sprawl these all around and pollute our environment. It emits stinks, and with breathing stink air germs of disease enter our body.

It may cause a number of stomach ailments. Therefore, disposal of vegetable peels and other waste should be left in an earthen pit and then filled up with soil. Even if we dispose of the garbage in a dustbin, we have to make arrangement to keep the bin closed.

Air Pollution and Remedial Measures

Air is an invaluable resource. We are literally living in an ocean of air. Animals and plants cannot survive without air. That is why pure air is most essential. The air contaminated with germs of diseases, dust particles and poisonous gases is called polluted air. Air of many cities become polluted through various means. Notice the picture given below and then prepare a list of different reasons that can cause air pollution.



Fig : Air pollution in a populated area

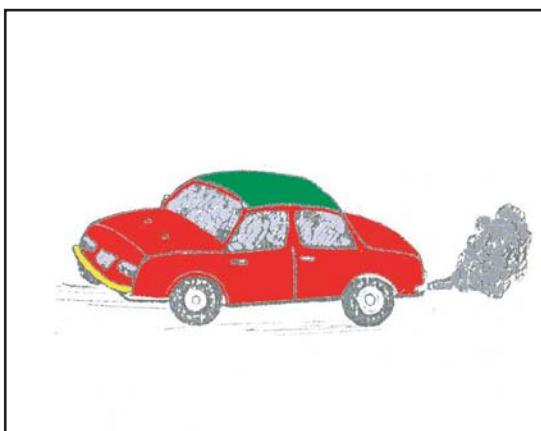


Fig : Air pollution due to black smoke of motor vehicle.

Coughing and spitting here and there spread germs of diseases in the air. Thus, air becomes polluted. Some people dispose waste materials, and urinate in side walks, under the trees or here and there. The immediate environment becomes filthy and fetid. Mills, factories and brick kilns must

have chimney or chemical filter so that smoke or fumes emitted from them cannot pollute the environment. To run motorcars, refined petrol or natural gas should be used. Now-a-days, motorised vehicles have started using natural gas. Generally natural gas does not pollute air.

Some germs of diseases are airborne and spread through air. Such diseases are small pox, tuberculosis, influenza etc. One should avoid close contact with and keep a safe distance from patients suffering from these.

Have you noticed how air gets polluted in your locality? What measures would you take to prevent that pollution? Discuss with your peers and prepare a list.

List -1

| Causes of air pollution | Harmful effects of pollution | Preventive measures of pollution |
|--------------------------------|-------------------------------------|---|
| 1. | | |
| 2. | | |
| 3. | | |

As we need nutritious food for keeping ourselves healthy, likewise, we need to breathe fresh air as well. Therefore, we have to be vigilant about our environment so that it does not get polluted.

Exercise

A. Tick (✓) the correct answer :

1. Which component is present in higher amount in air?
a. Oxygen b. Carbon dioxide
c. Water vapour d. Nitrogen

2. Which is needed for breathing of living beings?
a. Nitrogen b. Oxygen
c. Helium d. Argon

3. What is the ratio of oxygen, in the air of a certain place?
a. 1/5 part b. 1/10 part
c. 1/50 part d. 1 part

4. What kind of matter is air?
a. Solid b. Liquid
c. Mixture d. Heavy

5. What component of air is needed in the manufacture of plant food?
a. Oxygen b. Helium
c. Nitrogen d. Carbon dioxide

6. Why does a parachute land slowly and safely?
a. Because it lands with the help of a machine
b. Men are heavy so it descends downwards
c. Due to downward pressure of air
d. Due to upward pressure of air

B. Give short answers :

1. Explain what is atmosphere.
2. Give five examples of the existence of air.
3. Name the components of air. Which component exists in a higher amount?
4. Which component of air is needed in breathing by living beings?
5. Why is air called a mixture?

C. Essay type questions :

1. What is polluted air?
2. How is air polluted? Explain.
3. Mention some measures for keeping air pure.
4. Write down the uses of oxygen.
5. Write down the uses of carbon dioxide.
6. Write down the uses of nitrogen.
7. How can you prove that fire does not burn without oxygen?
8. Why do divers and mountaineers carry oxygen cylinder with them? Explain your answer.
9. How can you prevent pollution of air? Discuss it.
10. With the help of a diagram show the uses of different components of air. Write down which components are used.

Chapter Five

Hygiene

We live at home. During the day, we spend a considerable period of time in school and to purchase provisions from the market. If these places are not clean, we cannot keep ourselves healthy. We will get infected with various diseases. For our survival we need air, water and food. We get all these from the environment. If the environment is not clean then soil, air, water and food - all get polluted. Therefore, in order to remain healthy we have to maintain a clean and tidy environment.

Causes of Untidy Houses

Our houses become dirty in various ways. Kitchen gets dirty with vegetable peels, fish scales, stale food and dirty water. These give rise to a foul odour in the kitchen and create disturbances by the presence of houseflies, cockroaches and mice. Leaves, flowers and fruits fallen off the trees create garbage, as do droppings of poultry, cow dung and bits of dry straw. All these garbage turn the house dirty. As the garbage decays, it spreads further foul odour. The houseflies and various kinds of insect lay eggs and breed on the garbage. Decayed garbage contains germs of various kinds of disease. If we cough or betel leaves juice here and there, it dirties our houses and dwelling places. If you watch carefully you can find out the causes of a dirty house. Write down some of the causes in your notebooks.

Ways to Keep Houses Tidy and Clean

Collect garbage instead of throwing it all over the place and dispose of this in a pit away from the house. After the disposal of garbage,



Fig: A boy disposing garbage in a pit



Fig : A boy and a girl disposing garbage in a dustbin

cover the pit with soil. It will prevent spread of stink and disturbance of houseflies. Cow-dung heaps must be placed away from the house. Carcasses of animals must be disposed of under the soil in a pit. Take care not to put cow-dung and garbage disposal pit adjacent to wells and ponds. Refrain from coughing, spitting and urinating here and there. There are dustbins by the side of roads in cities to dispose of garbage. Dispose garbage in dustbin instead of scattering it all over the road. Some people throw garbage in the drain although they should not do it.

