Chapter 11

Nature's Treasures

School vacations are always fun for Bhoomi and Surya. This vacation, they visit their *Ajji* (grandmother). *Ajji* lives in a village on the edge of a forest in the Western Ghats. The air in the village is fresh and cooler than in the city. They can see beautiful hills, streams, and many interesting plants, animals and birds around them.

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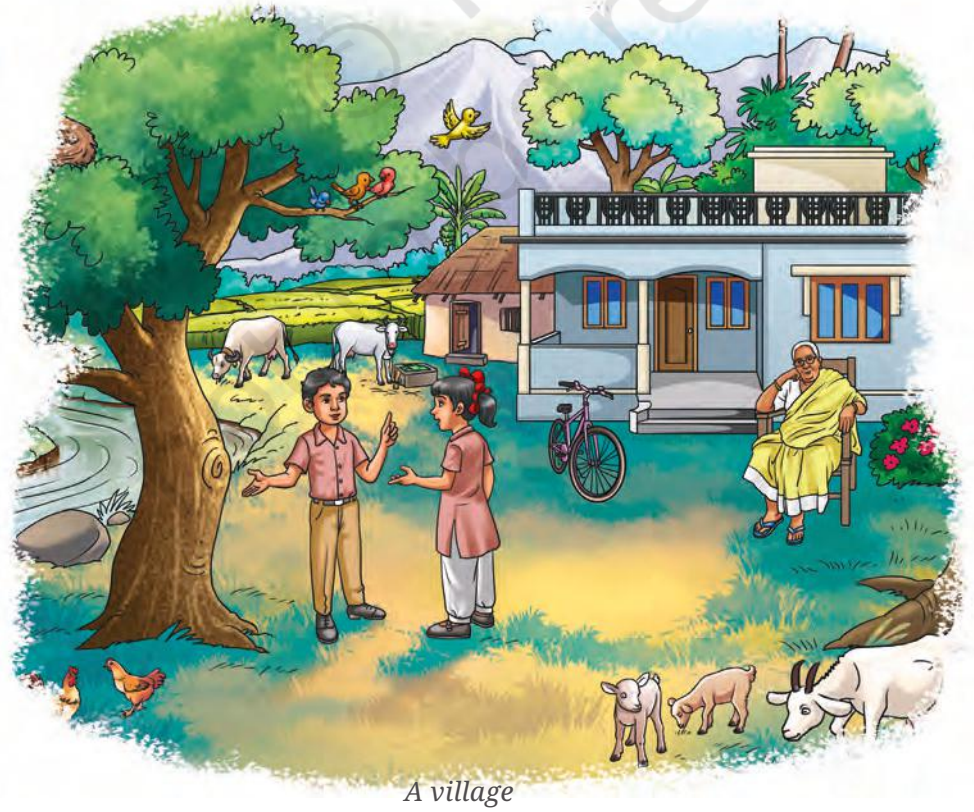
One afternoon, Bhoomi and Surya ask *Ajji* to tell them more about the place. *Ajji* says, "Children, do you know that this place has several treasures of nature that enrich our lives? The pure air is refreshing and the soil is so fertile that it supports a variety of living beings. Moreover, this place gets plenty of sunlight which is useful in many ways. Different varieties of trees provide food and shelter to animals including various birds and insects. Can you think of more such treasures of nature?"



A village

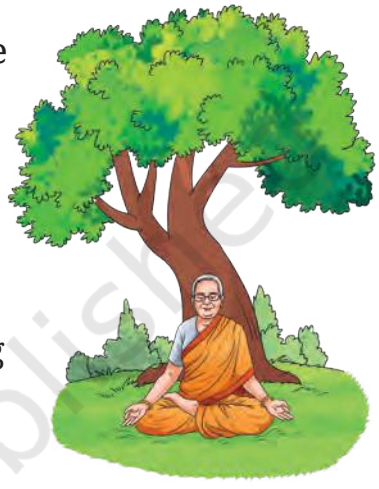
Bhoomi replies, "*Ajji*, we use water for drinking and growing vegetables." *Ajji* says, "Yes. We need these treasures for our survival and for making our lives more comfortable. Without these treasures of nature, any form of life on Earth is not possible." We all are a part of nature.

Ajji explains the importance of air around us and how it is essential for our survival. Let us find out more about air.

11.1 Air

One morning, Bhoomi and Surya see *Ajji* performing some breathing exercises. *Ajji* asks them to join her. She says, "I am taking deep breaths in, and letting them out. This helps in getting more fresh air in the lungs to stay healthy." Bhoomi and Surya sit with *Ajji* and start taking deep breaths.

Let us also perform a breathing exercise.



Breathing exercise

Activity 11.1: Let us experience

- Take a deep breath in, and then breathe out slowly.
- Take a deeper breath in again.
- Hold your breath for as long as you can and then breathe out slowly.
- How long can you hold your breath?
- How do you feel when you hold your breath?

Caution

Do not hold your breath for so long that you start feeling uncomfortable.

From this activity, we find that it is difficult to hold our breath for a long time. The air which we breathe in has oxygen. Our body needs oxygen to perform its functions. When we hold our breath for a long time, the body does not get enough oxygen to perform its functions. Thus, we need oxygen for our survival. Similarly, most of the living beings also need oxygen for their survival.

Do you know?

We can survive without food or water for a few days, but we cannot survive without oxygen for even a few minutes.

The air which surrounds the Earth is a mixture of gases. Can you name some gases which are present in the air? Air contains nitrogen, oxygen, argon, carbon dioxide and other gases in small quantities. Fig. 11.1 gives the composition of air in percentage. Notice that in Fig. 11.1 there are 100 squares. Out of 100 squares, 78 are occupied by nitrogen, 21 are occupied by oxygen, and 1 by argon, carbon dioxide and other gases.

