Elementary Science

Class Four



National Curriculum and Textbook Board, Bangladesh

Prescribed by the National Curriculum and Textbook Board as a textbook for Class Four from the academic year 2026

Elementary Science

Class Four

(Experimental Edition)

National Curriculum and Textbook Board, Bangladesh

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[Experimental Edition]

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Preface

Primary education bears paramount importance in national life. Equal opportunities have been created for all children in the country to receive quality primary education irrespective of ethnicity, socio-economic status, physical and mental limitations, or geographical location. A key objective of primary education is to foster humanitarian values, follow a curriculum and textbooks tailored to the local environment and resources, and create a joyous and congenial school environment to facilitate the physical and mental development of children.

In light of the National Education Policy 2010, the National Curriculum and Textbook Board (NCTB) has adopted an integrated curriculum to make primary education more contemporary. Curricula of different countries have been reviewed and teaching learning values have been incorporated in the context of Bangladesh. This has provided a practical foundation for making education more life-oriented and effective. In the context of globalization, the psychological state of children has been given special consideration. Considering the needs and opinions of stakeholders in the changed context, necessary revisions were made in 2025 to the National Curriculum 2021 (Primary Level). In this light, textbooks for Class One to Three have already been revised, and the textbook for Class Four has been developed.

The textbook is the most important component of curriculum implementation. Prioritizing this, the NCTB is always diligent in developing textbooks for every level and grade. In the writing and editing of each textbook, the curriculum's goals and objectives have been focused. Careful attention has been paid to the diverse curiosities and cognitive capabilities of children. Special importance has been given to textbook development to ensure that teaching-learning activities become a joyful experience. It is hoped that each textbook will contribute to the balanced psycho-physical development of children. At the same time, it will facilitate their acquisition of desired skills, adaptability, patriotism, and moral values.

In developing the 'Elementary Science' textbook for Classe Four, continuity with previous grades has been maintained. In developing the textbooks from Class One to Class Four, efforts have been made so that students can meet their fundamental learning needs by acquiring essential knowledge, subject-based skills, attitudes, and values. The informational and descriptive content in the textbooks for all four grades maintains continuity.

This textbook has been developed and revised under the direct supervision of the Primary Curriculum Wing of the National Curriculum and Textbook Board. Sincere thanks and gratitude are extended to all the class teachers, teacher trainers, pedagogues, curriculum specialists, subject experts, artists, and graphic designers who contributed their intellect and labor at various stages of the textbook's development, rational evaluation, finalization, and coordination. Thoughtful opinions and suggestions from all concerned for improving the textbook will be considered with importance.

September 2025

Professor Rabiul Kabir Chowdhury
Chairman (Additional Charge)
National Curriculum and Textbook Board, Bangladesh

Features of the Primary Science Textbook

1. Student and Teacher-Friendly:

- The learning content has been arranged considering the students' developmental stages.
- Special emphasis has been given to the students' prior knowledge and real-life experiences in selecting the content.
- The subject matter has been described in age-appropriate, simple, and fluent language.
- Clear headings, sub-headings, and adequate, colorful pictures/illustrations have been used.
- Abstract scientific concepts have been presented in a comprehensible way through colorful pictures/illustrations and appropriate descriptions.
- The content has been made attractive by using certain symbols.
- Two characters have been used to create interest and encourage critical thinking among children.
- New scientific terms related to each chapter have been written in colored and bold letters.
- A glossary has been added at the end of the textbook, where simple explanations of new scientific words are provided.

2. Emphasis on Inquiry-Based and Active Learning:

- To emphasize inquiry-based, problem-solving, and active learning, each lesson begins with a Key Question.
- At the end of each activity or experiment, a summary of the work or the result of the experiment has been presented.
- Following the summary/result, additional information has been added under the heading 'Let us learn more.'
- Graphic organizers have been included where necessary to visualize students' learning, develop learning skills, and ensure active learning.
- Instructions for using readily available alternative materials for experiments have been provided where necessary.
- The topic of coding has been included in the textbook to develop students' organized and critical thinking skills.

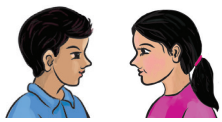
3. Focus on the Holistic Development of the Student:

- Ample opportunities for hands-on activities have been provided, which help in acquiring various science process skills such as observation, experimentation, comparison, measurement, etc.
- Group and pair discussion activities have been introduced to develop students' communication skills, ability to express themselves, and to form a positive attitude.

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Characters and symbols

1) Character	 Kavya Keya	Kavya and Keya will give you some hints or ideas in your science learning. Let us learn science together.
2) Symbol	Work:	Let us observe, investigate, and test.
	Be careful:	Let us act cautiously to stay safe.

Chapter 1

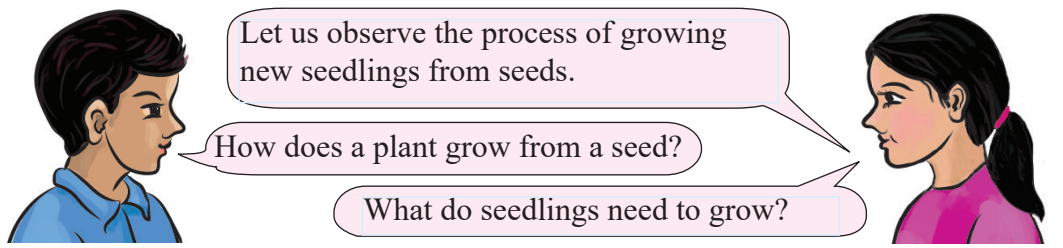
Growth and Reproduction of Living Things

Plants and animals need different things from the environment around them to stay alive and grow well. In this chapter, we will learn about what plants need to grow, stay alive, and get bigger.

1. Seed germination

The way a new plant starts growing from a seed is called germination. This is an important part of plants' reproduction.

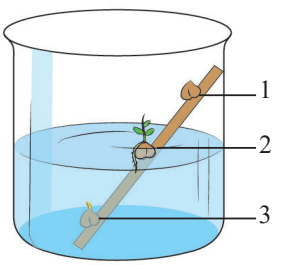
? What things do plants need to grow and stay alive?



Activity: Experiment of seed germination

What to do:
Let us...

1. Look carefully at the figure below and fill in the table.



Gram seed	What happens	Why happens
Seed 1		
Seed 2		
Seed 3		

2. Compare the filled table with that of our classmate beside us. Also do this activity ourselves with water in a beaker.

Summary

From the observation, the first seed has received heat, air and light, but it did not germinate due to a lack of water. The second seed has germinated well with heat, air, light and water. The third seed has not germinated well as it has received only water, but no heat, air and light. So, to grow a new plant from a seed, it needs heat, air, light and water from around us. If any one of these is missing, germination does not take place properly.

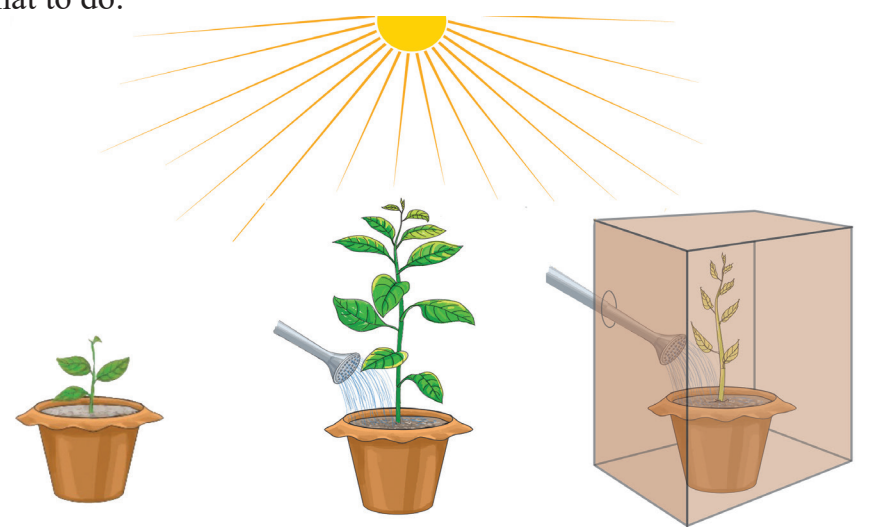
2. Plant growth

Plants get their nutrients and energy from food to stay alive and grow. They take food and gradually get bigger. Plants collect the necessary elements to produce their own food from the environment.

? What things are needed for plants to grow?

Activity: Finding out what things plants need to grow

What to do:



Pot-1 Pot-2 Pot-3

(Special note: If you can not do this activity for some reason, fill in the table with the results found in the picture above.)

Let us...

1. Set up three pots with seedlings.
2. Arrange three pots following the pictures below. Put Pot-1 and Pot-2 in open sunlight. Cover Pot-3 with a box made up of thick paper or wood.
3. Water Pot-2 and Pot-3 every day but not Pot-1.
4. After a few weeks, compare the growth of the three seedlings.

Pot	**Available Elements**	**Results Found in the Test**
1	Sunlight and air	
2	Sunlight, air, and water	
3	No sunlight, but air and water	

5. Write the results in the above table at the end of the activity.
6. Talk about the activity with your classmates.
7. After discussion, write the answer to the question below in your notebook.

What things do plants need to grow?

Summary

From the experiment and observation, we found that the plant in the first pot received sunlight and air but not water, so it did not grow. The plant in the second pot received sunlight, air, and water, so it grew well. The plant in the third pot received water, but no sunlight or air, so it did not develop properly. That means, without sunlight, water and air, plants cannot grow well.

Plants need sunlight, water, and air to grow. When plants produce food, they take in carbon dioxide from the air and nutrients and energy from the surrounding environment. Plants also take in oxygen and release carbon dioxide during their respiration. As plants grow, at one stage, they bloom with flowers and bear fruit.

3. Flowers, fruits, and seeds in flowering plants

In class three, we learned that some plants do not have flowers or fruits. These are called non-flowering plants. Other plants do have flowers and fruits. These are called flowering plants. In flowering plants, flowers turn into fruits and seeds.

? What are the parts of flowers and fruits?

A flower is a changed form of a leaf. We see different kinds of flowers around our home and school. They come in various colours like red, white, yellow, purple, and more. Some flowers have a pleasant smell.

Now, Let us watch and see what parts a flower has.

 Activity: Watching different parts of a flower and identifying their role.

 **What to do:**

1. Observe the different parts of a flower. Draw a picture of the flower in your notebook.
2. Compare the picture of the flower you drew in your notebook with the flower or picture that the teacher shows you. Discuss the function of each part in a group.
3. Fill in the table below after thinking about the functions of the different parts of the flower.

The Function of Different Parts of the Flower	Name of the Relevant Parts of the Flower
Protects other parts of the flower	
Holds the egg (ovule)	
Makes the flower look pretty	
Produce pollen grains	

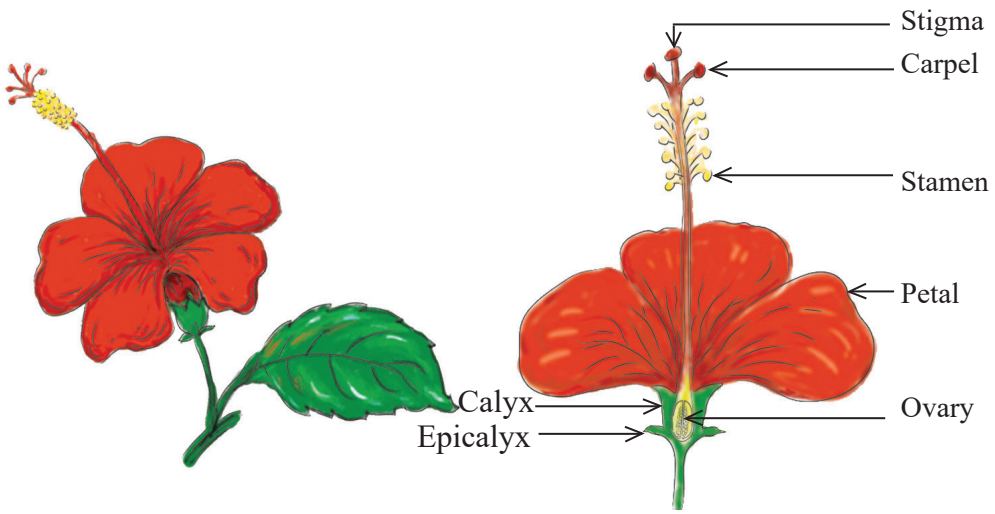
4. Talk about the filled table with your classmates.

Summary

A flower has different parts. Each part has some functions.

Let us learn more about different parts of flowers and fruits...

Parts of a Flower



Different Parts of a Flower

Calyx

Calyx is usually green and looks like a leaf. This is the outermost part of the flower. During the bud stage, it protects the other parts of the flower from insects, rain, and Sunlight.

Corolla

The second bright and colourful part, from outer to inner of the flower is the petals. Many petals together form the corolla. The colourful corolla attracts insects and birds and ensures pollination.

Androecium

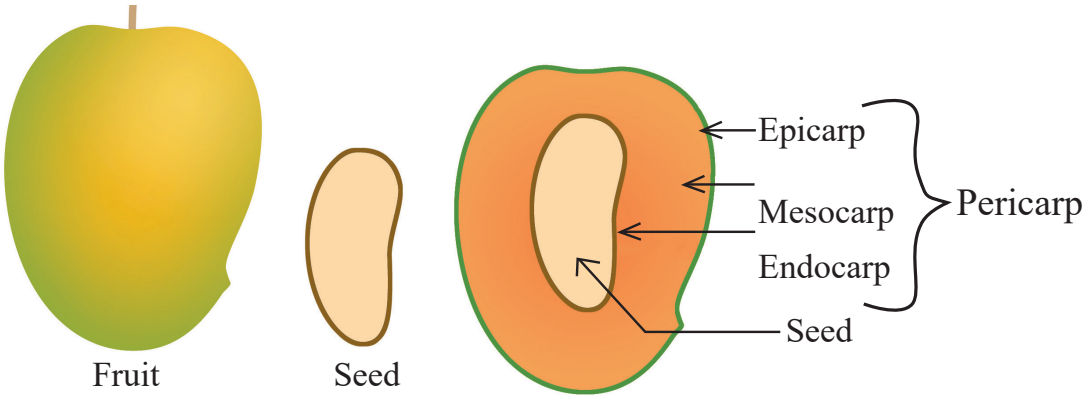
Androecium consists of one or more stamens. This is an essential part of the flower. The stamen has a stalk-like part, called the filament and a sac-like part at the top, called the anther. Pollen grains are produced inside the anther. Male germ cells remain inside the pollen grains. Insects and birds carry pollen from one flower to the stigma of a carpel of another flower. This process is called pollination.

Gynoecium

This is an essential part of the flower. The gynoecium consists of one or more carpels. A carpel has three parts: the ovary, the style, and the stigma. The ovule remains inside the ovary. Ovary is a female cell.

Fruits and Seeds

The ovule remains inside the ovary of a carpel. The ovule is a female cell. The male cell of the pollen grain gets fused with the ovule of the ovary. This process is called fertilization. In this process, the ovary transforms into fruit and the ovule transforms into seed.



Different Parts of a Fruit

A fruit has two parts. Such as pericarp and seed. The pericarp has three layers. Such as epicarp (outer most skin), mesocarp (middle layer) and endocarp (inner layer).

Epicarp is the peel of the fruit. It protects the inside parts of the fruit.

Mesocarp is usually juicy and we eat it. It has vitamins and minerals.

Endocarp covers the seed. The thin cover on the seed is the endocarp.

? Do all fruits have seeds?

Activity: Finding presence of seeds in familiar fruits

Things you need:: Different known fruits (such as- mango, blackberry, papaya, watermelon, banana, jackfruit etc.)

What to do:

Let us...

1. Collect a few kinds of fruits and cut them open with help from a teacher.
2. Observe from the peel of the fruit to the inside parts.
3. Fill in the table by observing the inner parts of different fruits.

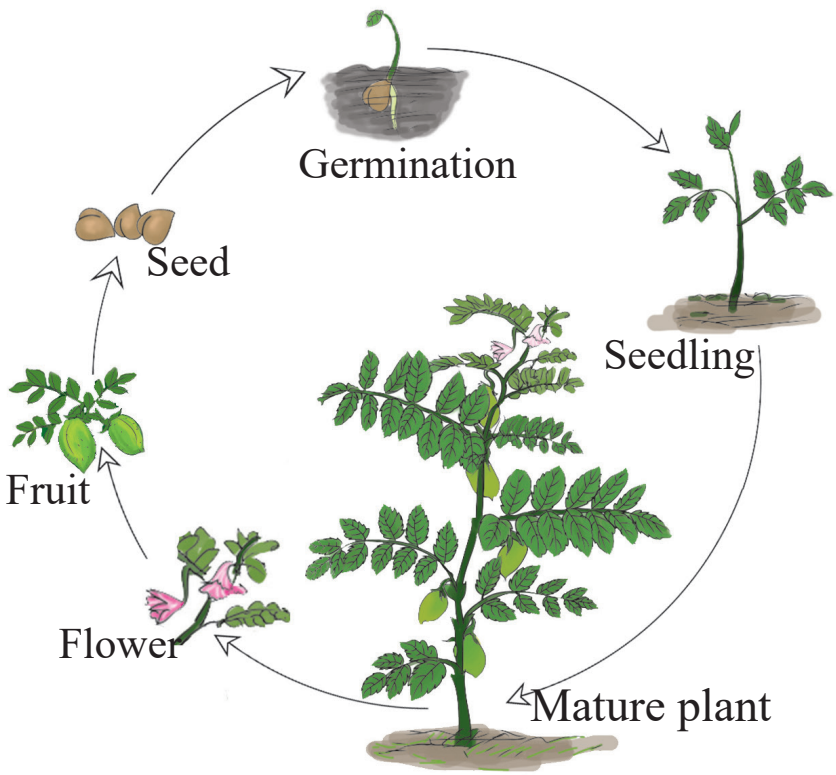
Name of the fruit	Presence of seeds (Yes/No)	Number of Seeds (One/Few/Many)

Summary

Most fruits have seeds. Some fruits have only one seed, while others have many seeds.

4. Life cycle of flowering plants

After pollination and fertilization, the ovule turns into a seed and the ovary turns into a fruit. In favourable environment, a new seedling grows from the seed.



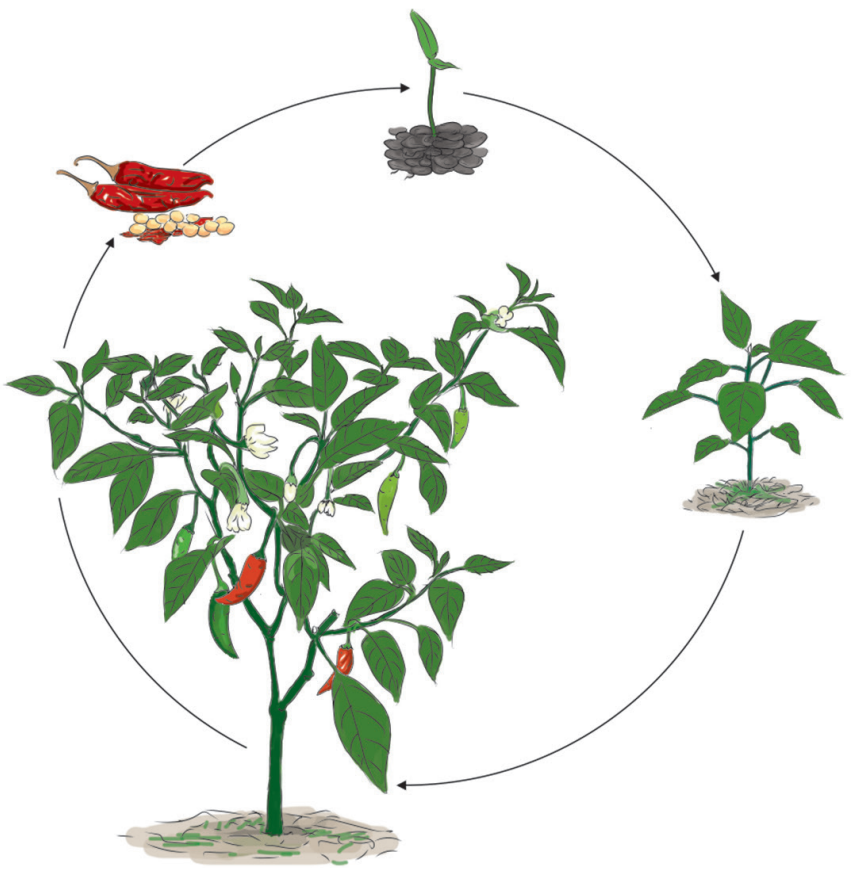
Life Cycle of Flowering Plants

The seedling grows gradually, bear flowers and fruits during maturity. These stages continue sequentially throughout the life of all flowering plants. The stages that occur recurrently or cyclically during the life span are called the life cycle. Plants such as chili, tomato, mango, blackberry, jackfruit, etc., bear flowers and fruits and the fruits contain seeds.

Activity: Finding the stages of life cycle of plant

What to do:

1. Let us discuss about the picture below with a classmate. Identify the different stages of the life cycle in the figure.



5. Life cycle of animals

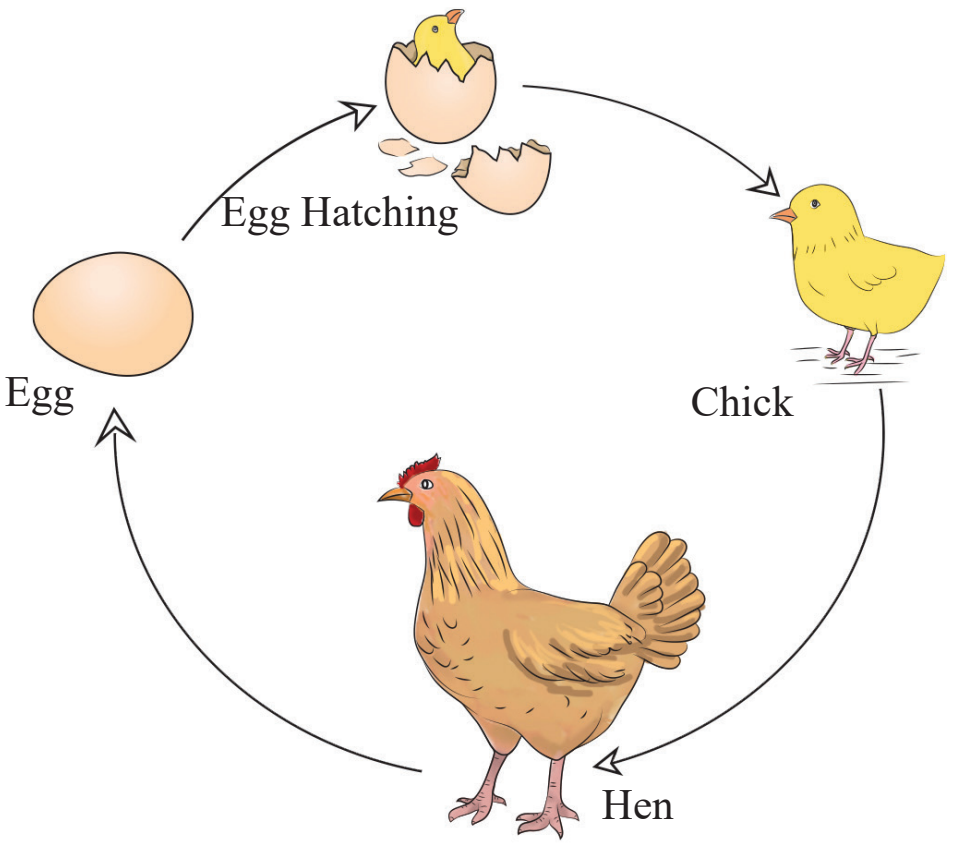
We have learned about the life cycle of plants. Does the life cycle of animals have the same stages?

Activity: Drawing the life cycle of a hen

What to do:

Let us...

1. Draw the life cycle of a hen.
2. Discuss about the drawn picture with a classmate.



Life Cycle of an Animal

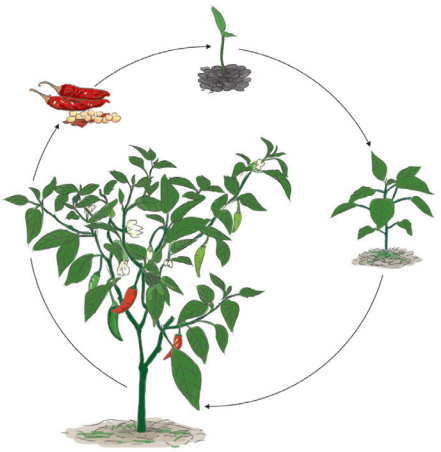
Summary

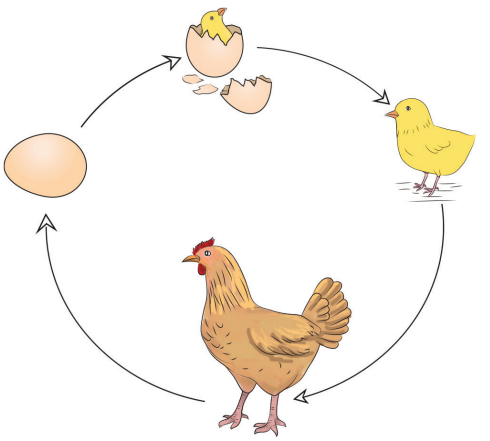
We have learned that chicks hatch from eggs and gradually grow up. The mature hen lays eggs again. In this way, the cycle continues. Ducks, pigeons, parrots, mynas, crows, cuckoos, and other birds also lay eggs.

Activity: Comparing life cycles of plants and animals

What to do:

The pictures on the life cycle of a chili plant and a hen are given.





Let us...

1. Observe both figures carefully.
2. Find the similarities between the life cycle of the chili plant and that of the hen.
3. Discuss the task with a classmate and complete the following table.

Comparison of the life cycle of a chili plant and a hen	
Chili plant	Hen

Summary

From birth to death, every living thing undergoes a definite life cycle. Living things are born; they grow and they reproduce. Eventually, they die. There are similarities between the different stages of the life cycle of plants and animals. For example, the seed of a plant and the egg of a hen. The egg or the seed marks

the beginning of the life cycle of a hen or a plant, respectively. But humans, cows, goats, dogs, and cats do not lay eggs. They give birth to babies directly. The life cycle begins with these babies. However, even in these cases, eggs still play an important role in their lives. We will learn more about that in the next grade.

Let us learn more about reproduction in living things...

So far, we learned about the life cycle of living things. We saw that at a certain stage of the life cycle, new living things are born that look like the parent. This process of making new living things is called reproduction.



Reproduction in Animals

Importance of Reproduction

Every living thing eventually dies. If living things only died, all life would disappear one day from the earth. But in reality, that does not happen. At one stage of the life cycle, death occurs, but at another stage, through reproduction, new living things similar to the parent are born, and their numbers increase. Reproduction is the process by which an living thing creates its replica and leaves behind future generations. In this way, living things have been surviving on the earth for years after years.

EXERCISE

1. Fill in the blanks.

a) Every living thing takes in……

b) For producing food, plants need …….. water and air.

c) The bright and colourful part of the flower is ..... .

d) A new …….. grows from a seed.

2. Put a Tick mark (√) on the correct answer.

1) While making food, what do plants release?

a) Oxygen b) Nitrogen

c) Carbon dioxide d) Water vapour

2) Where does energy for living things come from?

a) Air b) Water c) Soil d) Food

3) Which part of the flower protects the other parts when it is in the bud stage?

a) Calyx b) Petals

c) Stamens d) Carpel

3. Chose the correct/incorrect statement.

a) Plants make their own food themselves.

b) Pollen grains are made in the leaves of plants.

c) During respiration, plants take in oxygen.

4. Answer the following questions in brief.

a) In which part of plants are seeds found?

b) You have planted seeds in a sunny place in your yard. What things are necessary for a seed to grow into a seedling?

5. Answer the following questions in detail.

a) Describe the functions of the different parts of a flower with a diagram.

b) Explain with picture where the life cycles of a mango tree in your yard and your pet cat are similar.

Chapter 2

Health Protection 

According to the definition of the World Health Organization, good health does not simply mean no sickness. Rather, it refers to being well physically, mentally, and socially simultaneously. Anything that causes us physical, mental, or social problems and disrupts normal living is considered a disease. To avoid illness and maintain good health, we should follow certain guidelines. In this chapter, we will discuss physical health.

1. Different types of diseases

Generally, what kinds of diseases do we suffer from?

Activity: Listing of diseases

What to do:

Let us...

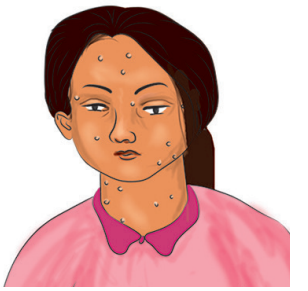
1. Think about the diseases I have had so far and write them down in a list.
2. Many of us have father, mother, brothers, sisters, grandfather, grandmother, maternal grandfather, and maternal grandmother in our families. Add to the list the names of the diseases they have suffered from at different times.
3. Now, look at the lists prepared by your classmates.
4. Add the names of diseases that are not already included in my list.

Names of diseases I have suffered from	Names of diseases other family members have suffered from	Names of other diseases

Let us have a few classmates and go in front of the teacher and act to be afflicted with certain diseases.

5. If the names of the diseases shown through your friends' acting are not on your list, add them as well.
   - Let us look at the pictures below and write the name of each disease under the Pictures













Summary

We fall ill at different times due to various diseases. Some of these diseases include cold, cough, cholera, smallpox, conjunctivitis, night blindness, diarrhoea, heart disease, diabetes, etc. Any disease causes suffering for us.

2. Classification of diseases

We can get sick at any time. Diseases occur due to various reasons. Some diseases spread from one person to another. Usually, tiny germs (micro-organisms) cause diseases. Additionally, we become ill if the structure, form, or function of any organ is impaired.

Diseases are classified in various ways based on their causes.

How many types of diseases are there?

Activity: Classification of diseases

What to do:

Let us discuss with classmates and fill in the table below.

Names of diseases that spread from one person to another	Names of diseases that do not spread from one person to another

Summary

Infectious Diseases

Some diseases spread from one person to another; these are called infectious diseases. Viruses, bacteria, fungi, or other parasites cause infectious diseases. For example: cold, conjunctivitis, smallpox, corona, measles, etc.

Non-infectious Diseases

Some diseases do not spread from one person to another; typically, a person becomes ill when the function of a body organ declines or metabolic processes are

disrupted. These are called non-infectious diseases. For example: heart disease, night blindness, alzheimer's, diabetes, cancer, mental illness, etc. According to the latest classification by the World Health Organization, drug addiction is also considered a disease.

Let us learn some more about the classification of infectious diseases…

Generally, air, water, or animals carry the germs of infectious diseases and cause their spread. Based on the mode of transmission, these diseases are known by different names.

Waterborne diseases - Diseases that spread through water are called waterborne diseases. For example: diarrhoea, dysentery, typhoid, etc.

Airborne diseases - Diseases spread through air are called airborn diseases. For example: influenza, pulmonary tuberculosis, COVID-19, etc.

