Test Edition

Grade 4

Textbook GENERAL SCIENCE

Based on Single National Curriculum 2020

یہ کتاب محکمہ تعلیم حکومت بلوچستان کی جانب سے تعلیمی سال 2025 کیلئے مفت تقسیم کی جارہی ہے اور نا قابل فروخت ہے

ONE NATION, ONE CURRICULUM

حکومت بلوچستان کا پروگرام "معیاری تعلیم سب کے لیے"

Balochistan Textbook Board, Quetta

Textbook

GENERAL SCIENCE

4

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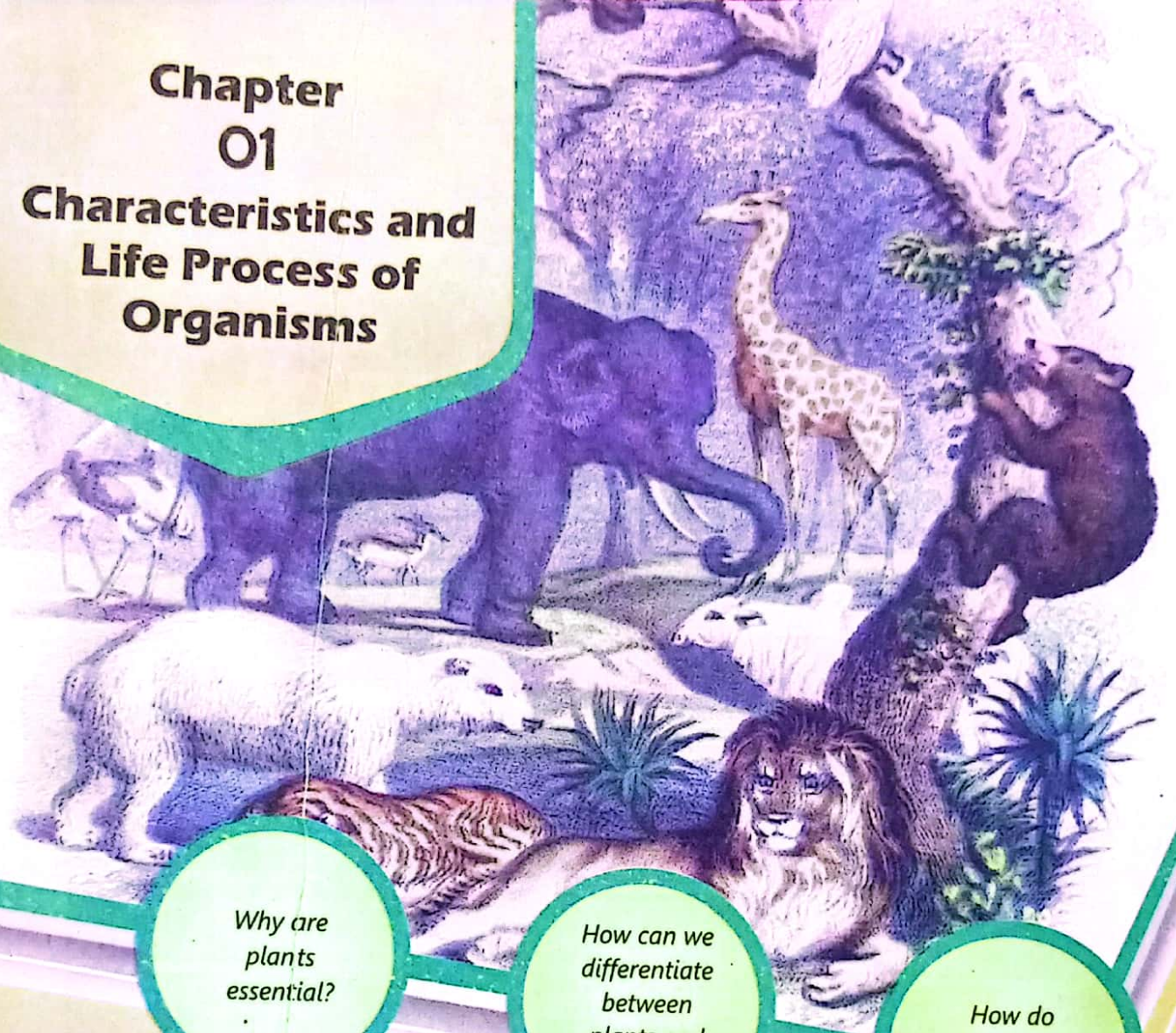
Chapter 01
Characteristics and Life Process of Organisms



Why are plants essential?

How can we differentiate between plants and animals?

How do leaves get water?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Compare and contrast characteristics that distinguish major groups of living things (plants and animals).
2. Classify animals in terms of vertebrates and invertebrates with examples and analyze the differences and similarities in vertebrates and invertebrates.
3. Classify plants in term of flowering and non-flowering with examples and analyze the differences and similarities in flowering and non-flowering plants.
4. Recognize and appreciate diversity in life (both plants and animals) and identify ways to protect diversity.
5. Identify major parts and organs in animals (teeth, bones, lungs, heart, stomach, muscles and brain).
6. Relate the parts and organs of body of animals to their functions e.g. teeth breakdown food, bones support the body, lungs take air in, the heart circulates blood, the stomach helps to digest food, muscles move the body.
7. Identify parts of a plant body (leaves, stem, flowers, seeds roots).
8. Relate the structures of plants to their functions i.e., roots absorb water and nutrition and anchor the plant, leaves make food the stem transport water and food, flowers produce seeds and seeds produce new plants.

On the way from your home to school, you would have seen many things. Make a list of these things. The things you see everyday, you may add these things in the list. How would you decide that things are living or nonliving?

Characteristics of Living Things

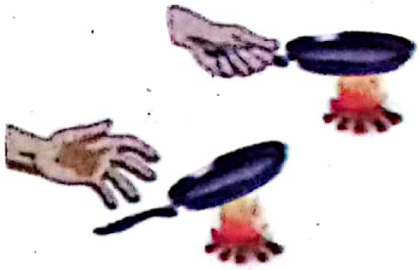
Living things use food to remain alive.

Living things breathe.

Living things can move on their own.

Living things produce living things of their kinds.

Living things have the characteristics to grow.



Living things have the ability to sense.

- Can you tell some more qualities of living things?

Point to Ponder!

Tell few characteristics of a vehicle that are also found in living things.

Characteristics of Major Groups of Living Things

Do you know that both plants and animals are living things? You might have seen butterfly, bird, goat, cow and fish, and trees of apple, banana, orange and mango. If both plants and animals are living, then what is the difference between them?

The two major groups of living thing are:

1. plants
2. animals

Similarities and Differences between Plants and Animals

Activity 1.1

Look at the pictures of a mango tree and a goat. Analyze the differences and similarities between the characteristic of these two living things.

Plants

1. Usually they are green in colour.
2. Make their own food.
3. Cannot move from one place to other.

Similarities

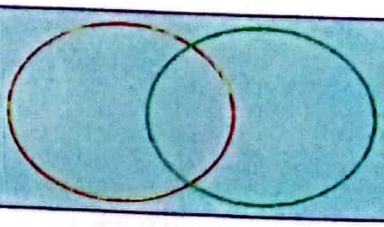
1. Grow.
2. Respire.
3. Reproduce.

Animals

1. Usually they are of various colours.
2. Depend on plants and other animals for their food .
3. Can move from one place to another.

Interesting information

This is a Venn diagram. Similarities are shown in its centre and differences are shown on its sides.



Do you know?

1. Living things have characteristics of execration and sensitivity.
2. Both plants and animals need food, sunlight, water and air.
3. Plants provide oxygen to the environment. Thank you, plants!

Classification of Animals

Activity 1.2

Put your hand on the back side of your neck, then take your hand downward towards your back. Did you feel any bone? This is called backbone or vertebral column.

- How many vertebra are in your backbone?

Animals are divided into two major groups on the basis of vertebral column or backbone.

Vertebrate: The animal having backbone.

Invertebrate: The animals having no backbone.

Pictures of few vertebrates are given below:

				
Fish	**Frog**	**Lizard**	**Pigeon**	**Cat**
Few vertebrates				

Pictures of few invertebrates are given below:

				
Cockroach	**Honey bee**	**Butterfly**	**Starfish**	**Millipede**
Few Invertebrates				

Activity 1.3

Paste pictures of various animals in your scrapbook. Divide them into vertebrates and invertebrates. Which of these are found in Pakistan?

Classification of Plants

Usually the plants are divided into two groups:

1. Flowering plants
2. Non-flowering plants

1. Flowering Plants

Plants on which flowers grow are called flowering plants. Mustard, sunflower, rose, guava and lemon are examples of flowering plants. Flowering plants may be herbs, shrubs, and trees. Flowering plants are of various colours and sizes.

Pictures of few flowering plants are given below:

		
Mustard	Rose	Sunflower
		
Apple	Lemon	Guava
Flowering Plants		

2. Non-Flowering Plants

The plants on which flowers do not grow are called non-flowering plants. Moss, fern and conifers (for example pine, juniper, thuja, sago palm) are examples of non-flowering plants. Pictures of few non-flowering plants are given below:

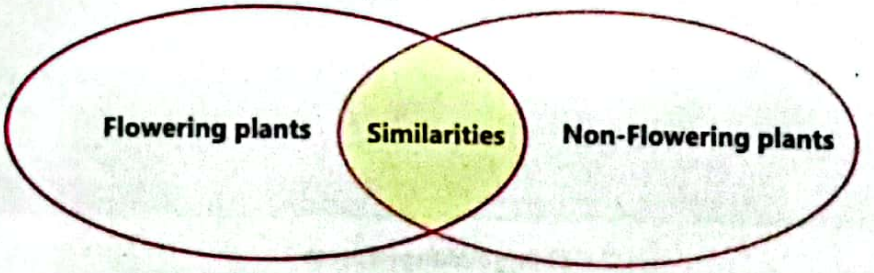
		
Moss	Fern	Pine
		
Juniper	Thuja	Sago palm
Non-flowering Plants		

Interesting Information

Conifers are found in the northern areas of Pakistan , for example, Swat, Kaghan, Chilas, Murree and in some areas of Balochistan e.g., Ziarat, Zhob, Sherani. Conifers are very important for our economy. Its wood is used for making furniture, construction materials and ornamental things. It is also used to make paper. The seeds of some conifers are used as dry fruit such as pine nut (chilghoza).

Activity 1.4

Draw the given figure in your scrapbook and write the differences and similarities between flowering and non-flowering plants in it.



Activity 1.5

Paste pictures of various plants in your scrapbook. Divide them into flowering and non- flowering plants. Which of these are found in Pakistan?

Biodiversity

Just look around you and observe the living things. Do all the living things look alike? If No then why? All these living things are different in their functions and structure.

The number of various types of living things found at a particular place is called Biodiversity. We still do not know the actual number and kinds of living things present on the Earth. Many types of livings have become extinct. The existence of many living things is in danger due to many factors such as destruction of habitat, change of climate, increase of temperature on Earth and scarcity of water.