More to know!

Percentage is the number of parts in 100. It is denoted by the symbol '%'.

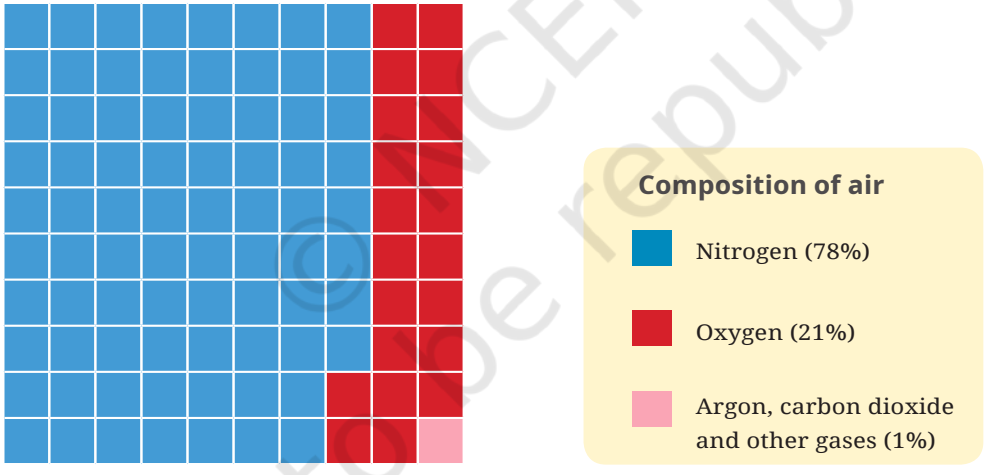


Fig. 11.1: Composition of air

You notice the presence of air when the leaves of a tree rustle, the clothes hanging on a clothes line sway, or the pages of an open book begin to flutter once a fan is switched on.

Moving air is called wind. Sometimes it blows fast, for example, during a storm, and sometimes it blows gently as a breeze. You must have played with a *firki* (paper pinwheel) many times. Let us make a *firki* by performing Activity 11.2.

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Activity 11.2: Let us make and decorate

- Take a square paper of size 15 cm x 15 cm, a pair of scissors, an all-pin and a soft stick.
- Follow the instructions shown in Fig. 11.2 to make a *firki*.

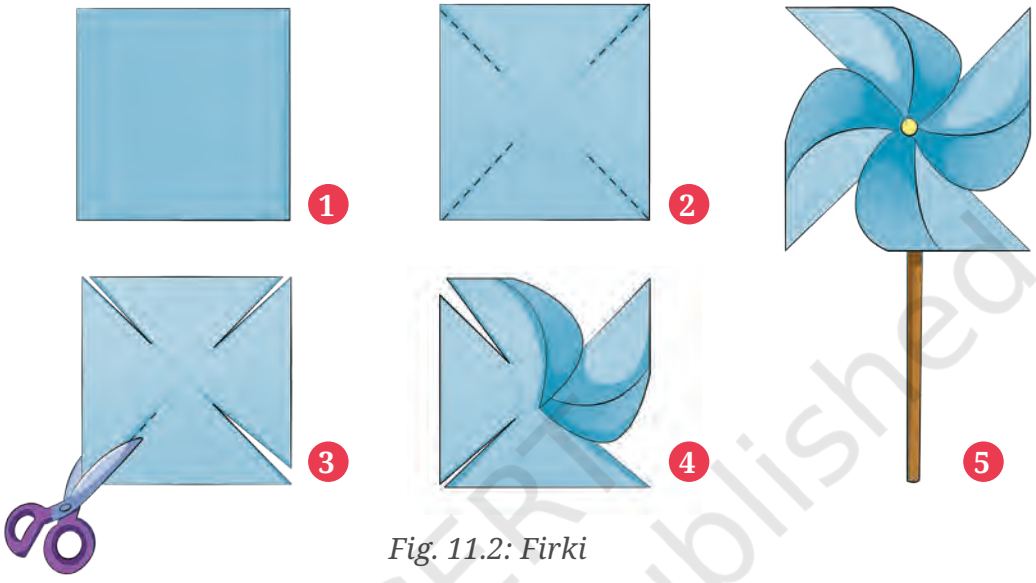


Fig. 11.2: Firki

Now, you can hold the *firki* in your hand and run. You can also blow air on it. What do you observe? Does the *firki* rotate? When you move it a little back and forth, the *firki* rotates. What makes a *firki* rotate? It is the wind that makes a *firki* rotate.

The working of a windmill is similar to that of a *firki*. Wind rotates the wings of a windmill. Windmills can be used to run flour mills, to pull up water from a well, or to generate electricity. In India, there are many windmill farms. A windmill farm is an area that has a large number of windmills which use the energy of the wind to generate electricity (Fig. 11.3).

Fig 11.3: A windmill farm

More to know!

Muppandal Wind Farm in Tamil Nadu, Jaisalmer Wind Park in Rajasthan and Brahmanvel Wind Farm in Maharashtra are some of the leading windmill farms in our country. Find out more other windmill farms in our country.