Animal-borne diseases - Some animals carry disease-causing germs. For example: malaria and dengue through mosquitoes, plague through rats, and rabies through dog bites. Diseases that spred through animals, are called Animal-borne diseases



Activity:Activity: Identification of air, water, and animal-borne diseases



What to do:

Let us think individually and discuss with classmates to fill in the table below.

Diseases that spread through the air	Diseases that spread through water	Diseases that spread through animals

3. Causes and spread of diseases

What causes diseases in us?

Activity: Finding causes of different diseases

What to do:

Let us

1. Fill in the table below based on your own experience and knowledge.
2. Let us discuss with a classmate to add more causes of diseases to the table.

Name of disease	Causes of the disease

Summary

Causes of Infectious Diseases

People can get sick due to various reasons. We have already learned that infectious diseases are caused by different germs (microorganisms). When these germs enter the body, they cause diseases. Therefore, staying close to an infected person or consuming water contaminated by germs can lead to diseases. Sometimes, diseases can also be transmitted through insects or animals that carry germs. Often, malnutrition weakens the immune system, making people more susceptible to diseases. Eating unhealthy or imbalanced food and adopting unhealthy lifestyle habits can also cause diseases.

Causes of Non-Infectious Diseases

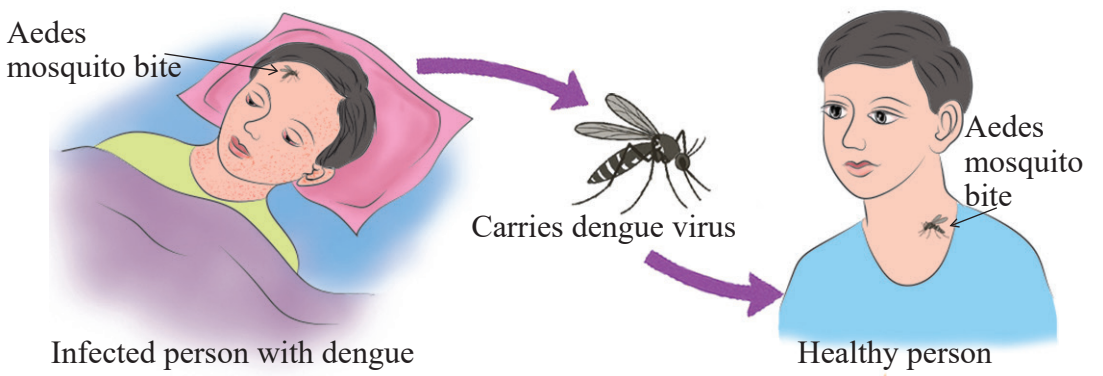
Usually, various environmental factors, such as polluted water or air, can cause diseases. Lack of physical activity is also responsible for some non-infectious diseases. Air pollution and other environmental pollution can lead to skin diseases, asthma, and similar conditions. Smoking and drug abuse can cause non-infectious diseases such as cancer and heart disease. Genetic factors can

also contribute to certain non-infectious diseases. Additionally, deficiencies in vitamins can cause diseases. For example, a deficiency of Vitamin A can lead to night blindness, and a deficiency of Vitamin D can cause rickets.

How do infectious diseases spread?

Spreading of a disease means a disease going from one person to another. Infectious diseases spread from an infected person to a healthy person through various means. Usually, germs spread through different ways. For example, drinking or using water contaminated with germs can lead to waterborne diseases. When an infected person coughs, sneezes, or talks, airborne disease germs float in the air and enter the body of a healthy person.

Mosquitoes carry the germs for diseases like malaria, dengue, and chikungunya. When a mosquito bites an infected person and then bites a healthy person, there is a chance that the healthy person will infect these diseases. In this way, mosquitoes spread the germs of many diseases within an area. Dog bites can cause rabies, and rat bites can cause plague. It means many disease-causing germs are spread through animals such as mosquitoes, rats, dogs, and others.



Spread of Dengue Disease

Coming into contact with an infected person can lead to the spread of infectious diseases, such as conjunctivitis, smallpox, or colds, through the transmission of germs. Additionally, various infectious diseases can spread through blood, physical contact and other means.

4. Symptoms of diseases

Every disease has its own distinct symptoms. When we are affected by a disease, the changes that occur in our body and behaviour are the symptoms of that disease. These symptoms help us identify the disease.

What are the common symptoms of various diseases?

Activity: Identifying diseases based on symptoms

What to do:

Let us

1. Take several pieces of paper and write the name of one disease on each piece.
2. Be divided into several groups.
3. Each group pick one piece of paper.
4. Discuss the symptoms of the disease written on the picked paper within the group.
5. If anyone in the group has experienced the disease, Include that experience in the discussion.
6. Present the symptoms through role-playing.
7. After observing presentations of your own and other groups, Write the symptoms of various diseases in the table below.

Disease Name	Symptoms

Summary

The common symptoms of various diseases are:

- **Common Cold**: Continuous runny nose, and nose turns red.
- **Conjunctivitis**: Eyes become red, itching and burning sensation in the eyes, sticky discharge causes the eyelids to stick together.

- **Diarrhoea**: Frequent loose stools, excessive thirst, abdominal pain, dehydration causing wrinkled skin, and the patient gradually becomes weak.
- **Malaria**: Periodic fever with shivering, headache, abdominal pain, body aches, and nausea.
- **Asthma**: Difficulty breathing, a wheezing sound during breathing.
- **Diabetes**: Frequent thirst, frequent urination, and weight loss.
- **Tuberculosis (TB) of the lungs:** Prolonged cough, occasional blood with cough, chest pain, weight loss, and accompanying fever.

5. Treatment of diseases

At various times in life, we get different diseases. The measures taken to recover from a disease are considered its treatment.

What are the ways to treat diseases?

Activity: Finding ways to treat diseases

What to do:

Let us

1. Fill in the table below by thinking independently and discussing with a classmate.

What are done when someone at home gets sick

2. Now, let a few of us read our writings aloud to the entire class.
3. After listening to others' readings, Let us add any missing treatment methods to the table.

Summary

When someone is sick, they should take the prescribed medicine and diet as advised by a doctor. Maintaining cleanliness is also a prerequisite for disease treatment.

Let us learn more about disease treatment...

For patients with diarrhoea or cholera, it is essential to drink sufficient fluids or Oral Rehydration Solution (ORS) to prevent dehydration. For patients suffering from typhoid, malaria, or other fevers, applying wet clothes to the forehead or body sponging should be done to reduce body temperature. It is crucial to regularly wash the patient's clothes, bedding, and utensils such as plates, glasses, and cups. By taking the appropriate medication and following a prescribed diet tailored to the disease, along with sufficient rest, recovery can be achieved easily.

If the patient's condition remains critical despite these measures, it is essential to consult a specialist doctor immediately.



Taking Medicine



Drinking ORS



Applying Wet Clothes

6. Preventing Diseases

None of us wants to get sick. The precautions or awareness steps we take to avoid diseases are known as preventive measures.

How can various diseases be prevented?

Activity: Identify the way of disease prevention.

What to do:

Let us

1. Write down the measures we take to stay free from various diseases and remain healthy in the table below.

Disease Name	Precautionary Measures
Fever	
Diarrhea	
Cough	
Conjunctivitis	

2. Discuss the precautionary measures with classmates and add new ideas to the table.

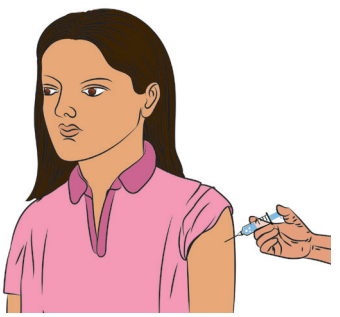
Summary

Disease-causing germs typically spread through various means. Therefore, measures must be taken to prevent the spread of germs. For example, maintaining cleanliness, following proper etiquette for sneezing and coughing, eating a balanced diet, and getting adequate sleep are essential. Practising healthy habits in daily life is also very important. Keeping ourselves and our environment clean can protect us from various diseases.

Let us learn more about disease prevention…

infectious Diseases

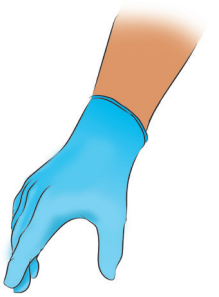
A person with an infectious disease should be kept as far separate as possible from healthy individuals. Patient must avoid spitting cough-sputum anywhere but dispose of it in a designated place. When caring for a patient, it is necessary to use masks, protective goggles, or gloves as needed. The patient should also wear a mask before being taken to a caregiver or doctor. The patient's daily-use items must be thoroughly washed with hot water before reuse. Appropriate measures should be taken to stay safe from animals that spread diseases. Additionally, vaccines that act as preventatives for various diseases should be taken on time according to age.



Taking Vaccines



Using Masks



Using Gloves

Non-Infectious Diseases

To prevent non-infectious diseases, maintaining a healthy lifestyle is essential. A clean, pollution-free environment is another key method of disease prevention. Avoiding the use of tobacco products and smoking, refraining from alcohol and other abused drug substances, and avoiding unhealthy or unbalanced foods (e.g.,

fast food, excessively sugary foods or drinks, excessive salt, etc.) are crucial. Consuming a balanced and healthy diet and engaging in regular physical exercise (e.g., sports) significantly reduces the possibilities of most non-infectious diseases. In some cases, genetic factors may increase the risk of non-infectious diseases from the outset. Even in such cases, adopting a healthy lifestyle can help reduce that risk.

7. Guidelines for maintaining health

By following specific health guidelines in everyday life, we can stay healthy. This will also enhance our immunity to diseases.

What specific guidelines should be followed to maintain health?



Activity: Identify the guidelines for maintaining health.

What to do:

Let us observe the pictures above and discuss with classmates to fill in the table below.

The guidelines for maintaining health

Practising Healthy Habits

Let us

1. Write answers to the questions in the table below:

Do I always drink clean water?	
What foods do I eat at home?	
Do I eat fruits every day? If yes, which fruits do I eat?	
What do I do after returning home from school?	
What do I do every afternoon?	
What do I do to keep myself clean?	
Do I wear clean clothes?	
What do I do before eating and after using the toilet?	

2. Read my written answers myself.

3. Try to identify which habits seem inappropriate for maintaining health and learn about them.

Summary

To stay healthy and free from diseases, we must follow certain guidelines in every aspect of daily life. To maintain good health, cleanliness is essential; eat a balanced and healthy diet in moderation; engage in regular physical exercise or sports, and get adequate rest. Access to clean air and the use of safe drinking water are crucial. These are all good habits for maintaining health.

Let us learn more about the maintenance of health guidelines...

Washing hands properly with soap or ash before eating and after using the toilet helps protect against disease-causing germs.

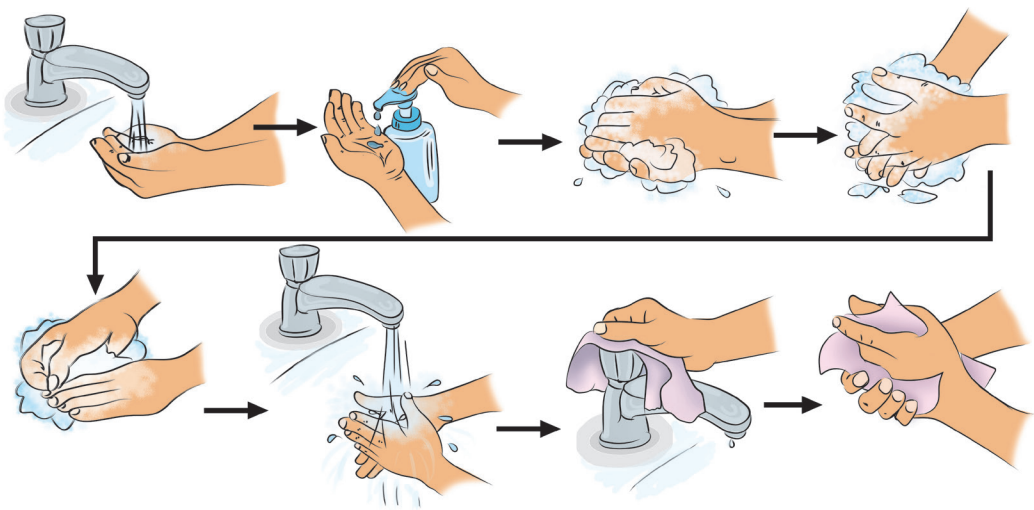
Extra oily, spicy, heavy, and junk foods are harmful to health. Consuming these can cause digestive problems and lead to weight gain, increasing the possibilities of various diseases. Therefore, we must develop the habit of eating healthy foods.

We should drink an adequate amount of safe drinking water every day. Green coconut water and lemon juice are beneficial for health. Soft drinks are generally harmful to health. Clean and germ-free water must be used in daily activities. Most infectious diseases spread through contaminated water.

Regular daily exercise, outdoor sports, and walking help to keep the body healthy.

Cleanliness is also a key foundation of good health. In addition to brushing teeth and bathing daily, we must keep everything we use and our surrounding environment clean. This reduces the risk of germ-related diseases.

From the picture below, we can learn the proper method of handwashing.



Steps of Handwashing

Exercises

1. Match the following diseases with their correct causes and symptoms by drawing lines.

Cause of Disease	Disease Name	Symptoms of Disease
Contact with an infected patient	Malaria	Fear of water
Drinking contaminated water	Hydrophobia	Fever with shivering
Mosquito bite	Diarrhoea	Red eyes with itching
Vitamin A deficiency	Conjunctivitis	Frequent loose stools
Dog bite	Night blindness	Inability to see well at night

2. Put a Tick mark (√) on the correct answer.

1) Which of the following is an infectious disease?

a) Heart disease b) Diabetes c) Malaria d) Rickets

2) Which is necessary for maintaining health?

a) Drinking soft drinks daily b) Exercising regularly

c) Eating spicy, tasty food d) Studying late at night

3) Which of the following is true about non-infectious diseases?

a) They are not hereditary b) They cannot be controlled

c) They are not caused by pollution d) They are not spread by germs

3. Answer the following questions in brief.

a) Classify the following diseases based on their mode of transmission:

Dysentery, Dengue, Common Cold, Plague, Typhoid, Conjunctivitis

b) Why is it necessary to drink Oral Rehydration Solution (ORS) when suffering from diarrhoea?

c) What are the ways to prevent non-infectious diseases?

4. Answer the following questions in detail.

a) Let us write the symptoms of two airborne diseases.

b) What are the ways to protect oneself from infectious diseases?

c) Let us write about the health maintenance habits we practice in daily life.

Chapter 3

Accidents and First Aid

1. Accidents in daily life

Along with staying healthy, protecting our bodies is also essential. Various types of accidents can threaten our safety.

What types of accidents commonly occur in our lives?

Activity: Listing the names of accidents.

What to do:



Let us...

1. Carefully observe the pictures above.
2. Write down the accidents that have happened in our own life in the table in the next page.
3. Add the accidents we have observed to this table.

4. Discuss with classmates and add the missing accidents to the table.

Accidents That Happened in My Life	Accidents I Have Observed	Other Accidents

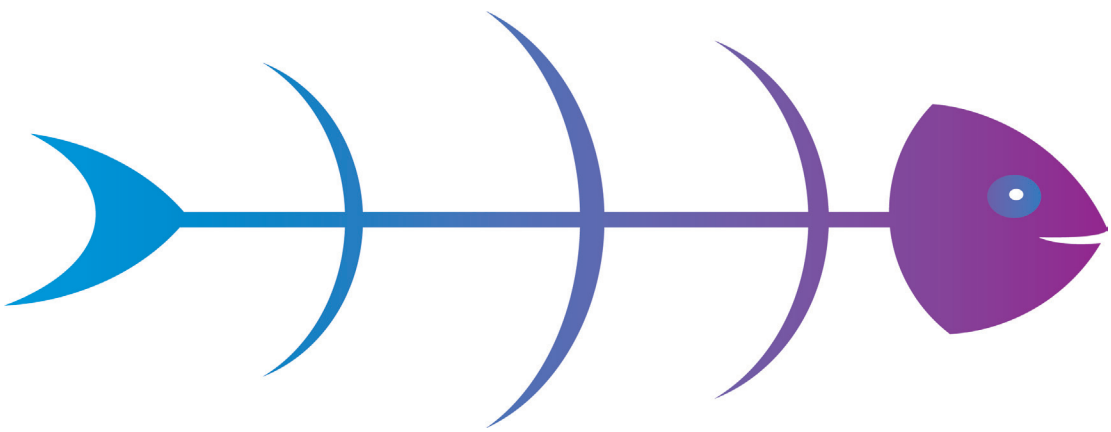
Summary

Various types of accidents occur in our lives at different times. For example, cuts to any part of the body, broken or sprained bones, burns from fire, snake bites, drowning in water, electric shocks and so on.

Activity: Identifying the damages caused by accidents.

What to do:

1. Let us think independently and discuss with classmates and then write down the general damages caused by accidents in the blank spaces of the diagram below.



Fishbone Diagram

Summary

Summary

Accidents disrupt the normality and safety of our lives. As a result, they cause harm to our health. Sometimes, they even pose a risk of death.

Let us learn more about the damages caused by accidents…

Falling from a tree can cause injuries, leading to cuts or broken bones in various parts of our body. This may result in limb loss, bleeding, or even death. Drowning in water can cause breathing to stop, putting us at risk of death. Burns from fire can damage various parts of the body, cause severe wounds and potentially lead to death. Snake bites also carry a risk of death. The venom from a snake can mix with the blood, causing respiratory distress, tissue damage, or paralysis in the patient. Electric shocks can damage the skin, muscles, nerves, heart, and lungs, also posing a risk of death. Road accidents can lead to limb loss or even death. To stay accident-free, caution is essential. Being cautious can reduce the extent of damage caused by accidents.

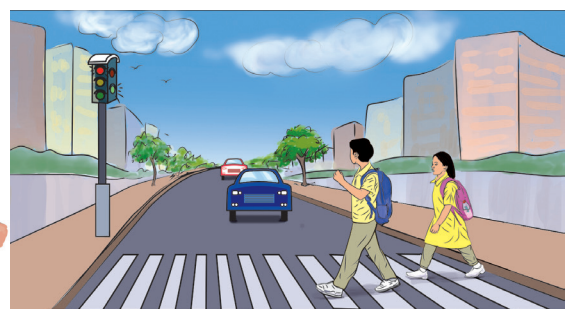
2. Precautions for accident prevention

How can we prevent accidents?

Activity: Identifying ways to prevent accidents.

What to do:





Let us...

1. Carefully observe the images above.
2. Discuss in groups one precaution for preventing each type of accident.
3. One member from each group demonstrate the precautionary measures discussed through role-playing.
4. Based on the group discussions and classmates' role-playing, fill in the table below.

Types of Accidents	Precautions for Prevention
Falling from a tree	
Burns from fire/heat	
Drowning	
Road accident	
Snake bite	
Electrocution	

Summary

By staying cautious, we can easily avoid accidents. Therefore, it is essential to know and follow these precautionary preventive measures.

Let us learn more about accident prevention…

Injuries during Play

To avoid such injuries, we should watch others while running during play and avoid pushing anyone. We must also warn others to be cautious about this.

Cuts

While using knives, scissors, or other sharp objects, we may cut our hands or other parts of the body. To prevent such injuries, we should seek help from adults when using these items. This reduces the possibility of bleeding.

Falling from a tree

Never climb trees on rainy days. At other times, climb trees carefully to avoid falling. While climbing, ensure someone stands below the tree for safety.

Drowning

Many of us enjoy swimming or playing in water. If we don't know how to swim, we should never go alone into ponds, canals, or rivers, nor should we bathe there. We must always have an adult with us during such activities. This reduces the possibility of drowning. Learning to swim can also help prevent drowning-related accidents.

Fire-related accidents

Touching hot objects with bare hands, playing with fire, can lead to burns. Sometimes, electrical short circuits can lead to catch a fire. So we should be cautious about electrical wire and connections in houses. Again other sources of fire, such as matches, bidis, cigarettes, or stoves can cause houses or other

structures to catch fire. To prevent fire-related accidents, playing with matches or fire-related items like oil lamps, lanterns, or candles is dangerous. Flammable materials such as paper, cloth, or wood should be kept away from fire sources to reduce the possibility of such accidents.

Electric Shock

Touching electrical items with wet hands can cause a shock, known as electrocution. To avoid this, we should never touch electrical wires or devices with wet hands or without adult supervision.

Road Accidents

Road accidents occur due to driving without following the traffic rules. We should cross the road noticing both the sides and traffic signals. And this will reduce the accident at large scale. If there is a zebra crossing or a sidewalk, we must use them.

Snake Bites

The surroundings of the house should be kept clean so that snakes can not hide there. We should avoid places where snakes may be reside. It is safe to move around at night with a light and a stick. We must also be cautious while watching snake performances. If there are bushes around the house, they should be cleaned, and rat holes should be filled.

By following these precautions in our daily lives, we can easily prevent various accidents.

3. First aid for accidents

The immediate temporary treatment given to an accident victim before a doctor arrives or before they are taken to a hospital is called first aid.

There are some general rules for first aid. These include:

1. First, seek help from an adult or emergency services.
2. To keep oneself accident-free, ensure one's own safety before helping an injured person.
3. Keep the accident victim still without moving them.
4. Reassure the injured person (by saying, "You will get better") to keep them calm.

After following these general rules, first aid must be provided according to the type of accident.

What types of first aid are needed for different accidents?

Activity: Identifying first aid methods related to accidents.

What to do:



Let us...

1. Carefully observe the pictures above.
2. Discuss in groups about one first aid method for each type of accident.
3. One member from each group demonstrate the first aid measures discussed through role-playing.
4. Based on the group discussions and classmates' role-playing, fill in the table below.

Name of the Accident	First Aid
Falling from a tree	
Burns from fire/ heat	
Drowning	
Road accident	
Snake bite	

Summary

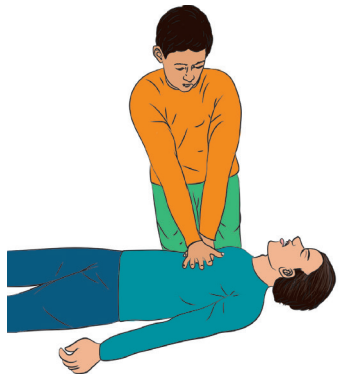
Providing prompt first aid to an accident victim reduces the risk of life loss. Therefore, it is essential for everyone to know some basic first aid techniques.

Let us learn more about first aid for accidents…

- If someone is injured from **falling off** a tree, playing, or any other cause, ice should be applied to the affected area immediately. If these accidents result in a bone fracture or sprained bone, support the broken bone with a piece of wood and secure it and then seek a doctor's advice.
- If a part of the body is **cut**, it should first be cleaned with cotton and an anti-septic. Then, wrap the area with a thin cloth to stop the bleeding.
- If someone is **burned by fire**, pour clean, room-temperature water over the affected area for 10 minutes. Then, apply oil or cream to the wound. Take care to prevent blisters from forming. If blisters do form, they should never be burst.
- In case of **electric shock**, the person must be disconnected from the electrical source first. This can be done by turning off the main switch or removing the electrical plug. Dry wood or bamboo can also be used for this purpose. The task must be performed while standing on a plastic mat, a piece of wood, thick paper, or a jute sack. During this time, the person affected by the electric shock must not be touched or grabbed, as this could cause the rescuer also to get electrocuted. Check the patient's breathing, pulse, and injuries, and continue providing first aid according to the symptoms until they can be taken to a doctor.

- If a **snake bites** someone, keep them as still as possible. It is essential to keep the bitten area below the level of the heart. Tie a cloth strip or rope tightly just above the bite site and seek medical advice immediately.
- If someone **drowns**, specific steps must be followed to restore normal breathing after rescuing him from the water. These steps include:

Lay the rescued person on his back and apply pressure to the abdomen to expel water.	
Then, gently lift the chin as shown in the picture on the right.	
Now, pinch the patient's nose closed, place your mouth over him, and blow air until his chest rises.	
However, occasionally remove your mouth to give him a chance and time to exhale.	
If the patient's chest does not rise within a short time, adjust his head position and blow air again.	

Then, as shown in the picture on the right, place your hands in the centre of the patient's chest and press down 30 times. Ensure that the chest is compressed by about one-third of its height during this process.	
Continue blowing air and pressing on the chest in this manner until the patient's breathing returns to normal or until they are taken to a doctor.	

After providing first aid, it is essential to take any person affected by an accident to a doctor for proper medical treatment.

4. Taking specialist consultation

In which health-related situations should one seek Consultation?

Activity: Identification of areas for consultation with expert.

What to do:

Let us...

1. Discuss in a group regarding types of sudden illnesses.
2. Mention what type of specialist should be consulted in case of this symptoms.

Symptoms	Type of Specialist
Feeling pain in the left side of chest; chest pressure, shortness of breath and sweating	Cardiologist

Summary

In case of accident or sudden illness, even in any cases consultation from near health or doctor/speacialist's advice should be taken. Besides accident if any healthy person feels sick suddenly, immediatly he/she should meet specialist physician.

Let us learn more about consulting an expert...

we learned about the symptoms of various diseases in previous chapter. Like accident some diseases also appear suddenly. Consultation of doctor/specialist in both cases of accident or sudden illness should be taken.

We may learn about symptoms of some more sudden diseases and it will help us to take immediate treatment.

- To meet neurologist in case of sudden fainting for10/15 minutes.
- We may meet cardiologist in case of feeling pain in the left side of chest; chest pressure, shortness of breath and sweating
- We should consult a cardiologist in case of sudden blurring speech, facial distortion or failure to recognize people.

Exercise

1. Fill in the blanks.

a) To stay free from accidents, …… is essential.

b) I will not go into the water without knowing ……..... .

c) Playing with …… is dangerous.

d) An accident victim should be kept ……. .

e) First aid reduces the possibility of …… .

2. Put a Tick mark (√) on the correct answer.

1) Which one is not an accident-related injury?

a) Bleeding b) Indigestion c) Loss of limbs (d) Risk of death

2) In which case is it necessary to consult a specialist doctor?

a) Catching a cold from getting wet in the rain b) Indigestion from food

c) Minor injury during play d) Chest pain with sweating

3) What type of accident is likely to occur if one carelessly plays with a sky lantern?

a) Fire-related b) Injury-related c) Poisoning-related d) Bleeding-related

3. Answer the following questions in brief.

a) Name a few types of accidents.

b) What should be done if someone is electrocuted?

c) What is meant by first aid?

4. Answer the following questions in detail.

a) What are the general rules of first aid?

b) How should first aid be provided to a person who has drowned?

c) What precautions should be taken to stay free from accidents?

Chapter 4

Matters



1. Properties of matter

From toys to air, water, everything around us is matter. But are all types of matters the same? Of course not. Have you ever wondered why a ball bounces? Why does water flow in a river? The reason behind all this is the different properties of matter. Matter has some special characteristics. These special characteristics are called the properties of matter.

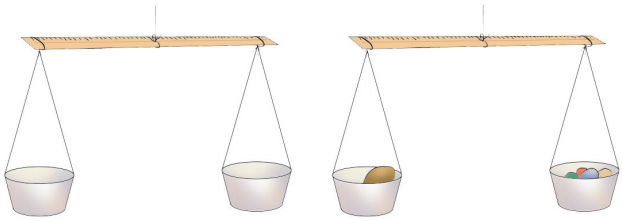
In class three, we learnt an interesting fact that if we drop a stone into a glass of water, the water level rises. In this way, we discovered an interisting property of solids that is volume. Solids occupy space which is called the volume of that object. Solids have a specific shape. Like solids, liquids also have volume. They take on the shape of the container they are kept in. Another important property of liquids is that they can flow from one place to another.

What are the properties of solids and liquids?

Activity: Simple experiment to understand whether matter has weight.

What we need: A stick or scale (30 cm or longer), a pencil or pen, two identical paper or plastic cups, some coins or small stones, sewing thread, scissors, and adhesive tape.

What to do:



Let us...

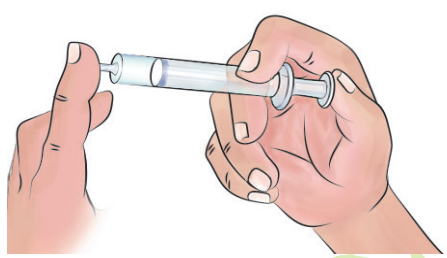
1. Take two pieces of equal length sewing thread.
2. Tie the mouth of two light plastic or paper cups (or small containers) with two pieces of thread in such a way that they can be easily untied later if needed.
3. Tie the two cups to the opposite ends of a ruler scale or a stick in such a way that the scale can be balanced.
4. Tie another string along the middle of the scale and place it on a pencil or pen in such a way that the scale swings and its balance can be observed.
5. Check whether the scale is initially straight (horizontal). If not, slightly move the cup or thread to level it(making horizontal).
6. Now place a coin on the left side and see which way the scale tilts.
7. Slowly place small stones on the right side to restore balance.
8. Now fill the left side half full with liquid. Slowly place small stones on the right side to restore balance.

Summary

If we place a coin or water on one side of a balance made of a scale and a cup, we will see that the scale leans towards the side where the water or coin is placed. Then, a stone is placed on the other side to bring it into balance. This shows that objects like coins or water, i.e. solids and liquids, have weight.

Activity: Matter apply resistance upon the application of pressure.

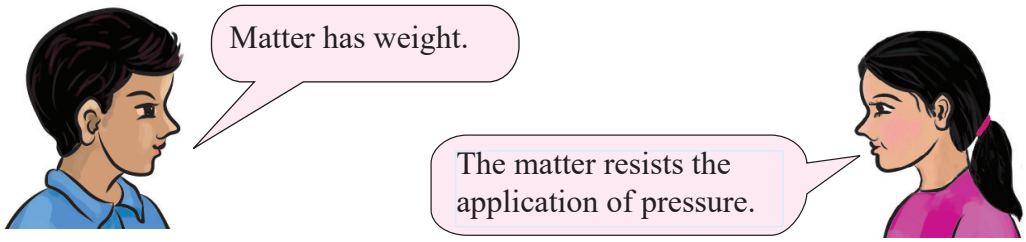




What to do-

Let us...

1. Push against a wall.
2. Take a syringe without a needle.
3. Fill the syringe with water and close its opening of the syringe with your finger. Now slowly press the piston.
4. While doing this activity, think about the following questions.
   - What has pressed back?
   - What are the properties of gaseous matters?



Summary

When we push against a wall, the wall pushes back and we can not move it. Rather, we feel a resistance. This means that the solid object creates resistance against the pressure or force. When the syringe is closed and pushed inward, the piston does not want to go down easily. This is because the water inside resists. As a result, we understand that one of the properties of matter is that it resists when pressure is applied.

Properties of gaseous matters

Let us try to learn about the nature or properties of gaseous matters (such as, air or wind).

What happens when pressure is applied?

Activity: Identifying the properties of gaseous matters

Things you need:: Sewing thread, a ruler scale, two new polythene bags collected from the same source or two balloons.

What to do:

Let us...