This clogs the flow of water and pollutes environment. Mosquitoes also lay eggs in stagnant water.

Ways to Keep Classroom and School Neat and Clean

We study in the schools and spend a considerable period of time of a day in school. Therefore, to keep us healthy, it is essential to keep the school clean and tidy. During tiffin you

perhaps eat banana, peanut, ice cream and biscuit. Do not throw away the peel or the skin, packets, scraps of papers, tins or cans, polythene bags etc. all over the places. Put all these in a basket placed in a corner of the classroom. Also put litter of sharpened pencil and scraps of paper in it. Keep a drum or a plastic bucket in the classroom or in a particular place in the school so that all of you can dispose of litter there. If it is not possible, then make a pit away from the classroom out in a corner of the school ground so that all litter can be disposed there. With a regular interval this pit has to be filled with soil. If we follow these activities with care then there will be no garbage around the school. Every day you need to wipe off chalkboards, tables, chairs and benches.

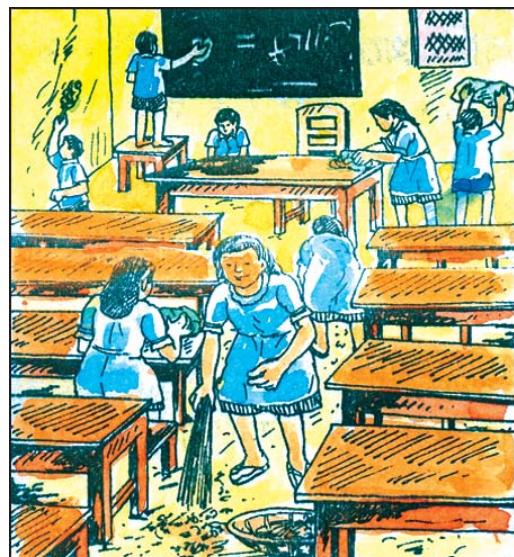


Fig : Learners cleaning the classroom

Classrooms must be swept regularly. Once in a week, all the students of a class should clean soot from walls and ceiling of their classroom. In a group you will clean your classroom, flower garden and playground. You will find your school has a lustrous look. You will feel good to study in this neat and clean surroundings.

Make a list of activities that you will do to keep your home and school clean and tidy.

List-1 : Ways to keep household clean

| | |
|----|--|
| 1. | |
| 2. | |
| 3. | |
| 4. | |

List-2 : Ways to keep school clean

| | |
|----|--|
| 1. | |
| 2. | |
| 3. | |
| 4. | |

Use of Sanitary Latrine

Defecation and urinating here and there are injurious to health. These waste materials are carried away by rainwater into ponds, bogs, rivers or canals and they pollute the water in these places. Moreover, environment also becomes polluted. Therefore, we should take care to build sanitary latrine and ensure its careful use. It is not appropriate to erect an unmetalled or make-shift latrine directly upon a canal, a bog or a water body. This will pollute the environment.

Latrine should be built a little away from the household. Latrine should be built by digging a deep pit and placing a concrete slab with hole on the rim of the pit. The concrete slab should be washed every time it is used. There should be no tube wells or ponds near or around the latrine.

In cities, as well as, in many rural



Fig : A make-shift latrine

households, the latrines that are being made now-a-days following modern methods are hygienic. This type of latrine is known as sanitary latrine. Constant maintenance for cleanliness is needed for this type of latrine. After defecation hands should be washed with soap, soil or ash and water.



Fig: A sanitary latrine

Harmful Effects of Contaminated Water and Food Consumption

No animal can live without water and food. However, water and food must be pure and safe for consumption. Contaminated water often acts as a cause of death. Cholera, typhoid, diarrhoea, dysentery, jaundice etc., diseases can occur on drinking contaminated water.

It is harmful to take food that are rotten, stale or on which flies have settled. Pickles and chanachur are sold in front of many schools. These foods contain germs as flies sit on them and dust particles gather on them. In this way these foods become contaminated. If contaminated foods are eaten, different kinds of stomach-related infection such as, cholera, typhoid and dysentery occur. We can be safe from many diseases if we wash our hands carefully before taking food.



Fig : Foods safely covered



Fig : Flies settling on uncovered food

We could prevent various diseases if we consume water and foods following the rules given below :

1. We must know whether the tube well water is arsenic-free or safe for drinking.
2. If water of well or river has to be used for drinking purpose, it should be boiled and cooled for drinking.
3. We should drink piped water or tube well water.
4. We should wash all plates, utensils and vegetable in pure and safe water.
5. We should cover all kinds of food and water.
6. We must not take stale and spoiled food.
7. We should wash our hands well before eating.
8. We should keep our kitchen and dinning space neat and clean.

Taking Care of the Body

To remain healthy it is essential to take care of the body and maintain cleanliness. Hands, legs, nails, hair, eyes, ears are parts

or organs that constitute our body. We have to take care of each part of our body. That will keep body sound and healthy and the mind happy.

Care of Eyes

The eye is a vital organ. We see everything with this organ. If we do not keep our eyes clean, they can get infected with diseases such as, conjunctivitis, red eyes, scratchiness of eyes etc. Every day eyes should be washed a number of times with clean water. If any dust particles or any other particle get into your eyes, then wash these out by splashing your eyes with water. Do not wipe off your eyes with dirty hands. To wipe off your eyes, use a soft and clean piece of cloth. If your eyes become red or you have water running from your eyes, then visit a doctor.

Care of Tooth

We use teeth for chewing our food. If we do not take care of our teeth, they get infected and we will have to lose our teeth prematurely. After each meal, we need to gargle well with water.



Fig : Washing eyes by splash of water



Fig : Brushing teeth with toothbrush

It is essential to brush our teeth with a toothbrush or a neem twig every morning and at night before going to bed.

There are chances of infection if teeth are cleaned by using charcoal or ash. Small bits of food get stuck between the teeth. If teeth are not cleaned regularly these particles of food decay and form germs. Teeth are then infected with various kinds of disease such as toothache, swelling of gums and formation of pus at roots of teeth. Sometimes it so happens that you have to uproot the tooth. You should visit a dentist at regular intervals.