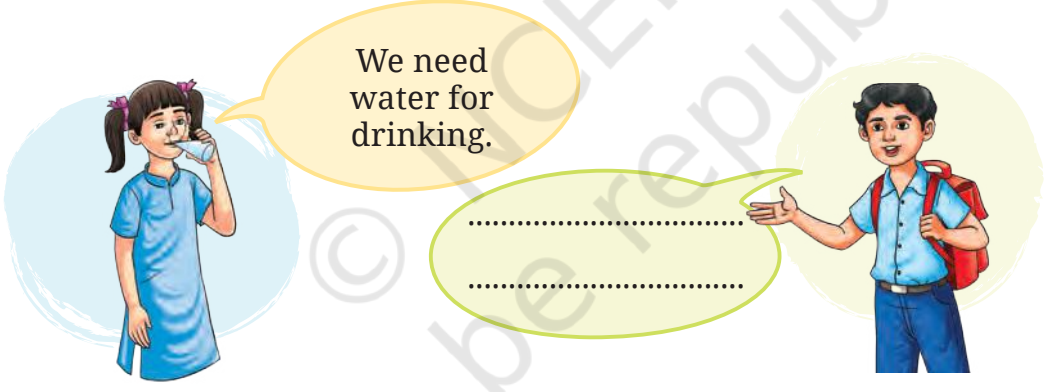
We have learnt that air is very important for us. Water too is essential and precious for us. How do you feel when you cannot get water to drink, especially when you are thirsty? Let us find out more about water.

11.2 Water

Bhoomi and Surya help *Ajji* in filling the troughs of water for the cows. They also help her in watering plants such as vegetables and medicinal herbs in the garden. *Ajji* teaches them how to water the plants so that every drop is used and none of it goes waste.

Can you think of some more uses of water in your daily life? Write down your responses in the blank bubble.

Watering the plants



We need water for many daily activities, such as drinking, cooking, bathing, washing and cleaning. It is also used for growing crops and for industrial purposes. Where do we get water from? Make a list of the different sources of water.

Water covers about two-thirds of the Earth's surface. Most of the water is found in oceans and seas. However, this water is saline or salty. This saline water is not fit for domestic, agricultural and industrial use. For all these activities, we need freshwater, which is present in the form of ice sheets or snow, rivers or lakes on the surface of the Earth, and underground. Freshwater present in ice sheets

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and snow, or underground water is difficult to access. A very small fraction of the freshwater present in ponds, rivers, lakes and wells is easily accessible. Water is precious, that is why *Ajji* guides them to use it with care.

Do you feel that water is being used efficiently in our daily activities? Have you observed water being wasted in your daily activities? Let us find out activities where water is wasted and how this wastage can be reduced.

Activity 11.3: Let us find out

Fill the Column II and Column III in Table 11.1.

Table 11.1: Wastage of water in your daily activities

Column I	Column II	Column III
Activity	**How is water wasted?**	**Suggest ways to reduce wastage of water.**
1. Hand washing		
2. Washing clothes		
3. Washing utensils		
4. Taking shower		
5. Cooking		
6. Gardening		
7. Brushing teeth		

What conclusion can you draw from the information you gathered in the table? What can you and your family do to reduce this wastage of water? There are many ways to reduce wastage of water. For example, turning off taps when not in use and fixing water leakages. Recycling water and water harvesting also help in saving water.

Our country is blessed with numerous rivers, streams and lakes. Have you ever noticed plastic bags and wrappers floating on the surface of water? We pollute freshwater

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sources by throwing trash (waste materials) in them. Waste from homes and industries pollute our water sources when it is dumped into them. Identify other human activities that lead to water pollution. Discuss with your friends in the class what you can do to reduce water pollution. Polluted water is not fit for consumption by living beings.

As freshwater sources are limited, there is a shortage of water in many parts of India. At some places, people have to walk long distances to fetch drinking water. Everyone does not have the same kind of access to water. It is important for us to conserve water and use it judiciously. We must also prevent it from being polluted so that water remains fit for consumption by all living beings. In what ways can you conserve water?

Water harvesting is one of the methods for conserving water. In many buildings, rainwater is collected and stored in large quantities for later use. This is called **rainwater harvesting** (Fig. 11.4a). Do you know that rainwater is also harvested in many homes, residential societies or schools? It is an age-old practice in India.

Fig. 11.4 (a): Rainwater harvesting

For example, stepwells (Fig. 11.4b), commonly known as *Bawadi* in Rajasthan and *Vav* in Gujarat are built for water harvesting as a response to the scarcity of water in these regions. These stepwells have a unique system of water harvesting. They store not only rainwater but also water seeping from nearby lakes, ponds and rivers. The walls of the trenches (long deep holes dug in the ground) are lined with blocks of stones that allow seepage of water. Find traditional water harvesting practices in your locality. Discuss with your teachers and parents to learn more about it.

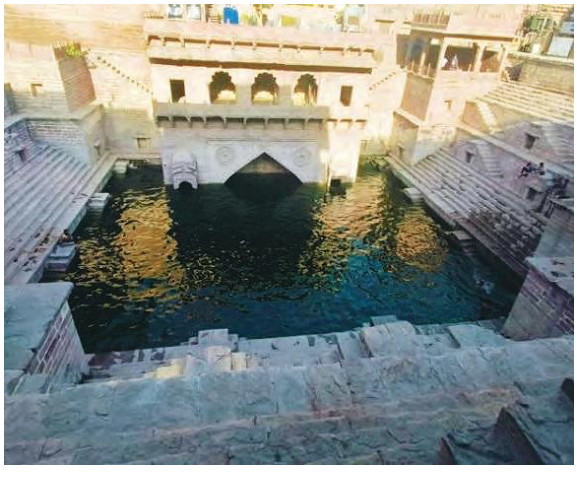

Fig. 11.4 (b): Bawadi (Toorji ka Jhalra, Jodhpur in Rajasthan)

Do you know?

World Water Day is observed on 22nd March every year. Find out its importance.