1. Take two pieces of thread of equal lengths..
2. Gently tie the openings of two polythene bags with thread so that they can be easily untied later.
3. Tie two polythene bags to both ends of a ruler in such a way that it can be easily moved from side to side.
4. Tie another long piece of thread along the middle of the ruler and hang it from a high place so that the ruler can swing freely.
5. If the ruler tilts to one side, adjust the position of tied bags until the ruler is horizontal.

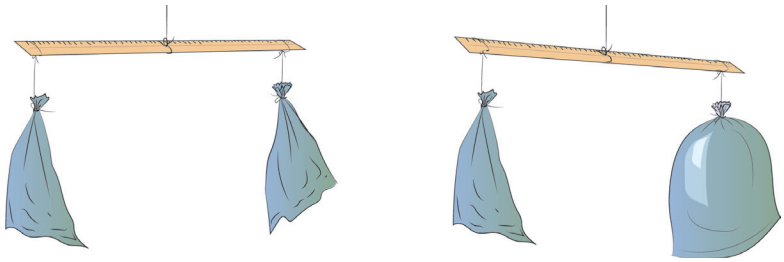
Let us open a sealed polythene bag at any one end and spread the opening of the polythene bag with both hands, and move it to let air in. Then, tie the mouth of the air-filled bag using the same thread and then hang it back on the ruler in the same place. (Use the same thread fixed to the ruler.)

Let us see what happens.

Apply light pressure to the air-filled bag and see what happens.

Fill in the Table below based on your observations.

Observation Table	
How was the polythene bag inflated?	
Therefore, does air have a volume?	
Which side of the ruler is tilted after the air-filled bag is hanged?	
Why has it tilted?	
Did you experience any resistance in applying pressure?	
Does air exhibit all three properties of a solid and a liquid?	
Can we consider air as a matter?	



Identifying whether air has weight using simple ruler

Summary

Air is a matter. Like solids and liquids, air or gaseous matters also have weight and volume. Moreover, gaseous matters resist the application of pressure.

2. Different states of water



Water



Ice melts into water



Water is vaporised by heat

We have already learned about the different states or properties of matter. Generally, every matter has three different forms, namely solid, liquid and gaseous. Can we think of any matter that we have seen in all three of these states? Let us think about water. Now we will talk about the three states of water.

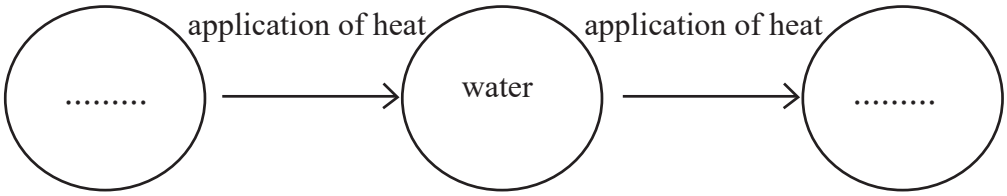
What are the different states of water?

Activity: Watch what happens when we heat ice.

What to do:

Think about the questions below and fill in the blanks in the chart.
What happens when ice is heated? Does the ice change in any way?
Have we ever seen people making tea or boiling water at home?

What happens when water is heated? Does the water change here?



Summary

When ice is heated, it melts to form liquid water. When the water is heated, it becomes hot and turns into steam. This is how water changes from one state to another.

3. Characteristics of the three states of water

What are the characteristics of the three states of water?

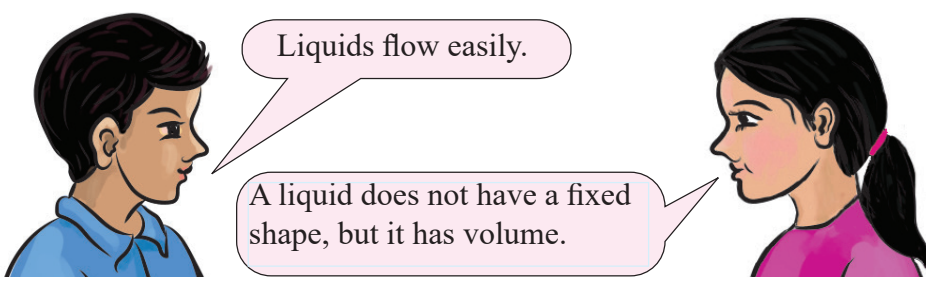
Activity: Name the three states of water and identify their properties.

What to do:

Let us

1. Think about the following questions.
   Have we seen water in three states: solid, liquid, and gas?
   What are the names we know water in its solid, liquid, and gas states?
2. Discuss with the classmate sitting next to me and fill in the table below.

State of water	Name of state	Characteristics
Solid	Ice	
Liquid		
Gaseous		



Summary

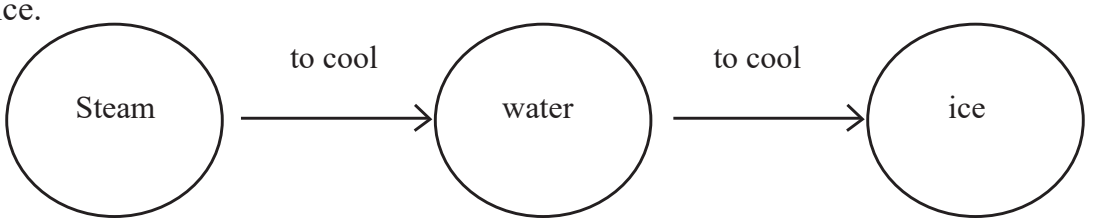
We find water in three states: liquid, solid (ice) and gaseous (steam). Each state has different properties. For example, solid water (ice) has a definite shape and volume. In the liquid state, water flows. It has no definite shape, but it has a definite volume. In the gaseous state, water (steam) does not have a definite shape and volume.

Water can transform from one state to another due to changes in thermal conditions. In all three states, water provides various benefits in our lives.

Let us learn more about the properties of the three states of water...

Water has three states like other matters. Ice is the solid state of water. Ice has its own shape. We feel cold when we touch ice. Liquid form of water does not have its own shape. It takes the shape of the container it is placed in. Liquid water easily rolls off, for example, if it falls from a glass, it spreads on the floor. The gaseous state of water is steam. When water gets very hot, it turns into steam. The smoke we see when we open the lid of a cooking pot is called steam. It mixes with the air and then we no longer see this steam.

Conversely, if we cool steam, we get liquid water. And by cooling water, we get ice.



4. Importance of different states of water

How do three states of water benefit us?

Activity: Understanding the importance of different states of water

What to do:

Let us...

1. Discuss in groups about how we use different states of water in personal and family life.



Solid Liquid Gaseous

2. Draw a chart like the one below in our notebook.

3. Fill in the chart based on our group discussion.

Water condition	Use of different states of water in personal and family life

Summary

We use water in different states in our personal and family lives. We use water in its liquid state for bathing, cooking, drinking, etc. We use water in its solid state for making various foods like ice cream, for first aid, etc. For steaming, cooking in a pressure cooker, etc., we use gaseous state of water.

Let us learn more about the importance of different water conditions...

Could we make ice cream if water didn't have a solid state? Would we have clouds and rain if water didn't have a gaseous state? What would we drink if water didn't have a liquid state?

We know that the snow on the mountain tops melts in the summer and flows to the rivers. In this way, our needs for water are met. Again, the water that we drink, cook, and irrigate every day is in liquid form. The need for water is immense for animals to survive. The clouds that we see floating in the sky are formed from the gaseous state of water. From clouds, rain fall, which keeps the Earth alive including helping crops grow.

5. Chemical change

The process in which one or more substances combine to form one or more new different substances is called a chemical change. Making yogurt from milk, rotting of fruit, change in the colour of leaves, burning of candles, setting off fireworks, etc. are all examples of chemical changes.

What is a chemical change?

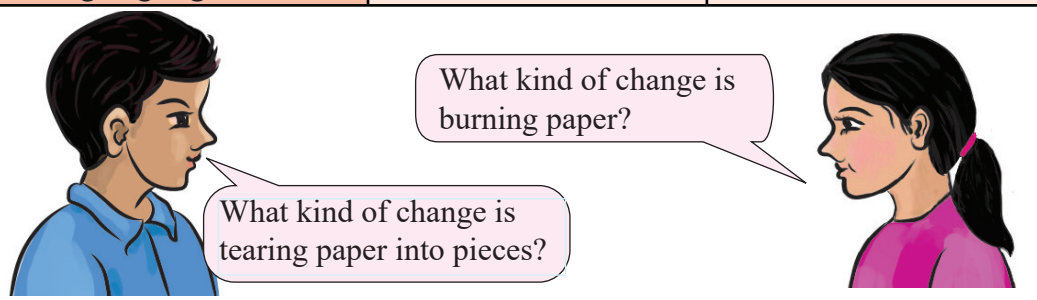
Activity: Identifing chemical changes that occur in real life

What to do:

Let us...

1. Identify which of the changes we see around us are chemical changes by discussing them with my classmate sitting next to me.
2. Discuss among classmates which of the following events is a chemical change and why. Write it in the table.

Event	What chemical change occurred?	Why does this seem like a chemical change?
Burning paper		
Tearing paper into pieces		
Ripening of fruit		
Changing of colour happens when we cut an apple and leave it for some time		
Forming of liquid water from ice		
Grinding sugar grains		



Summary

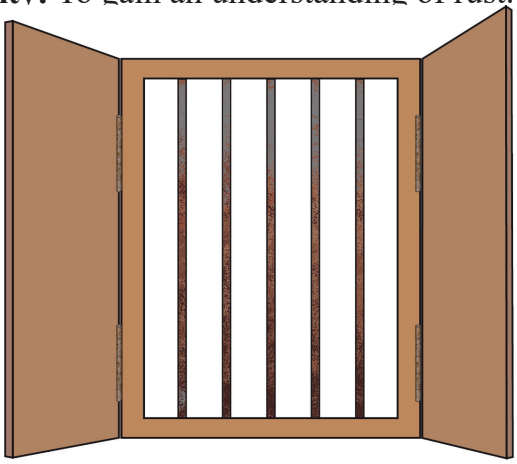
Burning paper is a chemical change because the paper is converted into ash, smoke, and gas, which are new substances. On the other hand, tearing paper into pieces is not a chemical change because it only changes the shape of the paper, but does not create any new substances. Ripening of fruit is also a chemical change because the chemical changes inside the fruit change its taste, colour, and smell. An apple turns red when left for a while after being cut because it creates new substances. Therefore, it is a chemical change. Making liquid water from ice is not a chemical change because it is a change of state, where the water changes from a solid to a liquid, but the chemical composition remains the same. Similarly, grinding sugar into powder is not a chemical change because the sugar only changes its shape, the chemical composition remains the same.

6. Rust

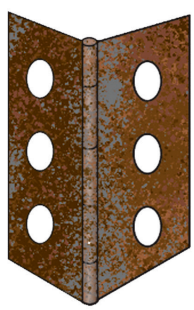
Rust is a reddish or brownish layer on iron materials. Rusting is a type of chemical change.

What is rust?

Activity: To gain an understanding of rust.



Rusty window grills



door hinge

What to do:

Let us...

1. Form some groups.

2. Find out if there are any objects made of iron (such as window grills, door hinges) inside our classroom.

3. Observe the iron substances and fill in the table below:

Observation of iron substances	Result
Have you found any iron-based material that has a reddish or brownish layer on it?	
Does the covering have a name? (Take help from a classmate or teacher, if necessary)	
Is it possible to remove this layer?	
What kind of change is it?	

Summary

The reddish or brownish layer that we see on a substance with iron elements is rust. The formation of rust on iron is a type of chemical change.

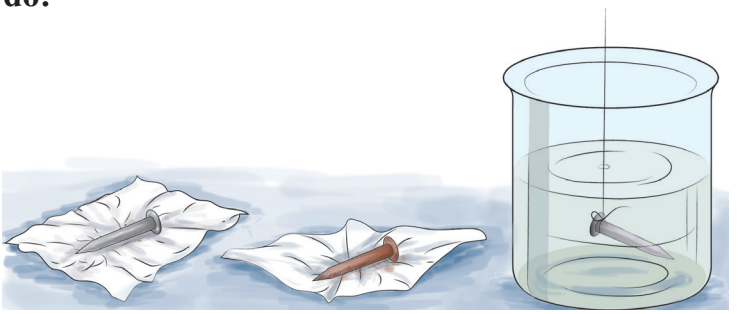
Causes of Rusting

Why do iron objects rust?

Activity: Investigation of the cause of rusting.

Things we need: An iron nail, wet tissue or a piece of wet cloth, oil or mobil.

What to do:

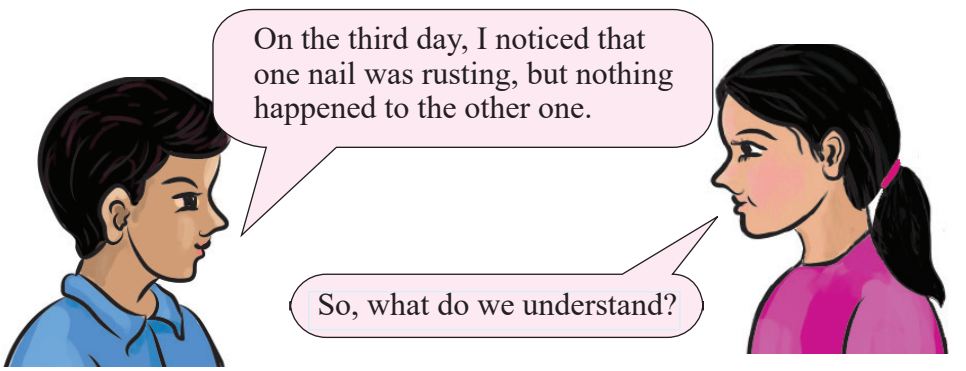


Let us...

- Take two nails.
- Wrap a nail in a wet tissue or piece of cloth and keep it in a safe place. Pour water on the tissue or cloth regularly to keep it wet.

- Coat the other nail well with any substance such as oil, mobil, grease, or petroleum jelly.
- Put the two nails side by side.
- Inspect them once a day for three consecutive days and fill in the table below.

Day	The condition of the nail wrapped in wet tissue paper or cloth	The condition coated with oil/ mobil/grease/petroleum jelly
After the first day		
After the second day		
After the third day		



Summary

By this work, we can learn about the cause of rusting. One nail is kept wet every day by placing it in a wet tissue or cloth so that it easily comes into contact with air and water. The other nail is covered with a substance like oil, mobil or grease so that air or water does not come into contact. After three days of observation, it is seen that the wet nail rusted, but the nail coated with oil/mobil/ grease/petroleum jelly did not rust.

Let us learn more about the causes of rusting...

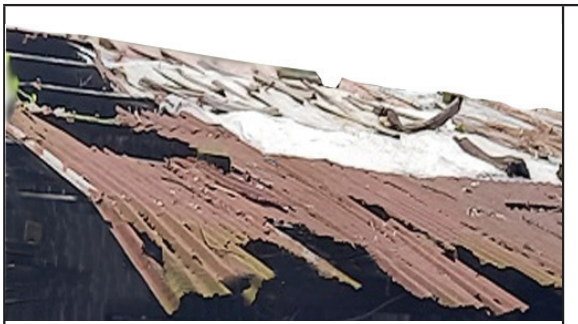
The presence of water or gaseous water (vapour) plays an important role in the formation of rust in iron. Rust is formed when iron reacts chemically with

oxygen in the presence of water.

Oxygen + Gaseous water (vapour) + Iron = The rust

7. Harmful effects of rust and how we can stop it

Due to rusting, the quality of our valuable goods or objects gradually deteriorate, and eventually become unusable. Therefore, goods or objects made of iron must be protected from rusting.



Roof of a house with holes due to rust



Deteriorated bicycle parts



Corroded plate



Rusty spoon

How to prevent rusting?

Activity: Identifying the ways to protect essential goods or objects from rusting.

What to do:

Let us...

1. Form a few groups in the class and find ways to prevent rust through discussion.

2. After the discussion, fill in the table below individually.

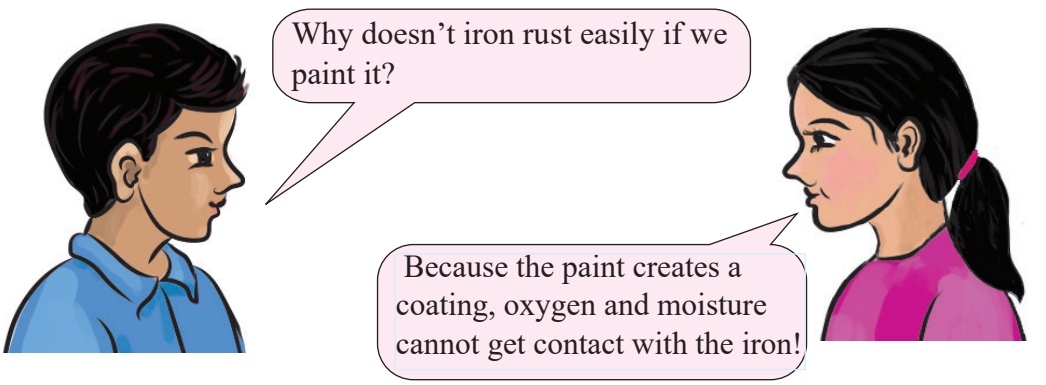
What is the way to prevent rusting?

Summary

To protect essential items or objects from rust, objects made of iron should be kept away from contact with vapour and oxygen.

Let us learn more about ways to prevent rusting...

The main way to prevent rusting is to keep iron objects away from contact with oxygen and water or moisture. This is because when iron, water, and oxygen come together, rust (a substance called iron oxide) is formed through a chemical reaction. This gradually corrodes iron. To prevent this rusting, oil, grease, or mobil can be applied on the surface. Coating of paint or zinc can be applied to the iron. This coating prevents oxygen and water vapour from coming into direct contact with the iron. As a result, these coatings help prevent iron from rusting. In addition, a special type of rust-resistant steel (stainless steel) can be used instead of iron.



Exercise

1. Put a Tick mark (√) on the correct answer.

1) Which of the following is not a characteristic of gaseous matters?

a) has weight
b) has definite volume
c) resists when pressed
d) occupies space

2) Which of the following is a way to prove that matter has weight?

a) Making comparisons by making scales
b) Marking with colour
c) Soaking in water
d) Drawing on paper

3) Which change is not a chemical change?

a) Rusting of iron
b) Breaking of glass
c) Making curd from milk
d) Change in the colour of a leaf

4) What is not needed to form rust?

a) Water
b) Iron
c) Oxygen
d) Fire

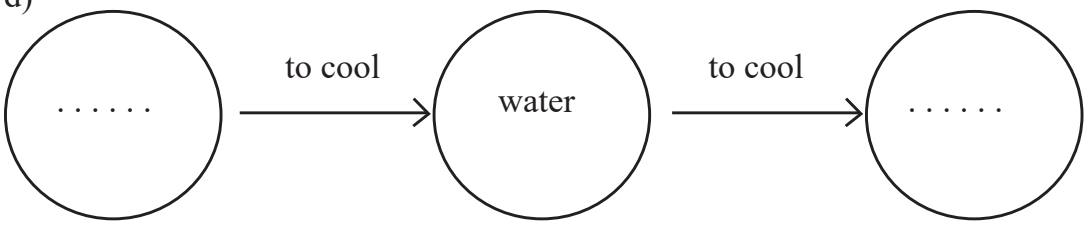
2. Fill in the blanks.

a) When we close the tip of the syringe and press it, the inside air.....

b) Ice is the .....state of water, and the water is the ..... state, and steam is the .....state of water.

c) Air is also a matter, because it has ..... and .....

d)



3. Match the the right column with the left.

Left	Right
Ice	does not have specific size or volume
Water	allows to make ice cream
Air	melts into water
Solid form of water	produces steam upon heating

4. Answer the following questions in brief.

a) Air is invisible to the eye, but how do we know it is a matter?

b) Which property of matter can be understood by dropping a stone into a glass of water?

c) How do you know if a matter is solid or liquid?

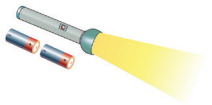
5. Answer the following questions in detail.

a) Distinguish between the three states of matter, such as solid, liquid, and gas, based on their properties.

b) What is chemical change of matter? Give three examples of chemical changes of matter.

c) Explain the uses of water in its solid, liquid and gaseous states in our daily lives

Chapter 5



Energy

In Class Three, we learned about different kinds of energy. Light energy helps us to see things around us. Sound energy is needed to hear. Electrical energy runs many of our machines and gadgets. Heat energy is used to cook food.

1. Different forms of energy

There are different types or forms of energy. From our surroundings, we can find various forms of energy.

What kinds of energy are there around us?

Activity: Identifying different forms of energy.

What to do:

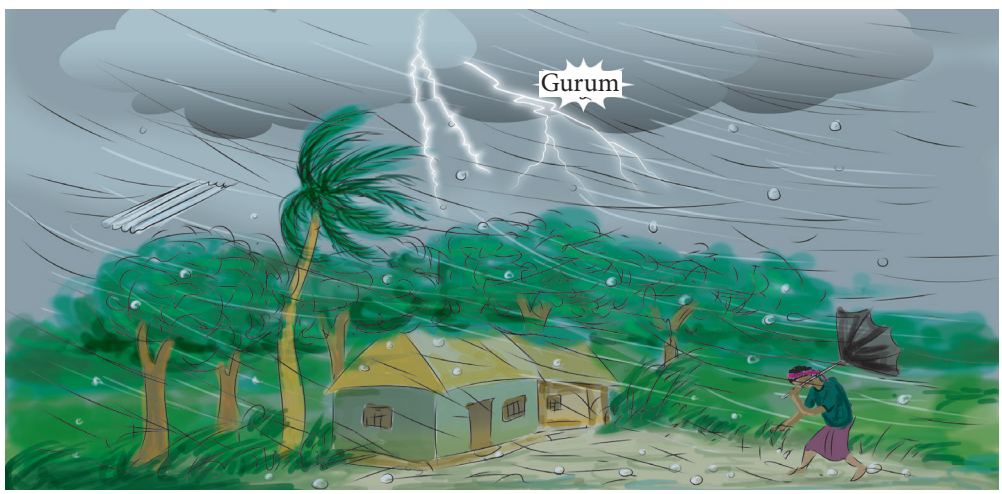
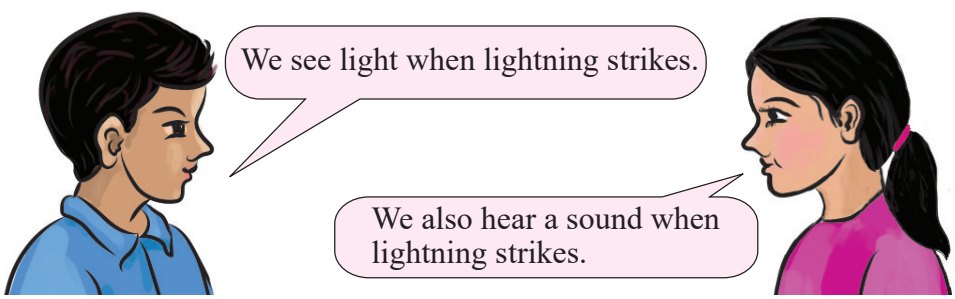


Figure: Various Energy in Nature



Let us...

1. Look carefully at the above picture.

2. Write down the types of energy that are shown in the events of the previous page's picture.

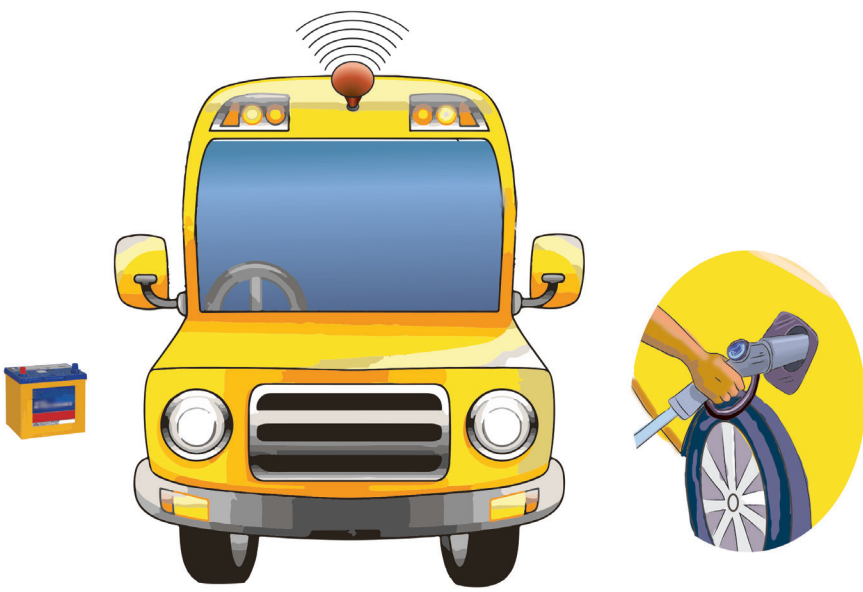
Event	Energy involved
Thunderstorm	

Summary

We see a bright light during lightning. Thus, light enargy is involved with this event. Surroundings get cool when it rains. This shows the effect of heat energy. When thunder roars or raindrops or hailstones fall on the roof, we hear loud sounds. This shows sound energy. When wind blows fast, trees move and bend. This shows kinetic energy. In the sky, during lightning, another type of energy is also involved — that is electric energy.

Activity: Identifying the different forms of energy in different parts of the car.

What to do:



Observe the car carefully and write down which forms of energy are associated with it.

Name of the Parts of Car	Related Energy
Battery	Chemical energy
Oil	
Headlight	
Horn	
Wheel	

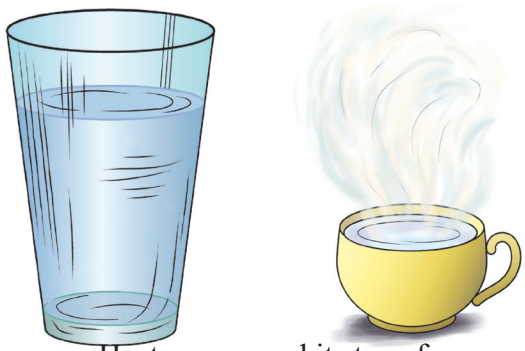
Summary

Chemical energy is stored in the battery and fuel of a vehicle. The headlights use light energy to light up the road. The horn produces sound energy. Both the headlights and the horn get their power from the battery. Finally, the wheels of the car possess kinetic energy allowing the car to move.

Let us learn more about different forms of energy…

Heat Energy

An objects heat energy rises with its temperature. For example – a cup of hot water has more heat energy than a cup of cold water. Heat energy can also transfer from one object to another. For example– in a glass of hot water, the heat transfer from the water to the glass.



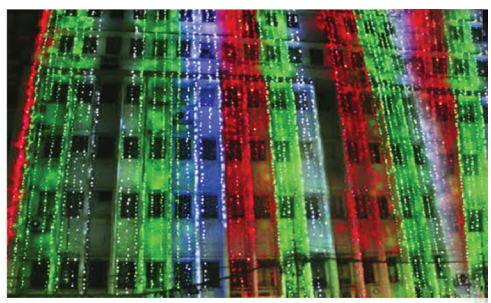
Heat energy and its transfer

Light Energy

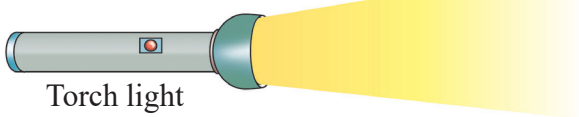
It helps us to see, and this energy can travel from one place to another over a very long distance. For example– light from the Sun travels a long way and reaches the Earth.



The Sun



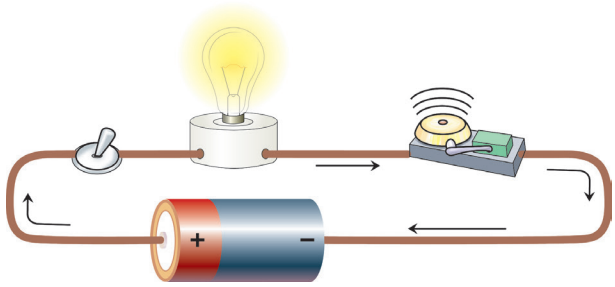
Lighting



Torch light

Electrical Energy

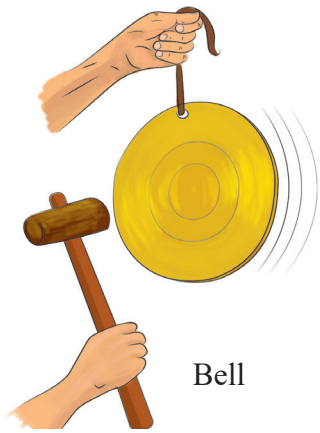
We cannot see electrical energy, but we know it is there. When there is load-shedding, no electrical machines at home can work. Also, when a battery has no charge, the wall clock and electric toys stop working.



Ringing the bell and liting up the bulb with electricity

Sound Energy

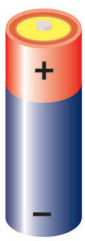
Sound energy is a type of energy that we can hear. It is created when objects vibrate. For example – when the school bell rings, it vibrates and produces sound that we can hear.



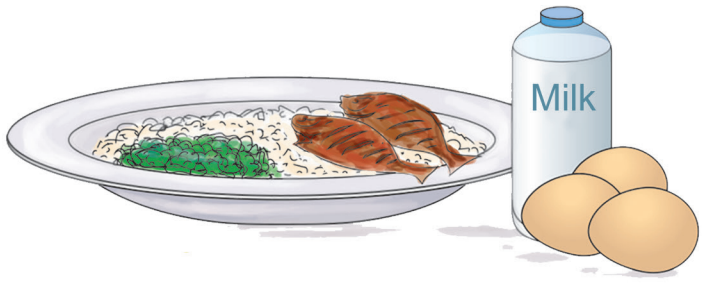
Bell

Chemical Energy

We get energy when we eat food. This energy is stored in food as chemical energy. In the same way, chemical energy is also stored in fuels like oil, wood, gas, coal, and even in batteries.



Battery



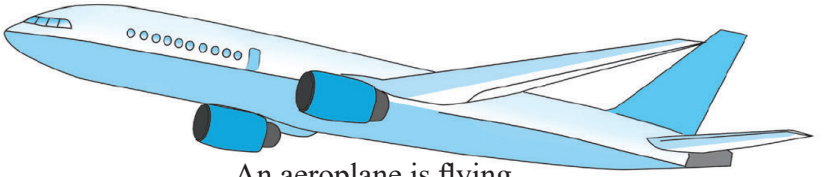
Food



Fuel

Kinetic Energy

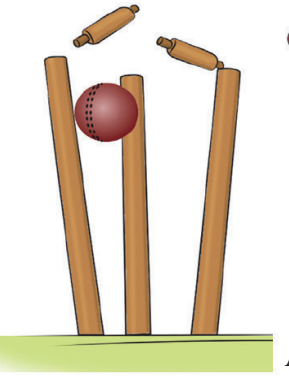
A moving object has energy because of its motion. When we run, jump, ride a bicycle, or an aeroplane flies, kinetic energy is produced. The faster an object moves, the more kinetic energy it has.