Care of Ears

We hear with our ears. The inner part of the ear is very soft. Therefore, never insert any hard chip or feather to clean your ear. It may cause damage to the ear and can rupture the eardrum. To clean ears, you have to use a small piece of clean soft cloth or cotton winding it on top of a chip. For this we should take the help of elder. Excess wax in the ear may cause earache and sometimes it impedes hearing sensation.

Care of Nails

If you grow your nails too big, dirt and germs of diseases stick into the nails. When you eat with these dirty fingers, dirt goes into your stomach and causes infection. Therefore, you should cut your nails regularly. In addition, keep the nails clean.

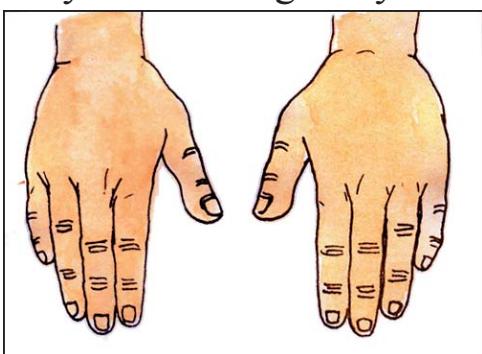


Fig : Clean nails

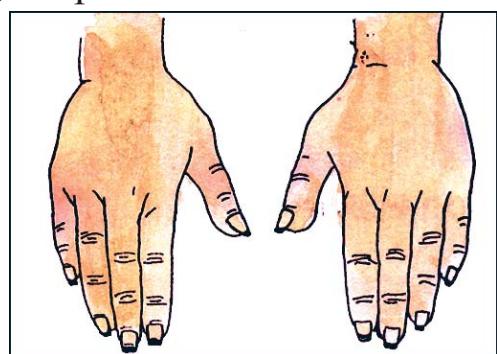


Fig : Dirty nails

Exercise

A. Tick (✓) the correct answer :

1. What is needed to be healthy?
a. Pure water b. Safe food
c. Clean environment d. All of the above

2. Where does housefly lay eggs?
a. in courtyard b. in water
c. on decaying garbage d. in grass

3. Which makes your classroom dirty?
a. vegetable peel b. litter from sharpened pencils
c. bits of straw d. scraps of food

4. Which disease is water-borne?
a. Cholera b. Headache
c. Tetanus d. Breathing trouble

5. What water is safe to drink?
a. river b. well
c. pond d. rain

6. What do we need to do to keep healthy?
a. Clean eyes b. Cutting nails
c. Regular brushing of teeth d. All of the above

7. What should we use to brush teeth?
a. Toothpaste b. Ash
c. Charcoal d. Soil

B. Match the word/words on the right side with those on the left side :**Left**

1. Egg shells, dry leaves create
2. Spoiled food causes
3. Contaminated water contains
4. Other name of water is
5. To keep environment clean we have to be

Right

- a. diarrhoea
- b. life
- c. careful
- d. pure
- e. garbage
- f. germs of diseases

C. Fill in the blanks :

1. We should drink _____ free tube well water.
2. If the kitchen is dirty it increases disturbance of _____.
3. Dead bodies of animals should be buried _____ the soil.
4. Spitting here and there is a _____ habit.
5. In cities there is _____ to dispose of garbage.
6. After taking snacks _____ throw packets here and there.
7. Do not build a _____ directly on a water body.
8. Wash hands with _____ after defecation.
9. Jaundice spreads through _____.
10. In stagnant drain water _____ lays eggs.

D. Give short answers :

1. Why do we need to maintain clean environment to keep healthy?
2. What is the normal garbage of the kitchen?
3. Why should a garbage pit be dug away from the home?
4. What happens when garbage is thrown in the drain?
5. What would you do to keep your classroom clean?
6. Why is defecating and urinating here and there harmful?
7. Write down how you can build a sanitary latrine.
8. Write down what diseases can infect you if you drink contaminated water.
9. What precautions should be taken about drinking water ?
10. What is the necessity of taking safe food and drinking safe water?
11. How can you take care of your eyes?
12. Why is it not appropriate to insert chips into the ear?

Chapter Six

Science For Improved Life

Life style of Ancient Men

Ancient people had to endure many adversities. They had no idea about how to make fire. They could not cook. They lived on fruits and roots of various plants. Moreover, they hunted wild beasts and ate raw flesh. At that time, they had no idea of building houses, and lived in mountain caves. They had no skill in weaving clothes and used to cover their bodies with barks of trees and animal skins. As there was no medicine, they died of minor ailments. There was no transport system and they had to travel distant places on foot.



Fig : Life style of ancient men

Methods of Tool and Fire Making by Ancient People

At one stage, man learnt to make fire by rubbing stones. As they learnt to make fire, they roasted meat in fire and ate it. They gradually learnt to till lands and to do that they learnt to make ploughs. They fell trees with chopper and axe, and built their houses with the timbers.

Once, they used to make tools of stone. They also used animal bones and wood to make tools. They used these tools to hunt

animals and to protect them from the attacks of ferocious animals.

It took early people a long time to discover copper, bronze and iron. Gradually, they learnt to make various tools and weapons from those metals.



Fig : Ancient men making tools and fire

Works of Scientists

Scientists have carried on various studies for newer applications of science. The scientists keenly observed the natural phenomena. They sorted out why particular phenomenon had happened. For instance, they learnt that to raise a good crop soil must be tilled. Water and fertilizer have to be added in the soil. Quality seeds have to be sown. The crop has to be protected from pests and diseases. To do so, application of insecticides are needed. The scientists have invented many products. Cement, plastic, polythene etc. are not available in nature. The scientists have invented these. These materials are used to make many kinds of things.



Fig : Various plastic products.

Can you imagine how comfortably present day people are leading their lives compared to the ancient days? How all these amenities of comfort became available? It happened due to the development of science.

Man got much more advantage with the invention of electricity. At present, industries are run by electricity. We use electric fans and lights. Electric and battery run appliances are a fact of every day life today.

Science has improved our life in two ways. Science has helped us acquire knowledge about the nature. Then again, science has provided us various appliances. These appliances make our living convenient and comfortable. The success of science has enabled modern day people to lead a comfortable life.