In the chapter 'A Journey through States of Water', we have learnt about the water cycle, where the Sun plays an important role in the evaporation of water. Have you ever observed your mother or grandmother cut raw mangoes and expose them to the hot sun for several days to dry? Let us explore more about energy from the Sun.

11.3 Energy from the Sun

On a sunny day, Bhoomi and Surya are helping *Ajji* dry chillies in the Sun. *Ajji* says, "We use the heat from the Sun to dry it. We can use dried chillies when fresh ones are not available. I will give you some to take home. Do you know that the Sun is the main source of energy on Earth? All plants and animals are dependent on it."

We use heat and light from the Sun for various purposes. What are some of the activities for which we need heat and light? Bhoomi draws some pictures to show the uses of heat and light from the Sun. Help her by adding more examples. Draw the pictures and write their descriptions in the space provided.

Plants make food

Drying of clothes

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One afternoon, Bhoomi and Surya pass by the field near *Ajji's* house, where they see a cow grazing the grass. They talk about the Sun being the main source of energy. Read the conversation carefully and answer.

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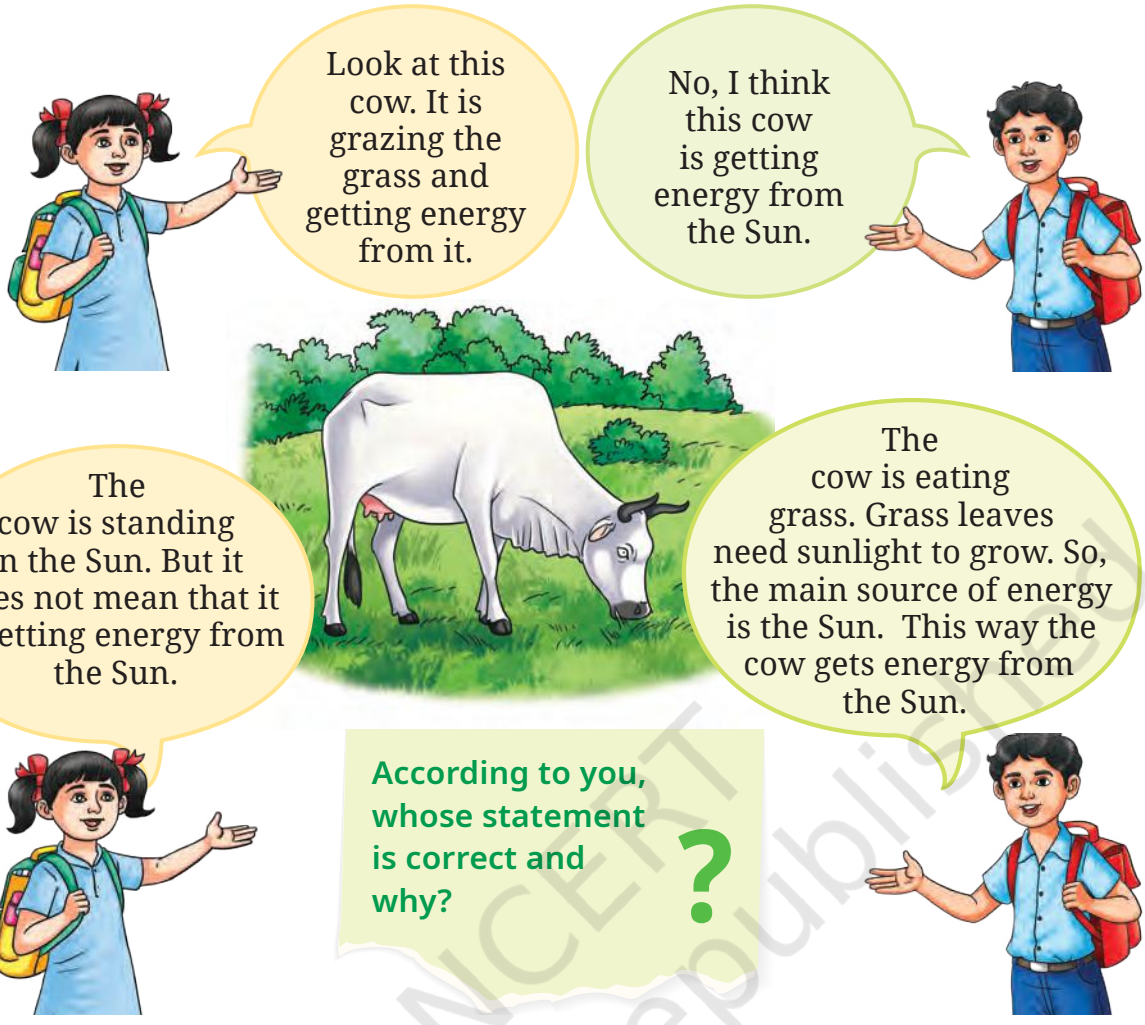
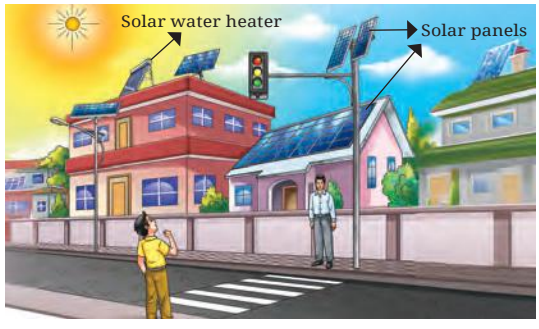


Sunlight helps plants prepare food. The Sun also provides all the living beings on Earth with heat and light. It is their main source of energy.

Do you know?

In many households in India, water is offered to the Sun early in the morning as an expression of gratitude to the Sun.