An aeroplane is flying



Runing





A ball has been thrown

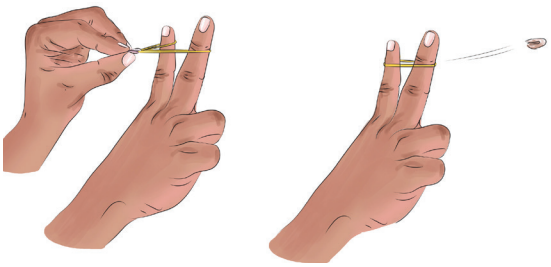
Potential Energy



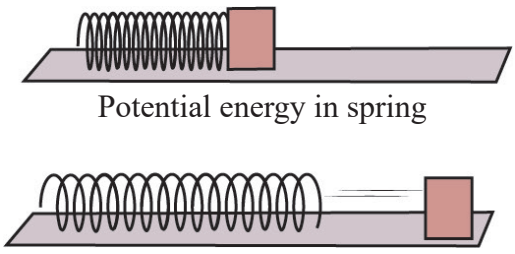
Potential energy is the energy stored in an object because of its position. For example – when a car is parked on top of a hill, it has potential energy because

it is high above the ground. If the car engine is off at the position shown in the previous picture can still roll down the hill. The energy that makes the car move downward comes from the stored potential energy.

When we pull a rubber band with a piece of paper, it stores potential energy. If the rubber band is released, that potential energy transforms into kinetic energy. As a result, the paper moves forward with the rubber band. The speed of the paper comes from the stored potential energy of the rubber band.



(Potential energy in rubber),
(Velocity gained by the piece of paper)



Potential energy in spring

A piece of wood gaining speed

A compressed spring with a piece of wood has the potential energy. If the spring is released, the wood piece moves and gains speed.

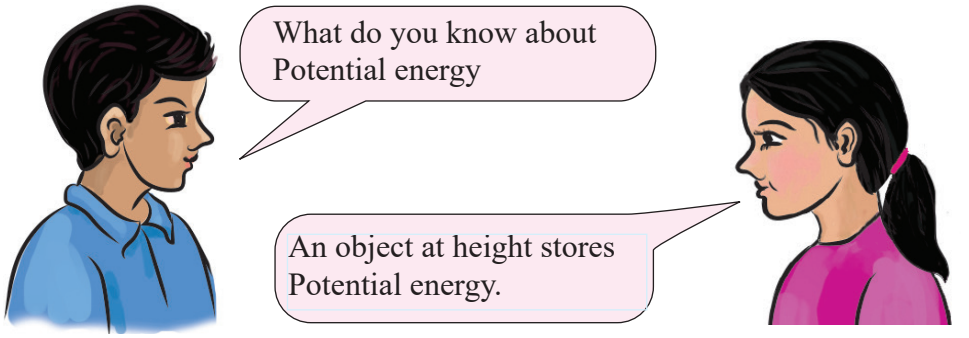
Activity: Learning about the different forms of energy.

What to do:

Let us

1. In the previous lesson, we learnt about seven forms of energy in short. Read them again attentively and discuss them in groups. Then one person from each group will share the information with the whole class.
2. After the presentations, each group will discuss the characteristics of the seven types of energy and write them in the table below.

Form of Energy	Characteristics



2. Sources of energy

Everyday we see many changes happening around us, and behind those changes, there is always some source of energy. For example– cars need chemical energy to run. This chemical energy comes from petrol, oil, or gas. Do you know what source of energy is used when we charge a mobile phone? Let us do a fun activity about different sources of energy.

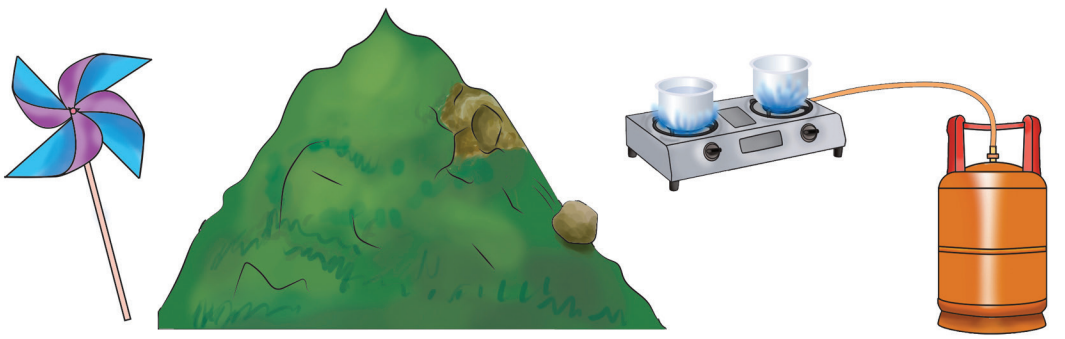
What are the different sources of energy?

Activity**:** Finding out the sources of energy.

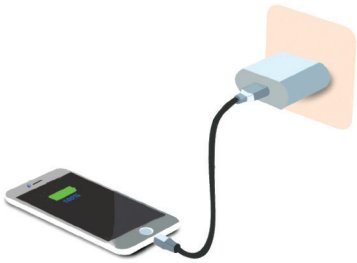
What to do:

Let us...

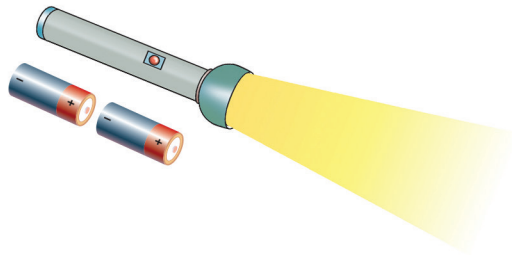
Look carefully at the pictures below.



The paper pinwheel is rotating Stone is rolling down Cooking on a gas stove



Mobile phone is getting charged



Light is coming out of the torch

2. Write down in the table below the names of the sources of energy in each of the instances above.

Events	Sources of Energy
Pinwheel	
A rock rolling down a hill	
Cooking on a gas stove	
Charging a mobile phone	
Light coming out of the torch	

Summary

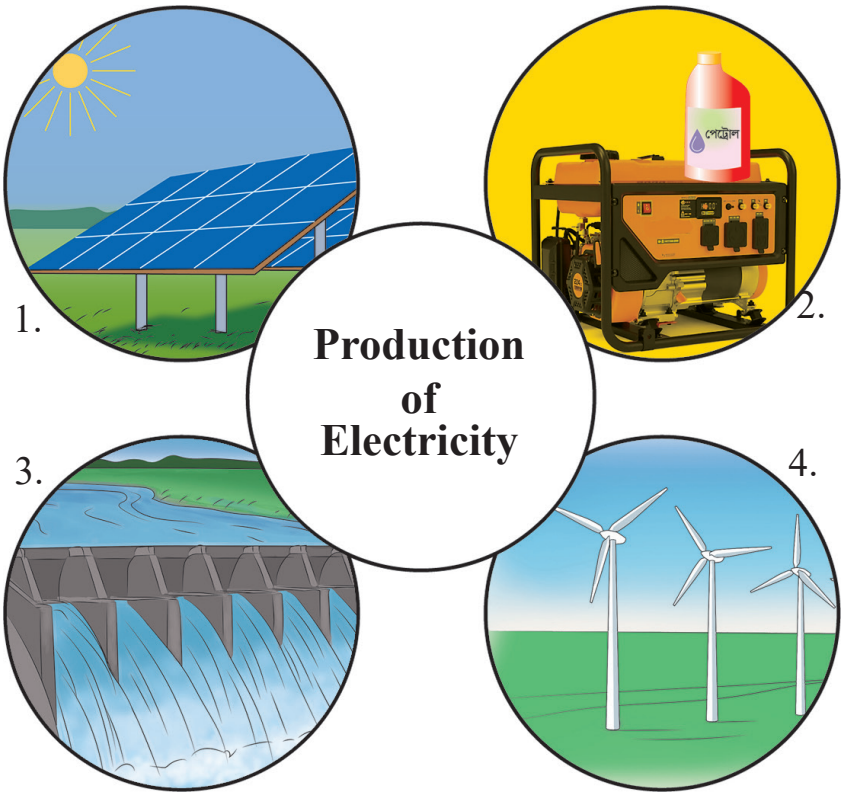
The pinwheel moves because of the kinetic energy of air. A rock rolling down a hill moves because of its stored potential energy. The source of energy for a gas stove is chemical energy of gas. For charging a mobile, electrical energy acts as a source. To get light from a torch, a battery is needed. That is why, in the case of a torch, chemical energy is the source.

What are the sources of electricity?

Activity: Finding the sources of electricity.

We can produce electricity in many ways:

1. Using solar panels
2. Using a generator
3. Building a dam in rapidly flowing water
4. Using windmills



What to do:

Let us talk in groups about how electricity is produced in different ways and find out what energy sources are used. Then fill in the chart below.

Ways of Producing Electricity	Source of Energy
Using a dam	
Using windmills	
Using a generator	
Using solar panels	

Summary

Water stored in a dam has potential energy. If the water is released, it flows down and moves a turbine connected to a generator. This produces electricity. In this

case, the source of energy is the potential energy of stored water. Windmills use the power of moving air to turn blades and produce electricity. Here, the energy source is wind. Generators use fuel like oil to produce electricity. In this case, the energy source is chemical energy. Solar panels need sunlight to generate electricity. So, the energy source here is light energy.

3. Responsible use of energy

Responsible use of energy means saving energy, avoid wasting, and using more renewable energy. We should use energy wisely to protect our health and the environment.

How can we use energy properly?

Activity: Finding out the correct use of energy.

What to do:

Let us think about the proper use of energy in our daily life. Then write it down in the chart below.

Name of Energy	Proper Use of Energy
Light energy	
Electrical energy	
Sound energy	
Heat energy	

Summary

Responsible use of energy means making smart choices every day. For example, we can wake up early in the morning and use sunlight instead of electric lights. Using energy-saving bulbs is also a responsible use of electrical energy. In hospitals or busy areas, we should avoid using loud horns unnecessarily. To save heat energy, we should keep hot water in a good-quality flask instead of leaving it in open containers.

Activity**:** Identifying how to use energy responsibly.

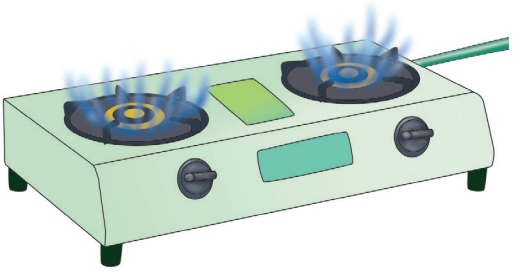
What to do: Look at the pictures below and write how we can use energy responsibly in the boxes below.



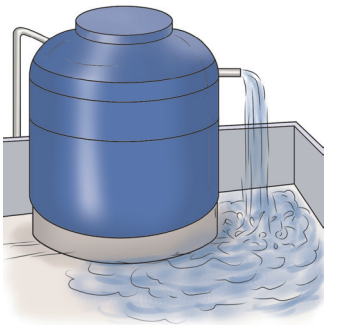
Students leaving the classroom.



Use of the laptop has finished

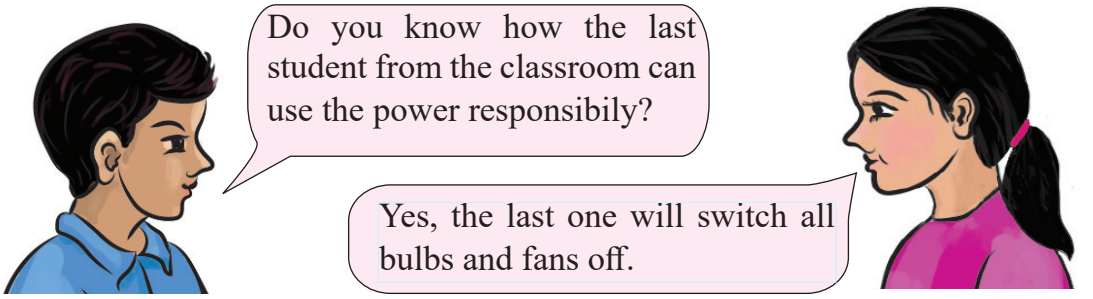


A gas stove is runing unnecessarily



Water is overflowing from the water tank

Situation	Responsible Use of Energy
You are the last student to leave the classroom.	
The use of the computer or laptop has finished.	
A gas stove is runing unnecessarily.	
Water is overflowing from the rooftop water tank.	



Summary

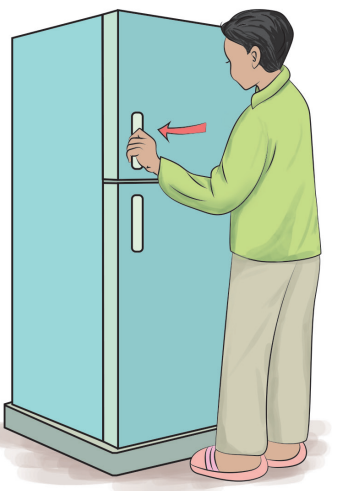
We should always use energy responsibly. For example, if you are the last student to leave the classroom, you should turn off all the lights and fans before leaving so that energy is not wasted. When we finish using a computer or laptop, we should turn it off to save electricity. After cooking, we must turn off the gas stove and never leave it burning without use. We also need energy to pump water. So, if water is overflowing from the rooftop tank, we should stop the water pump right away.

Let us learn more about responsible use of energy...

by changing our habits, we can reduce wasting energy. For example, in the morning, instead of switching on the light, we can open the curtains and let the sunlight brighten the room. Moreover, if windows are open, fresh air can move easily inside the room. To save electricity, we should use gadgets that need less energy. When not needed, we should switch off gadgets, unplug the charger after charging, and close the fridge door properly. If we go away for many days, we should turn off all electric equipment and close the water taps. To save heat energy, we should cook food in pots with lids. In winter, we can save heat by keeping hot water in a flask.



Lighting up the room removing the curtain.



Closing the door of the fridge after use

To use energy properly, we need to have the mindset to use the right technology. For example, we should reduce dependency on fossil fuel because this fuel pollutes the environment. Instead, we can try to use biogas or clean fuel. We

should also use rechargeable batteries instead of normal ones. We can use renewable energy, like solar power and water power, to make electricity. Instead of always using personal cars, we can use buses, trains, or bicycles. If possible, we can even walk. In this way, we can save energy.



Environment friendly manner in proper use of energy

We should create awareness among our friends and people around us to use energy responsibly. Loud noises cause sound pollution, which reduces our hearing ability and harms our mental health. While driving, we should not honk the horn unnecessarily, especially near hospitals, schools, and homes. We should also avoid playing music too loudly.

Exercise

1. Tick (√) the correct answer.

1. Which type of energy is used when the school bell rings?
   a) Light energy b) Chemical energy
   c) Sound energy d) Heat energy
2. Which one is not a source for electricity production?
   a) Oil b) Sunlight c) Moonlight d) Wind
3. Where can we find chemical energy?
   a) Horn b) Torch light c) Battery d) Bicycle
4. Which of the following is not a responsible use of energy?
   a) Using sunlight by opening the window curtains
   b) Keeping the gas stove burning without need
   c) Using rechargeable batteries
   d) Closing the fridge door quickly

2. Fill in the blanks.

a. _____ energy helps us to hear.

b. When someone jumps from a high place, _____ energy is produced.

c. Using a flask for hot water saves _____ energy.

3. Match the the right column with the left.

Left Side	Right Side
Energy that transfers from one object to another easily	Potential Energy
Not keeping the fridge door open for long	Chemical Energy
Energy stored in oil	Heat Energy
Energy stored in water held behind a dam	Good Habit

4. Answer the following questions in brief.

a) What is chemical energy?

b) What are the different sources of electrical energy?

5. Answer the following questions in detail.

a) What is meant by kinetic energy and potential energy? Explain with examples.

b) What can we do in our daily life to use energy responsibly?

Chapter 6

Motion and Force



In Class Three, we learned about how force affects objects. Force can change the size, shape, and volume of an object. Can force change the motion of an object?

1. Motion and force

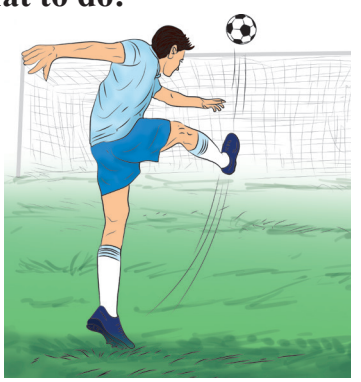
Motion is an important topic in science. Motion means the change of position of an object with time. On the other hand, a force is an effect that can cause a change in the state, shape, or motion of an object.

What effect of force is observed in the change of motion?

On the playground, we see a player kicks a football at rest and send it far away. A force is applied when a player kicks a stationary football. Because of this force, the football standing still starts to move- its motion changes.

Activity: The role of force in changing motion

What to do:





Let us...

1. One player will place a football on the ground and kick it toward the goalpost.
2. The goalkeeper will stop the moving football with his hands.
3. In this way, we can observe how the motion of football changes because of force.

Now, let us discuss in groups how force changes the motion of objects in daily life, and write more examples in the table below.

Examples of how force changes motion in daily life
1. When a football player kicks a football, its motion changes because of the force.
2.
3.
4.

Summary

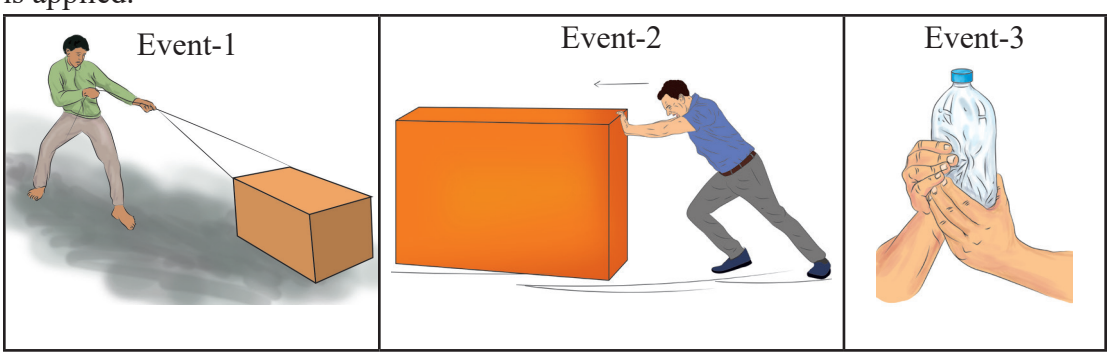
In daily life, we see that force and motion are related. When we apply force, the motion of an object changes. For example, when a football player kicks a football, its motion changes. Similarly, when a person runs or swims, they apply force. Because of this force, their motion changes.

2. Types of force and their effects

What type of change occurs when force is applied on an object?

Activity: Observing the change of an object due to force.

What to do: After observing the pictures below, write what happens when force is applied.



Event	Type of force	What happens?
Event-1		
Event-2		
Event-3		

Summary

In different events, we often change the motion or direction of motion of objects as needed. To move something from one place to another place or to change its position, we apply force. again, we use force to change the shape of object.

Let us Learn More about...

There are different types of force. By applying different kinds of force, the motion and state of an object can change. For example, by force a still object can be made to move, or a moving object can be made to stop. Moreover, the shape, size, or form of an object can change when force is applied.

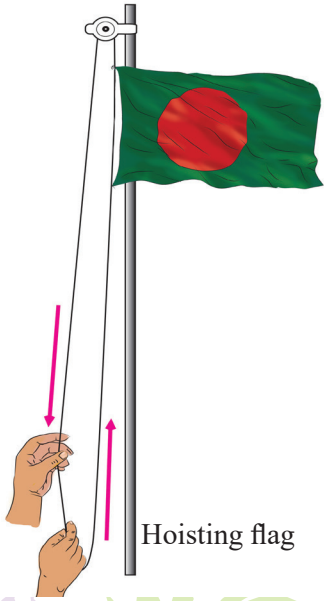
In general, with a pulling force, we bring something toward us. With pressure, the shape or size of something can change. With a pushing force, we move something forward or from one place to another.

3. The role of force in the change of motion in daily life

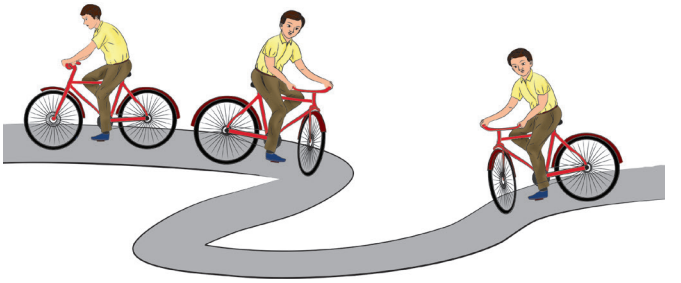
What kind of effect does force have on motion?

Activity: Observing the effect of force due to the change of motion.

What to do: After observing the pictures below, how does the 'force' affect on the following events.



Hoisting flag



Riding bicycle



Swimming

Event	How does the forces work
Hoisting flag	
Riding bicycle	
Swimming	

Summary

In daily life, we use force to solve many problems. It is necessary to apply force to ride a bicycle, hoist a flag, or swim.

Let us learn more about the role of force in the change of motion...

we do many kinds of work in our daily life. While doing these works, we use different types of force like push, pull, and press. To move an object closer or farther, we need to apply force.

When a person rides a bicycle, he sits on the seat and put his foot on the pedals. The pedals are connected to the back wheel by a chain. When they push the pedals, the wheels rotate and the bicycle moves forward. In this way, it gets motion. To stop the bicycle, he stops pedalling or presses the brakes. To turn the bicycle right or left, he pushes the handle.

We need a rope and a flagpole to hoist a flag. The flag is tied to one end of the rope. At the top of the flagpole, there is a ring. The rope passes through this ring and easily moves. When we pull the rope, the flag goes up.

When swimming, a person does not move if he just floats in the water. To move, swimmers must use his hands and legs to push the water backward. We understand that force is needed to move forward while swimming. How do we use this force? In fact, while swimming, we push the water backward. Then the water pushes our body forward, so we can move ahead. The harder we push with our hands and legs, the faster we move forward.

Exercises

1. Put a Tick mark (√) on the correct answer.

1. Which one of these makes an object change its position?

   a) Force b) Motion

   c) Time d) Volume

2. What do we apply to a stationary object to move?

   a) Object b) Force

   c) Motion d) None of the above

3. In the case of hoisting a flag, where is force applied?

   a) On the flagpole b) On the Rope

   c) On the ring d) On the ground

2. Fill in the blanks.

a. By applying force with pressure, the object's ..... changes.

b. Because of the application of ..... motion changes.

c. By applying force, the ..... of a vehicle can be controlled.

3. Answer the following questions in brief.

a. What is force, and what is motion?

b. What is the difference between force and motion?

c. What must be applied to move an object from one place to another?

4. Answer the following questions in detail.

a. Describe the effect of force on the change of motion in our daily life.

b. Describe the types of force and their effects.

Chapter 7

Natural Resources 

1. Concept of natural resources

We observe many nature-created **materials** around our school or home. These things/materials are essential for our survival. We use them in various ways in our daily life. These things that are valuable and necessary for humans are resources. Anything found in nature that is useful to humans is a natural resource.

What natural resources do we use?

The picture below shows different types of natural resource.



Activity: Finding different types of natural resources.

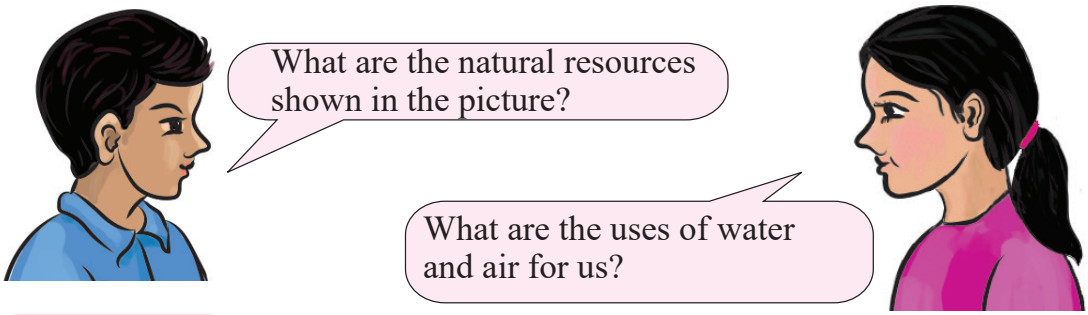
What to do:

Let us...

1. Carefully observe the picture above
2. Draw a table like the one below.

3. In the table, write the names of the natural resources shown in the picture and describe uses for humans.
4. Discuss the activity with classmates.

Name of Natural Resources	What are their Uses for Humans



Summary

We get almost everything we need to survive from natural resources. We use natural resources for various purposes in our daily life. Natural resources cannot be created by humans.

Let us learn more about natural resources…

water Resource

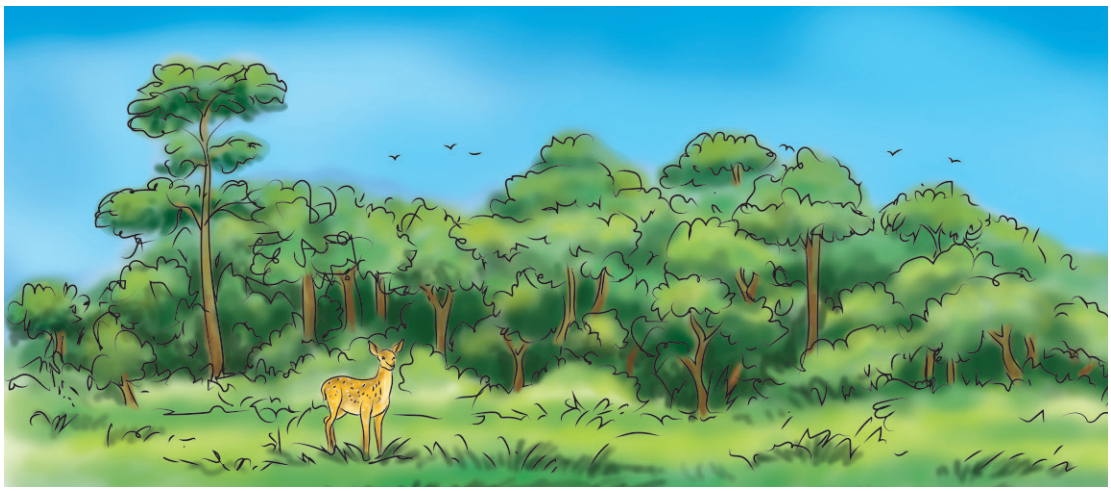


Water Resources

Water is an important natural resource. Every living being needs water to survive. We get water from rainfalls, ponds, rivers, seas and other sources. We also get water from wells and tubewells. People use water for many purposes. Such as

drinking, washing, cooking, growing crops, etc. We catch fish from seas, rivers, ponds, and lakes to meet our needs; we irrigate crops to grow crops; and we even generate electricity by using the flow of water.

Forest Resources



Forest resources

Forests are home to a variety of plants, animals, and birds. Many things that humans need are collected from forests. The main sources of wood used in our daily life is forest plants. Forest plants provide us wood for building houses, making furniture, and producing books and notebooks; they provide firewood for cooking. Plants produce and supply the oxygen we need to breathe. Forest plants help make the world habitable for humans by purifying the air. Besides, the animals, plants, and birds of forests maintain the balance of the environment.

Land Resources



Playground



Road



Crop field

The solid ground beneath our feet is the land. The land is full of many resources that we use every day. People build houses, roads, schools and other structures on land. Land is used to grow fruits, crops, vegetables, and grazing for livestock. We do everything on the land, from running and playing in the playground, to traveling on the road and driving vehicles. Various types of minerals, including gold and silver, and fossil fuels are extracted from the deep layers of the land. The land must be preserved to keep it pollution-free and habitable for living beings. We can take care of the land by planting trees.

Mineral Resources



Mineral resources

Various mineral resources such as mineral oil, coal, metals, natural gas, limestone, marble, etc. are found deep in the earth. There are different types of mineral metals, such as gold, silver, copper and iron. Limestone and marble are a type of rock. Various types of minerals and rocks are used to make chalk, metal coins and construction materials. Heat is obtained by burning oil, coal and natural gas. This heat is used to run factories and vehicles, for cooking and for generating electricity.

Other Natural Resources

Natural resources also include sunlight and wind. They are sources of energy by themselves. They are also used to produce other types of energy. We get light and heat from the sun. Electricity can be generated from sunlight, wind flow and water flow.

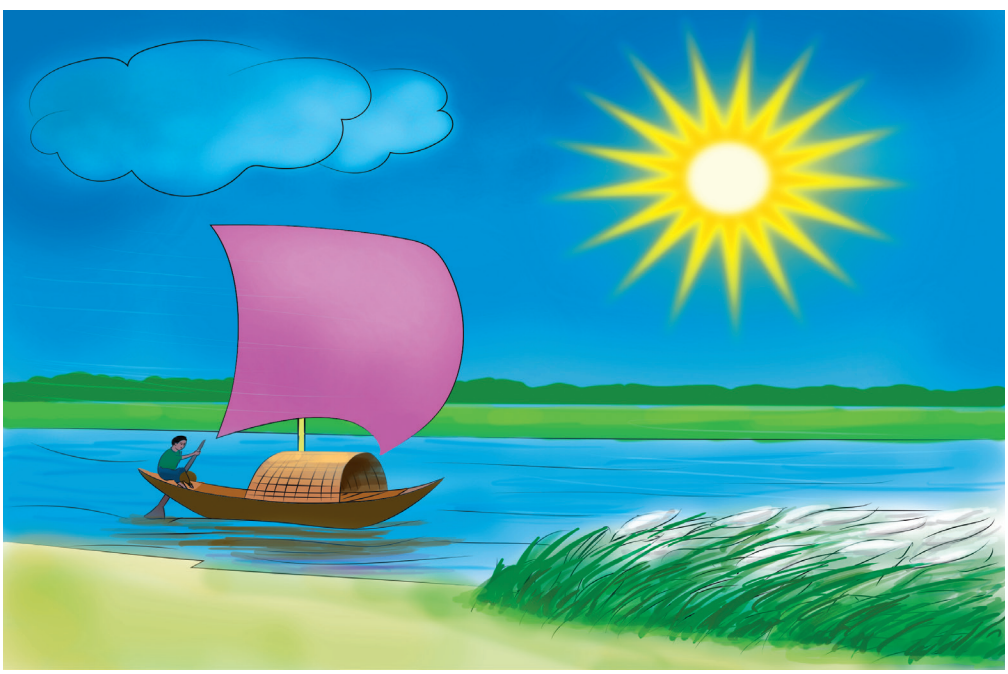
Natural Resources of Bangladesh

Bangladesh has various types of natural resources, such as sunlight, wind, water, soil, plants and animals. In addition, natural gas, coal, hard rock, silica sand, clay, limestone and various minerals are found in Bangladesh.

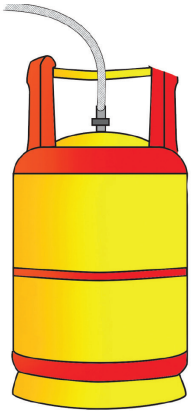
2. Types of natural resources

How many types of Natural Resources?