Science in Prevention and Cure of Diseases

Scientists found out causes of different diseases. They invented newer vaccines for prevention and medicines for cure of these diseases. In early days, many people died of cholera, small pox and tuberculosis and became physically disabled by polio. At present, these diseases do not happen because vaccines and medicines for these diseases have been discovered. Scientists have discovered that a patient with diarrhoea has to take oral saline and liquid food. Earlier, many children died or became disabled by polio, measles, tuberculosis, diphtheria, whooping cough and tetanus.

At present, we have medicines and vaccines that can keep us safe from these diseases and hence, children rarely die of these diseases.



Fig : A child being vaccinated and oral saline being prepared

In ancient time, people used horse, donkey and elephant for transportation. Wheels were not invented at that time. With the invention of wheel people got bullock cart, horse carriage, cycle, rickshaw etc.

Just imagine, how difficult life would have been for us, if there were no wheels. Science has helped us a lot in the field of communication. Motor cars and aeroplanes are modern means of transportation. With the help of vehicles we can travel fast from one place to another and carry goods and luggage as well.



Fig : Different transport vehicles

In the following table there are some names of transports given in left side. Write down the names of transports that have wheels in the right column.

| Name of vehicles | Name of vehicles with wheel |
|------------------|-----------------------------|
| Horse carriage | |
| Bullock cart | |
| Rail carriage | |
| Motor car | |
| Cycle | |
| Boat | |
| Rickshaw | |
| Palanquin | |

Science has given us increased mobility in the transport sector. For the mobility of the people, three kinds of transport are available. The examples are listed below in a table form.

| Land vehicles | Water vessels | Aircraft |
|---|--|----------------------------|
| Rickshaw, cycle, rail carriage, horse carriage, motor car, truck, jeep, car, etc. | Raft, boat, launch, steamer, ship, mechanised boat, speedboat,etc. | Helicopter, aeroplane, etc |

Each of you prepare a list of land, water and air transports. Then share your lists with others. Identify the transport vehicles that you have travelled by. Prepare a table in your notebook following the table given below.

| Different water vessels | Different land vehicles | Different air crafts | Transports you have used | Transports you have seen |
|-------------------------|-------------------------|----------------------|--------------------------|--------------------------|
| | | | | |

In ancient time, human beings used to do all works by physical labour. After wards, they began to use cows and horses to draw ploughs and carts. They learnt to use water current. The scientists invented engines and these are run by oil and coal.

At present, we are using electrically driven engine. In ancient days people used to write on plant leaves and on stones. After the invention of paper, people have learnt to write on paper. Afterward, scientists invented printing press and now books, newspapers, magazines, etc are printed in the printing press.

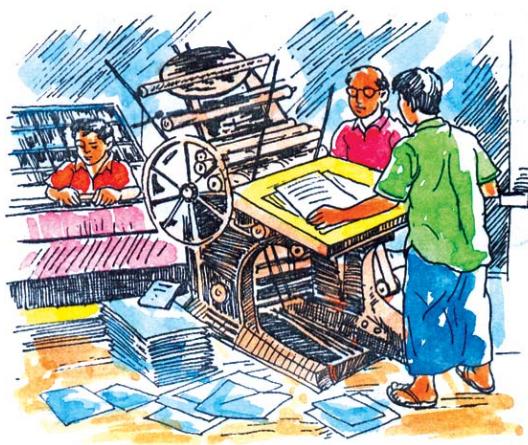


Fig : Printing press

You must have heard about computer. A computer is capable of counting very quickly. Many information can be stored in it. Information can be sent through e-mail.

Moreover, computers can receive a mailed message immediately. Pictures can be drawn with the help of a computer.

One can also create cartoon pictures. We can see films and dramas, listen to music and also play games on computers. We can communicate with a person anywhere in the globe through internet. In a computer you can store necessary information on education or anything you like.



Fig : A computer



Fig : A microscope



Fig : A telescope

Scientists have devised many instruments to study nature. A microscope is used to observe a minute object in a much bigger size than its original size. Doctors and scientists use this instrument for their work. The instrument, which is used to observe distant objects, is called the telescope. Scientists observe planets and stars through the telescope.

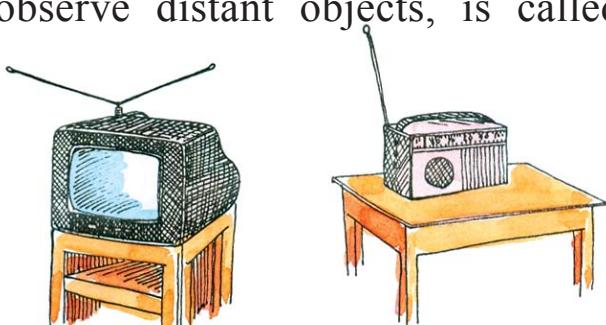


Fig ; A television and a radio

Scientists have invented radio and television. We listen to radio and watch television for various news related to education.

In addition to listening to sounds or speeches, we can see pictures on the television. We can improve our knowledge by listening to news on television and radio.

Simple Instruments and Their Use in Every Day Life

We use different types of instruments for our household chores. Notable among these are chopper, kitchen knife, knife, scissors, spade, axe, sickle and plough. These are called simple instruments.

Chopper and axe are used to chop bamboo and woods. These are used in making household materials. Besides, we need chopper and knife in various day to day activities. Using a chopper we can cut bamboo and with a knife we can chop onion, garlic and vegetables. Moreover, we need this instrument to slaughter cows, buffaloes, sheep and hens.

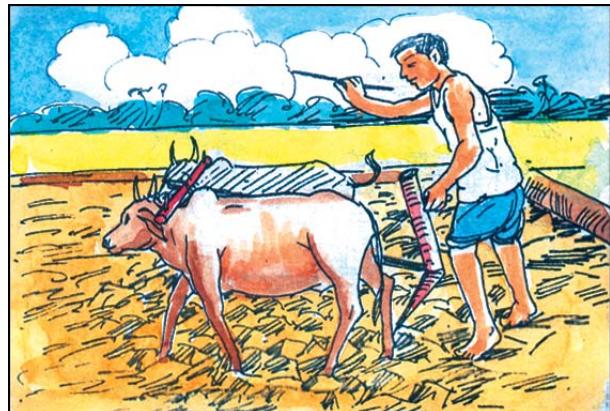


Fig : Tilling land with plough

Kitchen knife is used in chopping of vegetable , fish and meat. Cloth and paper are cut with scissors. Spade and sickle are used in agricultural activities. Spade is used to till soil and sickle is used to harvest crops.