Have you seen solar panels on rooftops, on top of street lights or on traffic signals? The solar panels capture the Sun's energy and produce electricity. Energy from the Sun can also be directly used for cooking in a solar cooker or for heating water in a solar water heater.



Uses of solar energy

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What will happen if the Sun is not visible for a few days?

1. We may have to depend on artificial lighting during day time also.
2. ----------
3. ----------

?

One cannot imagine life on Earth without the Sun. The Sun is the main source of energy on the Earth. Plants get energy from the Sun and produce food. Animals eat plants and grow. We get food from both plants and animals. This cycle on Earth is possible due to the Sun. So, we all are dependent on the Sun as the main source of energy. Where do we find a large variety of plants or animals? Let us explore.

11.4 Forests

One morning, *Ajji* takes Bhoomi and Surya for a walk in the forest. They find a variety of herbs, shrubs and trees in the forest. *Ajji* explains, "Forests are large areas with dense growth of various types of plants." On the way, they collect some *nellikai* (Kannada term for Indian gooseberries) that have fallen on the ground. *Ajji* tells them, "We have a tradition in the village not to pluck fruits from the trees; they are left for animals and birds to eat."

A forest

Discuss with your friends and make a list of at least five products that we get from forests.

Forests are a natural home for many wild animals, including birds and insects. Forests provide food and shelter to them. In nature, every animal depends on other life forms for survival. The diversity of life forms ensures food for every living being. However, over the years, the forest cover has been decreasing, mainly due to human activities like large scale cutting of trees. It takes many years to grow a new forest or restore lost forests. Therefore, we must preserve and use forests responsibly so that they get enough time to regenerate.

Van Mahotsav is a week-long event celebrated across the country during the month of July. It is a forest festival during which new plants and trees are planted, and awareness about respecting forests is raised. The aim of the event is to increase the green cover. You too can plan a *Van Mahotsav* in your community.

What are the consequences of cutting a large forest area? Make a presentation or do a role play, or write a story or a poem that shows what could happen if we continue to cut down trees in our forests.

?

Do you know?

From ancient times, India had a tradition of respecting, protecting and preserving forests. You have already learnt about sacred groves in the chapter 'Diversity in the Living World'. Many efforts have been made by common people to prevent the cutting of trees, and thus, saving forests. One such effort is the famous Chipko movement. It started in the early 1970s in Uttarakhand (previously part of Uttar Pradesh). Local women actively participated in this movement. They encircled and hugged the trees to protect them from being felled.

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During their walk in the forests, Bhoomi and Surya notice that there are a lot of leaves on the ground and the soil feels damp. *Ajji* explains, "The roots of plants hold on to the soil and prevent it from being washed away. The leaves that fall from the trees decay and enrich the soil with nutrients. This soil is used by new plants and trees to grow. This is an example of recycling in nature." Let us investigate the soil in more detail.

11.5 Soil, Rocks and Minerals

Fig. 11.5: Soil preparation for planting vegetables

Bhoomi, Surya and *Ajji* come back home from the forest. Bhoomi and Surya help *Ajji* in preparing the soil in the garden for planting some vegetables (Fig. 11.5). *Ajji* asks them to dig the soil gently and loosen the lumps. You have already learnt in the chapter 'Living Creatures: Exploring their Characteristics' that for plants to grow, the space between the soil particles not only provides sufficient air but also space for the roots to grow easily. Bhoomi and Surya could see small pebbles, the roots of plants and a few earthworms too in the soil. Do you realise that earthworms are natural agents that help in turning and loosening the soil?

While Bhoomi and Surya help *Ajji*, let us do our own experiment by performing Activity 11.4.

Activity 11.4: Let us investigate

Caution
Remember to wash your hands thoroughly after touching the soil collected from different places. Sometimes soil that has garbage carries germs that may be harmful to us.

- Collect samples of soils from different areas around your home and school.
- Guess what could be there in different soils.
- Observe carefully each soil sample and note its colour.
- Touch each soil sample and feel its texture.

- Observe the soil samples with your naked eye. If you have a magnifying lens, look at the soil through it.
- Record your observations in Table 11.2.

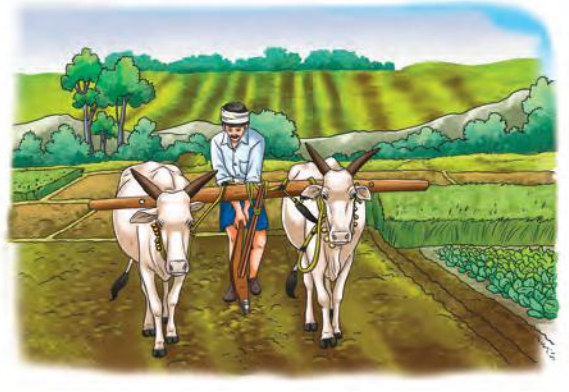
Table 11.2: Soil samples

Location from which soil sample was collected	What I guessed about the soil?	Observation of soil with naked eye including its colour and texture	Observation of soil with magnifying lens
Soil from a farm after ploughing			

- Is there any difference between your guess and what you can actually observe when you look closely?
- Do you see any differences in the soil samples taken from different places?
- Do you see differences in what you are able to observe with your naked eye and what you can observe with a magnifying lens?

There are many things in the soil, such as sand, insects and worms. There may be many small organisms that we cannot see with our naked eyes. Plants and animals also become part of the soil as they decompose and decay. The soil samples collected from different places may be of different colours because they may contain different materials.