Natural resources are mainly of two types, namely renewable and non-renewable. Renewable natural resources do not get exhausted due to their use. They are constantly available from nature and can be used. For example, sunlight. On the other hand, non-renewable natural resources get depleted due to their use. For example, oil, coal, etc. How many types of natural resources are there?



Sunlight, Air and Water


Gas


Stone


Coal


fuel


Silica sand

Activity: Identifying renewable and non-renewable natural resources.

What to do:

Let us...

1. Draw a table like the one below.

2. Write in the table below which of the natural resources shown in the above pictures are renewable and which are non-renewable.

Renewable Resources	Non-renewable Resources

Summary

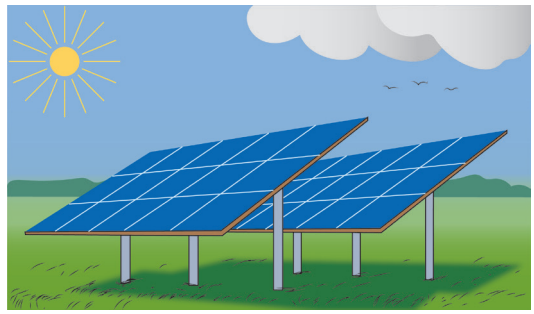
Renewable natural resources do not get exhausted by use, while non-renewable natural resources are depleted by use.

Let us learn more about the types of different natural resources...

renewable Natural Resources

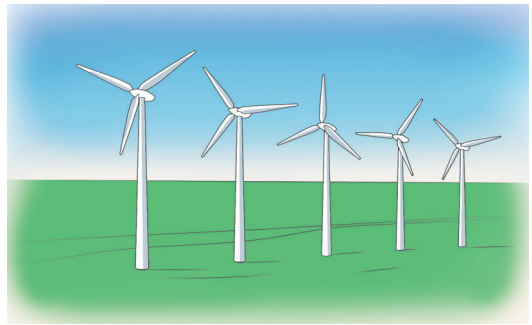
Sunlight

The sun gives us light and heat. Sunlight is an important source of energy. Sunlight can be converted into electricity through solar panels. We see solar panels on the roof of our houses or in the calculators.



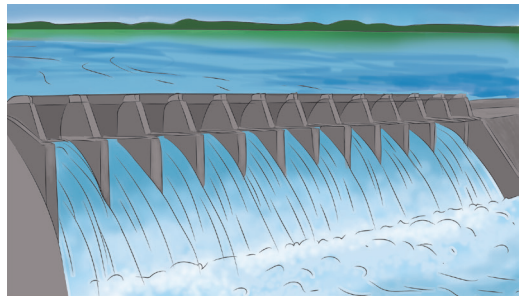
Wind flow

Electricity can be generated using wind flow. The wind flow rotates the blades of the windmill. The windmill is connected to the generator, a device for generating electricity. When the blades of the windmill rotate, electricity is generated through the generator.



Water flow

Electricity can be generated using water flow. The water flow rotates the turbine connected to the generator. As a result, electricity is generated.



Non-renewable Natural Resources

Oil, coal, and natural gas

Oil, coal, and natural gas are non-renewable resources. They are stored in nature. Once these resources are used up, they are no longer available for use. When they are burned, heat is generated. This heat is used for various purposes including cooking, driving vehicles and generating electricity.

Minerals

Metals such as gold, silver, iron, etc., are found underground. We use different metals to make jewelry, machinery, buildings, and many other things. If these metals are extracted in excess for use, they will not be available again.



Gold, silver, and iron

3. Importance of proper use of natural resources

Natural resources are essential for our survival and well-being. We are surrounded by air. With the help of air, we breathe. We quench our thirst by water. The presence of water is very important for the survival of animals. Natural resources provide the materials to build our homes. They provide energy to run our lives. Natural resources are limited on earth, so it is very important to use them properly and responsibly.

Activity: Finding out the importance of proper use of natural resources.

What to do:

Let us...

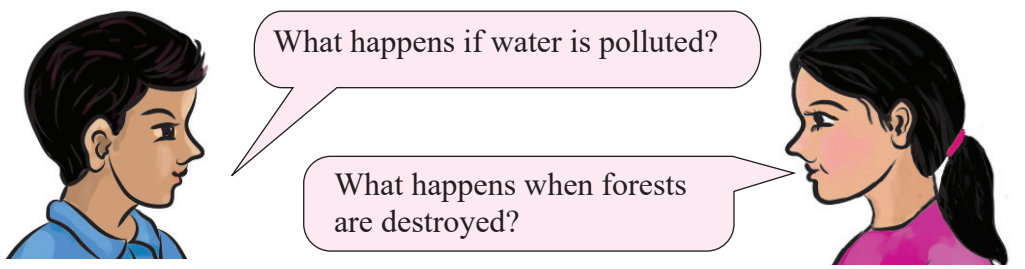
1. Write the names of three renewable and non-renewable natural resources in the table below.

2. Write in the table below what will be the impact on the lives of humans and other living beings if these resources are not available, polluted, destroyed, or exhausted.

Renewable Natural Resource	Impact on the Lives of Humans and Other Living things
1.	
2.	
3.	
Non-renewable Natural Resources	**Impact on the Lives of Humans and Other Living Things**
1.	
2.	
3.	

Summary

Natural resources are very essential in our daily lives. Human beings use natural resources in many areas including energy sources, breathing, electricity generation, fuel. Survival of human beings is unimaginable without natural resources.



Let us learn more about the importance of proper use of natural resources...

Proper use of natural resources is very necessary for resource-sustainability, environmental protection, economic stability, social welfare and biodiversity conservation. By using resources properly, we can ensure the availability of resources for future generations.

Sustainable use of resources

Proper use or prevention of misuse of natural resources ensures the availability of natural resources for future generations. This concept is known as sustainable use of resources. Natural resources like water, forests and fossil fuels should not be overused or destroyed. If we use natural resources sustainably, we will be able to use them in the future as well. For example, if we keep gas stoves burning unnecessarily, the gas will run out quickly. For long-term and sustainable use, gas wastage must be prevented.

Environmental protection

The proper use of natural resources helps to protect the environment. Overuse or misuse of resources can lead to various types of pollution, destruction of habitats and climate change. For example, burning fossil fuels for energy releases greenhouse gases into the atmosphere. This increases global warming. By using renewable energy sources such as wind and solar energy, we can reduce pollution and protect the environment.

Social welfare

The proper use of natural resources also promotes social welfare. Balanced and sustainable use of resources reduces social conflict. As a result, everyone can get the resources they need. For example, clean water is essential for health and well-being. If water resources are used properly, access to clean water can be ensured for everyone.

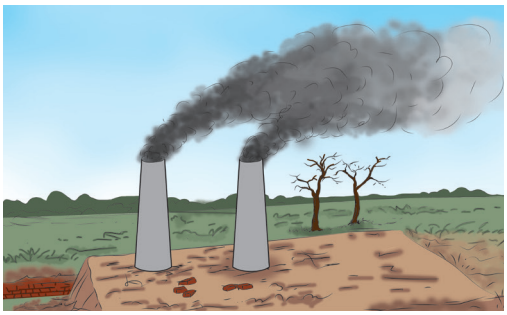
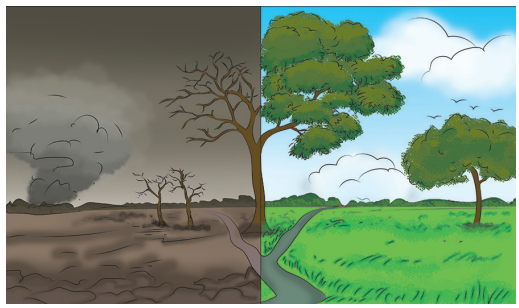
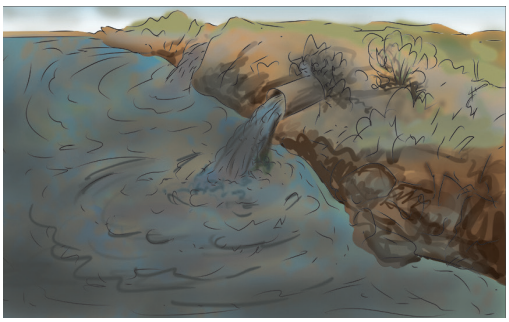
Biodiversity conservation

The proper use of natural resources helps to protect biodiversity. No matter how small an organism is, it has a role in the ecosystem. Overuse of forest resources and other resources may cause plants and animals to become extinct. As a result, habitat of living organisms is destroyed and biodiversity is reduced. Therefore, protecting the natural habitat of plants and animals is very important. Sustainable use of natural resources is helpful in protecting rich biodiversity.

4. Man-made causes of environmental change and their effects

Everything around us -plants, animals, air, water and land is environment. We depend on the environment for survival. Human beings often damage the environment. Let us see how human activities cause changes in the environment.

What are the man-made causes of environmental change?

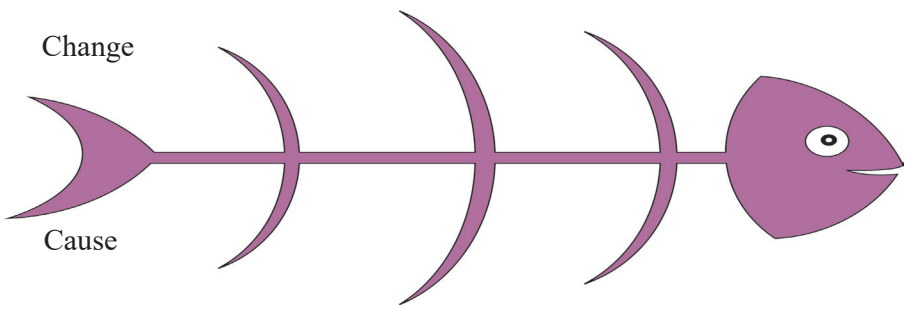





Activity: Making a list of the causes of environmental change due to human activities

What to do:

Let us…

1. Look carefully at the pictures on the previous page.
2. By looking at the pictures and discussing in groups, make a list of the causes of environmental change done by people.
3. Write different environmental changes and their causes in the diagram below.



Summary

Humans change the environment by cutting down trees and polluting the air, water and land. The environment is damaged as a result of such human activities. This destroys the habitat of many plants and animals. If the environment of a place changes, the weather and climate of that place also change. This destroys the balance of nature.

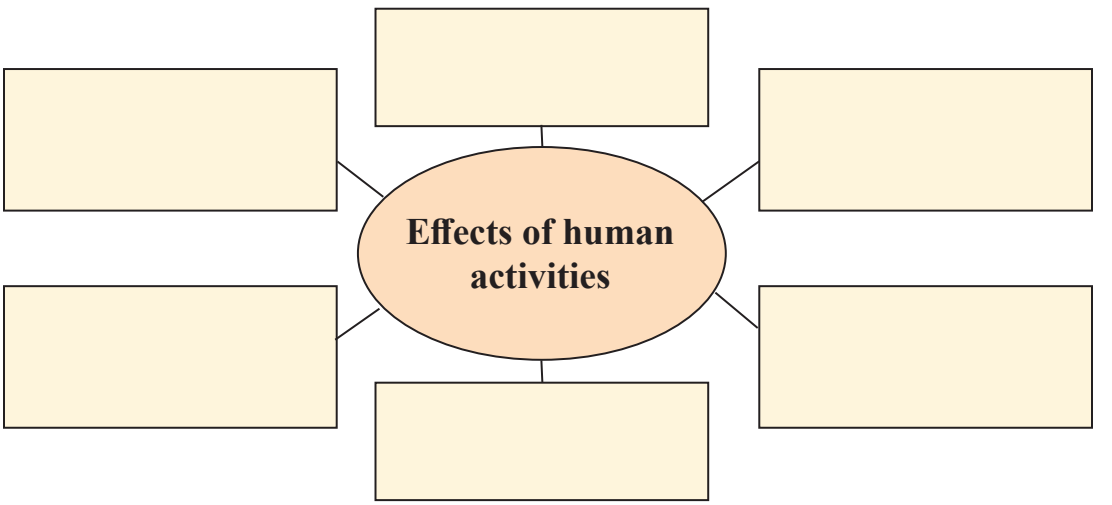
Activity: Showing the effects of human activities on environmental change in the conceptual diagram.

What to do:

Let us...

1. Discuss in groups the effects of the human-made factors that we listed in the previous activity on environmental change.

2. Write the effects of human-made activities on environmental change in the blank spaces of the concept map on the next page.

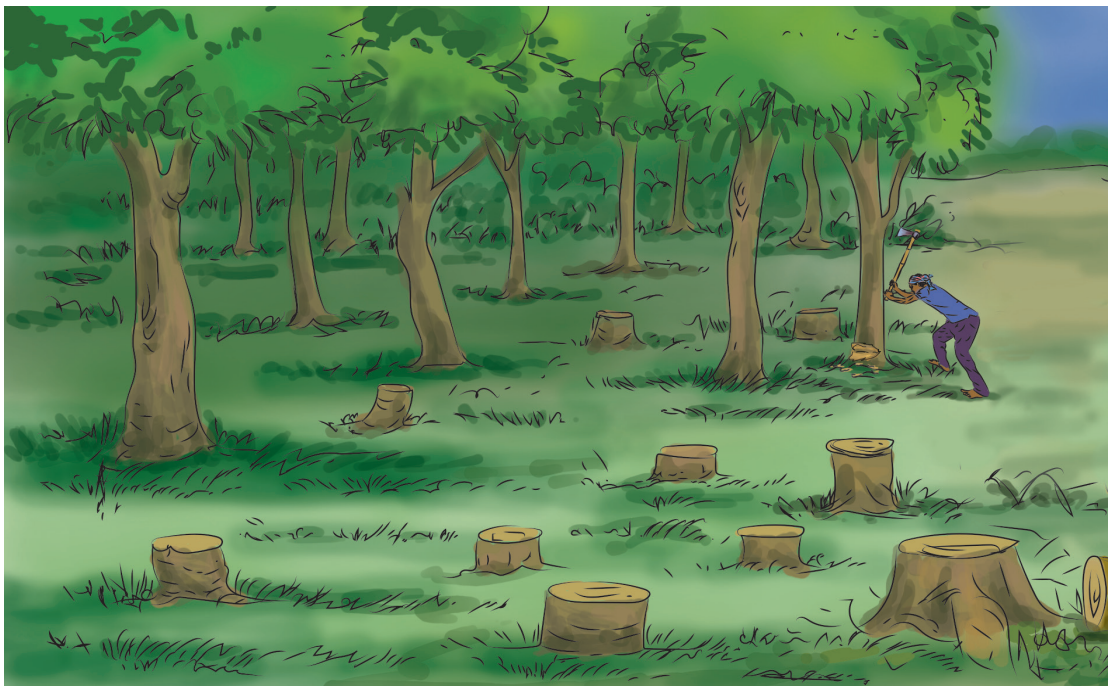


Let us learn more about human-made causes of environmental change and their effects...

Deforestation

Deforestation means cutting down trees of a large area of forest. Plants give us oxygen. They purify the air by releasing oxygen. They provide space for animals to live in. Deforestation changes the environment. This destroys the habitats of

living organisms and endangers the existence of living organisms. When a forest is destroyed, the top layer of soil gets removed. This causes erosion of the forest soil and therefore loses its fertility. As a result, new trees cannot grow in that area.



Deforestation by cutting down trees

Pollution

Elements of the environment are polluted as a result of human activities. Various types of harmful substances mix with air, water, and soil and cause pollution. Different types of pollution occur in the environment. For example-

Air pollution: Running cars and factories and burning fossil fuels for other activities release smoke and chemicals into the air, causing air pollution. Air pollution makes it difficult for living organisms to breathe.

Water pollution: The water of rivers, canals, lakes, seas, and oceans are polluted with various types of garbage, chemicals, and waste. This destroys the habitat of fish and other aquatic organisms and leads to extinction.

Land pollution: Dirt, garbage, factory waste, and chemicals mix with the soil and contaminate it. Land pollution threatens the lives of plants and animals.

5. Ways to conserve natural resources

Protection of natural resources and their planned use is called conservation. If natural resources are conserved, they can be used for a long time. As a result, future generations get the opportunity to use natural resources.

What are the ways to conserve natural resources?

Activity: Finding out the things that can be reduced, reused, and recycled.

In order to conserve natural resources in our daily lives, Let us discuss in groups and identify the things that we can reduce, reuse, and recycle in our homes and close surroundings, and write them in the table below.

Reduce	Reuse	Recycle

Summary

We can take different steps to conserve various natural resources. For example, arranging for rainwater harvesting. To prevent water wastage, broken water taps should be reired immediately. To prevent gas wastage, ensuring that the gas stove is turned off after cooking. To reduce land erosion, plant trees. Informing the appropriate authorities in case of forest destruction or wildlife poaching. We can play a role in conserving natural resources by reducing our use, recycling, and creating new objects from discarded things.

Let us learn more about conserving natural resources...

Conserving natural resources is very important. This saves natural resources for future use. By reducing overuse, recycling, and preventing wastage, natural resources can be conserved. As a result, the amount of waste in the environment is reduced and energy is saved. Natural resources can be conserved in various ways, such as-

Reduce overuse of resources

Being careful in using resources is a good way to conserve natural resources. We can conserve natural resources by reducing energy use. For example, turning off the electric lights when they are not needed, and preventing wastage of water while washing clothes or bathing.

Reuse of resources

We can reuse any used item for other purposes instead of throwing it away. For example, give old clothes and toys to someone else instead of throwing them away. Use discarded plastic bottles or cans for other purposes. If something is broken, repair it and use it.

Recycling of resources

Old items can be given a new look through recycling. In this way, the pressure on natural resources can be reduced. It is possible to reduce the pressure on natural resources by recycling paper, plastic, glass, and various metals. For example, making pulp from old paper, and reusing it to make paper.

Reducing the use of non-renewable fuels

Humans mainly use non-renewable natural resources such as oil, coal and natural gas as fuel to produce energy. These resources are exhausted once they are used. A good way to conserve natural resources is to reduce the use of non-renewable fuels and generate energy using renewable resources such as sunlight, wind, and water currents.

6. Sensible use of natural resources in our immediate environment

Sensible use of natural resources means using them wisely and preventing unnecessary use. By using natural resources sensibly and taking proper care of the environment, our world will be saved. We can ensure the availability of

natural resources for future generations through the sensible use of resources.

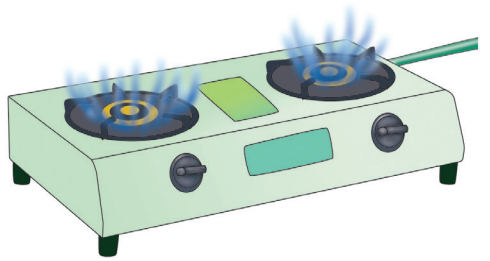
How can we use natural resources sensibly in our close environment?



Wastage of water



Wastage of electricity



Wastage of gas





Wastage of paper

Activity: Finding ways to use natural resources moderately

What to do:

Let us...

1. Look at the pictures above carefully.
2. Natural resources are not used sensibly in the pictures. Discuss with your classmates how to ensure the sensible use of natural resources shown in the pictures.

3. Fill in the table below.

Natural Resources	Sensible Use
Water	
Electricity	
Gas	
Paper	

Summary

We can use natural resources sensibly and responsibly through our own will and practice, and social awareness.

Awareness for Sensible use of resources

Sensible use of natural resources is not just the duty of one person, it is the responsibility of everyone. Our family, friends, school teachers all need to be aware. We will make our classmates and other friends aware of how to save water or electricity. If we all become aware, the world will become more beautiful and livable.

Exercise

1. Fill in the blanks.

a. Anything found in nature that is useful to humans is a ……...

b. Non-renewable natural resources, once used, become _____.

c. Proper use of natural resources ensures their availability for _____ generations.

d. Because of human activities, the environment becomes _____.

e. By reducing the use of energy, we can _____ natural resources.

2 Match the the right column with the left.

Left	Right
The main source of wood is	cause change in the environment
Renewable natural resources	helps in preserving rich biodiversity.
Sustainable use of natural resources	forest trees.
Humans cut down trees, pollute the air, water, and land	sensible use of these and preventing their unnecessary use.
Using natural resources sensibly means	are not exhausted by use.

3. Chose the correct/incorrect statement.

	Correct	Incorrect
Natural resources cannot be created by humans.		
Airflow is a non-renewable natural resource.		
Sustainable use of resources ensures the availability of natural resources for future generations.		
Making paper pulp from used paper and reproducing paper is called reuse of resources		

4. Answer the following questions in brief.

a) What are natural resources?

b) What types of natural resources are coal and natural gas?

c) How do forest resources make the environment habitable?

d) What is the effect on living organisms when water is polluted?

e) How can you reduce wastage of water in household work?

5. Answer the following questions in detail.

a) What natural resources are there in Bangladesh? Let us make a list.

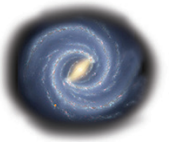
b) What harm does deforestation cause to the environment? Let us explain.

c) Let us write down four means that play role in the conservation of natural resources at home or school.

d) What we should do to protect natural resources for future generations. let us write down with reasons.

Chapter 8

The Universe



If we look at the sky at night, what do we see? In the night sky, we usually see the moon and countless stars. Why can not we see them during the day? It's because the sunlight is so bright that it hides the stars and the moon. During the day, we can only see the sun. The universe is made up of all planets, solar systems, stars, and galaxies.

1. Solar system

The Sun and its family members, together make the solar system. The members of the solar system are the Sun, planets, moons, and other space objects. The planets move around the Sun. The names of the planets, in order of distance from the Sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Each planet has its own special features. Some planets have satallite that orbit around them. The earth has only one natural satellite, and its name is the Moon.

How is the Solar System formed?

Activity 1: Learning about the solar system by running in the playground.

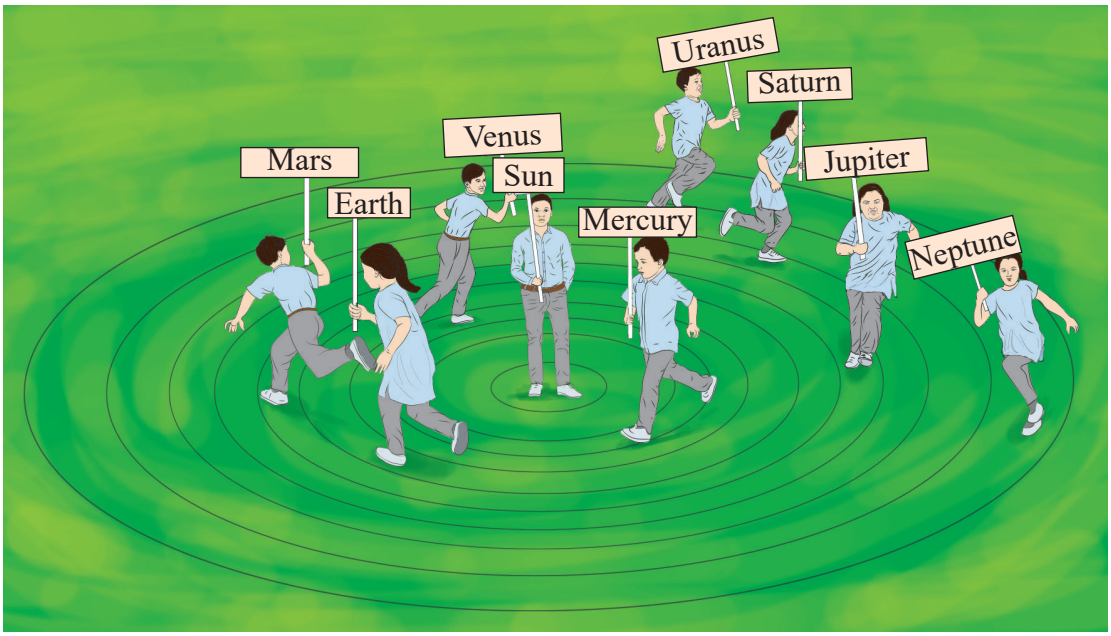
Things you need: Playground, placards with planet names.

What to do:

Let us...

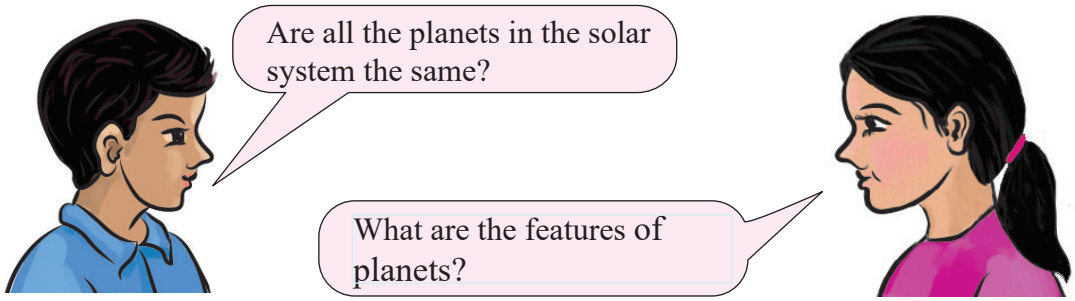
1. Make a group with 9 classmates.
2. Choose one friend by lottery to play the role of the Sun. Give him a placard writen "Sun" on it. He will stand in the middle of the playground.
3. The other 8 friends each will pick the planet names from lottery. They will hold placards with their planet's name.
4. The classmates holding the placards of Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune will line up in order. They will run in a circle around the imaginary "Sun", holding up their placards.

5. Then everyone will get together and talk about how they felt during the game.



Solar System in the Playground.

- Did everyone travel the same distance while moving around the Sun? Who had to travel the longest distance to move around the Sun once?
- Did all the students take the same time to move one round? Who took the least time to come back to the initial position?



Activity 2: Making a model of the solar system

Things you need: Coloured papers, white thread, pen.

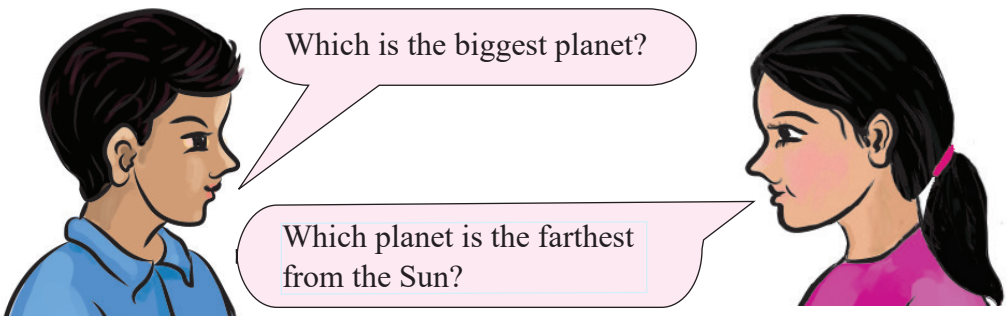
What to do:

Let us...



Name of the Planet	One Special Features

1. Place a black paper on a flat surface.
2. In the middle of the black paper, put a big round yellow paper to mean the Sun.
3. Cut different coloured papers to make eight planet circles and write names on them.
4. Cut white thread long enough. Use glue to fix the eight threads in equal gaps, keeping each at the same distance from the others to form circles. These circles represent the orbits.
5. Place the planets (coloured circles) on the orbits according to their distance from the Sun.
6. Draw a chart on coloured paper like the one above and write one special feature of each planet different from others.



Summary

The Sun is at the center of the solar system. The planets revolve around the Sun. Compared to the nearer planets, the farther planets take more time to go around the Sun.

Let us learn more about the solar system…

We know that the Sun is at the center of the solar system. Eight planets and their satellites move around it. Let us know some characteristics of the planets.

Mercury:

Mercury is the closest planet to the Sun and also the smallest one. It has no satellite. There are rocks, holes, and flat lands on its surface. It takes only 88 days to revolve around the Sun.

Venus:

The size and structure of venus is the same as Earth. But its environment is totally different. It has a very thick and heavy atmosphere that traps heat. As a result, Venus is the hottest planet in the solar system. It has no satellite. People also call Venus the "Morning Star" or the "Evening Star." In the morning, it shines in the eastern sky and is called the Morning Star. In the evening, it shines in the western sky and is called the Evening Star.

Earth:

Earth is the only planet with liquid water and liveable environment. It has only one satellite called the Moon. Earth takes 365 days to move around the Sun. This time span is called a year.

Mars:

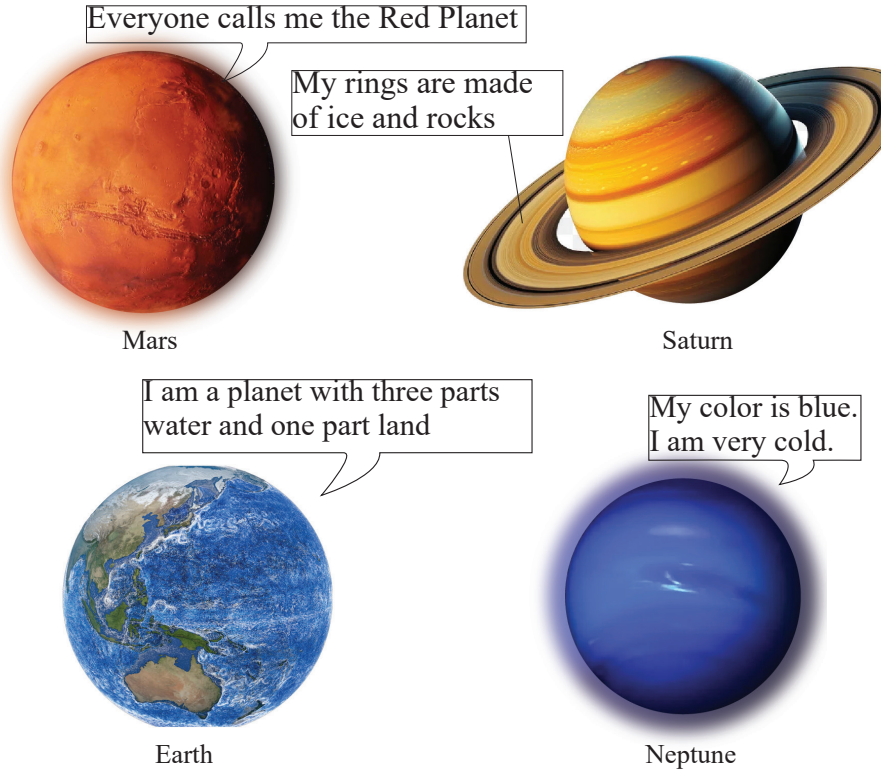
Mars is called the Red Planet because its surface is orange-red. This planet is very cold, and its surface looks like a desert. Mars takes 687 days to move around the Sun. The atmosphere on Mars is very thin. There is ice below the surface of Mars. This planet has two small satellites.

Jupiter:

Jupiter is the biggest planet in the solar system. A revolving giant storm within it has never stopped for the last few centuries. Jupiter has 95 satellites, and four of them are the biggest ones in the solar system.

Saturn:

Saturn is the second biggest planet in the solar system. It has a beautiful zone made of ice and rock. It has 146 satellites.