These day to day utility instruments are very sharp. We have to handle them carefully. Otherwise, we may cut our hands or

legs with these sharp instruments. We should keep these out of children's reach.



Fig : Various types of simple instruments

Effects of Science upon Environment

The contribution of science to the development of human civilization is immense. Science has provided many benefits for human welfare. Side by side with progress, science has also been damaging nature in different ways.



Fig : Polluted environment



Fig : Improved environment

The motorised vehicles and factories are among the achievements of science. But emission of black smoke from them cause many harms to the environment. These black

smokes make air poisonous. Black smoke is very harmful for human health. Plants and vegetation keep our environment pleasant. However, in erecting modern buildings we need bricks and timbers. Lots of wood is burned to produce bricks. This causes depletion of plants and causes imbalance in environment. One of the main causes of environmental disasters is the change in environment, excessive rain, floods etc. In order to avert disaster and save our environment we must keep planting more trees.

Exercise

A. Tick (✓) the correct answer :

1. Where did ancient people live?
 - a. Branches of trees
 - b. In mountain caves
 - c. Under the sky
 - d. On mountains
2. What has science offered to human?
 - a. Hardship
 - b. Poverty
 - c. Natural calamities
 - d. Improved life

B. Fill in the blanks :

1. Once, human beings used stones to make _____.
2. Convenience and comfort resulted from the _____ of science.
3. Ancient people lived on hunting wild _____ and eating _____.

4. The computer is capable of _____ very quickly.
5. Minute objects are studied in a much larger size through _____.
6. Distant objects are watched through _____.
7. Cloth and paper are cut with _____.
8. Plough is used to till _____.

C. Give short answers

1. What were the materials that ancient people used to cover their bodies?
2. What are the vaccines of diseases invented by the scientists ?
3. Give examples of water vessels, land transports and aircrafts.
4. How do we hear news of distant places?
5. Give some names of different types of simple instruments.

Chapter Seven

Information For Knowledge

At the beginning of the year 2000, learned and wise people of the world had said something very prudent. They said that knowledge was the major and real asset of the current world, not gold or diamond mine or oil reserve. This means that when the people of a country acquire more knowledge through studies, that country will flourish faster and be more resourceful. If we want our country to be prosperous and resourceful, then our children have to acquire knowledge. They have to study and know about new and current information.

Information

Human race is different from birds and animals. You may have noticed that they do not have to learn anything new to survive. But we have to learn to survive. When a child is born, he remains totally helpless. His mother rears him up with a lot of care and attention. The mother has to know many things to help the child grow up properly. She learns the things from other members of the family or from doctors or nurses. She also learns many things from radio or TV. The children also start learning new things as they grow up. They go to school after growing up a little more. Then they start learning by studying the textbooks at the schools and also from the

teachers. Therefore you can very well see that human beings spend all their life in learning new things.

Knowledge

Information and Knowledge do not mean the same. It is not good enough to have information. Information needs to be applied also. Application of information can be termed as Knowledge. You can easily understand this from the following example. The marks obtained by a student of your class is information. But if you are given this information and you just memorise those figures, your knowledge will not improve at all. But if you study the figures in details, your knowledge will increase. Because then you will notice that most of the students have not obtained good marks in English. This means that English was not taught well in your class. You will then study more and try to learn English well. From the information you will be able to seek new knowledge. You will be able to apply your knowledge properly in your life.

Many people in our country think that information is knowledge. They force the students to memorise the information given in the textbooks at the schools. Our students work very hard but their knowledge does not increase by this in any way. When you study, always try not to memorise but to understand and apply the information .

Necessity of Information

You must have understood by now the necessity of information. The capability to use information is Knowledge. Therefore if there is no information, there will be no knowledge. Scientists extract new knowledge by using new information. Government needs to have

information, old and new to run the country well. People's lives can be saved and they can be protected from danger if we have information on cyclone or floods beforehand. Therefore information is essential for a better way of life. But information has to be correct and has to reach concerned people in proper time.

Preservation of Information

There was a time when information could not be stored or preserved. People used to store information in their mind. When they used to get old, they used to transfer the information to other people. Men for the first time started preserving information when they learnt how to write. People used to write books by hands, before the printing machine was invented. This is why there was limited number of books in the world. Only a few lucky persons could read those books. After the printing press was invented ordinary people also had the chance to read books. Then onwards, necessary information has been stored in millions of books kept in the libraries all over the world. Information also has been stored as photographs, images of books, films, and audios.



Fig: A lot of information are preserved in Library books.

People started preserving information in a new system after computer was invented. This is known as Digital System. This system can help to store a large volume of information within a smaller space. Throughout the world much of the information is preserved with the help of this system now.

Exchange of Information

If you just collect and store information, your work does not finish. Information has to be sent from one place to another. There was a time when it was difficult to send information as one person had to travel physically from one place to another with a piece of information. Now there are many ways to send information, such as, postal communication, fax-telephone or computer networks. We can send letters by postal system. Letters can be sent to any place across the world by motor vehicles, trains, ships or airplanes.

You all have seen telephones. Anyone can talk with another person through a telephone. Now mobile phones have been invented. We can carry a mobile phone in our pocket to any place we go. When letters, papers or documents etc. are sent by using telephonic system then it is called Fax.



Fig: exchange of information by using computer networks is called Internet



Fig: mobile phones can be carried to any place

Computer networks are now widely used for exchanging information. You can exchange information through your computer which can connect millions of computers all over the world. This system is known as Internet. Internet can be used for sending any mail or e-mail, picture, video or any other information from one computer to another. Not only that one can find lots of information stored in different computers. The current world depends heavily on the internet system.