Have you ever wondered how soil is formed? Soil is formed by the disintegration (breaking apart) of rocks by actions of the Sun, water and living organisms over a long time (thousands of years). There are different types of soils. Some are good for growing certain types of



Ploughing

plants while some are good for making bricks for buildings. Forests have a variety of soils. Soil is a precious treasure that supports biodiversity.

You may have seen rocks in your surroundings. Rocks are used in the construction of houses, buildings, temples, roads, dams and table tops. Some rocks, like slate, are used for roofing (Fig. 11.6) and laterite can be used as a building material, like bricks (Fig. 11.7). Some of the important rocks are granite, sandstone and marble. Human beings have been using rocks to make tools such as hand axes (Fig. 11.8a) and arrowheads (Fig. 11.8b) since thousands of years.

Fig. 11.6: Rocks used for roofing

Fig. 11.7: Laterite rocks used as bricks

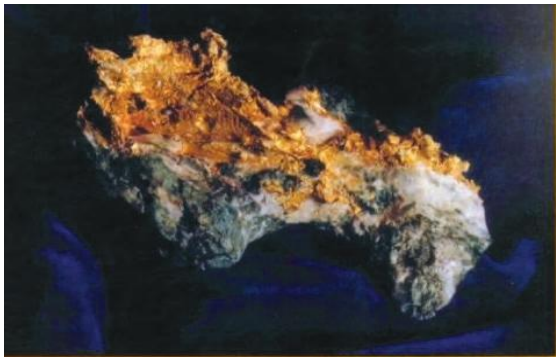
Fig. 11.8 (a): Hand axes

Fig. 11.8 (b): Arrowheads made from stone

Mining of marble

What are rocks made up of? They are made up of minerals. Important metals, such as aluminium, gold, copper and iron are extracted from minerals. Minerals are used in the manufacturing of airplanes, cars, jewellery, cosmetics, and

electrical and electronic equipment. For example, the basic mobile phones that we use contain about a dozen minerals like gold, silver, copper, cobalt, etc.

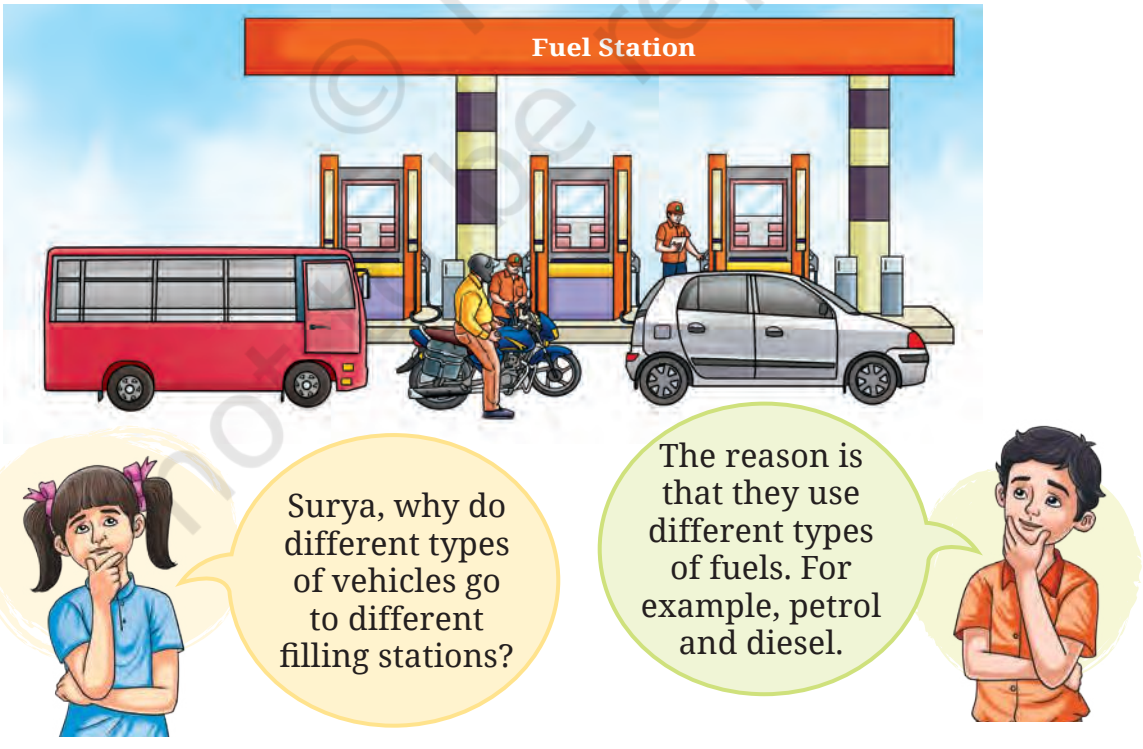


Naturally occurring gold

Some minerals found in nature

Rocks play a vital role in our lives. It takes thousands to millions of years to form rocks. Therefore, it is important to conserve and use them responsibly. Do you know how rocks and minerals are transported from one location to another? Most vehicles that we use for transportation use fossil fuels. Let us explore more about fossil fuels.

11.6 Fossil Fuels



Let us explore more about it by performing Activity 11.5.

Activity 11.5: Let us conduct a survey

- Conduct a survey of vehicles in your neighbourhood.
- Which types of vehicles are there? What types of fuels do they use?
- Record the information that you collect in Table 11.3.

Table 11.3: Types of vehicles and fuels used

Type of vehicle	Type of fuel used

What are the most common types of fuels used? Petrol and diesel are the two most widely used fuels for vehicles. Petrol, diesel and kerosene are obtained from petroleum. Petroleum along with natural gas and coal are commonly called **fossil fuels.** They are formed essentially from the remains of microorganisms and plants that got buried deep inside the earth, and were converted to petroleum, natural gas and coal. It takes millions of years for these fuels to form.