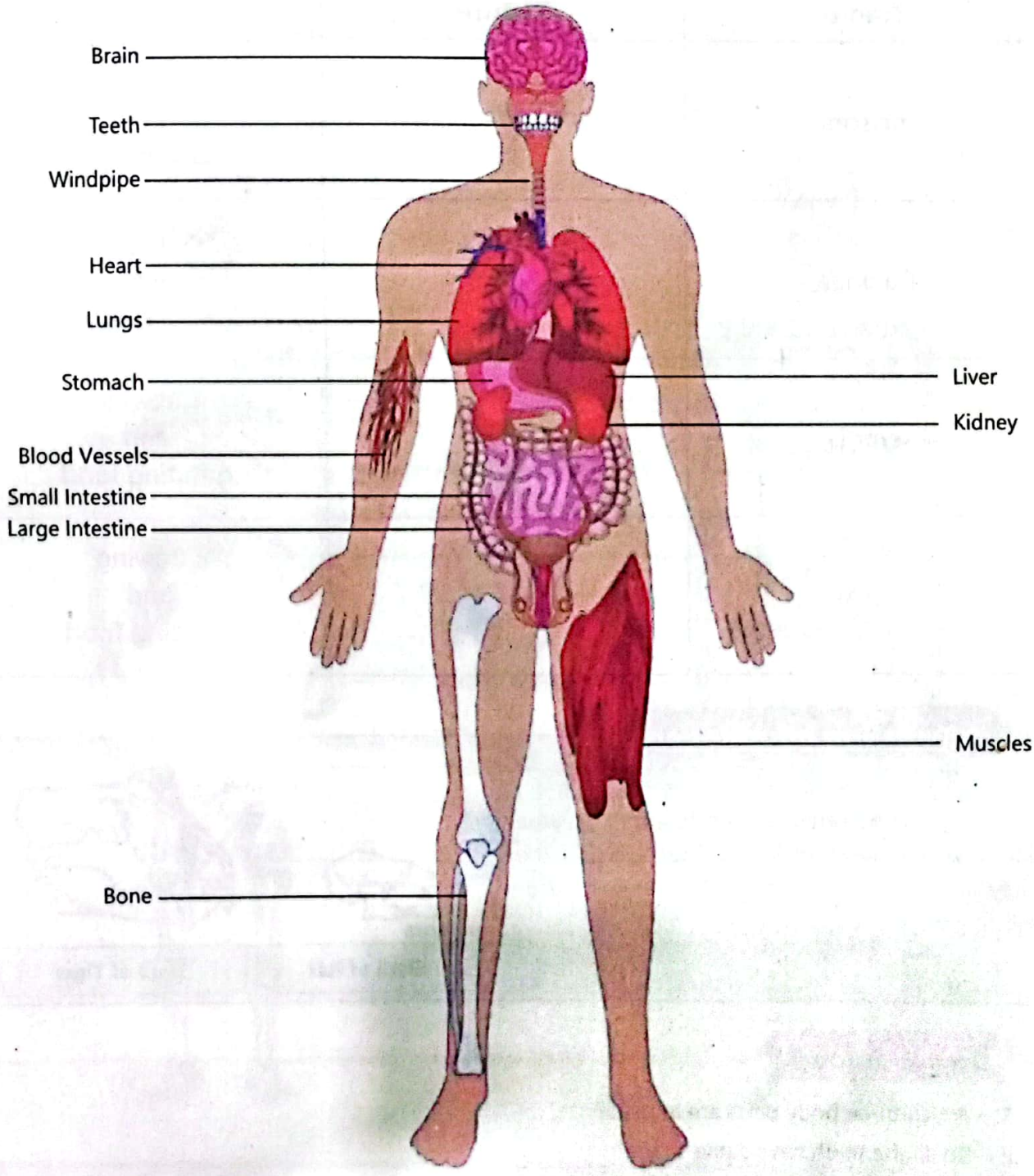
Do you know?

1. Government of Pakistan has initiated to plant billions of trees to stop climate change.
2. Near Lahore, Changa Manga is the largest man-made forest in the world.

Changa Manga forest

Major Body Parts and their Functions

Teeth, bones, lungs, heart, brain and muscles are major human body parts that we will study here.



Major Human Body Parts

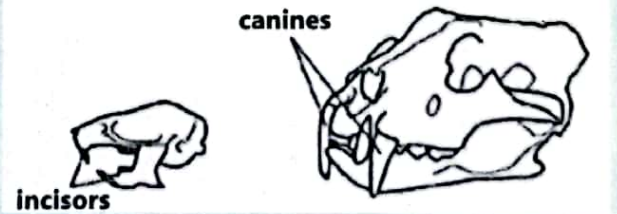
Teeth

Can you swallow large pieces of bread or meat without chewing? There are four types of teeth that perform various functions.

Name	Picture	Functions
Incisors		Biting and cutting food
Canines		Piercing food and tearing food
Premolar		Chewing and grinding food
Molar		Chewing and grinding food

Interesting Information

A tiger has large canines whereas a rat has large incisors. Tiger uses its canines for piercing the prey and rat uses its incisors for biting food or killing prey.



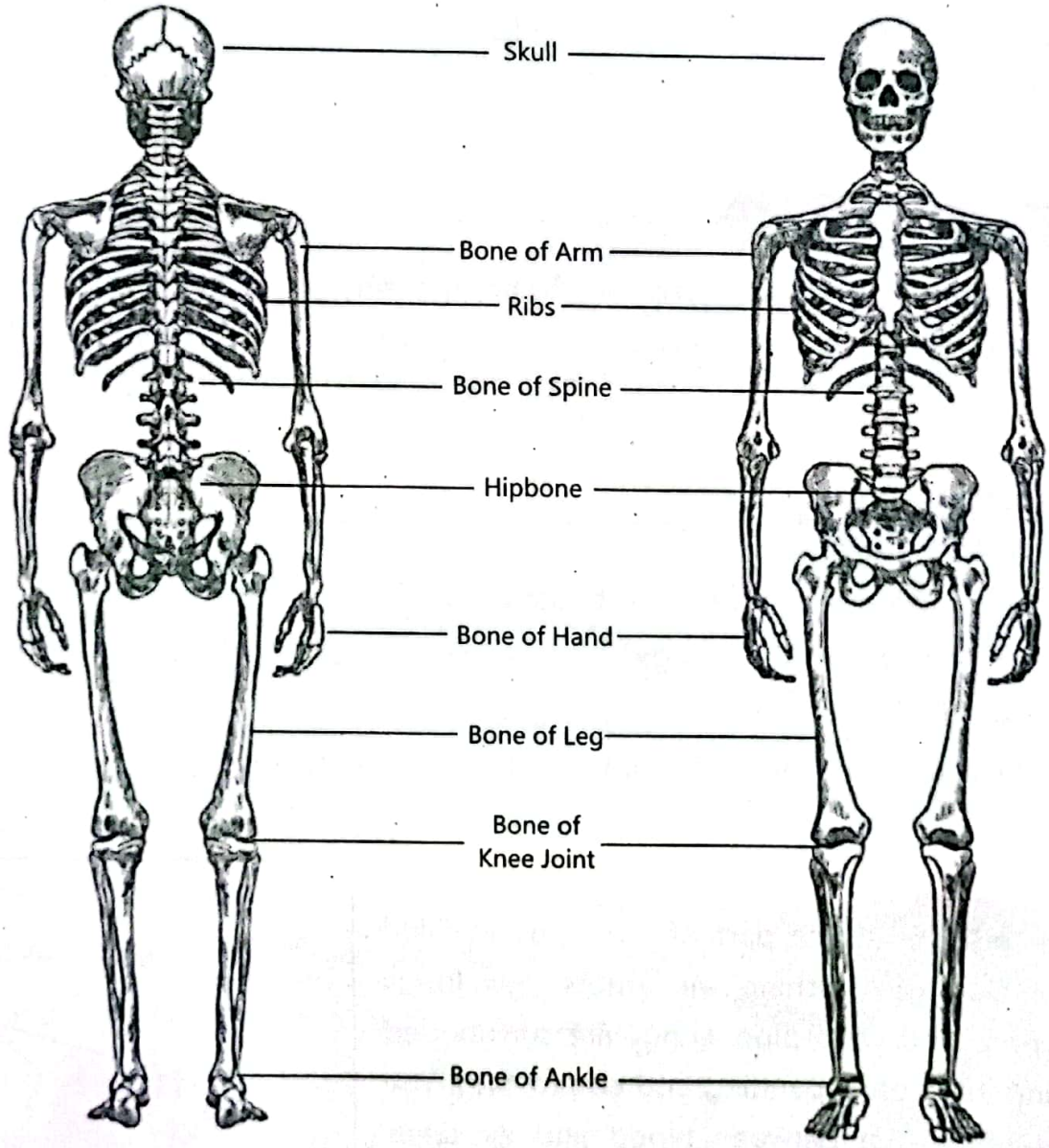
Skull of Rat | Skull of Tiger

Do you know?

1. Which three body parts are in pairs?
2. Do all the teeth have same shape?
3. What is the difference between molar and premolar?
4. What is the number of teeth in human?

Bones

Press any bone of your body. Is it hard or soft? Most of the bones are hard. They are of various size and shape, for example the bones of the arm are longer than those of fingers. All the bones are united with one another at the joints forming a frame called skeleton. Can you tell the functions of bones? What will happen if there are no bones in a human body?



Bones of the Human Body

Activity 1.6

Complete the table.

Name of the Bones	Function
Skull	
Ribs	
Bones of Hand	
Bones of Leg	

For Your Information

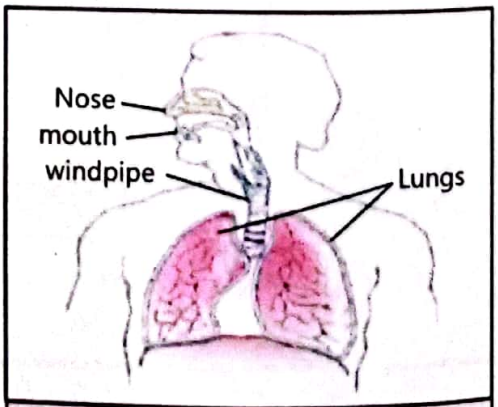
There are 206 bones in the human skeleton. The bones of arm and leg are hollow. They have bone marrow which helps to produce blood.

Lungs

Activity 1.7

1. Observe the lungs of a goat and touch them.
2. What is the colour of the lungs?
3. Why are the lungs spongy?
4. What will happen if air is filled into the lungs through windpipe?

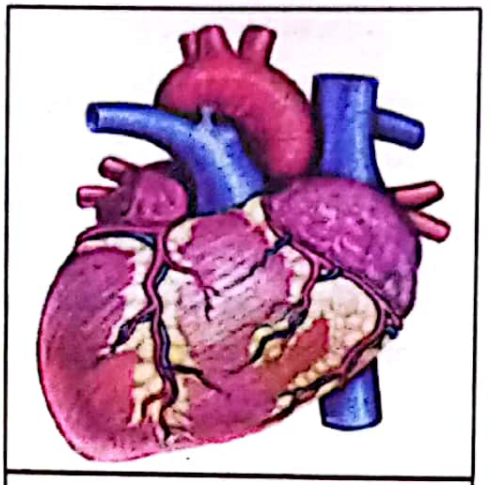
When we breathe, which part of our body in filled with air? During breathing air enters our lungs through nose and wind pipe. Lungs are surrounded by ribs and keep on expanding and contracting. The exchange of oxygen between blood and air takes place in the lungs.



Lungs

Heart

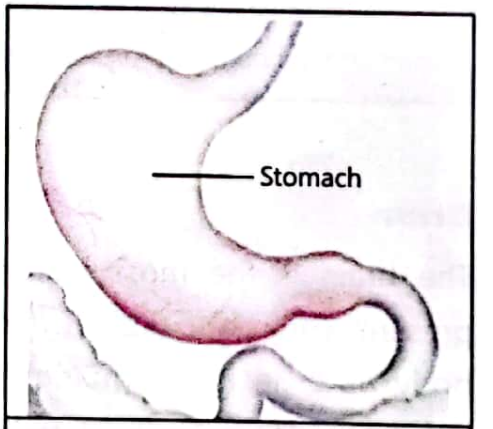
Put your hand on the ribs of the left side. Do you feel "beat" of anything? The heart is surrounded by the ribs. The heart works continuously like a pump throughout the life. The muscles of the heart contract and relax. It circulates blood all over the body through blood vessels.



Heart

Stomach

The stomach is a bag like organ. It is present on the left side below the heart. It is the biggest part of digestive track. It secretes digestive juice. The muscles of stomach move the food and the digestive juice digests the food.

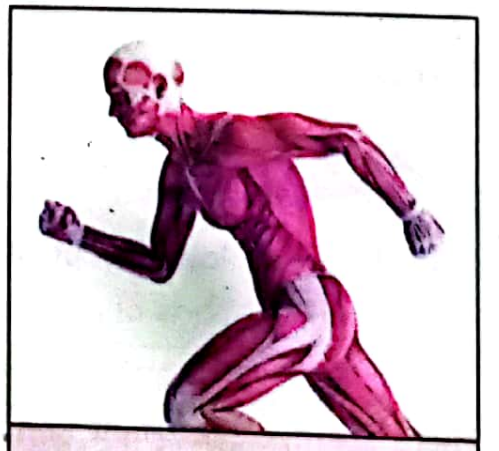


Stomach

Muscles

The human bones are attached and covered by the muscles. The muscles are soft. They are pink or red in color. You must have seen the meat of cow, goat, or hen. What is their colour?