Uranus: This planet is made of water, methane, and ammonia ice on rock. It is the third biggest planet in the solar system. Because of the presence of methane gas in atmosphere, Uranus looks blue. Uranus has 28 satellites.

Neptune: Neptune is the farthest planet from the Sun. Its shape and atmosphere are like Uranus. It also looks blue like Uranus. The strongest winds and storms in the solar system blow on Neptune. Neptune has 16 satellites.

2. Earth's natural satellite – The Moon

Just like planets move around the Sun, satellites move around planets. Satellites are much smaller than planets. There are two types of satellites: natural and artificial (made by humans). Earth's only natural satellite is the Moon.

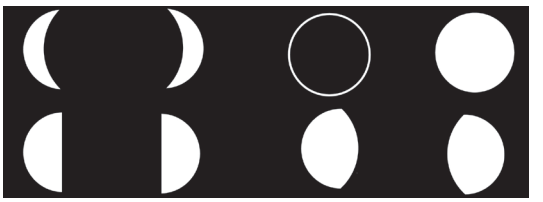
Artificial satellites are man-made objects that revolve around the Earth. These are known as satellites. These are sent into space for communication, weather observation, scientific studies, and military research, along with many other purposes. Bangladesh also has a satellite called **Bangladesh Satellite-1**.

How does the Moon's shape change?

Activity: Watching the Moon

What to do:

Let us...



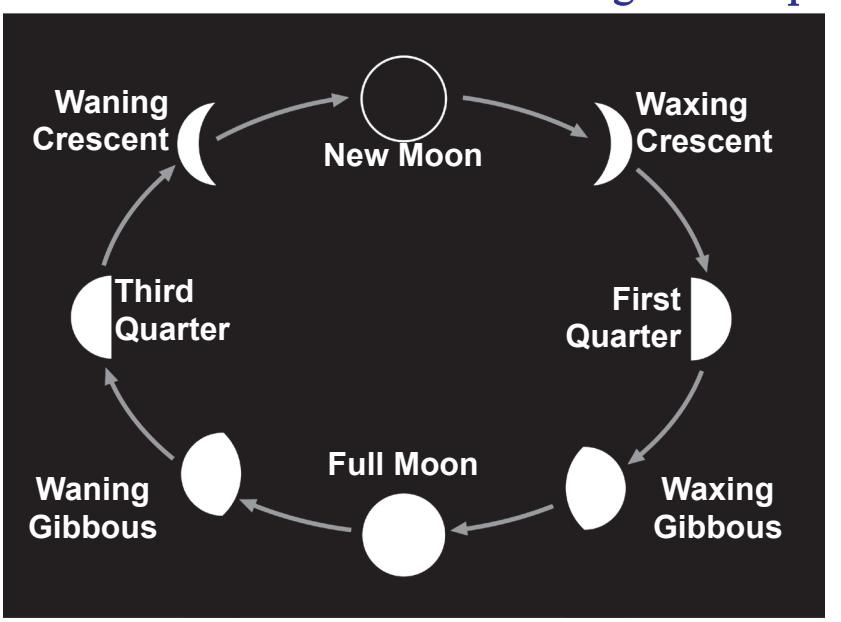
Different shapes of the Moon.

1. Write down in your notebook what shapes of the Moon you have seen at night.
2. Match the pictures of the Moon's shapes in the above figure with the ones you have drawn.
3. Mark which shapes of the Moon you have seen and which ones you have not.

Summary

If we look at the Moon at night carefully, we will see that sometimes it is big and round. And sometimes it is small or half-round.

Let us learn more about how the moon changes its shape…



The eight phases of Moon

The changing of the bright shape of the Moon is called the phases of the Moon. The Moon has 8 phases**.** To return to its previous state, the moon takes about 29.5 days.

New Moon: At this time, the side of the Moon facing the Earth is completely covered with shadow. As a result, the Moon can not be visible from Earth. This happens when the Moon is positioned between the Earth and the Sun.

Waxing Crescent: After the new moon, a small part of the Moon starts to shine. Each night it gets a little bigger. This is called the waxing crescent.

First Quarter: When the Moon moves one-fourth of its way around Earth, we can see half of it bright. It looks like a half-circle.

Waxing Gibbous: After the first quarter, more than half of the Moon becomes bright.

Full Moon: The whole Moon is bright and round. At this time, the Earth stays between the Sun and the Moon.

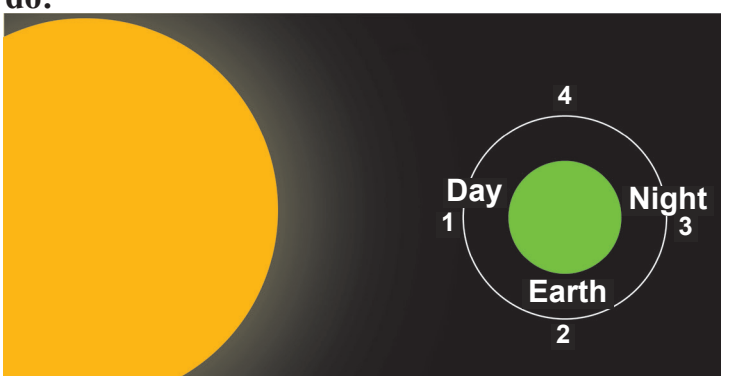
Next Phases: After the full moon, the next phase is Waning Gibbous (the bright part slowly gets smaller). Then comes the **third quarter** (half bright again), and then a **waning crescent** (a small thin shape). All these phases together take about **29.5 days**. This is called a **lunar month**.

How do Full Moon and New Moon happen?

Activity: Making a model of Full Moon and New Moon.

Things you need: Papers of different colours, white thread, and a pen.

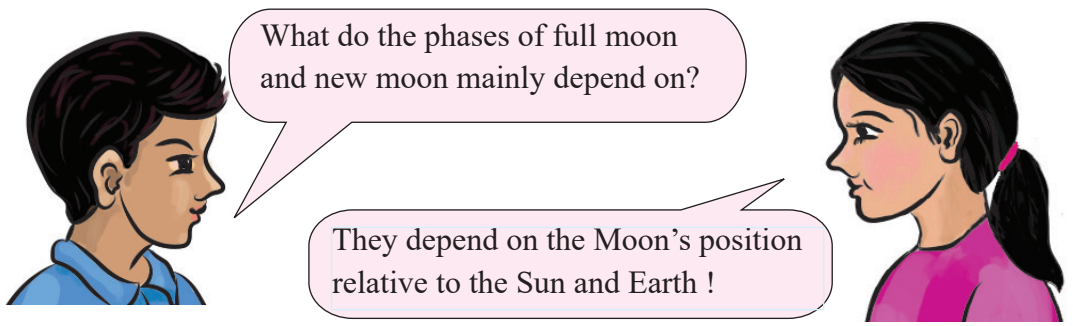
What to do:



Let us...

1. Put a black paper on a flat surface.

2. Place a round orange paper in the middle of the black paper to mean the Sun.
3. Cut a green round paper and place it near the Sun and think it as the Earth.
4. Take a long white thread. Use glue to fix it and make a circle around the Earth. The circle represents the orbit.
5. Cut two yellow round papers. draw “Full Moon” on one and “New Moon” on the other.
6. Place the Moon papers at the correct spots (1, 2, 3, and 4) around the orbit to show Full Moon and New Moon models.
7. Look at the model and answer these questions:
   - Why do we see the Moon bright during Full Moon?
   - Why do we see the Moon dark during New Moon?



Summary

During the New Moon, the Moon stays between the Sun and the Earth. At this time, the bright side of the Moon cannot be visible from the Earth. During Full Moon, the Earth stays between the Sun and the Moon. At this time, we can see the whole bright side of the Moon from Earth.

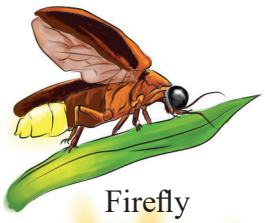
How does the Moon shine?

Have you ever looked at the night sky and wondered what is the secret behind the Moon’s beautiful light? Why does it shine so brightly? Does it have its own light?

Activity: Finding out the reason why the Moon shines.

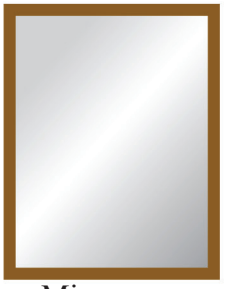
What to do:

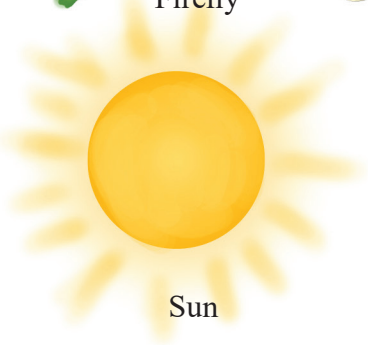
Let us...


Firefly

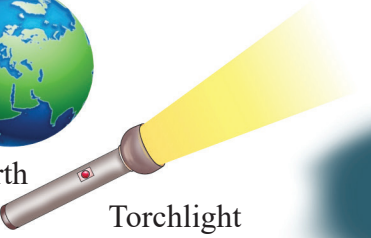

Grasshopper


Bulb

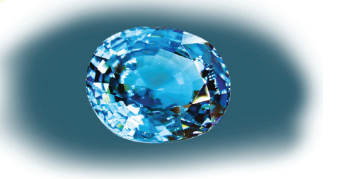

Mirror


Sun


Earth


Torchlight

Shiny Stone



1. Draw a table like the one below.

Produce Light	Does not Produce Light

2. Look at the above pictures.
3. Write which ones make their own light and which does not.
4. Talk about the question below in groups:
    - Why can we see those who do not make their own light?

Summary

Some objects produce their own light while others do not do that. However, we still can see them because they reflect the light from others.

Let us learn more about how the moon shines…

the Moon has no light of its own. It depends on the Sun for light. We can think of the Sun as a big torch in the sky. The surface of the Moon is covered with rocks

and dust, which reflect the Sun's light like a mirror. That light comes back to the Earth, so we can see the Moon at night. The Sun lights up only one side of the Moon, while the other side remains always dark.

Now think – if we lived on the Moon, could we see the Earth from there? Yes, because like the Moon, the Earth also reflects some sunlight. That's why from the Moon the Earth is visible.



The Earth has risen in the Moon's sky.

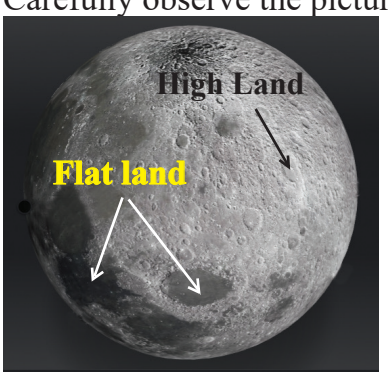
What is there on the Moon's surface?

Activity: From close-up photographs observing what the Moon's surface is made of.

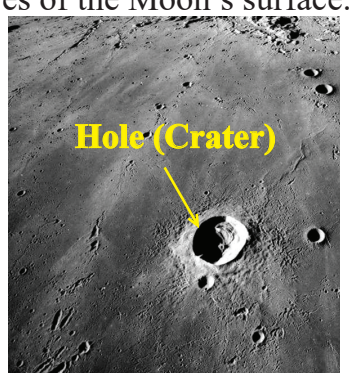
What to do:

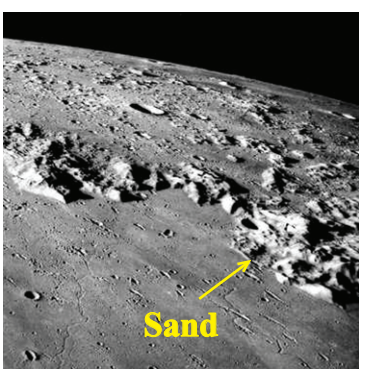
Let us...

Carefully observe the pictures of the Moon's surface.



Picture taken from far away position





Picture taken from close up position

Write the differences between the Earth's surface and the Moon's surface.

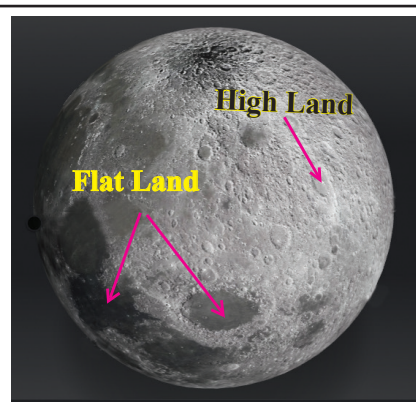
Moon	Earth

Summary

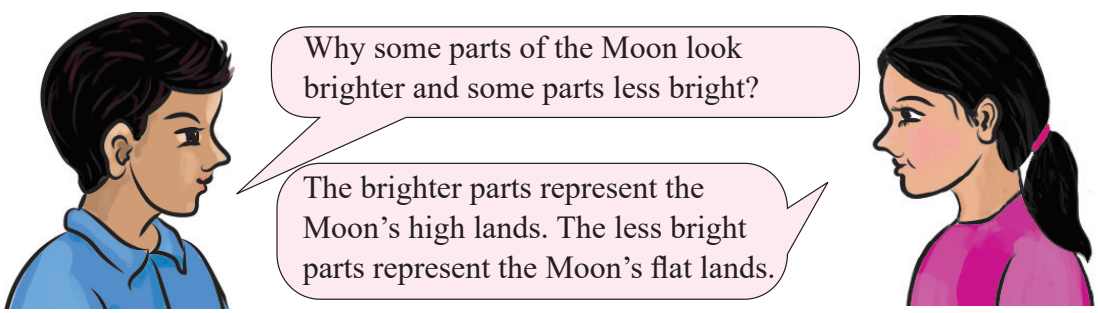
When we see closely, the Moon's surface shows many holes (craters) which are not on the Earth. Besides, the Moon's surface is covered with dust. Unlike the Earth, the Moon has no air and water. That's why there are no trees or plants on the Moon.

Activity:from far-away photographs observing what the Moon's surface is made of.

What to do:

Let us carefully observe the picture of the Moon's surface. Discuss with classmates and notice if the Moon shines the same everywhere or not. Then write it down.	 Picture taken from far away position

1.
2.



Summary

When we look at the full moon with our eyes, we see bright parts and also less bright parts. The less bright parts we see are called the "spots" of the Moon.

From far away, the Moon looks like it has light and dark patches. The light patches on the Moon's surface are the highlands. The dark patches on the Moon's surface are the flat plains.

Let us learn some more about earth's only natural satellite – the moon...

For many years, meteors and other space objects have struck the Moon at high speed. As a result, many holes of different shapes are created. A special kind of dust called regolith was also produced, and it covers the Moon's surface like a dusty layer. A big difference between the Earth and the Moon is that the Moon has no water. It also has no air or rain like the Earth. Just like the Earth, the Moon also has rocks.

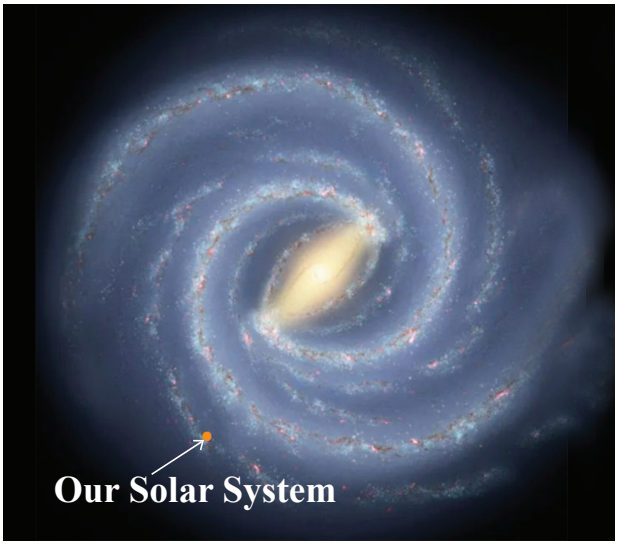
In the pictures of the Moon taken from a distance, the light-coloured parts are the highlands. They make up most of the Moon's surface. The highlands are made of a type of rocks with aluminum and calcium, and it reflects light well.

Across the Moon's surface there are dark, flat plains called "maria". The rocks here were formed by old volcanic eruptions. Compared to the highlands, the sands from these areas reflect less light therefore they look darker.

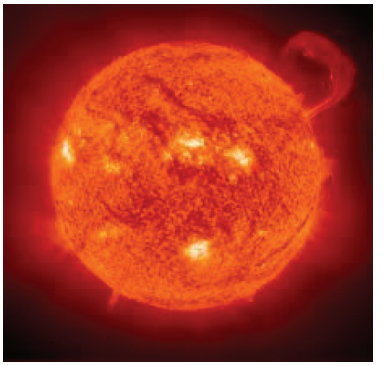
3. The galaxies

The universe is very, very big. It is made up of countless galaxies. A very small part of the universe with a huge group of stars is called a galaxy. Our solar system is located a galaxy called the Milky Way.

The Sun is the only star in the solar system. A star is a huge ball of hot gases and it has its own light, heat, and energy. Other stars look smaller than the Sun because they are very far away from us.



Milky Way Galaxy



The Sun

How big is the universe?

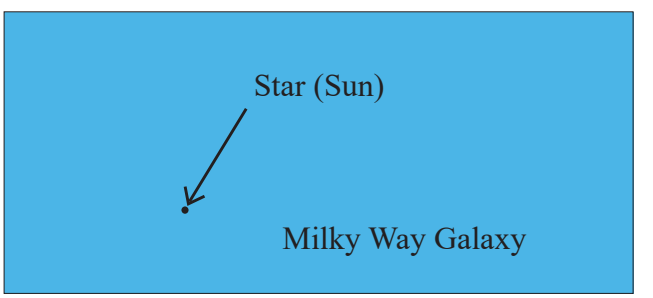
Activity 1: Realizing how huge a galaxy is compared to a star.

Things you need:: A sheet of paper, a pen.

What to do:

Let us...

1. Take a blue paper sheet. Write “Milky Way Galaxy” on it.
2. On the paper laveled “Milky Way Galaxy” draw a small dot with a ballpoint pen and lavel it “Star (Sun).”
3. Discuss with your classmates how vast a galaxy is in comparision to a star.



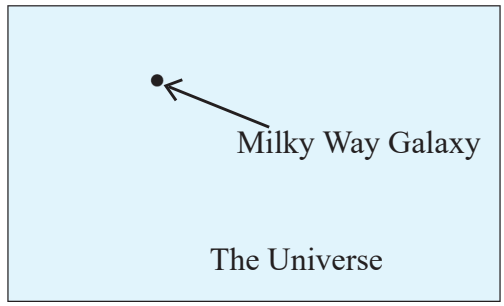
Activity 2: Understanding how big the universe is compared to a galaxy.

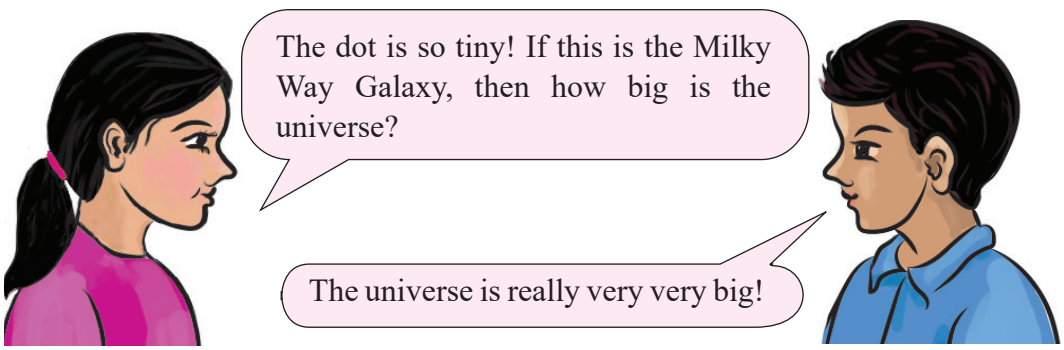
Things you need:: A sheet of paper, a pen.

What to do:

Let us...

1. Take a white sheet of paper. Write "Universe" on it.
2. On that paper, make a small dot with a pen and name it "Milky Way Galaxy."
3. Talk with your classmates about how big the universe is and write down some more examples in the table below.





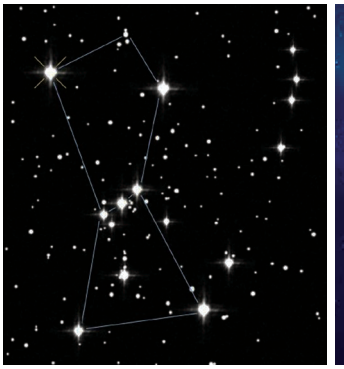
Summary

The Sun, which is the only star in our solar system, is a tiny part of the Milky Way Galaxy. This is shown by a small dot on paper (Activity-1). The Milky Way Galaxy is also just a very small part of the universe. This is also shown by a small dot on paper (Activity-2). From these two activities, we learnt how huge the universe really is!

Let us Learn More about the Universe...



The Sun is a star



Constellation



Halley's Comet

Constellation: Stars make small groups in the sky. At night, some star groups look like shapes of people, animals, or objects. These special star groups are called constellations. For example, Orion is one constellation.

Galaxy: A galaxy contains many stars. The Milky Way galaxy looks like a long, curvy path. The stars and planets that we see at night are parts of this galaxy. Our Sun also moves around the centre of the Milky Way galaxy.

Comet: In the solar system a comet is a small object that moves around the Sun. It is made of ice, dust, and rocks. When it comes near the Sun, the ice and other volatile matters turn into gas. This makes a head and a long tail. The most famous comet is Halley's Comet. It moves around the Sun once every 76 years. People on Earth may see it again in the year 2061!

Asteroid: An asteroid is a space rock made mostly of stone. They move around the Sun. Most asteroids are found between the planets Mars and Jupiter. Some asteroids even have satellites, just like the Earth.

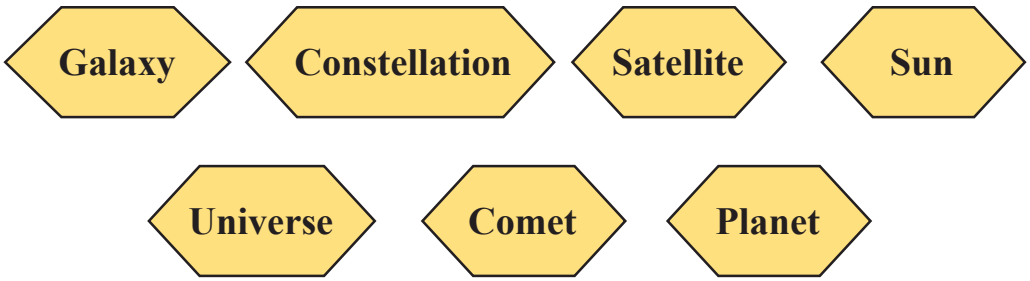
What is the relationship between different objects in the universe?

Activity: Arranging the names of different objects in the Universe in ascending order.

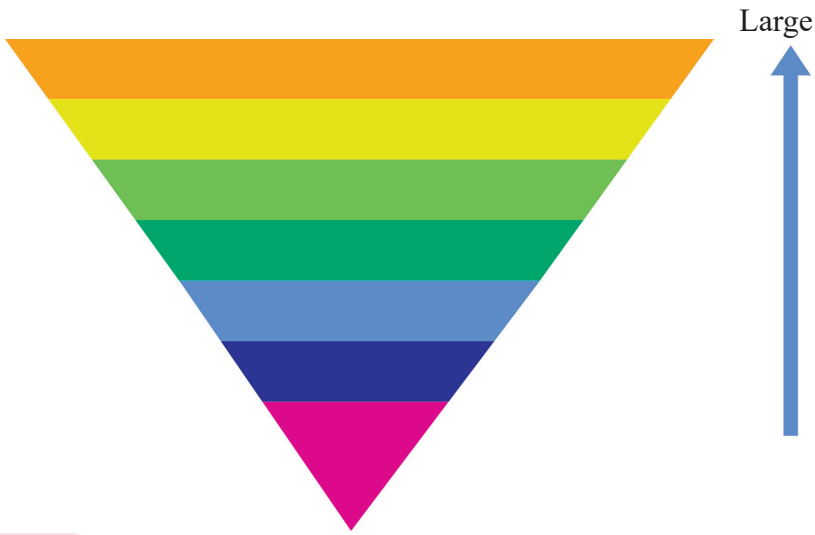
What to do:

Let us...

Look at the names below and think about which ones are larger and which ones smaller.



Now place these names inside the upside-down pyramid with the largest object at the top.



Summary

The universe is really vast, and it has countless galaxies. Each galaxy contains many stars. A constellation is a group of stars. The Sun is a star, and it is much bigger than the planets. In our solar system, six out of eight planets have satellites. Satellites are smaller than planets. Comets are even smaller than planets.

4. The Effect of Celestial Objects on Our Daily Life

When the sun sets, the Moon and the stars make the night sky beautiful and bright. At night, we can see many stars close to our solar system. But very distant stars are not visible at night. In our daily life, the main space objects that affect us are the moon and the sun. The moonlight helps us see at night. The Moon causes tides in the seas and oceans. The Sun is the only source of light and heat on the Earth, which is necessary for life.

What would happen in absence of celestial objects in the universe?

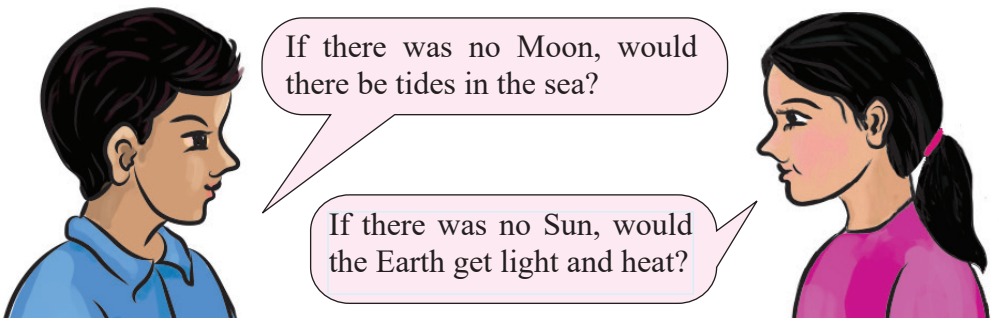
Activity: Understanding what would happen in the Earth in absence of the Moon and the Sun.

What to do:

Let us...

Make small groups and complete the table below.

What would happen in absence of the Moon?	What would happen in absence of the the Sun?



Let us learn more about how celestial objects affect our daily life…

Because of the pull of the Moon on Earth, the seas have tides (high tide and low tide). These tides play a very important role in the reproduction process of sea animals. The attraction of the Moon also helps keep Earth's axis steady. This is why the weather and climate change slowly in Earth. So, the presence of the Moon is very important for maintaining biodiversity on the Earth.

Due to the Earth's axial tilt different parts of it get different amounts of sunlight. Because of the Sun's light and heat, we get seasons. The Earth takes one year or 365 days to move around the Sun once. The length of a year is important for agricultural, social and cultural activities, and religious festivals.

Exercise

1. Put a Tick mark (√) on the correct answer.

1. The Moon has no light of its own because –
   a) It absorbs sunlight
   b) It is a dark object
   c) It reflects the Sun's light
   d) It shines with Earth's light
2. What happens during a Full Moon?
   a) The Earth is between the Sun and the Moon
   b) The Moon is between the Sun and the Earth
   c) The Earth is closer to the Moon
   d) The Earth is closer to the Sun
3. Artificial satellites are used –
   a) To observe the Sun
   b) To observe weather and for communication
   c) To increase the Moon's light
   d) To spread light in space

2. Fill in the blanks.

a) The planet **.....** is called the evening star and the morning star.

b) The **.....** is at the center of our solar system.

c) The Moon takes about **.....** to move around and come back to the same place.

3. Match the the right column with the left.

Left	Right
Mars	Called the Red Planet.
Mercury	The closest planet to the Sun.
Venus	The hottest planet.
Earth	Only planet where environment is favorable for living beings to exist.
Neptune	The farthest planet from the Sun.

4. Answer the following questions in brief.

a) How many planets are there in the solar system? What are they?

b) Why is Earth's environment suitable for life?

c) Does the Moon have its own light? How does it shine?

d) Why is Uranus called a blue planet and Mars called a red planet?

5. Answer the following questions in detail.

a) Explain the positions of the Sun, the Earth, and the Moon during New Moon and Full Moon.

b) How do the highlands and flat plains on the Moon contribute to the differences in reflected light?

c) Explain how celestial objects affect our daily life.

Chapter 9

Weather

At the beginning of the day, we plan our daily activities. How do we decide the issues like what kind of clothes to wear, whether we need an umbrella or whether we need to take winter clothes? We usually decide these issues based on the weather of that day.

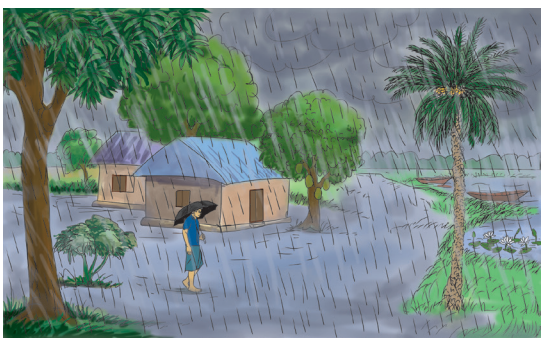
1. The weather

In nature, sometimes it is hot, sometimes cold. Again, sometimes it rains, and sometimes it is windy. We call these conditions of the day the weather.

How do we know what today is like?



Picture-1



Picture-2



Picture-3

Activity: Let us know the weather by looking at the pictures

What to Do:

Let us fill in the table below by observing what the weather was like that day from the pictures above:

How is the weather in the pictures?		
Picture No. 1	Picture No. 2	Picture No. 3
• Hot and sunny • Clear sky		

Summary

Weather means the condition of the sky, the temperature, the humidity, the rainfall or snowfall, and the wind all together in a place on a certain day.

2. Weather symbol

We get weather news from radio, television and newspapers. We can also get daily weather news from smartphones or computers. What is said in weather news? They may be like this – 'the temperature may increase during the day', or 'there is a possibility of light/heavy rain', or 'there may be light fog', or 'there will be gusty or strong winds'.

Different weather conditions are represented by different symbols. Let us look at them and identify them:

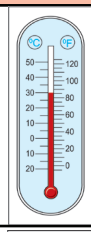
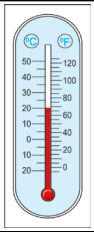
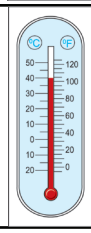
Sunny	Partly cloudy	Rainy	Thunderstorm
			

How do we identify weather conditions through symbols?

Activity: Identifying weather conditions

What to do-

Let us identify and write the weather conditions by looking at the symbols and temperatures given in the table below. Let us discuss the matter with classmates.

Symbol	Temperature	Description of the weather
		• The sky is partly cloudy. • We may feel hot during the daytime.
		
		

Summary

We get weather forecasts from various sources. The meteorological department uses various symbols to convey these forecasts.