Natural gas is used for cooking and generating electricity. Nowadays, it is also used in the form of Compressed Natural Gas (CNG) as a fuel for vehicles. It is a cleaner fuel than petrol or diesel. Coal is mainly used for the production of electricity. It is found in several parts of India. Find out the major coal-producing states and mark them in a map of India.

Do you know?

Earlier, coal, wood and dung cakes were used as fuels for cooking. Nowadays, less polluting natural gas and Liquefied Petroleum Gas (LPG) have gradually replaced these domestic fuels.

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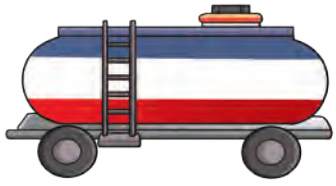
Coal

Petrol



Natural gas

Fossil fuels are found in limited quantities. Hence, we will soon run out of fossil fuels if we continue to use them in the manner that we currently do. To avoid such a situation, we need to explore alternate sources of energy. When fossil fuels are burnt, smoke and carbon dioxide gas are produced which pollutes the air. Over-dependence on fossil fuels for transportation and as domestic fuels has resulted in large scale air pollution.

Let us do our bit to conserve the fossil fuels by—

- Walking or cycling to nearby places.
- Using public transport.

Suggest some more ways.

11.7 Natural Resources: Renewable and Non-renewable

Nature's treasures fulfill our needs. They are essential resources to sustain all life forms on the Earth. For example, we get heat and light from the Sun, water from rivers, and food from plants and animals. These resources which we get from nature are called **natural resources.** We also use natural resources to make many useful things for our convenience. For example, electric bulbs, furniture, solar panels, bicycles, etc., make our lives comfortable. All such resources created by human beings are called **human-made resources.**

You have learnt about various natural resources, such as air, water, energy from the Sun, forests, soil, rocks, minerals and fossil fuels. Some of these natural resources

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get replenished through natural processes over a period of time. If you remember, *Ajji* told Bhoomi and Surya that they could collect only those *nellikai* that had fallen on the ground. This makes sure that there would be enough fruits for other animals and birds. The seeds from the droppings of animals and birds would enable new trees to grow, though it would take some years before we get fruits from these new trees. Thus, resources which get renewed, replenished or restored within a reasonable period of time are called **renewable resources.** Air, water and forest are some of the examples of renewable natural resources. Nature renews them. We should use our natural resources judiciously.

On the other hand, fossil fuels take millions of years to form. They are found in limited quantities and once used, they get exhausted. They are not produced or replenished within a reasonable period of time. These resources are called **non-renewable resources.** Examples of non-renewable natural resources are minerals, soil, rocks, coal, petroleum and natural gas.

11.8 Resources We Use

It is time for Bhoomi and Surya to go back home after a wonderful holiday at their *Ajji's* home. Their *Amma* (mother) comes to pick them up. Bhoomi and Surya show her the vegetable plants that have started to grow in the garden and the dried chillies given by *Ajji* to take home.

They notice changes in the colour of the skyline and the smell of the air once they reach the city. There are very few trees. The air does not smell as good as the air at *Ajji's* place. They can smell smoke from the vehicles. The air is polluted. *Amma* says, "Yes. When we use fossil fuels in our vehicles, smoke is generated. Now, there are vehicles which cause less pollution. For example, there are electric vehicles that do not release any smoke. So, people are making an effort to create alternatives."

Can you list some alternatives for reducing air pollution?

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We use many natural resources in our everyday life. Let us identify some resources that we use by performing Activity 11.6.

Activity 11.6: Let us make a list of natural resources used

Make a list of activities you do in your daily life and write down the natural resources used directly or indirectly for each activity. In Table 11.4, some items are already filled in. Using them as a guide, fill the remaining blank rows.

Table 11.4: Natural resources used

Activity	Natural resource
Washing clothes	Water
Making clay toys	
Collecting firewood	
Making kites	
Having breakfast	

How many natural resources did you list? Compare your list with that of your friend.

You and your friends have listed many natural resources that we use everyday. These resources are air, water, soil, and food from plants and animals. We get these resources from nature and also make things using them for our consumption. Therefore, we must conserve our natural resources and use them responsibly without wasting them. This way, we can continue to fulfill our present needs while also saving for the future, without harming the environment.

"Earth provides enough to satisfy every man's need but not for every man's greed."

– M. K. Gandhi

Keywords

Air
Coal
Forests
Fossil fuels
Human-made resources
Natural gas
Natural resources
Non-renewable resources
Petroleum
Rainwater harvesting
Renewable resources
Resources
Rocks
Soil
Sun
Water
Classify
Experience
Explore
Investigate
Observe
Survey

Summary

Key Points

- Resources required for our survival are provided by nature.
- Resources provided by nature are called natural resources.
- Some important natural resources are air, water, energy from the Sun, forests, soil, rocks, minerals and fossil fuels.
- Resources created by human beings to meet their needs are called human-made resources.
- Natural resources can be classified as renewable resources and non-renewable resources.
- Resources that get renewed, replenished or restored by natural processes within a reasonable period are called renewable resources.
- Resources that are in limited quantities and do not get replenished within a reasonable period are called non-renewable resources.
- All living beings, including humans, depend on natural resources for their survival so we should use them judiciously.

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Let us enhance our learning

1. Fig. 11.9 shows items related to natural resources. Match them with their jumbled up names. Make another table and write the names of these resources. Classify these resources as renewable or non-renewable.