Collection of Information

When you will grow up, you will surely collect much information, store them and will exchange them with others. If you wish you can start collecting information even from now. We give below a few ideas which you can use. Along with these you can also use your own ideas.

If you want you can collect leaves from different trees in your own areas and note their names.



If you want you can collect leaves from different trees

You can also write down the names of different birds you can find in your areas.

You can keep a record of the weather of different days in your

diary or a note book. You can observe the temperature, whether it is low or high, if there is fog or not, whether there was a storm or rain etc. If you can keep a record of all these information every day, you will ultimately get a picture of different seasons of Bangladesh.

You can also cut and paste pictures of your favourite sports or information about new scientific inventions in your note book.

Remember, your duty does not finish with collection of information this way. You have to look into it in detail and find out the knowledge hidden in all these information.

Exercise

A Tick (✓) the right answers.

1. What are the resources of the new world?
A oil reserve B gas field
C knowledge D fighter planes

2. What does a man need the most to live?
A new dress B new habitations
C new transports D new information

3. Where can information be stored?
A in the library B in the shops
C in the schools/colleges D in offices

B. Fill in the blanks.

1. The capability to store information is knowledge.
2. The act of exchanging information by using computer networks is called communication.
3. Telephone can be carried in the pocket.
4. Information can be stored in the computer by using memory system.
5. When letters, papers, documents are sent using telephonic system, the system is Called communication

C. Give brief answers.

- 1 Why should one not memorise during studying?
- 2 What is the necessity of information?
- 3 Write a few names of the systems for exchanging information.
- 4 Write about one of your ideas for collecting information.

Chapter Eight

Our World

The Sun, the Moon and the Earth

The Moon

We can see the moon in a cloudless sky. The moon is a satellite of the earth. There is no soil, water or air on the moon. There is only stone on the moon. We can see some shadows or marks that look like clouds on the moon.

These are actually hills. Scientists are still carrying out experiments on the moon. The moon has no light of its own. It gets its light from the sun. Our heart fills up with joy when we see the moon-light at night. Do you know how far the moon is from the earth? It is

3,84,000 (Three lakhs and eighty-four thousand) kilometers away from the earth. Compared to the earth's size, the moon is much smaller. In fact, the size of the moon is almost one fiftieth of the size of the earth. In 1969 man first landed on the moon by rocket.

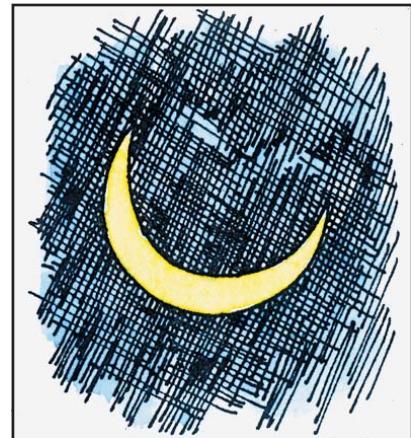


Fig: The moon

The Sun

Every morning the sun rises in the east and sets in the west. But it doesn't rise or set at the same time every day. The time for the sun set and the sun rise changes very slowly. If you watch the

clock every morning when the sun rises and every evening when the sun sets, it will become clear to you. The sun has its own light. And because the sun has its own light, it is called a star. So far scientists have discovered eight planets revolving around the sun.

According to distance, these are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Mercury is the nearest to and Neptune is the farthest away from the sun. At one time Pluto was considered to be a planet, but scientists no longer consider it a planet. Look at the picture here and you will see the position of the planets around the sun.

From the distance the sun looks like a plate to us. Because the sun is so far from us, it looks so small. Do you know how far the sun is from the earth? The distance between the sun and the earth is fifteen crore kilometers. The sun is 13,00000 (Thirteen lakh) times bigger than the earth. That means the sun would be the size of thirteen hundred thousand earths together.

The sun gives us light. What happens when there is no light? It becomes dark. That's why when the sun rises, it becomes day and when the sun sets it becomes night.

The Earth

We live on the earth. The earth is a planet of the sun. The earth is round, but not entirely. Its two sides are little flat.

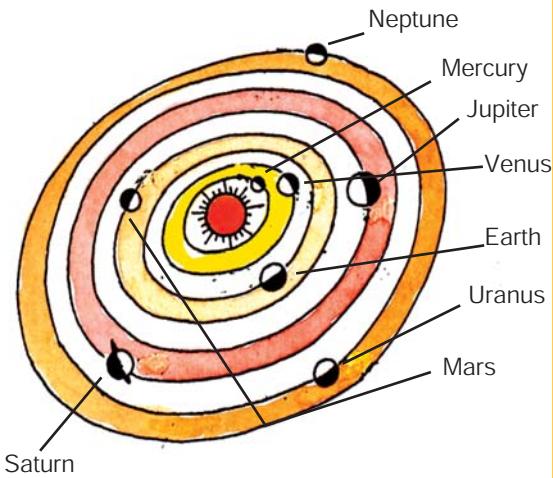


Fig: The Solar system

There is water, soil and air on the earth. Because of this, mankind, other living beings and trees and plants live on this earth. Except on the earth, on no other planets have these elements been found yet. That's why there are no living beings or trees and plants in any other planets. The place on earth where we live is called Bangladesh. There are many other countries like ours on earth as there are innumerable rivers, seas and mountains.

When the sun light falls on a particular part of the earth, it is day there. The other part remains dark and it is night there. Do you know why it happens so? The reason is that the earth does not stay fixed in one place. It is revolving around the sun following a definite path. At the same time it is also revolving on its own axis. It takes one year or, 365 days and 6 hours for the earth to come round the sun once. You may have seen a top spin. If you wind it and start it spinning, it keeps revolving on its own pin and at the same time moves from one place to another. Like the top, the earth is also revolving around the sun.

Experimenting on How Day and Night Happen

We can easily do this experiment with the help of the following picture. We will need a candle, matches, a table and a globe to do this experiment. Instead of a table, you can use the floor.