3. Weather elements

By weather elements, we mean the things around us that affect the weather. These include mainly temperature, humidity, wind flow, rainfall, latitude, longitude, air pressure, cloud position, etc. Among these elements, we will discuss temperature, humidity, wind flow, and rainfall. We can understand how the weather will be by noticing various state of the weather elements.

What are the elements of weather?

Activity: Finding out the elements of weather.

What to do-

Let us match the part of the sentences on the left with the correct part of the sentences on the right by drawing a line.

Event	Why does it happen?
1. We feel hot	if the humidity increases.
2. We sweat	if the temperature differs.
3. Lips are chapped	during the rainy season.
4. Wet clothes dry slowly	as the temperature increases.
5. The wind blows	in winter.

Summary

We feel cold or hot due to the variation in air temperature. If the humidity in the air is low, the skin on our hands, feet are cracked, and lips become chapped in the winter. Again, if the humidity increases, we sweat, and the possibility of rainfall increases. We can predict storms from the speed of airflow.

Let us know more about the elements of weather...

Temperature

We do not feel the same hot or cold everyday. We feel cold or hot based on how cold or hot the air is. How cold or hot the air is at any given time is the temperature at that time.



It can be cold in the morning and quite hot in the afternoon on the same day. Do you know why this happens? When the sun rises in the morning, the temperature rises and the weather gradually warms up. When the sun sets in the evening, the temperature drops and the environment gradually cools down. The higher the temperature, the more water vapour is produced. This water vapour later produces a lot of clouds. Temperature is expressed in degree Celsius (°C).

Humidity

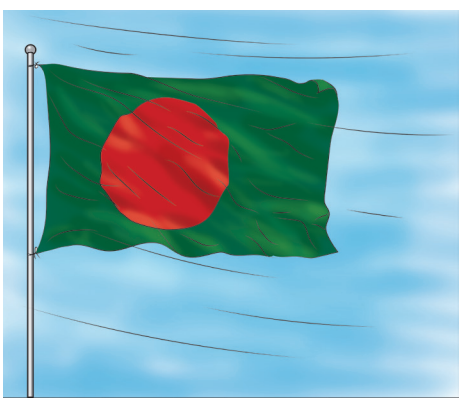
When the amount of water vapour in the air is low, it is a dry state of the air. When its amount is high, it is a humid state of the air. The presence of water vapour in the air is humidity. If the humidity in the air is high, the possibility of rainfall increases. If the humidity in the air is low, clothes dry out quickly, our lips and skin crack. The humidity is expressed as a percentage (%). Usually, rainfall occurs when the humidity is more than 90%.

Precipitation or Rainfall

Water vapour floats in the sky as clouds. These clouds cool down under the influence of temperature and air pressure and fall to the earth surface as rain. Rain, snow, dew, hail are all considered as precipitation. Precipitation is expressed in millimetre (mm).

Airflow

By seeing the movement of a flag or a tree leaf, we can tell that the wind is blowing or flowing. We cannot see the wind. But we can feel it when the wind is blowing. Wind is the state of motion of air. Sometimes the wind moves slowly and sometimes it moves rapidly. Wind is considered by its direction and speed.



Flag is flying in the wind



The leaves of the tree are moving in the wind.

4. Interrelationship among different elements of weather

We have already learned what the elements of weather are. Basically, weather changes when the conditions of its elements change.

What is the interrelationship between the elements of weather?

Activity: Determining the interrelationship between the elements of weather.

What to do:

Let us match the part of the sentences on the left with the correct part of the sentences on the right by drawing a line.

Event	What happens?
1. Increase in air temperature	the temperature drops
2. Increase in humidity	clouds are formed
3. Increase in air flow	chance of rainfall
4. If it rains	chance of a storm

Summary

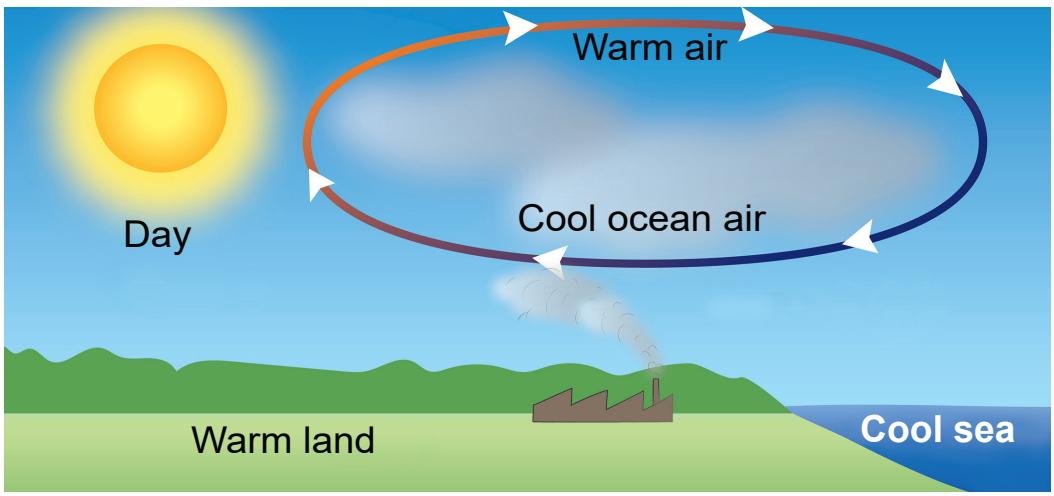
The elements of weather are interdependent. The increase or decrease of one element affects the other elements. The overall weather can be understood only as a result of the interaction of different elements of weather.

Let us learn more about the interrelationships of weather elements...

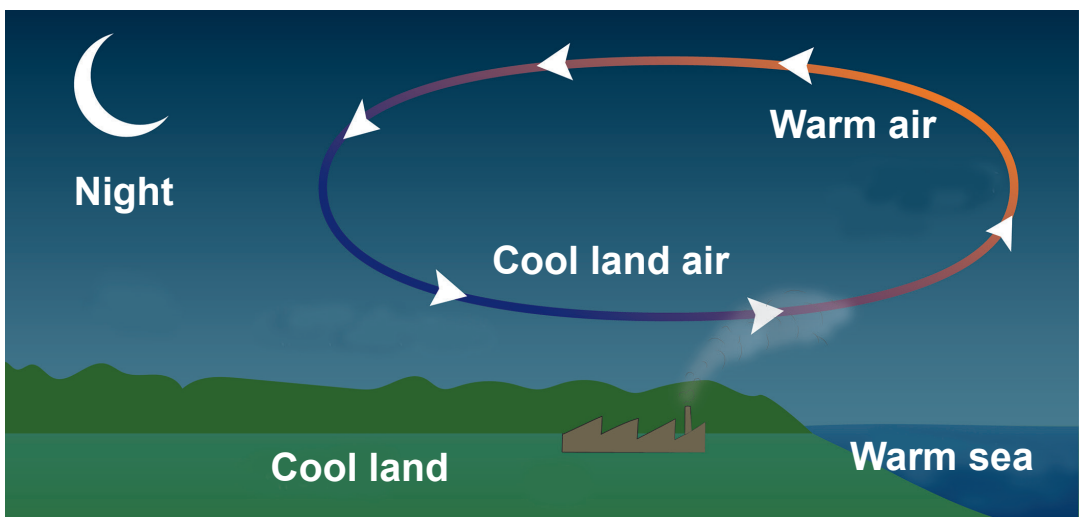
The moisture content of air may vary due to the effect of temperature. When a region of the earth's surface is hotter than another region, the air in that place becomes lighter and goes up to the atmosphere. As a result, a vacuum is created there, and the air pressure decreases. The air from the surrounding area fills that vacuum at a faster speed. In this way, the air flows due to the differences in temperature. The direction of the air flow also changes due to the effect of temperature. For example, during the day, the sea air is relatively cool. This cool air from the sea flows towards the land. This cools the land. At night, the air over

the land remains cool. This cool air flows towards the sea, and the warm air from the sea flows towards the land. As a result, it feels hot at night. Sometimes the air flow becomes very strong and creates storms or cyclones. The air flow carries water vapour from one area to another. Therefore, the air flow sometimes causes precipitation or clears the sky by removing clouds. If the humidity is high, it easily produces rain or dew from the clouds.

As the temperature increases, more water from oceans, rivers, stream, canals, beels and lakes turns into water vapour. This water vapour forms clouds and later falls as rain. Therefore, as the temperature increases, rainfall increases.



Airflow along the coastal area during the day



Airflow along the coastal area during the night

5. Weather impact, change, data analysis, and precautions

We have learned about the elements of weather. These elements of weather are related to each other.

To get an idea about the weather or to find out what the weather will be like on a particular day, we need to know the temperature, humidity, rainfall, air pressure, etc. of that day or the previous day. To know the weather information of a day, we usually have to rely on television, the internet, mobile, newspapers, etc.

What precautions should we take in daily life according to the weather?

Activity: Weather data analysis, forecasting, and warnings

What to do:

Let us divide ourselves into groups, fill in the table, and compare our results with other groups

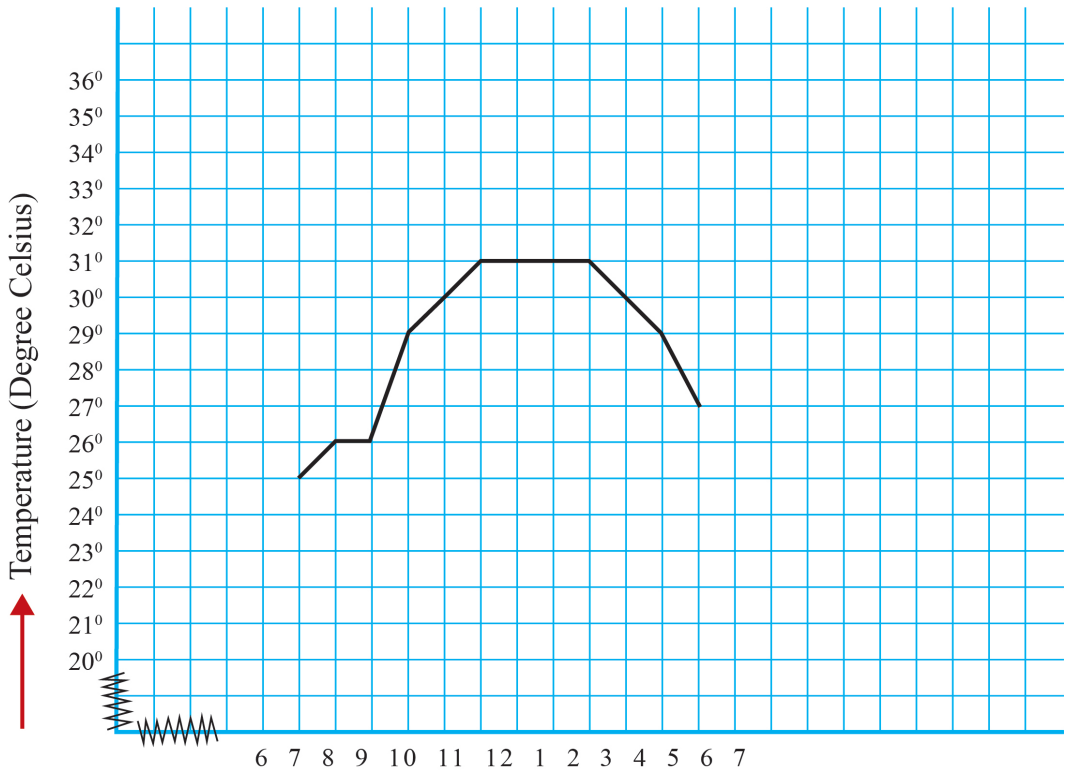
Weather elements	Weather information	Weather forecast	Precaution
1. Temperature 2. Humidity 3. Airflow	25^0C 90% Strong wind	Chance of storms and rain	Use of umbrella
1. Temperature 2. Humidity 3. Airflow	40^0C 30% Mild wind		
1. Temperature 2. Humidity 3. Airflow	12 ^{0}C 50% Cold wind		

Activity: Drawing of a graph of changes in time and temperature

What to do:

According to the information in the table below, Let us draw a time-temperature graph by placing time along the horizontal axis and temperature along the vertical axis.

Time	Morning					Mid day			Afternoon			Evening
	07	08	09	10	11	12	01	02	03	04	05	06
Temperature (Degree Celsius)	25^0	26^0	26^0	29^0	30^0	31^0	31^0	31^0	31^0	30^0	29^0	27^0



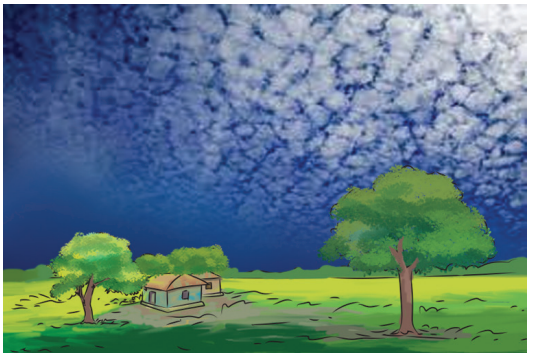
Time and temperature graph (sample)

Predicting Weather by Watching the Clouds

Clouds are water droplets floating in the sky. They are white/grey/black cotton or feather-like masses that float in the sky. Clouds are classified based on their height and structure. Clouds can be divided into ten categories. However, we will discuss the four main types of clouds.

Four types of clouds according to characteristics-

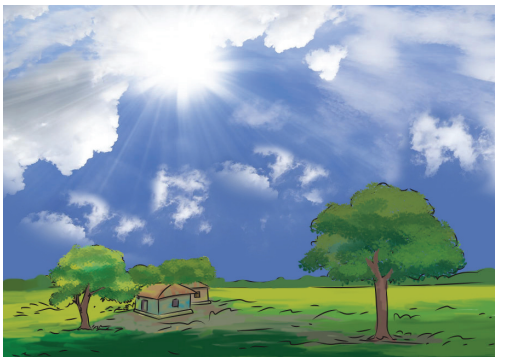
- The white feather-like clouds that float high in the sky are called Cirrus Clouds. These clouds do not produce rain.
- Grey or white clouds that look like cauliflowers are called Cumulus Clouds. These clouds may produce rain with thunders.
- The uniform grey clouds, those are like a very thin sheet, cover the wlole sky. This clouds are called Stratus cloud. They may cause light rainfall.
- Grey or black coloured clouds that are very close to the earth, is called Nimbus clouds. These clouds cause heavy rainfall.



Cirrus clouds



Cumulus clouds



Stratus clouds



Nimbus clouds

Summary

We see different types of weather at different times. Weather changes for various reasons. This is mainly due to changes in weather elements. We can take precautionary measures by listening and watching the weather forecast. Sometimes, seeing clouds in the sky is a sign of rain.

Effects of weather in our lives

We can take the necessary measures to stay safe by knowing the weather forecast. When the weather becomes worse, the meteorological department announces weather warning signals to alart us. By understanding and following them, we can be protected from the adverse effects of the weather. As a precautionary measure against cyclones, coastal people are evacuated to safe places. We suffer various kinds of damage due to heavy rain. In hilly areas, people are evacuated from those areas after knowing the forecast of heavy rainfall. This can protect people from accidents like landslides. According to the forecast, if necessary medicines and rescue equipment are kept in the area, the damage can be reduced.

6. Relationship between weather and different state of water

The weather has a relationship with different states of floating water in the sky. These states of floating water include clouds, rain, fog, and dew.

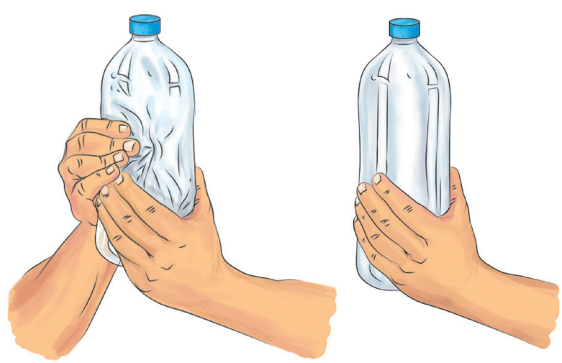
Cloud

How are clouds formed?

Can you ever tell if it will rain by looking at the sky? The elders in the house can do that. For example, if you see thick and dark clouds in the sky, you know it is going to rain. Now, tell me, what is a cloud?

Water on the surface of the earth evaporates in the heat of the sun and goes up. Due to the cold above, this vapour turns into small water droplets and floats. These are clouds. When these small droplets combine and become larger droplets, they fall down as rain.

Let us try to learn how clouds are formed through play.



Cloud making game

Activity: A fun game of making clouds

Things we need: A clean plastic bottle, hot water, and matches.

 What to do:

Let us...

1. Take a clean plastic bottle.
2. Carefully pour a small amount of hot water into the bottle.
3. Close the cap and shake the bottle so that the water particles stick to the bottle.
4. Discard excess water.
5. The bottle contains water, the first component in cloud formation.
6. With the teacher's help, lit a matchstick and then blow it off. Then, insert the extinguished stick into the bottle and close the cap quickly. Now, shake the bottle back and forth a few times. A smoke-like vapour will be formed inside the bottle. This vapour acts as the second component in creating clouds.
7. Now using both hands, press down on the middle of the bottle as hard as we can, and then pull it away. Let us do it very quickly. It creates pressure and temperature changes that are the third component of cloud formation.
8. After pressing and releasing the bottle several times, we saw clouds in the bottle.

In nature, the heat of the sun evaporates water from the oceans and rivers, and turns it into water vapour. When the water vapour in the air cools, it condenses on fine dust particles suspended in the air, and forms tiny water droplets. These tiny water droplets float in the sky as clouds.

Rain

When the droplets of the clouds in the sky become heavy enough, they fall to the earth surfaces. This is called rain. In most regions of the world, rain is the main source of fresh water.

How is rain formed?

 **Activity:** Making water from water vapour

Things we need:: A clear glass, hot water, a few pieces of ice cubes, a steel plate.

What to do:

Let us...

1. Carefully pour hot water into a glass.
2. Cover the glass with a steel plate.
3. Place a few pieces of ice cubes on the steel plate.
4. Look at the bottom of the plate.

It appears-

Drops of water have accumulated on the bottom of the plate. Where did these drops of water come from?



Experiment to create water from water vapour

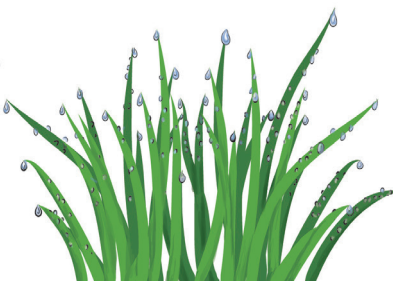
Here, the hot water in the glass turns into water vapour. When the vapour touches the cold plate, it changes back into water droplets. This is what has accumulated in the form of water droplets on the other side of the plate. When the water droplets grow large, they eventually fall down. If you look under the lid of the pot while cooking rice at your home, you will see that small water droplets have accumulated.

Similarly, water vapour in the atmosphere comes into contact with the cold above and forms clouds. The small water particles in the clouds combine to form large water particles. Large water particles are heavy, so they cannot float in the air. They fall down as drops of water. This is rain. We notice that sometimes ice cubes fall with rain. Do you know what these are? These are hails which are made of frozen water particles.

Fog and Dew

Where do fog and dew come from?

We are all more or less familiar with the word 'fog'. Fog is usually seen in winter. Fog is a type of cloud that forms near the earth surface. Water vapour in the air condenses into tiny water droplets around floating dust particles and turns into clouds. This cloud floats near the surface in the form of smoke called fog. The fog again condenses on the leaves of trees or grass and again becomes tiny water droplets that is known as dew.



Dew on the grass

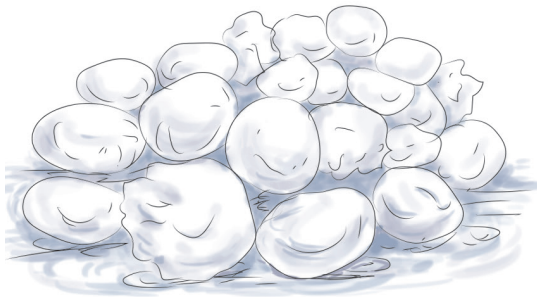
Summary

Clouds are very important for the environment and the weather. Clouds produce rainfall, which is also very important for our life. The role of rainfall is immense for sufficient crop production. Too much rainfall causes flooding, resulting in damage to crops and houses. Fog makes it becomes difficult to see anything even at short distance. As a result, disruptions or accidents can occur in vehicle movement. Fog also helps lower the day temperature during hot weather. Besides, fog may damage crops. Dew provides water to plants, and increases the humidity of the air. This is important for the living world.

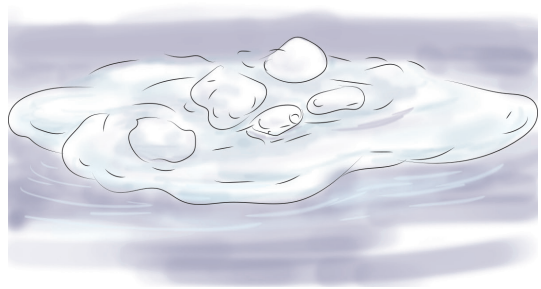
7. Water cycle

It is said that water is life. Water is an essential part of our daily life. But water does not always stay in the same state. In nature, we see it changing into different forms.

Now we will learn something interesting. Let us pour a small amount of water from a water bottle onto the table. If we observe after a while, we will see that this water has dried up. Do we realise where the water goes when it dries up? What else do we see like drying up at home? Have you ever seen hailstorm? The hailstones are basically pieces of ice. What do we see if we leave a few pieces of ice in a container for a while?



Hails

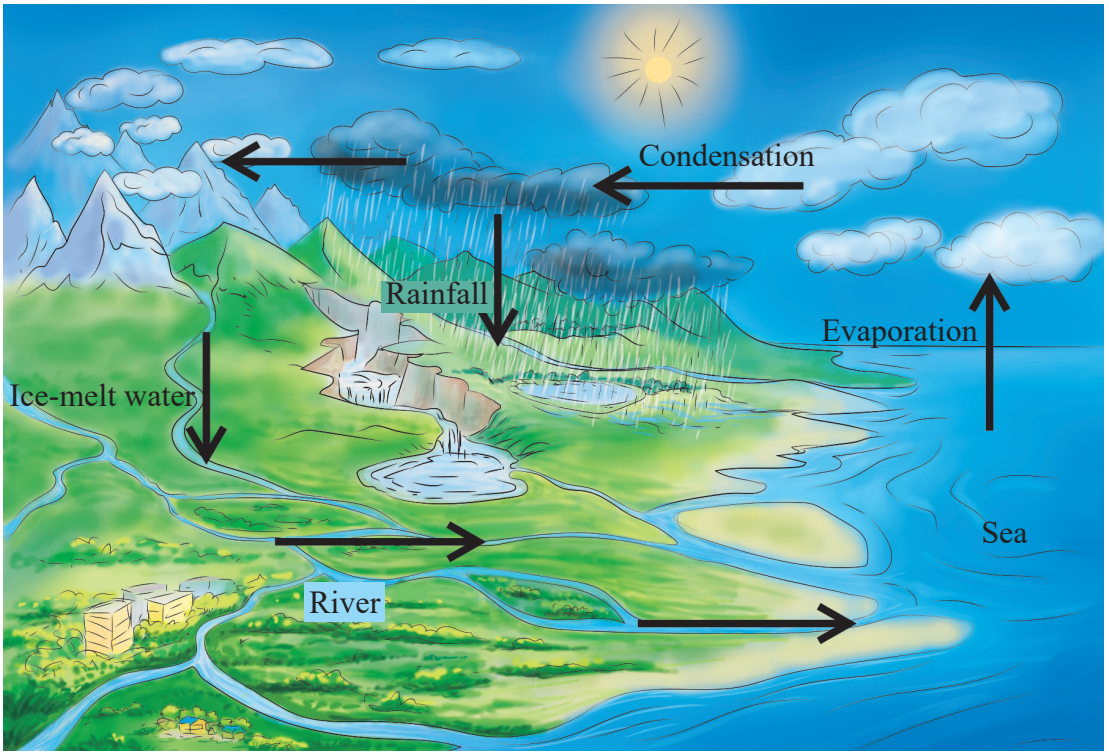


Change of hails into water

Where does all this rain water come from during the rainy season? How does all these water in rivers, stream, canals, beels, lakes and the ocean come from, and where does it go?

Let us discuss with classmates and write the answers in the table below.

What do we see under the lid of the pot after cooking?	
What happens if you spread wet clothes out in the sun?	
What happens after a while when hailstones fall to the ground?	
Why does the water level in canals, beels and ponds decrease during the summer?	
Where does all this rainwater come from during the rainy season?	



Water cycle

From the answers to the above questions, it can be seen that water is changing from one state to another. The process by which water changes into different states and spreads throughout the surface of the earth and atmosphere is called the water cycle.

Water from the ocean, rivers, and other water bodies evaporates in the heat of the sun and turns into water vapour. The water vapour rises up, cools down, and changes into water droplets. These later combine to form clouds. The cloud particles grow bigger and return to the earth surface as rain. The rain water are deposited in rivers, streams, canals, beels and lakes. Water from these sources falls into the ocean in various ways. The water in the ocean evaporates and retuns to the air. This is how the water cycle continues. This cycle is responsible for changing the state of water everywhere. The water cycle maintains the balance of water on the earth.

The role of heat in the water cycle

A lot of ice accumulates on the tops of high mountains. They melt in the heat and form waterfalls or springs. The water from those springs flows down the river and merges with the sea. While going from the river to the sea, some water also goes into canals. In summer, the temperature is very high. So some of the water in the sea, rivers, stream, canals, beels and lakes evaporates as water vapour into the air. Then the water level in canals, beels, lake, rivers and streams decreases slightly.

The higher we go from the surface, the lower the temperature. When these water vapours reach the upper layers of the sky, they turn into small water droplets due to the low temperature. These small water droplets are clouds. These clouds float due to the airflow. Due to the temperature difference in the atmosphere, the clouds float from one side to the other in the air. The higher clouds cool down and turn into large water droplets. These fall to the ground in the form of rain. In this way, the water in rivers, seas, ponds, canals and beels turns from water vapour back into water and returns to the earth surface. Some vapours rise up and reach very high altitudes. The temperature there is very low. As a result, the cloud particles become heavy and turn into snow. This snow falls down and accumulates in the form of ice on the mountain tops. These events continue endlessly.

Summary

When water is heated, it turns into steam, which is called evaporation. When steam cools and turns into liquid water, it is condensation. These two processes are always going on in nature. This is what forms the water cycle. As a result of the water cycle, water is transferred from one place to another.

Exercises

1. Put a Tick mark (√) on the correct answer.

1. Which of the following is not a weather element?

a) Temperature b) Humidity

c) Air flow d) Full moon

2. What is the process of a substance changing from a liquid to a vapour called?

a) Evaporation b) Condensation

c) Vaporisation d) Dilution

3. When water is heated, it evaporates. What happens here?

a) Evaporation b) Condensation

c) Vaporisation d) Heat absorption

2. Fill in the blanks.

a. Clouds that look like white feathers are called ……clouds.

b. If the humidity in the air is high, there is a high probability of …… .

c. When fog comes into contact with the leaves of trees, it turns into …… .

3. Answer the following questions in brief.

a. What are the elements of weather?

b. What happens if the humidity of the air is low?

c. What type of cloud produces a lot of rain?

4. Answer the following questions in detail.

a. What is meant by weather? How do we get weather information?

b. How does it rain?

c. What is the importance of weather in agriculture?

Chapter 10

Information and Technology



Information and technology are very important in our lives. We change our lifestyle by using information. The invention and use of various devices or technologies for collecting, storing, analyzing and exchanging information– are all part of Information and Communication Technology. Information and Communication Technology is abbreviated as ICT. ICT makes our lives easier and better.

1. Information, Sources of Information, and Types of Information

Suppose we asked a shopkeeper for the price of a dozen eggs. The shopkeeper replied that the price of a dozen eggs is one hundred and twenty taka. This answer from the shopkeeper is a piece of information. The shopkeeper is the source of that information. Besides the shopkeeper, other sources of information can be newspapers, radio, television and so on. For example, we can know the weather forecast from the television news.

Is all the information we get in daily life the same type? Of course not. Think about this, we come to know the half-yearly examination starting date by looking at the school notice board. In this case, the information is the examination date, the source of information is the school notice board, and the type of information is educational. There are many types of information. such as sports information, business information, weather information, education information, personal information, economic information.

Again, we came to know about the schedule of the upcoming Football World Cup from the internet. Can you identify which one the information is, what the source is, and what type of information it is?

What are the source and type of information?

Activity: Finding out the source and type of information.


Radio


Television


Book


Internet

What to do:

Let us...

1. Discuss in groups and fill in the table below with information, sources, and types of information related to a topic.
2. One member from each group will present the group works to the class.
3. After all group presentations, discuss in groups with information, sources and types related to other topics that are presented in the class. Fill in the rest of the table.

Information	Source of Information	Type of Information
Starting date of the half-yearly examination	School notice board	Educational

Summary

Information can be collected through observation and by asking people directly. We get different types of information from teachers, relatives, friends and neighbuors. There are different sources of information. Such as newspapers, books, radio, television, internet etc.

Let us learn more about the sources and types of information...

information is very important for our lives. By knowing information, we can learn many new things or make decisions. It is very important to know the

necessary information to make the right decision. It is a must to be the source of information reliable. Information should not only be known by oneself; if necessary, others should also be informed. For example, if I come to know about the change of examination date, I have to inform my classmates. If I do not tell them, my classmates will suffer. Again, suppose meteorologists learned that there would be a powerful cyclone in seven days. If this information is disseminated through various media, the lives and property of many people on the coastal areas will be saved.

2. Information Collection

The correct use of information means collecting, storing, and sharing information properly. If we are asked the question," How many students are present today?" – will we be able to answer it readily? Certainly not. For this, at the beginning, we have to collect the number of attendance of each class in that day from the class teachers. Then, we will be able to know the exact number of attendance by adding all the collected numbers of each class. This action of collecting information from the class teachers is known as data collection. We collect information or data in many ways.

How do we collect information?

Activity: Find ways of collecting information

What to do:

Let us write about the ways in the box below– we collect information in our daily lives, and the types of information we gather. (As an example, one has been done for you.)

Information	How we collect information
The number of students present in the school today	Communicating with each class teacher

Summary

Collecting information means finding data from different sources. In many ways we collect information from various sources. Such as, we can collect inforation by communicating with people by using technology, letter, telephone, and mobile phone. Besides, we can collect various information using computer, tablet, and browsing the internet on a smart phone.

3. Storing Information

Suppose, in a math class, the teacher solves a few problems on the board or by using a projector. The solutions given by the math teacher are important information for us. We definitely want to store this information for later use. This act of storing information is information storage. We can write this act of storing information on paper or in a notebook. We can store such information by writing it down on paper or in a notebook. Again, imagine we went on a study tour from school and had lots of fun with our classmates. These happy memories are also very important information for us. To store these memories, we use a camera or a mobile phone to take photos or record videos. Let us find out some more ways of storing information.

In what ways can information be stored?