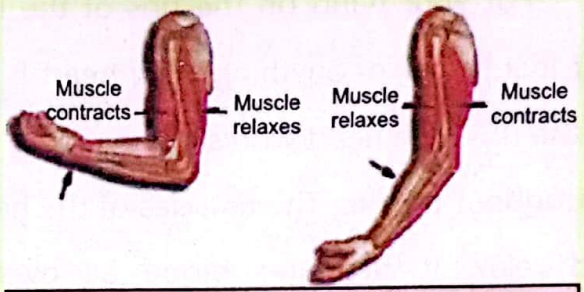
Muscles perform various functions. Muscles work with the bones and joints to help you move hands, arm, feet and legs. Due to these movements we can sit, walk, run and jump. Our hearts pumps blood with the help of muscles. Muscles move food through the digestive system. It is due to muscles that our lungs expand and contract.



Muscles

Do you know?

When muscles contract, they pull various parts of our bones. Due to this, bone moves at the joint. Joint is place where bones are connected. For example, elbow, wrist, knee etc. Muscles work in pairs. When one muscle contracts the other relaxes.



Working of muscles

Interesting Information

When we smile, 14 muscle are needed.
There are almost 600 muscles in a human body. Almost half of the body weight is due to muscles.

Brain

The brain is the most important part of our body. It is present within our skull. It controls all the functions of our body. It collects information from different parts of our body and decides what type of response our body should give.

Brain

Parts of Plants and their Functions

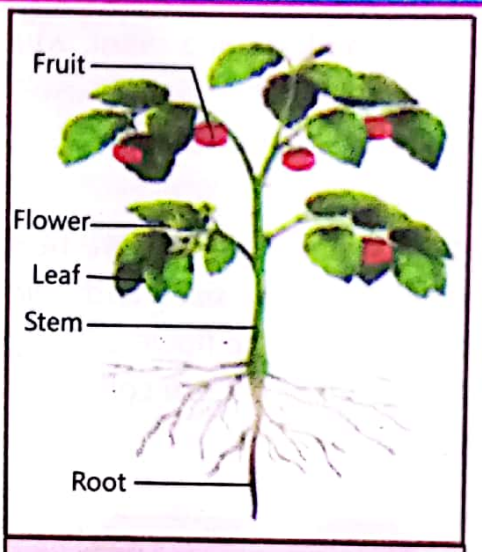
Activity 1.8

Take a small flowering plant. Observe its various parts. Draw a sketch of the plant and label the parts of the plant.

There are five important parts in a flowering plant. These are called root, stem, leaf, flower and seed. Out of these, each part performs its particular function.

Root

Usually the root is present under the ground. Its branches spread in different directions. The roots anchor plants in the soil and absorb water and minerals from the soil.



A Flowering Plant

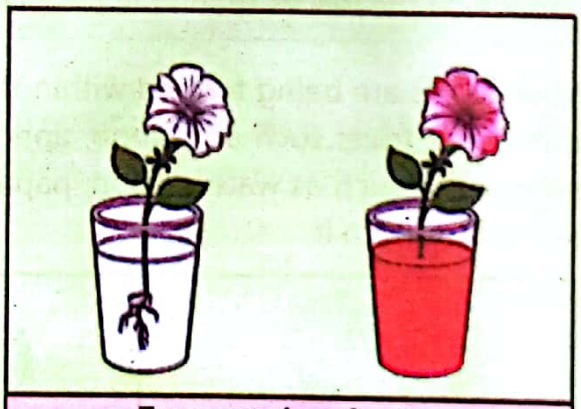
Stem

Usually the stem grows above the ground. Stem has many branches. There are many leaves on the stem and its branches. The stem transports water and minerals to the leaves absorbed by the root. The stem supports the plant.

Activity 1.9

Take two soft plants having white flowers, for example Petunia. Wash their roots thoroughly with water. Take two bottles or glasses, and pour water in both. In one bottle put few drops of red ink. Then put a plant in each bottle in such a way that their roots remain under the water.

Leave the plants for few hours or overnight. What did you observe? Cut the stem of the two plants and tell the differences between the two.

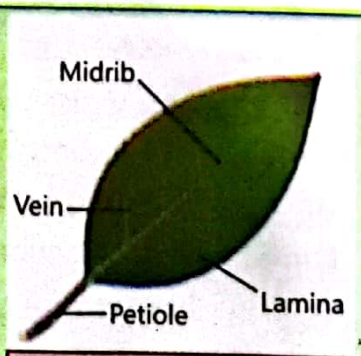


Transportation of water from roots to leaves

Leaves

Activity 1.10

Take a leaf. Draw its sketch. What is the shape of the leaf? Collect few leaves of various types. Keep them between newspaper and put any heavy object such as, any book over them. After three days take them out. Paste these on the scrapbook. Identify and write the name of the parts of leaf.



Leaf

When you look at a plant, what is the first thing you notice? The first thing you usually notice in a plant, are its leaves. Leaves are of different sizes and shapes. Usually the colour of the leaves are green. The important function of the leaves is to make food.

Flowers

The flowering plants have beautiful flowers. The flowers are of different sizes and colours. Fruits and seeds are formed from the flowers. Did you ever think that what is the purpose of these colorful flowers?

Flower

Seeds

Activity 1.11

Take soil in a box or flower pot. Sow few seeds in it. Then pour some water on it. Observe after one week. You will observe tiny plants. Did you ever think that food is made by the leaves then how the plant has been formed by the seeds?

When seeds are being formed within the flower then the area surrounding it ripens into fruit. Some fruits such as mango, apricot, peach have only one seed. Some fruits have many seeds such as water melon, papaya, guava etc. When a seed is sown, a new plant germinates from it.

Mango

Watermelon

Papaya

Fruits and their seeds

Activity 1.12

Suppose you woke up in the morning. Suddenly you see outside of the house. All the plants have become dried up. What will happen in this situation? Write a story with the following hints:

Hints: Beautification of the environment and plants. Plants as food for animals.
Importance of plants in providing oxygen. Forests and rain fall.
Need of water and oxygen for the existence of living things

KEY POINTS

1. Living things have been divided into two main groups; the plants and animals.
2. Plants make their food themselves whereas animals depend on plants or other animals for food.
3. Both plants and animals need food, sunlight, water and air.
4. The animals have been divided into two groups; the vertebrates and invertebrates.
5. The plants have been divided into two major groups; the flowering and non-flowering plants.
6. The number and kinds of living things found at a particular place is called biodiversity.
7. Teeth, bones, lungs, heart, stomach, muscles and brain are the major parts of the human body.
8. The function of teeth is to chew food, the function of bones is to protect body parts, the function of lungs is to bring air into the body, the function of heart is to circulate blood in the body, the function of stomach is to digest food, the function of muscles is to move body, the function of brain is to control the function of other body parts.
9. Root, stem, leaf, flower and seed are the major parts of plant.
10. The function of roots is to anchor the plant into the ground and absorb water and minerals from the soil.
11. The function of stem is to transport water and food.
12. The function of leaves is to make food and produce oxygen.
13. The function of flowers is to produce seed and the function of seeds is to produce new plants.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter.

1.	vertebrates and invertebrates	https://www.nationalgeographic.org/photo/vertebrate-invertebrate
2.	biodiversity	https://www.nationalgeographic.org/encyclopedia/biodiversity
3.	Parts of plant	https://www.youtube.com/watch?v=X6TLFZUC9gI

EXERCISES

1. Tick (✓) the correct answer.

i. Which one is common among butterfly, bird and bat?

(a) Teeth (b) Hair
(c) Bones (d) Wings

ii. Many plants produce fruits:

(a) to protect seeds.
(b) to produce food for the seeds.
(c) to store water for the seed germination.
(d) to stop seeds from dispersal.

iii. Fish are vertebrate and swim in water. Which one of the following is true?

(a) Have fur on the body (b) Have feathers and tail
(c) Have four legs (d) Have fins and tail

iv. Which part of a plant is absent in non- flowering plants?

(a) Root (b) Seed
(c) Fruit (d) Leaf

v. Which one of the following is a non- flowering plant?

(a) Apple (b) Rose
(c) Mango (d) Pine

vi. Which statement is correct for all the vertebrates?

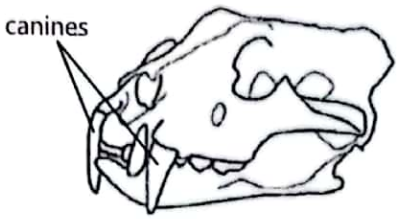
(a) Have fur (b) Have more than four legs
(c) Have backbone (d) Can fly in air

2. Write short answers.

i. Write any four characteristics of living things?
ii. Write any three differences between plants and animals?
iii. Differentiate between vertebrates and invertebrates.
iv. Write the name of types of teeth and their functions.
v. What functions do bones and muscles perform together?
vi. Describe the functions of lungs and heart?

3. Constructed Response Questions:

The diagrams show a tiger skull and a rat skull.



Skull of Tiger

Skull of Rat

A tiger has large canines. A rat has large incisors. Rat and Tiger eat different types of food.

(a) What does a tiger do with its canines?

(b) What does a rat do with its incisors?

4. Investigate:

i. How the invertebrates are useful for humans?

ii. What is the importance of biodiversity?

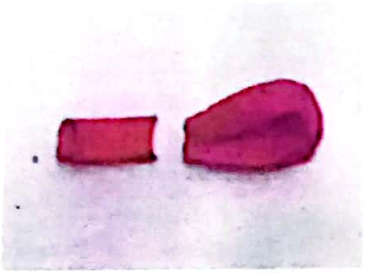
iii. What is importance of a flower?

Project:

Pumping of blood by the heart

List of things:

i. Balloon
ii. Red color
iii. Jar
iv. Water
v. Scissors
vi. Straw one blue and one pink
vii. Tape



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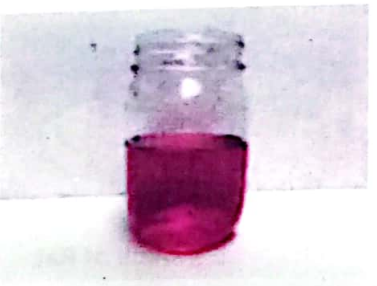

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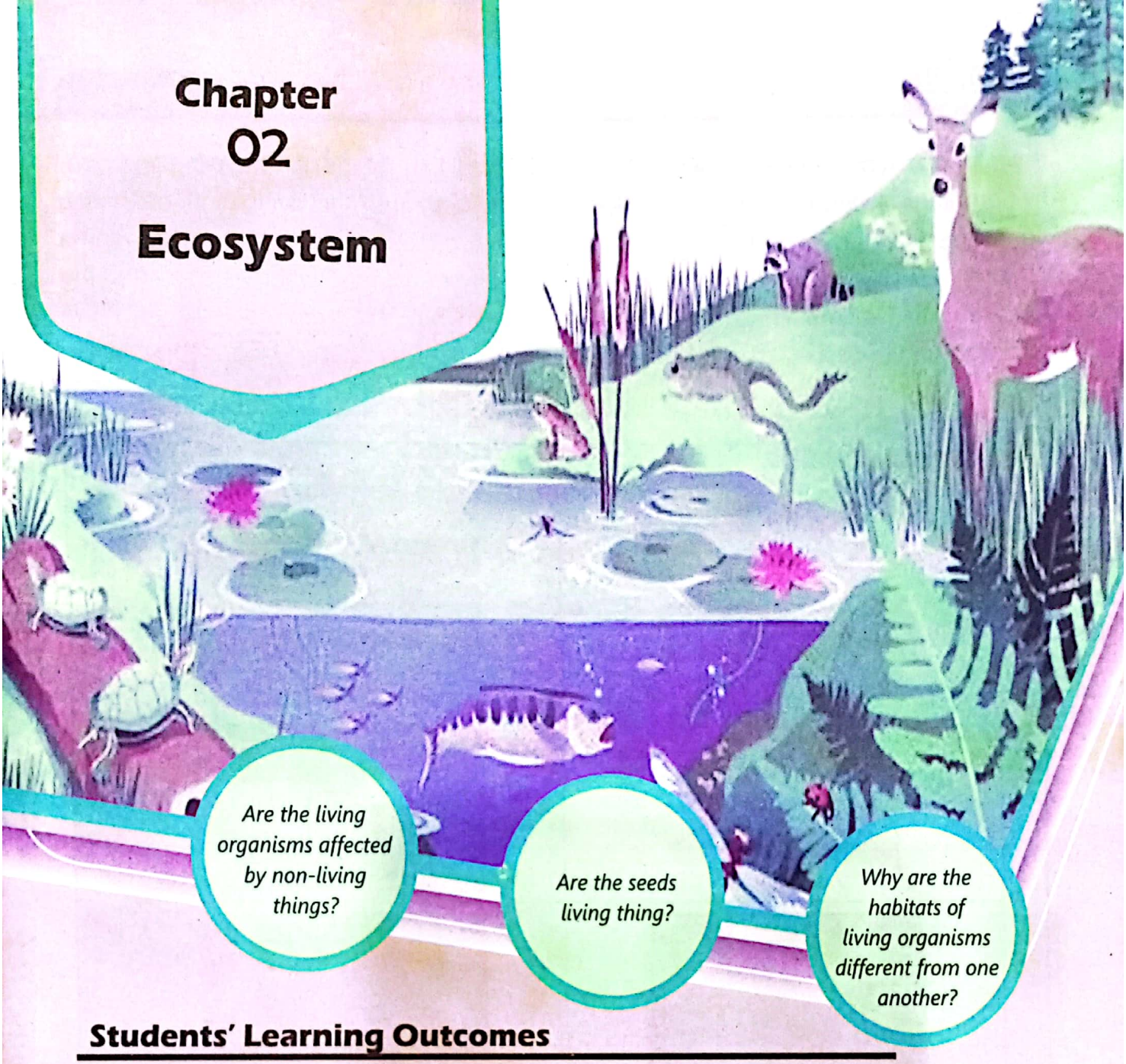
6