Item	Jumbled up name
	ocrk
	refost
	ndiw
	atwre

Fig. 11.9: Natural resources

2. State whether the following statements are True [T] or False [F]. If False, correct them.
   (i) Nature has all the resources to meet human needs. [ ]
   (ii) Machines are a resource found in nature. [ ]
   (iii) Natural gas is a non-renewable resource. [ ]
   (iv) Air is a renewable resource. [ ]

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3. Fill in the blanks using the most appropriate option—

   (i) A fuel that is commonly used in two wheelers like scooters or bikes is.....

   (a) Kerosene

   (b) Petrol

   (c) Diesel

   (d) LPG

   (ii) An example of a renewable resource is .....

   (a) Coal

   (b) Water

   (c) Natural gas

   (d) Petrol

4. Classify the following as renewable or non-renewable resources—coal, natural gas, forests and minerals.

5. Why do we say that petroleum is a non-renewable resource?

6. It is difficult to regrow forests. Justify this statement.

7. Make a list of five daily activities in which you use natural resources. Suggest ways by which you can reduce their use.

8. List four activities that are possible due to the presence of air.

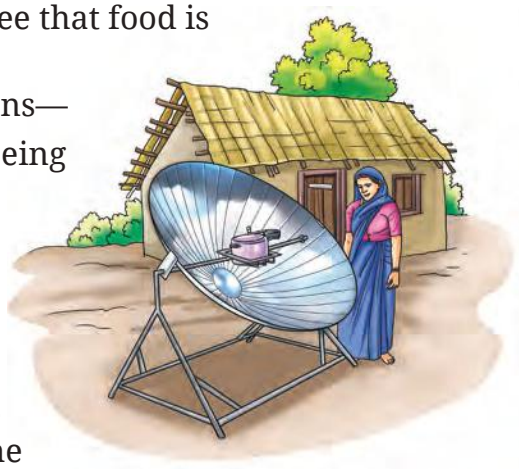
9. How can you contribute towards enhancing the green cover of your locality? Make a list of actions to be taken.

10. In the given illustration, we see that food is being cooked.

    Answer the following questions—

    (i) What type of energy is being used for cooking?

    (ii) Name one benefit and one drawback of using this type of energy for cooking.



11. Cutting down trees on a large scale impacts the quality of the soil. Why do you think it is so?

12. Explain two ways in which human activities pollute the air. Propose one action which can help in reducing air pollution.

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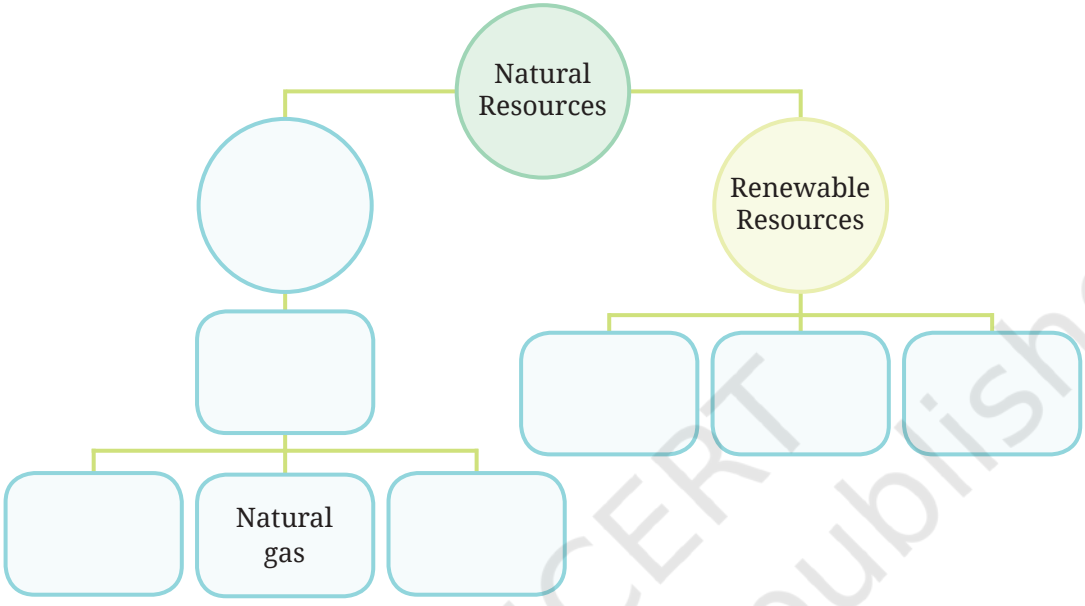
13. A family uses solar panels to generate electricity, a gas stove to cook food and a windmill for pumping water from a well. What would happen if there were no sunlight for a week?

14. Fill up the blanks using the following terms—

(fossil fuels, forest, air, petroleum, coal, water and non-renewable resource)



15. There is an increasing demand of trees to meet the requirements of industries and for housing. Therefore, trees are being felled. Is it justified? Discuss and prepare a brief report.

16. Propose a plan to use less water in your school. What steps would you take to make this plan happen and how would it help the environment?

Learning further

- Rainwater harvesting is an age-old practice in India. Find out some of the traditional rainwater harvesting techniques being used in your state or in other parts of the country.

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- Investigate the effect of air pollution on human health by interacting with your elders or community members and identify the main sources of air pollution in your local area. Based on your findings, suggest two practical steps that your school or community could take to help reduce air pollution.
- Prepare a list of the names and uses of important minerals and rocks that are used in your village/town/city for various purposes.
- You are an eco-club monitor. Organise a tree plantation drive in your school with the help of your teacher. List the steps required for organising this activity. Prepare a one-page report listing the names of the trees planted along with their importance.

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