Activity: Identifying ways to store information

What to do:

Let us…

1. Write the ways to store the information that we usually store in our daily lives in the table below.

Information	Ways to store information
Math teacher's problem solution	Writing on paper or in a notebook, taking pictures
Younger brother's birthday party	
Friend's poem recitation	
Class routine	
Large files sent by email	
Old photograph	

Summary

Recently, we use various devices to store information, such as cameras, computers, tablets, mobile phones, pen drives, CDs, DVDs, memory cards, and hard disks.

Let us Learn More about Data Storage...

If we do not store information, we may forget it later. There is a risk of losing information. In case of an emergency, it is difficult to get information to use for various purposes. Therefore, it is very important to store information timely. To complete any work attractively and accurately, to know history, to learn from the past, and to do various research work, information is needed. It is easier to make decisions based on information on specific issues. After collecting information, it has to be stored safely to make correct and effective decisions.

4. Information exchange

Proper use of information means collecting, storing, and exchanging information appropriately. We have already learned about collecting and storing information. In this lesson, we will learn about information exchange. Information exchange is the exchange of information between two or more people. It is very important to exchange information correctly. Correct exchange of information helps us to stay safe, live well, and be protected from danger.

Which technologies do we use to exchange information?

Activity: Identifying the technologies used in information exchange

What to do:








Let us...

1. Observe the above pictures.
2. Write in the table below the technologies we use to exchange information in our daily lives.

Technologies used in information exchange	
1. Letters	4.
2.	5.
3.	6.

Summary

Exchange of information means the giving and receiving of information. Information exchange is a process through which information is exchanged with relatives, friends, and other people. In the modern era, we use technology and devices to exchange information.

Let us learn more about information exchange...

In ancient times, people used to exchange information by drawing pictures or talking. People used to exchange information by sending letters to people living far away or by being present in person. People also used to exchange information by sending messages with the help of pigeons, beating drums, or giving smoke signals. In the modern era, we use telephones and mobile phones to talk to distant people. We can communicate with people by writing letters, sending messages through the telegraph, sending SMS (short messages) through mobile phones, and sending e-mails through the internet. We can exchange information by taking pictures or making videos with cameras. Moreover, we exchange information using various social media.

It is very important to exchange information properly. The importance of exchanging information in our personal, social, and national lives is immense. "The incidence of dengue fever may increase in the country next year." - If this information is disseminated through various media, people will be aware of the spread of dengue in advance. As a result, taking preventive measures will reduce the risk of getting infected with dengue. For the improvement of the education system, there is a necessity to exchange information among teachers, students, and all concerned. Information exchange is necessary for various tasks such as farmers' cultivation, workers' factory work, doctors' diseases and treatment, etc.

5. Importance of information and communication technology

We have surely seen smartphones or mobile phones. If a mobile phone has internet connectivity, we can use it for various purposes. For example, making calls, taking pictures, sending short messages (SMS), checking exam results from home, making videos, reading books, playing games, listening to songs, uploading and downloading, knowing the time and date, taking screenshots, sending e-mails, etc. We can easily do these things through smartphones. That means, we can do the following things through a smartphone-

1. Instant communication (making calls, sending SMS, sending e-mails)

2. Collecting information (making calls, taking photos, making videos, downloading, checking exam results from home).

3. Information storage (taking pictures, making videos, downloading, taking screenshots)

4. Information exchange (sending short messages, uploading, and downloading data)

5. Entertainment (making videos, playing games, listening to songs)

6. Digital services (banking transactions, paying school fees and various service bills, online shopping)

Besides mobile phones, we can also complete one or more of the above-mentioned tasks using other devices or technologies.

What tasks are done through the use of technology?



Activity: Identifying the use of different technologies

What to do:

Let us...

1. Fill in the table below with tick (√) and cross (x) marks.

Name of technology	Can communicate	Can collect information	Can store information	Can exchange information
Smartphone	√	√	√	√
Telephone				
Television				
Computer				

Invention and use of different devices or technologies for collecting, storing, and exchanging information together make up Information and Communication Technology. There are different types of information and communication technology. Such as radio, television, telephone, camera, mobile phone, computer, internet, etc. Information and communication technology is abbreviated as ICT. From the diverse uses of information and communication technology in our daily lives, we can understand how important information and communication technology is.

What is the importance of information and communication technology?



Activity: Identifying the importance of information and communication technology in our lives.

What to do:



Let us...

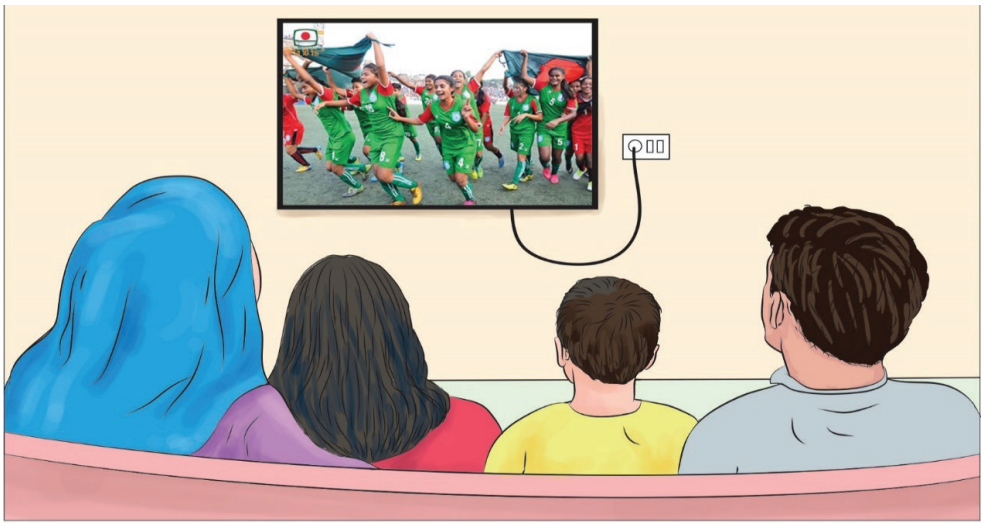
1. Observe the above images carefully.

2. Fill in the table below to identify how information and communication technology is helpful in our lives.

Name of Information and Communication Technology	Use

Summary

The importance of information and communication technology is immense. Due to the development of technology, it is very easy and common to communicate from one end of the world to the other. Now, we can now get news from all over the world through television sitting at home. At the same time, we no longer need to go anywhere to communicate with many people. Rather, through the smartphone in our hands, we can communicate with people from one end of the world to the other in just a few seconds. The use of information and communication technology can be seen in every aspect of our daily life. As a result, our lives have become much easier, more beautiful, and comfortable than before. Information and communication technology is improving further with time, and its use is also increasing.



Let us learn more about the importance of information and communication technology...

Information and communication technology has now been recognized as the most important tool for quality work in our lives. It is used in education, medicine, entertainment, business, agriculture, economy, industry, and culture. The method of exchanging information by connecting numerous computers to each other is called the internet. The internet is a huge repository of information. There is hardly any topic in the world about which information cannot be found on the internet. People can exchange information and communicate from anywhere through an internet connection.

6. Safe use of information and communication technology

What are the misuses of information and communication technology in daily life?

It is necessary to take extra precautions while exchanging information. For example, by believing false information from a stranger, our family may be affected in various ways, including anxiety and financial loss. Therefore, it is necessary to verify thoroughly before believing the information and it needs to be verified carefully.

Moreover, one should stay away from the misuse of information and communication technology and ensure its safe use. For example, do not use mobile phones excessively, do not use the internet without the permission, cooperation, and advice of a teacher or guardian. By taking care of information and communication technology devices and using them correctly, various problems can be avoided, and one can stay safe.

Activity 1: Identifying the misuse of information and communication technology

What to do:

Let us...

1. Discuss the misuses of information and communication technology in groups and write them in the table below.

Name of Information and Communication Technology	Misuse

2. Present the group's work in the class.

Summary

The sensible use of information and communication technology (ICT) makes our lives easier and more beautiful, while its misuse disrupts life and causes harm.

In the present era, due to the development of technology, it is very easy and common to communicate from one end of the world to the other. Using the internet, it is possible to exchange any information instantly. Information exchange is not safe without being completely sure whether the received information is correct and reliable, whether information is being sent to the wrong place, whether confidential information is going to dishonest or bad people. Various social media and communication technologies are used for exchanges of information and communication. From these platforms, different crimes are being committed by stealing personal and important information. False information can harm individuals and families in many ways. Misuse of information and communication technology can cause damage to physical and mental health, and a kind of addiction or obsession can be created. The overall development of children can be hindered.

What precautions can we take for the safe use of information and communication technology?



Activity 2: Identifying the safe use of information exchange.

What to do:

Let us...

1. Fill in the table below regarding the safe use of information and communication technology.

Information and Communication Technology	What Precautions can We Take for Safe Use
Telephone	Verifying information of strangers, not giving confidential information to strangers, etc.

Summary

Children should take permission and instructions from their guardians or teachers while using information and communication technology. We should be aware of not becoming addicted to using technology.

Let us learn more about the safe use of information and communication technology...

Now a days, we rely on the internet and many other technologies for all kinds of information. But not all information on the internet is correct. Many people unintentionally or intentionally mislead the general public with wrong or false information. There is abundant evidence of spreading various false information for business purposes. Therefore, information taken from the internet should always be verified. You should know in advance how people can be harmed through the Internet. You should learn online safety techniques well from seniors. If you see any suspicious activity, you should immediately seek help from someone experienced in this regard. You should be careful while communicating with strangers online. You cannot make friends online without knowing them well.

Despite the many positive aspects of information and communication technology, its misuse is consuming students. Students spend a large part of their valuable time looking at mobile or computer screens. They are playing excessive games, watching videos and chatting. Due to this excessive use, they are being physically and mentally damaged, becoming addicted to these.

We have to be aware and careful to ensure the correct and safe use of information and communication technology. By staying away from all harmful aspects of information and communication technology, we can build a healthy, beautiful, and improved life.

Exercise

1. Fill in the blanks.

a) Collecting information from various sources is called …….

b) A letter is a technology of ……

c) Using the internet, any information can be instantly……

2. Match the the right column with the left.

Excessive gaming	Information storage
Information exchange and communication	A huge repository of information collection
Internet	Digital services
Taking pictures, videos, and screenshots	Facebook, Twitter, emo
Banking transactions, online shopping	Physical and mental harm

3. Put a Tick mark (√) on the correct answer.

1) Which is not a source of information?

a) Television b) Newspaper c) Book d) Pen

2) Which is the oldest technology for information exchange?

a) Letter b) Telegraph c) Pigeon d) Mobile

3) Shelly sometimes studies in a Facebook group. One day, an unknown member of the group asked for her home address. What should Shelly do?

a) Give her home address b) Give her mobile number only

c) Inform her guardian d) Leave the facebook group

4. Answer the following questions in brief.

a) What does information exchange mean?

b) What devices are used to store information?

5. **Answer the following questions in detail.**

a) What is the importance of information and communication technology?

b) What precautions need to be taken for the safe use of information and communication technology?

Chapter 11



Problem Solving through Information and Communication Technology

In our daily lives, we face various problems. Some problems are regular and some are irregular. Where there is a problems, there are also a solutions. In the present era, the use of technology to solve problems is increasing. As a result, problems are being solved easily and in a much shorter time.

1. Work plan to solve problems

At the beginning of problem-solving, we usually plan. Planning means thinking in advance about what can be done to address an issue. In other words, through planning, we decide how to solve the problem. For example, if there is a problem in education, we usually plan to seek help from teachers, friends, or family members.

How can we plan to solve problems in daily life?

Activity: Make a plan to solve problems in daily life.

What to do:

Let us...

1. Think about the problems we face in our daily lives. Select a problem from them.

1. Write a plan on how to solve the selected problem in the table below.

Problem	Plan for Solving the Problem

Summary

Planning is thinking in advance about what can be done to solve a problem. In other words, through planning, we decide how to solve the problem. We face various problems in our daily lives. Any problem can be solved by implementing a plan successfully.

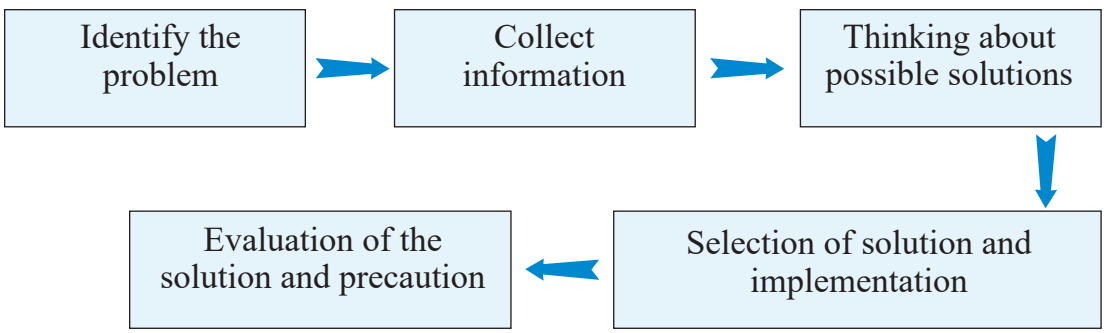
2. Steps of problem-solving

We usually make a plan to do any work or solve a problem. To do the work properly according to the plan, we follow some rules in sequence

What are the steps of problem-solving?

Activity: Identifying the steps of problem- solving

What to do:



Let us...

1. Observe the problem-solving flowchart above carefully.

2. For the problem "The leaves of the flower plants in the school garden are turning yellow," list the tasks that need to be done according to the flowchart in the table below.

1.
2.
3.
4.
5.

Summary

To solve a problem, one needs to follow a series of steps in order.

Solving Problems using Logical Instructions

How to solve problems by following step-by-step instructions or codes?

Activity: Making a century by rolling a dice

What to do:

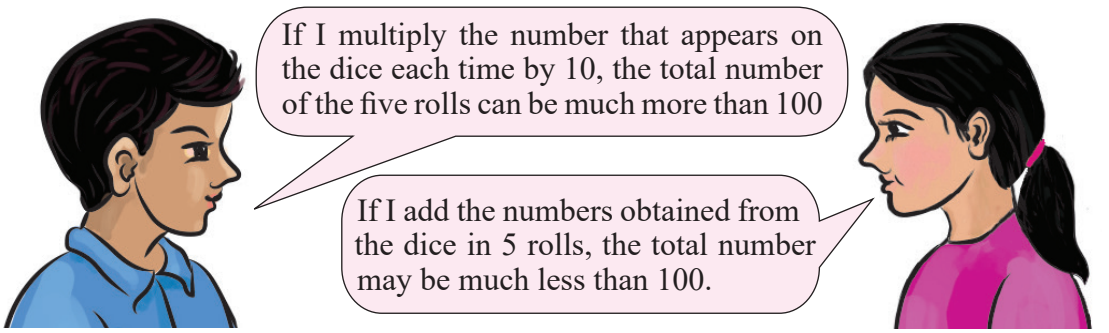


Let us...

1. Sit in a circle as shown in the picture below.
2. Take a dice for the group.
3. Assign a classmate to write down the names of the participants and the numbers obtained by the participants in the game.
4. Roll the dice one by one in turn.
5. Write the number that comes up on the dice, or ten times of that number, next to the dice-thrower's name according to his/her choice.
6. In this way, each participant will have five turns to roll the dice.

7. Add the numbers obtained from each participant's five rolls.
8. Declare the participant winner whose total number reaches 100 first, or comes closest to 100.

We can play the game in the classroom or outside the classroom.



Discussion

What strategy did the winning player adopt in the "By Rolling a Dice Making a Century" game?

1. What are the factors the winner has considered to win the game?
2. Discuss the winning strategy with classmates.

Summary

In the game of 'By Rolling a Dice Making a Century" we have understood that by following logical instructions, the goal can be easily reached, that is, the problem can be solved.

3. Solving common problems using information technology (introduction to scratch)

When doing any task, a computer or a machine works according to a series of instructions. By giving a series of instructions to a computer or mobile phone, that is, by giving a code or command, we can solve a task or problem. We will learn how to solve common problems by following a series of instructions using information technology.

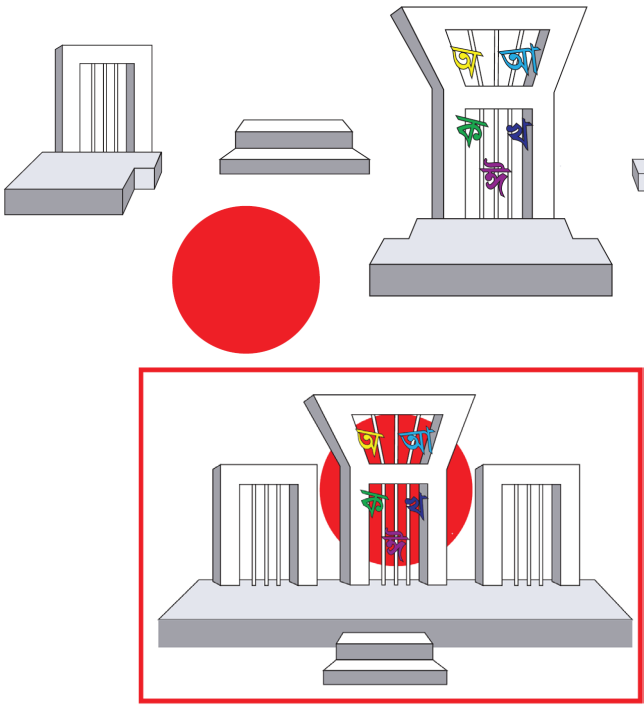
How to create a program using block code?

Activity: Make the whole joining the blocks

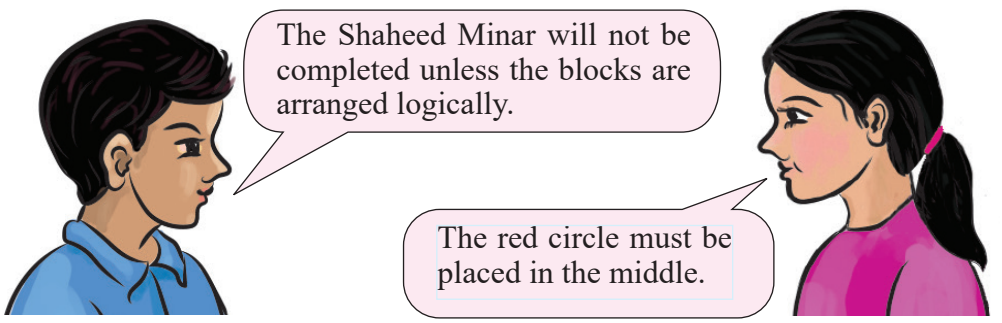
What to do:

Let us...

1. Arrange the blocks on the other page logically to construct the Shaheed Minar.



2. Discuss the task with classmates.



Discussion

Think about the following topic.

1. Could we have constructed the Shahid Minar without arranging it in a specific order? Give logic in favour of the opinion.

2. Discuss about the topic with classmates.

Summary

We have seen that by combining small blocks of an object or thing, we can create the complete object or content. For example, the complete picture of Shahid Minar has been developed by arranging different parts of the picture logically. We can also do this work through machines. Such works can be done using a computer or a mobile phone. We can use computer programs to do this activity.

Introduction to Scratch

A popular block-code-based program for children is **Scratch** SCRATCH. A computer with an internet connection is required to run this program. Through this program, we can easily create various types of games, animation videos, pictures, etc. using a computer, tab or mobile phone by dragging and connecting block-codes serially. Block-codes are used to control **Sprites** and **Backdrops** in the Scratch program. A sprite is a cartoon character in Scratch. Different types of sprites and backdrops are used as needed while working on Scratch.

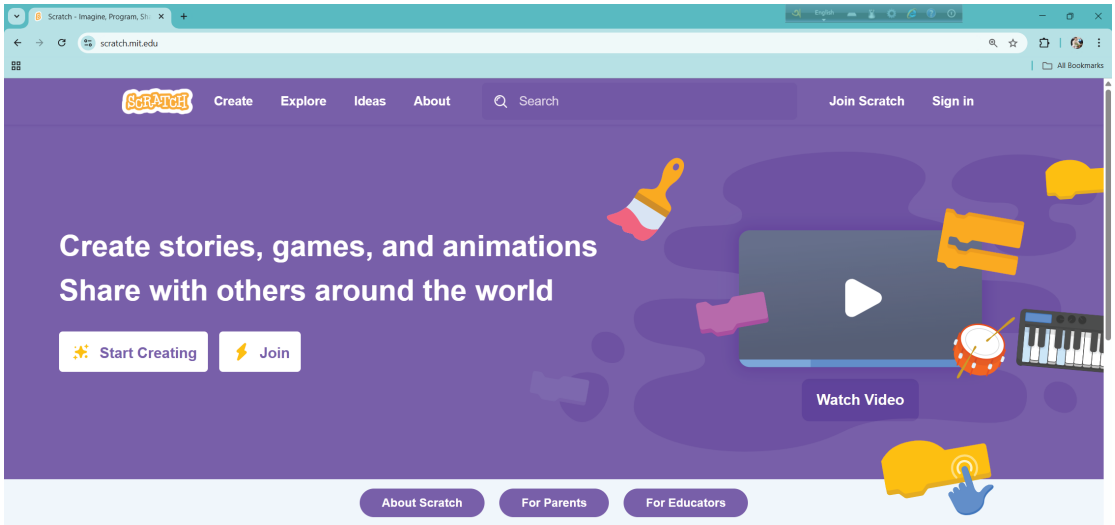


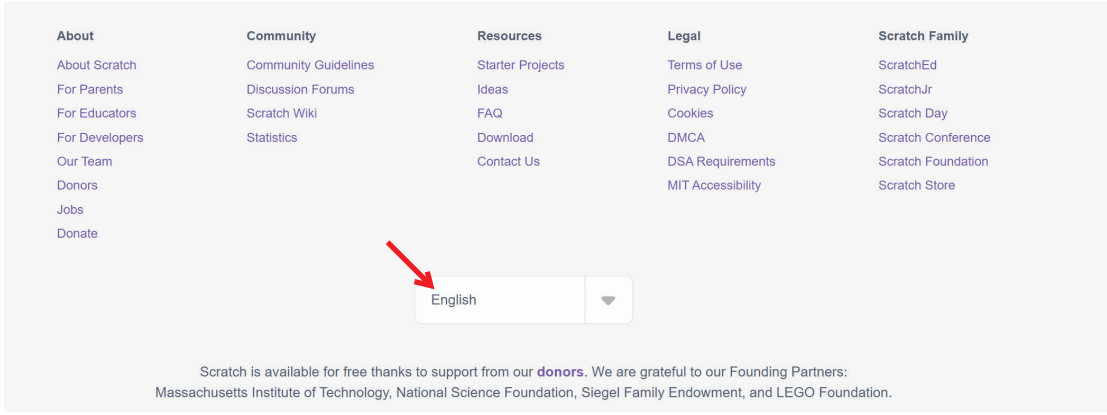
Sprites and Backdrop

Entering into Scratch and Changing Language

Let us open a computer's web browser, type **scratch.mit.edu**, and enter into the Scratch website. The Scratch website looks like the image on the oppo-

site page. This is the home page of Scratch program. By clicking on the area marked with arrow in this image, we can change the language and start the Scratch program in English, Bangla or any other language.

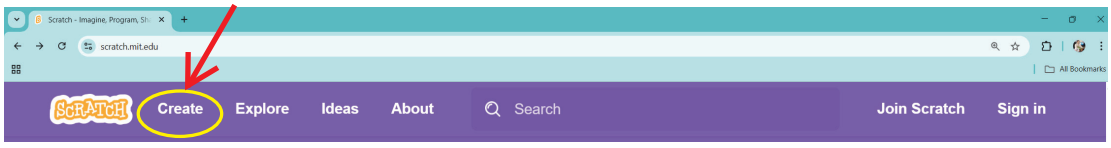




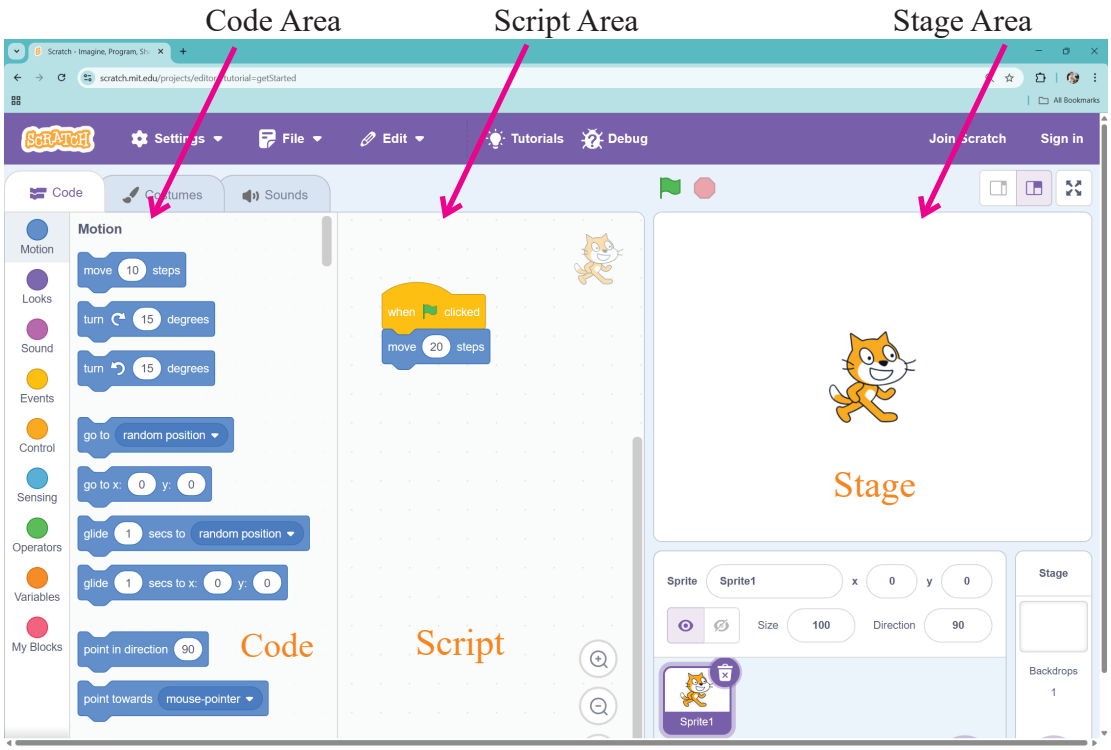
Scratch Home Page

Different Elements of Scratch

To create a new Scratch program, click on '**Create**' at the top of the Scratch home page.



After clicking, the Scratch Editor will appear as shown in the picture below. The Scratch editor has three sections or elements. Such as - code area, script area, and stage.



Scratch Editor

The left part of the Scratch editor is the code area where different types of block-codes are available. Different coloured block-codes are used for different types of tasks. To complete a specific task, various block codes are arranged in sequence in the Script Area at the center of the editor. Based on the arranged block codes in the Script Area, the output of the task becomes visible on the **Stage** at the right side of the editor.

Introduction to Block Codes

In Scratch, there are **nine types of block codes**. Their colours vary according to their functions. Thus, by seeing the colour of a block code, we can tell what type of task it performs. The description of the block codes is given in the following table.

List of Block-codes with Descriptions

Block-code		Description
1	Motion	Related to changing the motion and position of the sprite
2	Looks	Related to different uses of looks and controlling of the sprite
3	Sound	Use of different sounds
4	Events	Determining actions based on different events
5	Control	Checking different conditions and using repetition (loops)
6	Sensing	Determining actions related to sensations like clicking, touching, etc.
7	Operators	Mathematical operations and comparing different values
8	Variables	Variables, lists and their usages
9	My Blocks	Creating own functions according to one's need

First Task in Scratch

We have learned that a task can be completed by arranging different block-codes in the script area of the editor. As our first task in Scratch, we will move a sprite a few steps forward.

Activity: Moving the sprite forward.

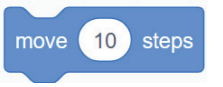
What to do:

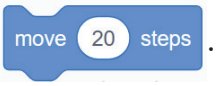
Let us...

1. Start the scratch editor
2. Open the editor, a sprite will appear on the stage.
3. Clicking 'Event' in the code area, drag the 

block code into script area.
4. Clicking "Motion" in the code area, drag the 

block code into script area and add to the previous block code.

5. Set the desired number of steps, in the white part of the 

block code, For example - 

.

6. Click on the green flag  at the top of the stage.
7. Observe the movement of the sprite.
8. Discuss about the task with classmates.

Summary

We have learned that a particular task can be done arranging different block codes in Scratch. This means a program. In the next grade, we will be able to do programming to solve different problems by following logical instructions and using block codes.

Exercise

1. Fill in the blanks.

a) To solve a problem, we need to follow several…...

b) A cartoon character in Scratch is called a _____

c) Various……. are arranged in sequence in the Script Area.

2. Match the the right column with the left.

Stage	Problem solving
Code area	Logical instructions
Planning	Left side of the Scratch editor
Following step by step	Right side of the Scratch editor

3. Answer the following questions in brief.

a) What are the steps of problem solving?

b) What is scratch?

4. Answer the following questions in detail.

a) Describe the functions of the scratch editor.

b) What needs to be done to move the sprite a few steps forward?

Glossary

Word	Meaning
Adverse	Harmful or unfavorable
Animation video	A video where still images are manipulated to create moving images
Atmosphere	The layer of different gases surrounding the Earth
Biodiversity	The diversity of animals, plants, and small creatures existing on Earth
Body sponging	Wiping or cleaning the body with soaked cloth
Carbon dioxide	A type of gas
Condensation	The change of a matter from gas into liquid.
Device	A machine
Diagram	A geometric pattern that can be used to represent a subject
Disinfectant	A substance or medicine that destroys germs
Drug addiction	The addiction created by the use of intoxicating or harmful drugs
Ecosystem	A well-organized system of mutual relationships and interactions between living beings and their environment
Electrocution	Being injured accidentally by the flow of electricity in the body
Evaporation	The change of a matter from liquid into vapor
Expert	A person skilled in a specific subject
Eye dirt	A discharge that accumulates in the region around the eye and causes discomfort

Forecast	Giving information about the future based on present information or situation
Generator	An electric machine that produces electricity
Germination	The process by which a seed grows into a seedling
Gloves	A plastic coverings worn on the hands while working for safety
Healthy	Suitable and useful for protecting health
Hereditary disease	A disease that is passed down to a child from parents or ancestors
Oxygen	A type of gas
Paralysis	The inability to move a part of the body
Piston	A machine part made of iron or metal that works inside the engine of a car or a machine
Pollination	The transfer of pollen to the stigma
Pure environment	Clean or pollution-free environment
Recycling	The process of converting used or waste materials into usable materials again
Skin-disease	A disease of the skin
Solar cell	A device that produces electricity using sunlight
Source	A source is a place from where something can be obtained
Stationary	The state of being motionless or standstill
Transformation	The change of something from one form into another
Turbine	A rotating machine that converts the energy of water, steam, gas, or air flow into mechanical energy
Web browser	A special program used to find and bring out information from the internet

End

Academic Year 2026, Class Four–Science



Call **333** (Call Centre) for information, services and remedy of social problems.

Call **109** (Toll free, 24 hours) National Help Centre to redress and prevent violence against women and children.

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