i. Cut the balloon as per given figure.
ii. Fill half of the jar with water and add few drops of red colour.
iii. As per figure cover the mouth of the jar with balloon.
iv. Make two holes on the balloon at a distance of about one inch. In one hole put blue straw and in other one the pink straw, so that they fit into the holes as per given figure.
v. Cover the holes around the straws with tape and also cover the opening of the blue straw with tape. Keep the jar in a tray.
vi. Push the middle part of the two straws with your figures.
vii. You will observe that the coming out of red colour out of pink straw, is similar to that of pumping of blood by the heart.

Chapter 02

Ecosystem



Students' Learning Outcomes

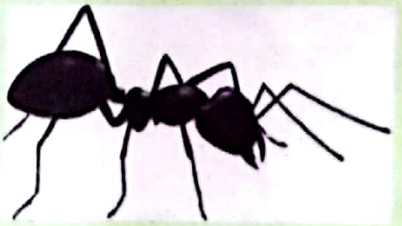
After studying this chapter, the students will be able to:

1. Recognize what is an ecosystem (e.g., forests, ponds, rivers, grasslands and deserts).
2. Explain biotic (plants, animals and humans) and abiotic factor (light, temperature, soil and water) and their linkages.
3. Analyse the way these biotic and abiotic constituents create a balance to sustain any ecosystem.
4. Recognize the interactions between animals and plants and the importance of maintaining balance within an ecosystem.
5. Describe a few food chains and analyse their structure to understand their function.
6. Describe the role of living things at each link in a simple food chain (e.g., plants produce their own food; some animals eat plants, while other animals eat the animals that eat plants).
7. Identify and describe common predators and their prey.
8. Recognize and explain that some living things in an ecosystem compete with each other for food and space.
9. Recognize the value of a balanced ecosystem.
10. Interpret that human actions such as urbanization, pollution and deforestation affect food chains in an ecosystem.
11. Identify various actions and roles that humans can play in preserving various ecosystems.

If we look around, we see variety of living and non-living things. All the living and non-living things around a living thing form its environment. The living and non-living components of an environment interact with each other. Every living things lives in a particular environment. Fish lives in water, tiger lives in forest whereas human being lives in villages and cities. The birds make nests on the trees and the ants live underground in nests. Do you know other animals that live in particular environments?

Activity 2.1

Identify the environment of the animals given below:

(Fish) 	
(Ant) 	
(Parrot) 	

Ecosystem

The living and non-living components of any environment make the ecosystem. Various types of ecosystems are found on our earth for example, forest, grassland, ocean, river, pond, snowy areas and desert.

For Your Information

1. The largest desert of the world is "Sahara" which is located in the continent Africa.
2. The desert located in Mianwali and Bhakkar in Pakistan is called "Thal" and the desert located in southern parts of Punjab is called "Cholistan".
3. The desert located in Sindh is called "Thar".

Snow Region

Grassland

Desert

Pond

Ocean

Forest

Various ecosystem

Point to Ponder!

In the desert the days are extremely hot and the nights are extremely cold. Why?

Activity 2.2

Enter the living things given below in their respective ecosystem:

Grass, Plant, Lotus, Thick Shrubs, Snake, Penguin, Polar Bear, Camel, Lion, Tiger, Elephant, Deer, Fish, Frog, Antilope, Sheep, Goat.

Forest	Grassland	Pond	Desert	snow

Components of Ecosystem

There are two components of an ecosystem.

1. Abiotic Components
2. Biotic Components

Abiotic Components

The non-living components of an ecosystem are called abiotic components. These include temperature, air, water, light and soil.

Biotic Components

The living components of an ecosystem are called biotic components. The biotic components are divided into three groups, which are given below:

1. Producer

The plants produce food for themselves and for animals with the help of absorbed water and sunlight. That is why, they are called producer. All the plants e.g., herbs, climbers, shrubs and trees are producers. Aquatic plants (for example lotus) algae are also producers. These are a major source of food of the aquatic animals

Producer

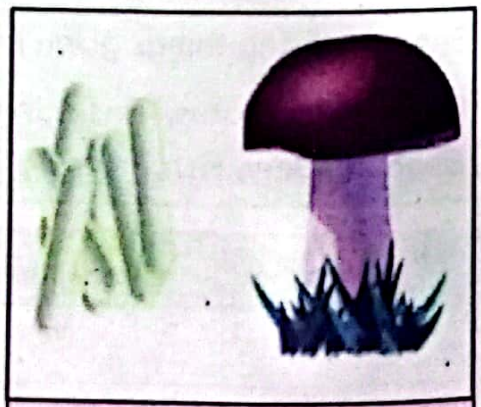
Consumer

2. Consumer

The living things which obtain their food from other living things are called consumers. They cannot make their own food. They depend on plants or plant eating animals for their food, for example all the animals and man.

3. Decomposer

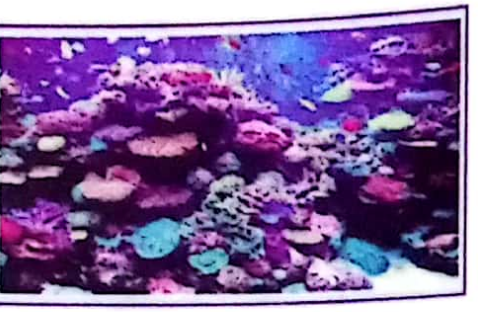
The living things which break down the dead bodies of plants and animals into simple components and obtain their food from these, are called decomposers. Bacteria and fungi are main decomposers.



Decomposers

Interesting Information

Corals are a part of beautiful ecosystem under sea. Corals usually live in form of a colony which is called coral reef. They are also called rain forest of ocean. They look like stone but actually these are animals.



Activity 2.3

Observe the picture and answer the questions given below.

1. Name few abiotic and biotic components in the environment shown.
2. In your opinion how do the abiotic and

Balanced Ecosystem

The Sun is the main source of energy in an ecosystem. The plants make food with the help of sunlight, carbon dioxide and water. They also produce oxygen in this process. This oxygen is used by animals for respiration. During respiration, animals produce carbon dioxide which is used by plants to make food. Such self-sustaining and durable ecosystem is called balanced ecosystem.

All the living things are essential for one another. They affect the lives of one another. Some animals benefit or harm one another.

Point to Ponder!

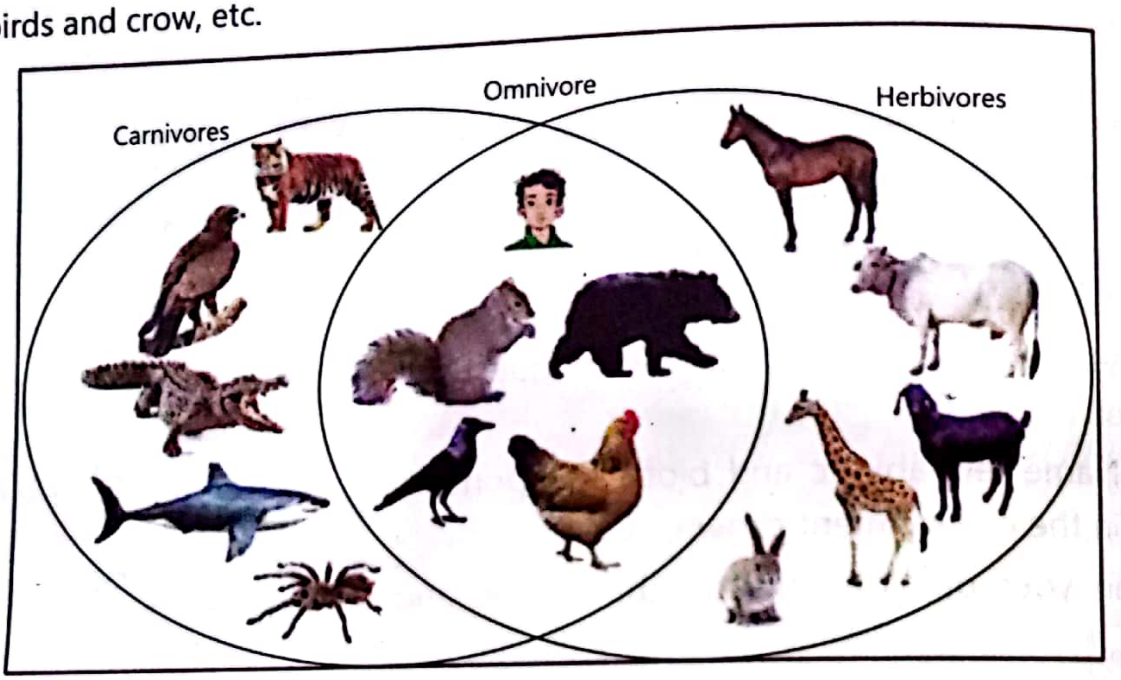
If the number of aquatic producers increases in a pond beyond the limit then fish and other living things die due to lack of oxygen. Why?

Food Chain

To obtain food living things depend on one another. Plants make food with the help of sunlight and water. The animals which eat plants are called herbivores, for example rabbit, goat, deer and cow.

The animals which eat other animals are called carnivores, for example lion, tiger, crocodile and shark.

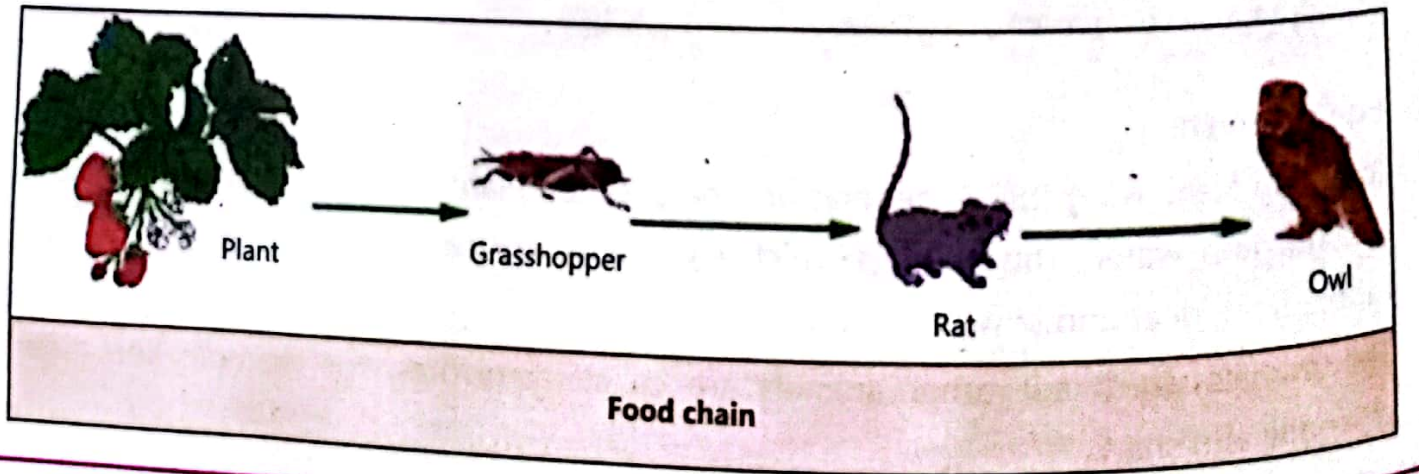
The animals which eat both plants and animals are called omnivores for example man, bear, birds and crow, etc.