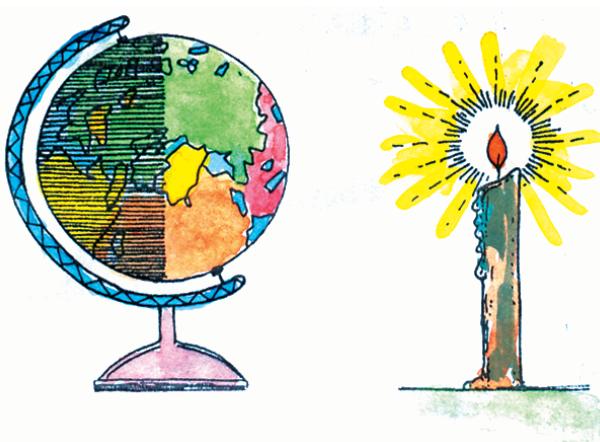


Fig : Experiment to show how day and night happen

Light the candle on the table or the floor in a dark room. Now place the globe in front of the lighted candle. Notice that the light is falling on one side of the globe only. The other side is not getting the light. And thus, we say that it is day on the part that gets the light and it is night on the part which does not get the light.

Record of the Amount of Rainfall

In order to record the amount of rainfall in a place, take two similar glasses and place them in rain. Store rain water in both the glasses. Keep time on a watch and see how long it takes to store the water. Take a ruler and measure the height of water level in each glass. Note down the height of water level and the time it took to store that much water in the following table. You will know more about the scientific ways to measure rainfall when you grow up.

Table - 1

| Height of water in the first glass | Height of water in the second glass | Time taken | Date |
|------------------------------------|-------------------------------------|------------|------|
| | | | |

Exercise

A. Tick () the right answer :

1. How many kilometers away is the moon from the earth?
a. 3 lakh and 80 thousand b. 3 lakh and 84 thousand
c. 3 lakh and 50 thousand d. 3 lakh and 60 thousand
2. How many times is the earth bigger than the moon?
a. 30 b. 40
c. 50 d. 60

B. Fill in the blanks :

1. The moon is a _____ of the earth.
2. The moon gets light from _____.
3. The moon doesn't have any _____ of its own.
4. The sun has its own _____.
5. The sun _____ at the same time every day and _____ at the same time.

C. Give short answers :

1. What is the sun?
2. How does the earth look?
3. How far is the sun from earth.
4. Which planet has living beings and trees on it?
5. Write down the names of the ten planets of the sun.

Chapter Nine

Population and Environment

Small and Large Family

We all live in the family. Our family consists of mother, father, brother, sister and other relations. In the chart below, we can see the members of three families that of Rashid, Rafiq and Runa. In Rashid's family, his maternal grandmother and maternal grandfather live with them. How many family members are there in Rashid's family including his mother, father, maternal grandmother, maternal grandfather and younger sister ? Who are the members in the family of Rafique? Rafique's younger uncle studies in a college and he stays in Rafique's house. In the family of Runa live her grandfather and grand mother. How many family members are there in Runa's family including her younger brother and sister ?

Write down the number of family members belonging to Rashid, Rafique and Runa respectively in the following chart. Write down how many family members each family has.

Table 1 : Small and large family

| | Mother | Father | Brother | Sister | Paternal grandfather | Paternal granad-mother | Maternal grandfather | Maternal grand-mother | Uncle | Aunt | Total members |
|---------|--------|--------|---------|--------|----------------------|------------------------|----------------------|-----------------------|-------|------|---------------|
| Rashid | 1 | 1 | 1 | 1 | | | 1 | 1 | | | |
| Rafique | 1 | 1 | 1 | | | | | | 1 | | |
| Runa | 1 | 1 | 1 | 2 | 1 | 1 | | | | | |

Study the above table and find out which family is small and which is large. The family that contains lesser number of members is called small family. According to the table above Rafique has a small family because their family has four members. There are seven members in Runa's family. The number of Runa's family members are more compared to families of Rashid and Rafique. Runa has a large family. The family that contains a good number of brothers and sisters and relatives is a large family.

Advantages of a Small Family and Disadvantages of a Large Family

A small family can live in a small house. Whereas, for a large family, it requires a big house with many rooms. If there is shortage of rooms in the house, family members of a large family have to live crammed in a room and have to suffer.

A large family has to spend more money for their food. When they cannot buy enough food for want of money, the family members do not get their required amount of food. In that situation family members suffer from malnutrition and might get infected with various diseases.

A family with smaller number of members can live well compared to a large family. Therefore, it is better to have a small family.

Classroom Environment

You read in class three. Count how many students are there in your class and write down the number in the table given below:

Table -2 : Student number in class three

| Class | Boys | Girls | Total |
|-------------|------|-------|-------|
| Class Three | | | |

Do all the students in your class have enough room to sit comfortably in the benches that are there? What will happen if the number of students increase further in your class? Then perhaps more students will have to sit in each bench than the number of students that sit on at present. Students will then have a lot of difficulties in sitting and writing comfortably. They won't be able to concentrate on what the teacher is teaching. This will hamper quality of learning.

If the classroom is crammed with students, the teacher could not give proper attention to every student of the class. Then a number of students would not be able to grasp their lesson. Therefore, these students would not do well in the examination.

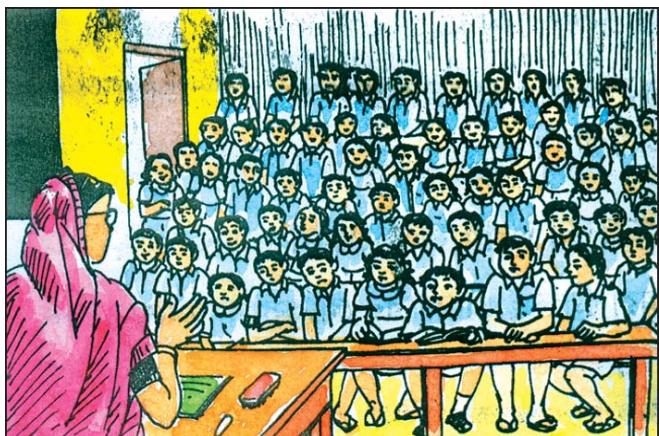


Fig : A classroom crammed with students

The teacher can give full attention to a class with smaller number of students. Teacher can make special arrangements for the

students who have difficulty in grasping the lesson. As the class is small the classroom does not quickly get untidy and dirty.