Activity 2.4

1. Observe an ecosystem near your school and identify the following components:
   i. Abiotic Components ii. Biotic Components iii. Producers
   iv. Herbivores v. Carnivores
2. Make a food chain using the identified components.

Producer make food, which is used by herbivores. The herbivores are eaten by carnivores. These carnivores may be eaten by other carnivores. The series of eating and being eaten in an ecosystem is called food chain. Grasshopper eats a plant and is eaten by rat. The rat becomes a prey of owl. This is an example of food chain.



Food chain

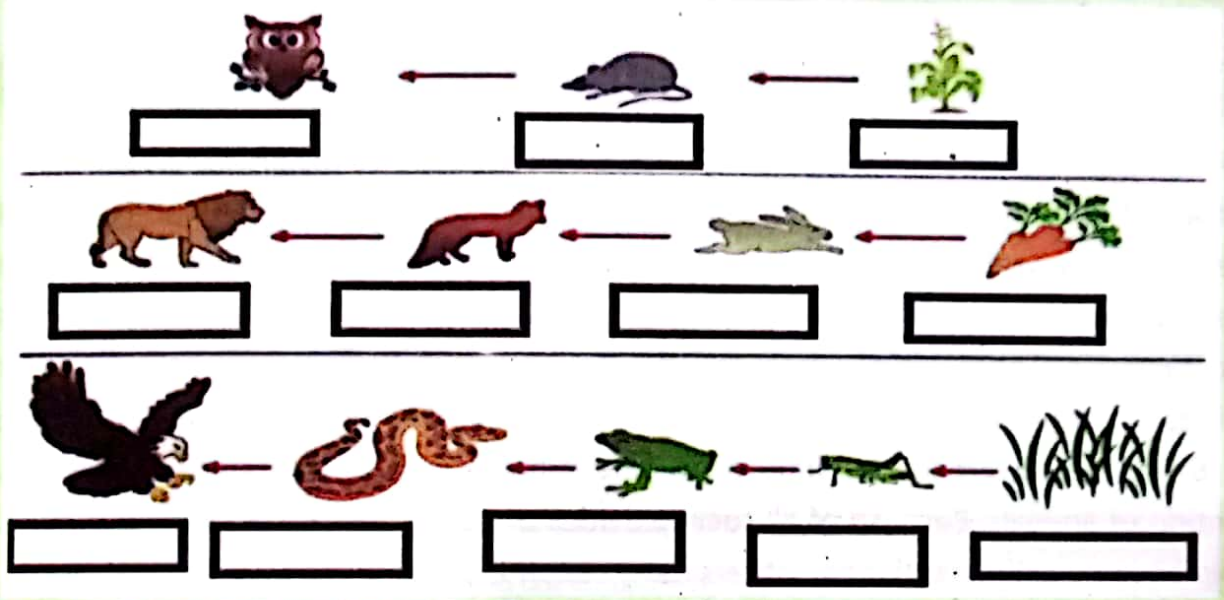
Links of Food Chain

A food chain consists of three links.

1. In any food chain the first living thing is a producer (for example plant and algae).
2. The second main link is the herbivore or omnivore animal for example rat, zebra and goat.
3. The third main link is a carnivore or omnivore animal for example lion, fox and snake.

Activity 2.5

Complete the following food chains:



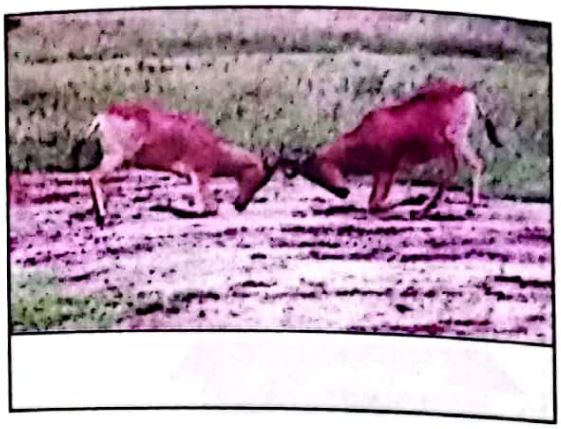
Predator- Prey Relationship

The animal which eats by killing another living things is called a predator for example lion, tiger, shark and lizard. The living thing which is killed and eaten by the predator is called a prey, for example zebra, deer, rat and fish. The interaction between predator and prey is called predation. For example, deer is killed and eaten by lion. Here, lion is the predator and deer is its prey. Similarly, goat is predator and grass is its prey.

Predation

Competition among Organisms

All the organisms living in an ecosystem depend on the resources which are available in that area. Every area can provide food and place to a limited number of living things. The limited resources in an ecosystem compel the living things to compete for food and place. For example, in the grassland all the herbivore compete for grass.



Point to Ponder!

The animals which live in grassland must be very alert and fast runner to survive there. Why?

Impacts of Human Actions on Food Chain in an Ecosystem

In the ancient times, human actions had little impact on their environment. Now a days, there are very visible impacts of human beings on environment. After the increase in the population, humans established cities. For this purpose, they cut forests, built roads and factories. These actions polluted the environment and water resources. Human beings did irreversible damage to the ecosystem of land and ocean animals. The cutting of forests destroyed the habitats of wildlife. Human beings also started unnecessary hunting of animals. Because of all such activities of human beings many wild organisms have become extinct and many others have become endangered.

Role of Human to Save the Ecosystem

Humans have done irreversible damage to the environment, but they are trying to save the ecosystem as well. Do you know what are they doing?

1. Wildlife parks have been made to save the habitats of living things.
2. Tree plantation is being done and artificial forests are being created to provide the natural habitat to living things.
3. Awareness is being created to save the environment and habitats of living things.

Do you know?

World Earth Day: This day is celebrated around the world on the 22nd April to demonstrate environmental protection. On this day, in Pakistan lights are switched OFF from 8 to 9 at night.

Plantation Day: Plantation day can be observed everyday but in the school of Pakistan it is celebrated in August as 'week of tree plantation'.

Tree Plantation

Key Points

1. The abiotic and biotic components of any environment form the ecosystem.
2. The two major components of ecosystem are abiotic and biotic components.
3. The living things which cannot prepare their own food are called consumers.
4. Any activity that may affect any component of an ecosystem, may make it unbalanced.
5. The animals which eat plants are called herbivores.
6. The animals which eat other animals are called carnivores.
7. The animals which eat plants and other animals are called omnivores.
8. Every food chain begins at a producer and ends at an animal.
9. The animal eats by killing other organisms is called predator.
10. An organism that is killed and eaten by predator is called prey.
11. The relationship between prey and predator is called predation.
12. An area can provide food and place to a limited number of organisms.
13. Humans of present days have great impact on environment.
14. Humans have caused irreversible damage to the environment but they are also trying to save it.
15. Ecosystem is being saved by creating the wildlife parks and tree plantation for the protection of habitat of organisms.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter.

1.	Habitats of animals	https://kids.nationalgeographic.com/explore/nature/habitats/
2.	Food chain	https://www.nationalgeographic.org/encyclopedia/food-chain/
3.	Relationships of living things in the ecosystem	https://www.nationalgeographic.org/activity/ecological-relationships/

Exercises

1. Tick (✓) the correct answer.

i. What is an ecosystem?

(a) System of non-living thing is an environment.
(b) Area having a group of living and dead things.
(c) System of living things in an environment.
(d) The collection of abiotic and biotic components in an area.

ii. All the biotic components are:

(a) animals (b) producers.
(c) living things (d) non-living things.

iii. Food chain:

(a) begins at a producer. (b) begins at a consumer.
(c) begins at a decomposer. (d) ends at producer.

iv. For the conservation of ecosystem:

(a) forests are being cut. (b) roads are being built.
(c) tree plantation is being done. (d) factories are being installed.

v. To control the population of insects if insecticides are used then the population of birds will:

(a) increases.
(b) decrease.
(c) decrease first then will increase.
(d) increase first, then will decrease.

2. Write short answers.

i. Define environment.

ii. Write the names of three biotic components of an ecosystem.

iii. Write the names of three abiotic components of an ecosystem.

iv. Draw a simple food chain.

v. If the food resources are increased what will be the effect on the population of predator?

vi. Write two human activities which are affecting the ecosystem.

3. Constructed Response Questions:

What is the relationship between biodiversity and compitetion among living things in a balanced ecosystem?

4. Investigate:

The ostrich are the largest and heaviest animals, but they cannot fly. To escape from the predator, they fight with their strong paw or runaway with a speed of 70 kilometer per hour. The light brown coloured female lays eggs. The female sits on eggs at the day time, whereas the black coloured male warm them at night. Analyse the difference in the colour and state. Is there any relationship between the colour of ostrich and its environment.

Female Ostrich

Male Ostrich

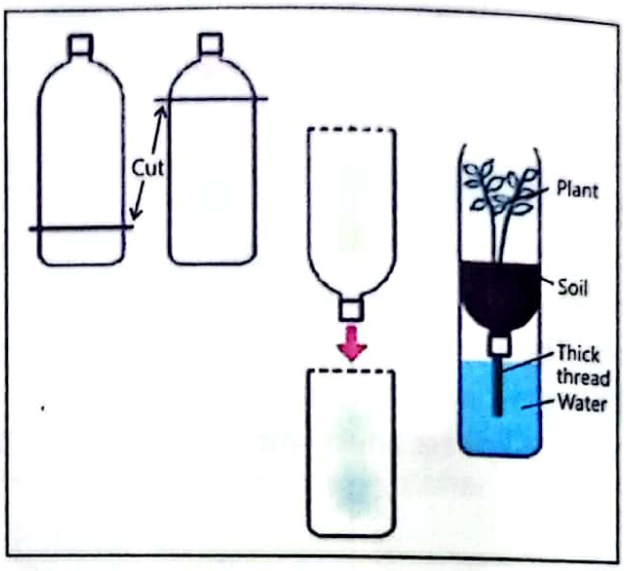
5. Project:

Make a model of ecosystem using abiotic and biotic components.

i. For this project, you will need at least two bottles. Cut the bottles as shown in the picture. In first bottle pour water to show aquatic ecosystem. In the second bottle, to show land ecosystem, put soil and a small plant.

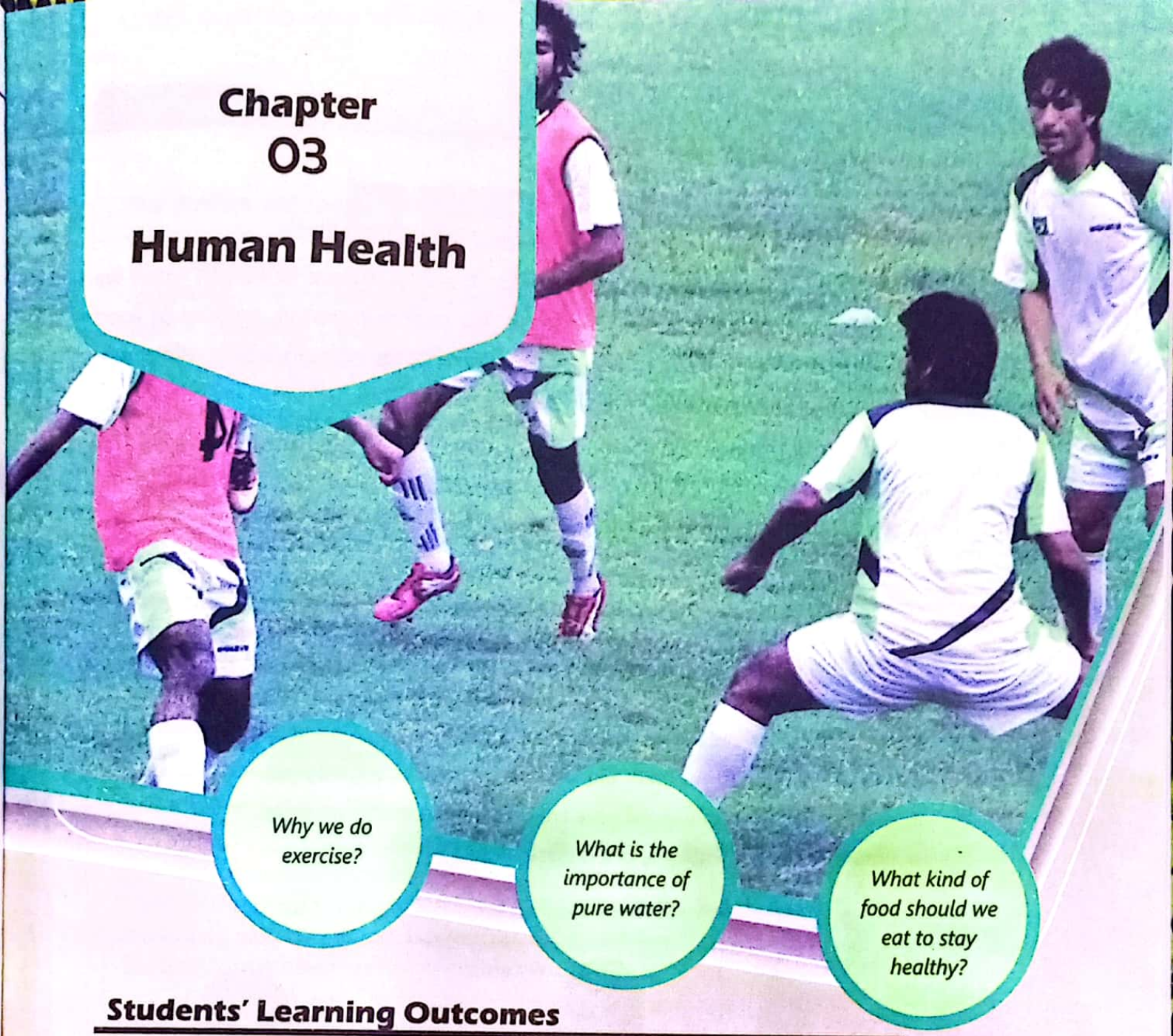
ii. Now connect ecosystems of both the bottles (connect soil with water with a thick thread) so that the plant may receive water and minerals.

iii. Observe it daily and write report of the result.



Chapter 03

Human Health



Why we do exercise?

What is the importance of pure water?

What kind of food should we eat to stay healthy?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Observe and recognize some common symptoms of illness (e.g., fever, coughing and flu).
2. Differentiate between contagious diseases (hepatitis, TB, flue and non-contagious (cancer, diabetes)
3. Relate the transfer of common communicable diseases (e.g., touching, sneezing, and coughing) to human contact.
4. Explain some methods of preventing common diseases and their transmission (e.g., vaccination, washing hands, wearing mask)
5. Describe the importance of maintaining good health.
6. Recognize everyday behaviours that promote good health (e.g., a balanced diet, drinking clean water, exercising regularly, brushing teeth, getting enough sleep).
7. Define balanced diet and explain its components.
8. Identify common food sources included in a balanced diet (e.g., fruits, vegetables, grains, milk and meat group).
9. Understand the value of clean drinking water and inquire about the factors that generally make it unclean.
10. Explore a few ways that can help make water clean and suitable for drinking water (water filtration and boiling).

Symptoms, Transmission and Prevention of Communicable Diseases

Health is a great gift of Almighty Allah. We realize the importance of health when we are sick. There may be many causes of a disease, for example germs, scarcity of food and air pollution etc. It is important to observe the symptoms of a disease to diagnose. Have you ever observed fever, cough and flue?

The human body temperature is 98.6°F or 37°C. If our body temperature increased this limit, then it is called fever. Cough is an instant response of our body. It is due to the soreness and scratchiness of the throat.

Do you know?

1. Fever is not a disease but it is a symptoms of any disease.
2. The body temperature of humans is measured in Fahrenheit degrees, which is written as °F.
3. The human body temperature is measured by thermometer.
4. The coughing removes obstruction of windpipe such as mucus of wind pipe.
5. The viruse and bacteria present in the nose are expelled out due to sneezing.
6. Flu is a disease as well as symptoms of a disease.

Fever

Flu

Coughing

Contagious Diseases

If any one of your classfellow suffers from flu then usually the teachers advise him to take rest at home. Why do the teachers say this? They advise because the other children may not get flu. Flu is a disease which is transmitted from one child to other.

The disease which can be transmitted from one person to an other persons is called contagious disease. For example, flu, polio, TB, hepatitis and COVID-19. The flu patient complains about congested or runny nose and headache.

Polio is caused by a particular type of germ called virus. This virus remains present in the throat and intestine of human. It paralyses the legs permanently. There is no treatment of this disease. Polio virus is transmitted through food, water and air.

TB is caused by a particular type of germ called bacteria. It usually affects lungs. TB, flu and COVID-19 are transmitted from one person to another through coughing, sneezing, use of articles of the affected person and conversation. The inflammatory condition of the liver is called hepatitis. The germs of disease are transmitted through polluted water, food or blood.

Interesting Information

One of the cause of covid-19 is a virus, which is called corona virus. It affects the entire body including lungs. In 2019-2020 this virus has affected the entire world and due to which millions of people died. It is transmitted from one person to another trough social contacts and respiration.

Non- Contagious Disease

Non- Contagious disease is not transmitted from one person to another for example diabetes and cancer.

In the diabetes the sugar level in the blood. The common symptoms of diabetes are feeling very thirsty and hungry, urination, extreme fatigue and weight loss. It affects the body organs such as heart, kidneys and eyes etc.

Cancer can occur in any part of the body for example liver, stomach, intestine and blood. There is uncontrolled increase in the number of cells of the affected organ in cancer. It may remain confined to any particular organ or may spread in the whole body.

Interesting Information

For the treatment of cancer there are hospitals in many cities of Pakistan, for example Kiran (Karachi), Nori (Islamabad), Shaukat Khanum Memorial Hospital (Lahore, Peshawar, Karachi), Inmol (Lahore), Baitulskoon (Karachi) are major hospitals of Pakistan.

Inmol, Lahore

Shaukat Khanum Memorial Hospital

Baitulskoon (Karachi)

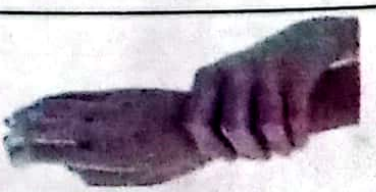
Prevention of Contagious Diseases

There are many ways to remain safe from contagious diseases such as washing hands, wearing mask and vaccination.

Washing Hands

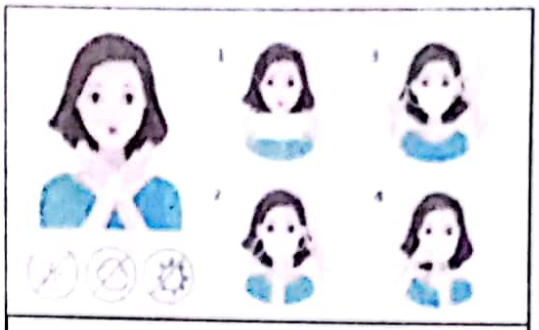
Wash your hands properly for at least 20 seconds with soap before and after meal. We should also wash hand after using toilet.

Seven Steps for Hand Wash

	
1. Rub hands palm to palm.	2. Rub the back of both hands.
	
3. Palm to palm with the finger interlock.	4. Back of fingers to opposing palm, with interlocked fingers.
	
5. Rub thumb in a rotating manner followed by the area between index finger and thumb. Repeat for both the thumbs.	6. Rub the finger tips into palm of your opposite hand. Repeat for both hands
Do you know? Global hand washing day is celebrated on 15th October of every year.	
	7. Rub both wrists in a rotating manner, rinse and dry thoroughly.

Wearing Mask

Do you know about a mask is? What are the benefits of wearing mask? Mask is a protection between your nose and mouth from environment. The germs cannot enter the body through nose and mouth by wearing mask. Do you know the proper way to wear the mask? Do not use the used mask. Dispose it off in a proper way.



Proper way to put on mask

Vaccination

Do you know about vaccination? In vaccination process the weak or killed germs of any disease are injected into the body. The antibodies are produced in the blood to fight the disease and immunity develops in the body. Polio is a dangerous disease, which may cause lifelong disability. The campaign is launched by Government of Pakistan, to administer polio drops for prevention of this disease. Polio drops should be administered to the children up to the age of five years. Have you been given polio

The process of vaccination

Do you know?

National Cleanliness Day: Cleanliness day is observed on 30th January. The awareness among people is created to keep their home, workplace, road and public places clean.

Ways of Maintaining Good Health

What we should do for maintaining a good health? We can maintain a good health by following few basic ways, for example:

1. **Balance diet:** This means that we should take all types of food (milk, cereals, meat, vegetables and fruits) in a proper quantity.
2. **Drinking clean water:** It is necessary to drink clean water for good health. Most of the diseases are caused by drinking polluted water.
3. **Exercise:** One must exercise regularly to remain fit, e.g., walking, running and playing.
4. **Brushing teeth:** Brush your teeth twice daily, once in the morning after getting up and at night before going to sleep.
5. **Getting enough sleep:** It is necessary to have sound and complete sleep. children must sleep from 8 to 10 hours daily.

Activity 3.1

Make a list of ways to live a healthy life. Make weekly chart and mark it, what you have practiced?

Do you know?

If you do not sleep at night then what you will feel in the morning?

Balance Diet and its Components

Activity 3.2

Prepare a list of food items that you take for example rice, bread, vegetables, meat, fruits etc. Out of these which food you take most? Which food you take least? If you take only meat or vegetable, then can you remain healthy?

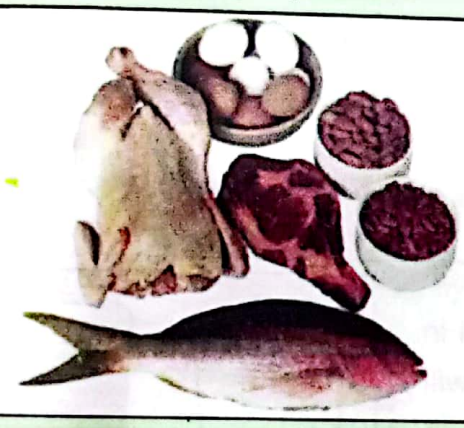
We take various types of foods for example grains, milk, and meat. The food has been divided into four groups:

1. **Milk group:** It include milk and things made of milk such as butter, cheese and yogurt etc.
2. **Grain group:** It includes wheat rice, barley, pearl millet, maize and pulses etc.
3. **Meat group:** It includes beef, mutton, fish, chicken, and eggs etc.

4. **Fruit and Vegetable group:** It includes fruits such as apple, orange, banana, mango, grapes, papaya etc., vegetables such as lady finger, turnip, radish, carrot, cabbage, and potato etc.

Milk group

Grain group



Meat group

Fruit and vegetable group

Four food groups

It is necessary for us to take proper quantity of food from different food groups to fulfill the needs of diet of our body. The immunity against disease also takes place in our body by taking balance diet. We remain healthy and energetic. The need of food components for each person varies. A diet that contains different kinds of food in proper quantities and proportions to fulfil the need of the body is called a balanced diet.

Balanced diet

Interesting information

Minerals such as calcium, iron, sodium, chorine, fluorine, and iodine etc., are very important for our growth. These are found in vegetables, fruits, meat and dry fruits etc. Calcium is found in milk, yogurt etc.

Point to Ponder!

The height of children increases rapidly in the early age. What type of food they should take more at this age?

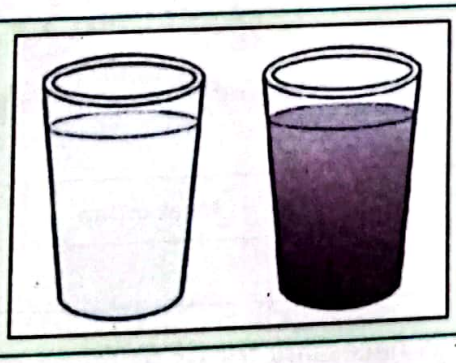
Activity 3.3

1. Design a menu for your lunch box. Give reasons; why were these food items chosen?
2. Prepare a list of food items daily eaten for the betterment of your health.

Value of Clean Drinking Water

Activity 3.3

Pour clean water in two glasses. Put a little soil in one glass and stir it. The water of the glass will become turbid. If you are asked that from which of the two glasses you would like to drink? What will be your answer?