Population of Bangladesh

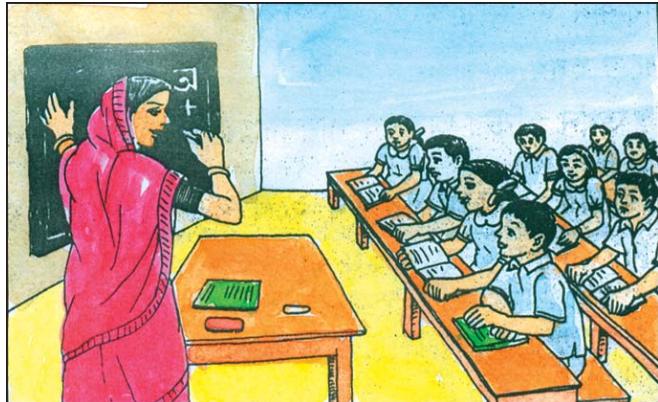


Fig : A classroom with small number of students

According to the census of 2001, the population of Bangladesh is about 12 crores and 93 lakhs. Out of the total population, one half is male and the other half is female. Notice the table below:

Table -3 : Population of Bangladesh

| Year | Male | Female | Total population | Remarks |
|------|-------------------|-------------------|--------------------|---------|
| 1991 | | | 11 crores 15 lakhs | |
| 2001 | 6 crores 59 lakhs | 6 crores 34 lakhs | 12 crores 93 lakhs | |

In 1991 , the population of Bangladesh was 11 crores and 15 lakhs. In 2001, the population of Bangladesh was 12 crores and 93 lakhs. The number of males was 6 crores and 59 lakhs, and number of females was 6 crores and 34 lakhs. Study the table above and you will see that out of the total population, one half of the population consists of males and the other half of females.

Find out from the table whether population has increased or decreased after the year 1991 and write down your remarks.

Effect of Population on Environment

You already have learnt that if there is more members in a family, it causes accommodation problem. We cannot live in a clean and tidy condition and for want of food various infections occur. Moreover, you have learnt that larger number of students creates scarcity of seats in the classroom which hampers learning of the students.

Rise in population of any country creates a number of problems. It creates scarcity of residential plots, houses and foods.

The number of population of our country is much higher compared to the land area. From the table - 3 on population of Bangladesh you have already learnt that population of our country is increasing further. Due to the increase in number of population, people of our country are not getting jobs. We have to meet shortage of food by importing food from abroad. There is shortage of land for building residents and houses to live. With the increase of population, air and water that are essential for us become polluted, too.

With too many people there will be too much of garbage. Lack of cleaning will cause accumulation of a huge amount of garbage. With the stink of the decaying garbage, air becomes polluted. More motor vehicles, launches and steamers are needed for the transportation of increasing

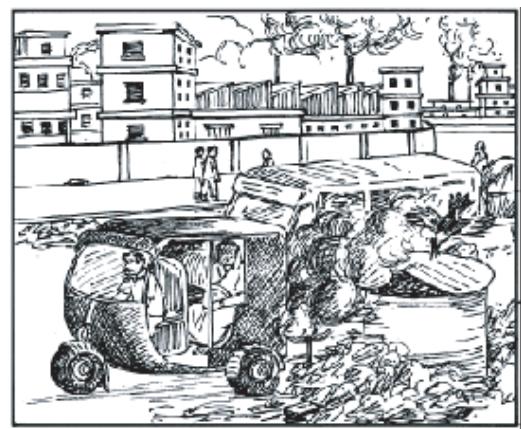
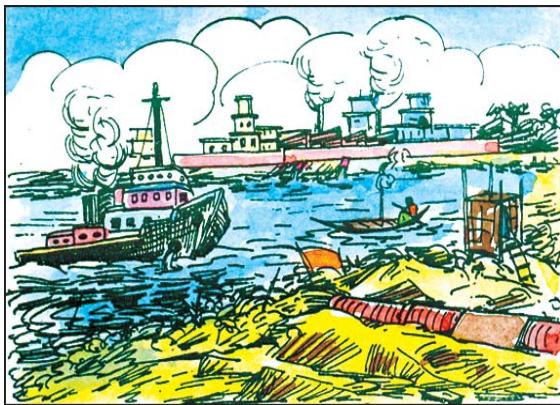


Fig : Air pollution

number of people. Smokes from these transports pollute air. Besides, smokes from mills and industries mix with the air in the atmosphere and pollute the air.



Litter from motor vehicles, launch, steamer, industrial waste and decayed garbage mix with water and pollute water. Polluted air and water are the causes of many diseases that affect us.

Fig : Water pollution

If the family remains small in size, the population size of the country will also remain small. If we want to live well we have to keep our family sizes small.

Exercise

A. Tick (✓) the correct answer :

1. Which ones have resulted due to the increase of population in Bangladesh?
 - a. Job opportunities
 - b. Housing facilities
 - c. Abundant food
 - d. Scarcity of safe water

2. After 1991, how population has increased or decreased in Bangladesh?
 - a. Declined sharply
 - b. Slightly decreased
 - c. Increased sharply
 - d. Slightly increased

3. What happens when a class has large number of students?
 - a. Study goes well
 - b. Teacher teaches well
 - c. Creates sitting problem
 - d. Can maintain cleanliness
4. Who are the members of a large family?
 - a. Mother and father only
 - b. Brother and sister only
 - c. Mother and father, brother and sister
 - d. Mother and father, brother and sister, and other relations

B. Fill in the blanks :

1. Large family has _____ members.
2. Large families cannot buy food for want of _____.
3. Out of total population of Bangladesh _____ male and other half _____.
4. A stink of decayed garbage pollutes _____.
5. Waste of launches and steamers pollute _____.
6. If there is a large number of students in a class _____ hampers.

C. Give short answers :

1. Write down three disadvantages of a large family.
2. Write down the difficulties a teacher faces when a class has a large number of students.
3. Write down three disadvantages of increased population of Bangladesh.
4. How does increase of population cause water pollution ?