Clean water is necessary because water is life. Sixty percent of human body consists of water. Blood circulates in the body and provides oxygen and food to every part of the body due to water. Germs are present in the polluted water. Drinking polluted water may cause diseases like cholera, typhoid and hepatitis. Clean water is essential for healthy life.

Do you know?

World Water Day: Every year on 22nd March global water day is celebrated. The purpose of celebrating this day is to provide awareness among the people to avoid wastage of water.

Factors Polluting Water

Air consists of various gasses, dirt and particles. All of these mix with rain water. Such rain water reaches in ponds, canals, rivers and lakes etc. and make them polluted. The poisonous water coming from homes, factories, insecticides, fertilizers and garbage is also polluting water.

Make water clean and suitable for drinking

There are many ways to make water clean and suitable for drinking. We will study here only boiling and filtration.

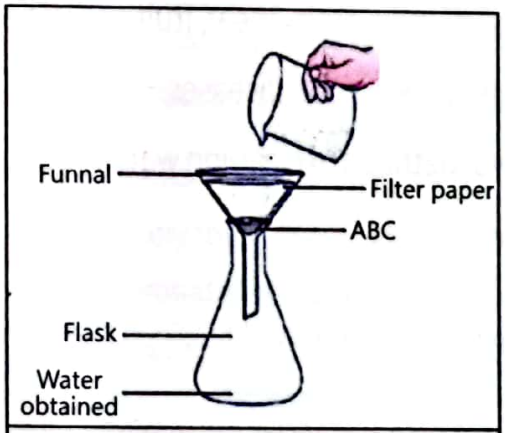
To boil water

Boiling

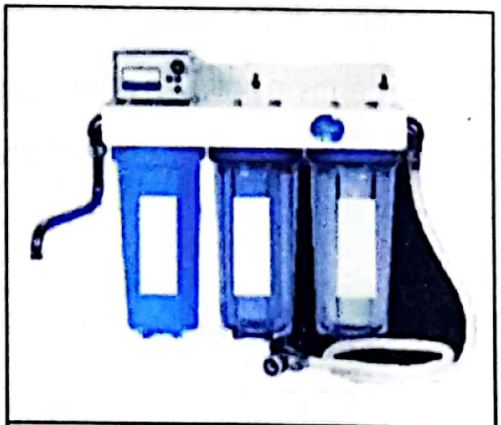
Keep on heating water in a pot till boiling. Then let it boil for another 5 to 10 minutes. Due to this the germs present in water will be killed. This is the easiest way to clean water.

Filtration

Have you ever seen making of tea? When the tea is passed through a sieve then it filters the tea leaves. Tea is collected in the cup without tea leaves. Water is also passed through the filter for cleaning in the similar way. The particles present in water cannot pass through the pores of filter and we get clean water. The process by which the particles present in water separated by a filter is called filtration.



The process of filtration



Simple Filteration Plant

Point to Ponder!

Do the germs present in water are also killed by filtration? Why chorine is used in large filtration plants?

Key Points

1. The human body temperature is 98.6°F or 37°C. if the temperature of our body increases. It is called fever.
2. Fever also occurs during flu and coughing.
3. The diseases transmitted from one person to another are called contagious disease, for example, TB, Polio, Hepatitis and COVID-19 etc.
4. The preventive methods from contagious diseases are washing hands, wearing mask and vaccination.
5. Vaccination improves immunity of the body. The process of vaccination is done by administrating weak or killed germs through drops or injection.
6. The food having proper proportion of food components from each group is called a balanced diet.
7. Balance diet, drinking clean water, exercise, brushing teeth, having sound and compute sleep is necessary for good health,.
8. Food has been divided into four groups i.e., milk, grain, meat, fruit and vegetable.
9. There are germs in polluted water which cause various diseases.
10. Boiling of water and filtration are the two methods of cleaning water.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter.

1.	Germs	https://www.nationalgeographic.org/media/infectious-agents/
2.	Food	https://www.nationalgeographic.org/article/food/
3.	Filter	https://kids.nationalgeographic.com/explore/books/how-things-?work/water-wonders/

Exercises

1. Tick (✓) the correct answer.

i. If our body temperature increases from 98.6°F to 101°F then its cause is:

(a) hot weather (b) fever
(c) sitting in the sun (d) sitting near fire

ii. In which food most of the calcium is found?

(a) Meat (b) Rice
(c) Milk (d) Pulse

iii. If you have flue then what you will do to save yourself and others?

(a) Will wash hand (b) will sleep for more time
(c) will sit in the sun (d) will wear mask

iv. What is the cause of polio?

(a) Bacteria (b) Virus
(c) House fly (d) Mosquito

v. It is necessary for the prevention from contiguous disease:

(a) Wearing mask, washing hand, vaccination
(b) Wearing mask, washing hand sitting in the sun
(c) washing hands sitting in the sun, sleeping more.
(d) Vaccination, washing hand, not sitting in the sun

2. Write short answers.

i. Write any three reasons to become sick?
ii. Differentiate between contagious and non-contagious diseases?
iii. What is the benefit of coughing?
iv. How does vaccination save us from disease?
v. What is meant by balanced diet?

3. Constructed Response Questions:

Look at the picture of drinking water filtration plant for the public and write the answers.

i. What is the function of filter? ii. Can filtration also stops the germs?

iii. How can germs be killed in water?

iv. How can water be made suitable for drinking?

4. Investigate:

Interview a doctor or a health worker and enquire about the principles of living a healthy life. Write in the table.

Serial No	
1.	
2.	
3.	
4.	
5.	

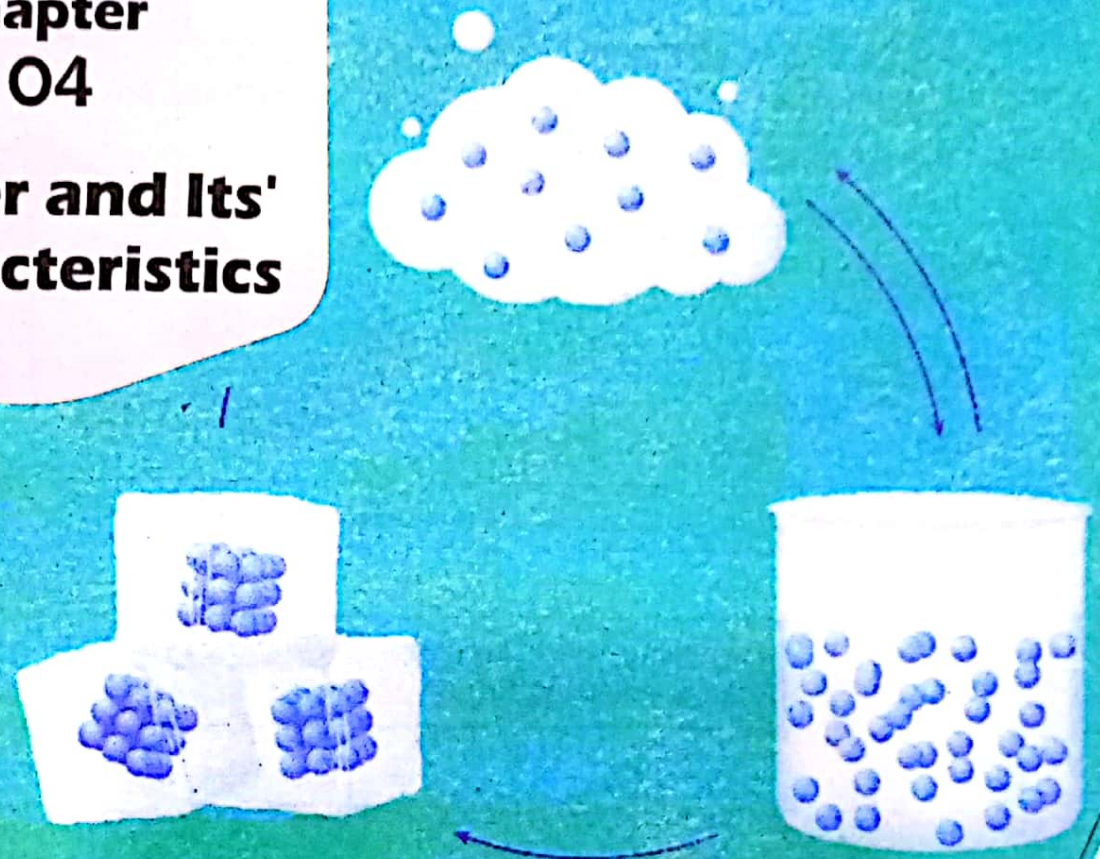
Project:

Observe the kitchen of your home and find out the factors which may cause diseases.

Serial No	Factor	Cause of Spreading Disease	Way of Prevention
1.			
2.			
3.			
4.			
5.			

Chapter 04

Matter and Its' Characteristics



Do you know the name of few metals?

What is the external appearance of metals?

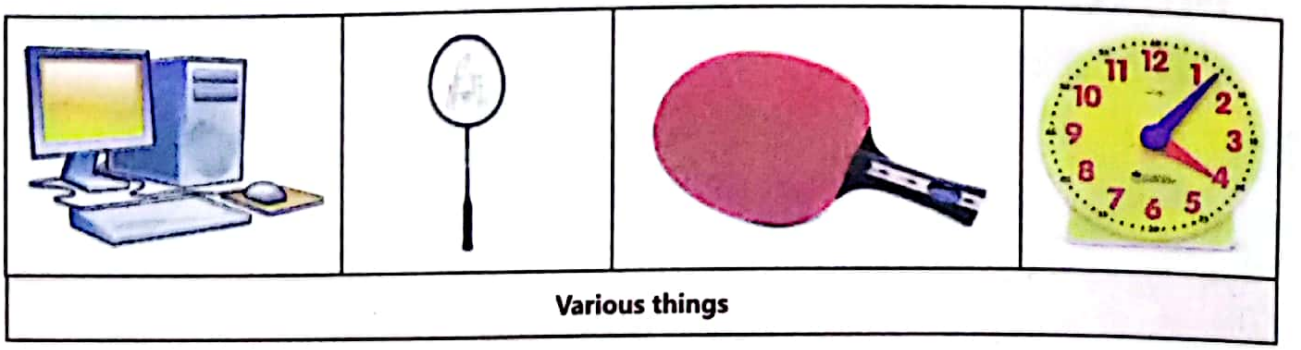
Why does snow float on water?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Describe matter and its states.
2. Describe characteristics of each state of matter with examples.
3. Compare and sort objects and materials on the basis of physical properties (e.g., mass, volume, states of matter, ability to float or sink in water).
4. Explore the properties of metals (i.e., appearance, texture, colour density).
5. Identify properties of metal (conducting heat and electricity) and relate these properties to use of metals (i.e., a copper electric wire, an iron cooking pot).

Observe the pictures what are these things in the pictures are made up of? All these things have weight and occupy space.

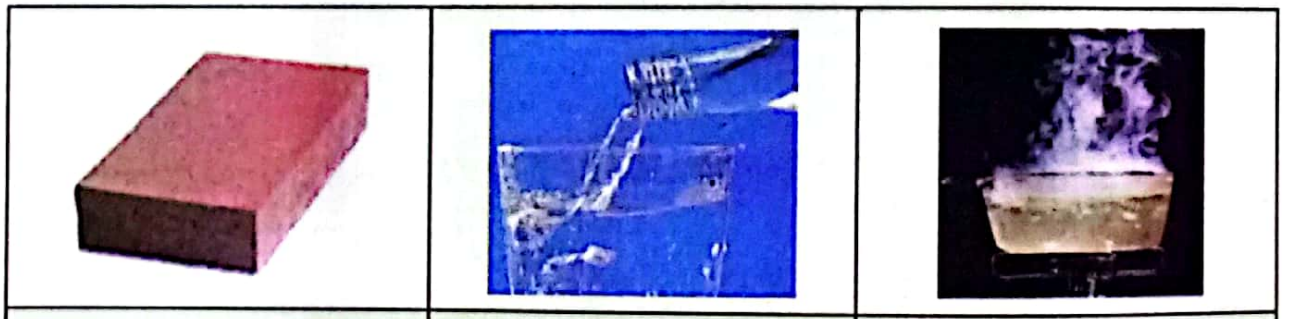


Various things

Everything which occupies space and possesses mass is called matter

States of Matter and its Characteristics

Matter occurs in three states i.e., solid, liquid and gas



Solid	Liquid	Gas

Three states of matter

Properties of Matter

Now we will study the properties of solid, liquid and gas.

Solid

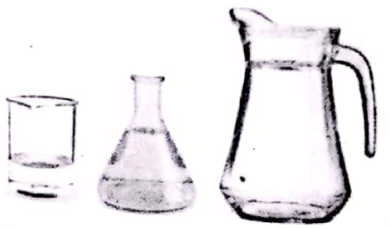
Press your book, table, pen or chair. Have these things become smaller on pressing? Few things do not become smaller on pressing, nor their volume change. These things are called solid.

Solids have definite shape and volume.

Liquid

Activity 4.1

Pour water in three vessels having different shapes. What have you observed? Is the shape of water in these vessels is same or different? When a liquid is poured in any vessel then it gets the shape of that vessel. It means the shape of the liquid changes. There is no definite shape of liquid.



Activity 4.2

Take a cup of water and pour it into a glass. Observe whether the volume of water is same which was in the cup. It has become less or more? Water changes its shape but its volume remains definite.

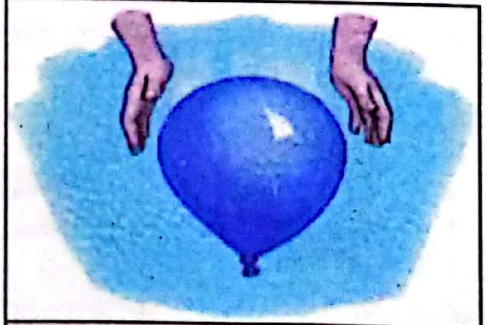
Liquids have definite volume but their shape is not definite

Gases

Activity 4.3

Take balloons of three different shapes. Fill air in the balloons. Observe the shape of the balloons. Is the shape of the balloons same? What do you conclude from this activity?

Air is the combination of various gases. Gases have no definite shape and volume. Gases spread throughout the available space. Gases are not visible to us. We can feel the fragrance or odour of the gas, for example we can smell the fragrance of a flower. Can gas be pressed? Press a balloon filled with air.



Pressing a balloon

Gases have neither a fixed shape nor any definite volume.

Point to Ponder!

Why an inflated balloon bursts when placed in the sun?

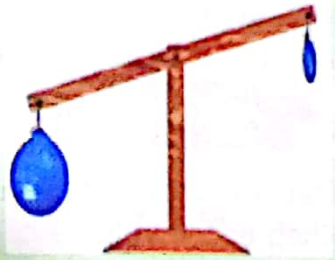
Classification of Objects on the Basis of Physical Properties

Objects are classified on the basis of their physical properties. It includes mass, volume, temperature, ability to conduct heat or electricity, ability to float or sink in water.

Mass

Activity 4.4

Tie a balloon not inflated at one end of the wooden rod and tie inflated balloon at the other end of the wooden rod as shown in the picture. Which end of the wooden rod bend down and why?



Quantity of matter in a body is called mass.

Do you know?

1. The mass of a matter never changes in any condition.
2. Mass is measured in gram or kilogram. 1 Kilogram = 1000 grams

Volume

Activity 4.5

1. Observe the objects given below.
2. Which object has occupied more space?

			
Football	Book	Pen	Glass

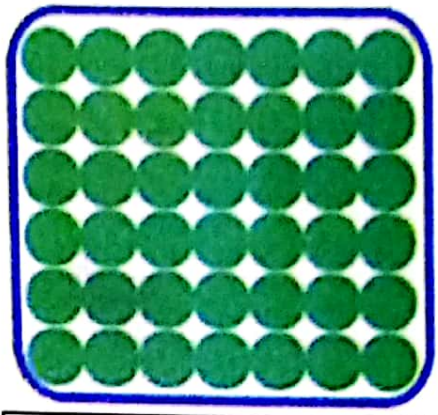
Space that an object occupies is called its volume.

States of Matter and Arrangement of Particles

All the matters consist of very tiny particles. The arrangement of particles in solid, liquid and gas is different.

Arrangement of Particles in Solid

In solid the particles are strongly attached with each other. These particles have strong forces of attraction. The particles vibrates only when in their mean position. Solids cannot be easily pressed. Solids maintain their definite shape and volume.



Arrangement of particles in solid

Activity 4.6

Put a piece of wood in a cloth bag. Make a small hole at the bottom of the bag. Try to take out the wooden piece out of this hole, but it will not come out. Why? The shape of the solid will remain same and wooden piece would not come out of the hole.

Arrangement of Particles in Liquid

The particles of liquid are near to each other. The forces of attraction among them is weaker than solids. The particles keep on colliding with each other. Their particles can move near or far from each other and thus liquids can flow.

The volume of liquids is definite, but their shape is not definite. The liquid takes the shape of the vessel in which it is poured. We have done this in activity 4.2.

Arrangement of particles in liquid

Activity 4.7

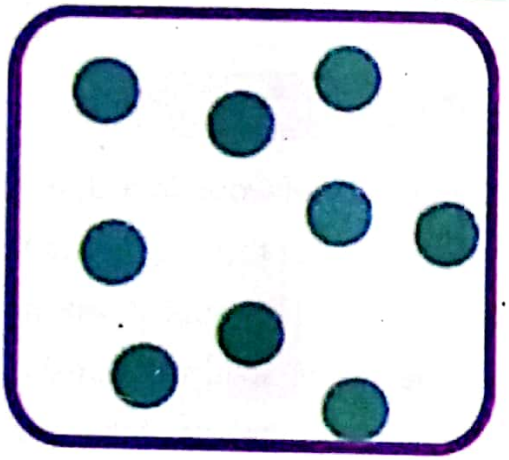
1. Pour water in a plastic bag and tie a knot at its top. Now make a hole at bottom of the plastic bag. Observe what happened?

   The water flows out of the hole. Because of weak forces of attraction among the particle of liquids they can flow fast. That's why the shape of liquid is not definite.

2. Press a soft plastic bottle filled with water. Write your observation.

Arrangement of Particles in Gas

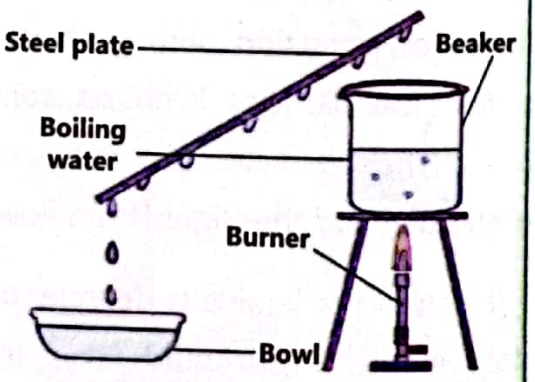
The particles in gas are at more distance from each other. They move fast because of less forces of attraction. The gas particles can move freely in any direction. They occupy all the available space. That is why they have no definite shape and volume.



Arrangement of particles in gas

Activity 4.8

Take a piece of ice in a beaker or in any pot. Heat it. You will see that the solid ice changes into water. Heat it more. Keep a steel plate in an inclined way over the beaker. The water will change into vapours i.e., gas and vapours will gather at the steel plate. Then after becoming cool it will be collected drop by drop in a cup. Now, if you put this water in a freezer then after few hours it will be changed into solid ice. What conclusion you have made from this activity? Write your observations.



Conductor

Activity 4.9

Put few objects such as steel spoon, plastic scale, pencil etc., as shown in the picture. Then pour some warm water into the beaker. Wait for 1-2 minutes. Touch the outer end of these objects. Write your observation.

Objects	Form of Matter	End is hot or not
Steel Spoon	Metal	
Plastic Scale	Plastic	
Pencil	Wood	

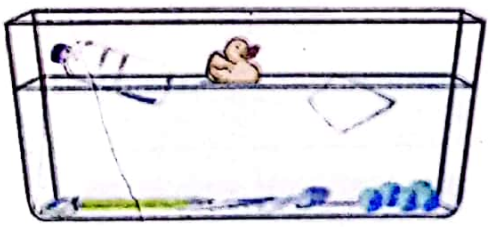
The objects that allow heat to pass are called conductor for example, iron, copper, etc. The objects that do not allow heat to pass are called non-conductor for example wood, rubber etc.

Ability of Matter to Float or Sink

Activity 4.10

Take water in a glass or pot as shown in the given picture. Put various things in it. For example, rubber, pencil, piece of paper, wooden piece etc. Observe it.

1. Write the names of floating objects in water.
2. Write the name of sinking objects in water.



Physical Properties of Metals

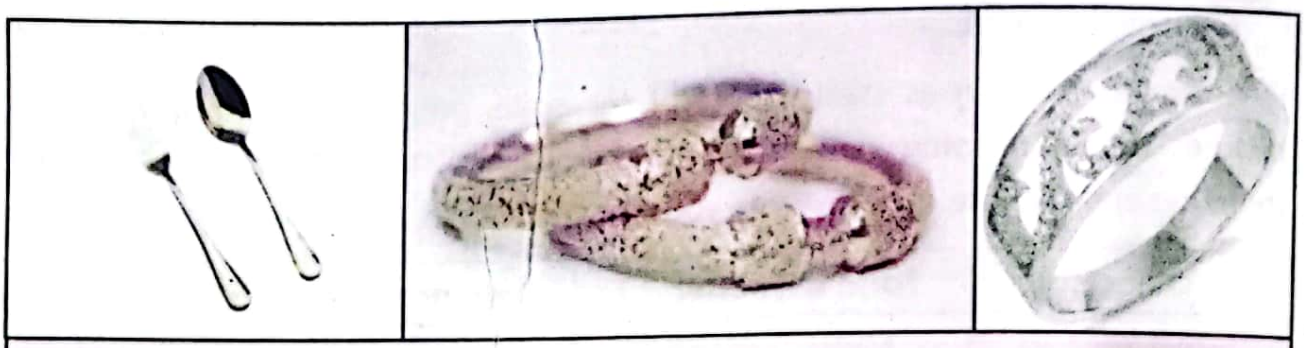
Activity 4.11

Make a list of objects present in your home which are made of metal, and observe them. There are many objects around us which are made of metals for example ornaments, spoon, cooking utensils.

Metal is a specific type of matter having the following properties.

Appearance of Metals

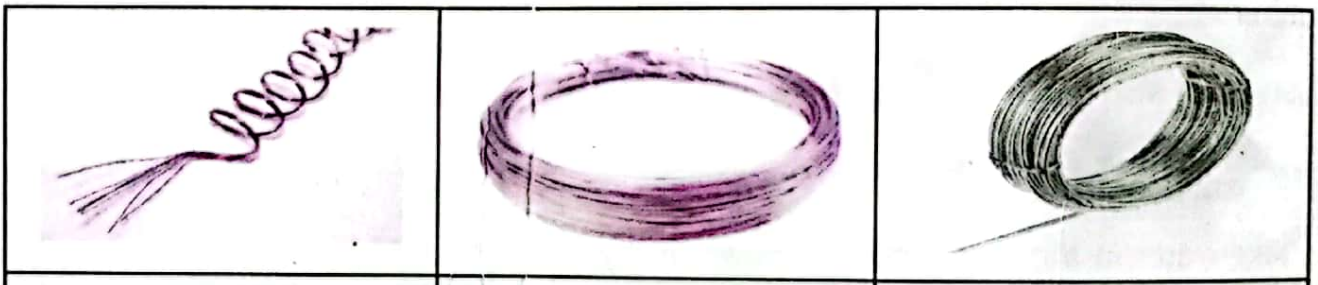
All the metals are lustrous.



Appearance of Metals

Texture of Metals

The metals are usually solid. Some metal are hard and strong for example iron. That's why these are used to make various tools and machine. Some metals are soft such as gold, silver and copper. Due to this property these are used to make foil sheets and wires.



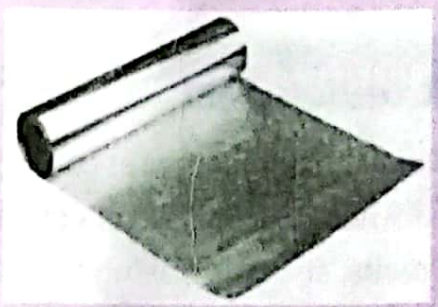
Copper	Gold	Aluminum

Texture of metals

For your information

Silver foils are used in beautification of sweets. Aluminum foil is used to cover cooked food and other things.

Silver coating

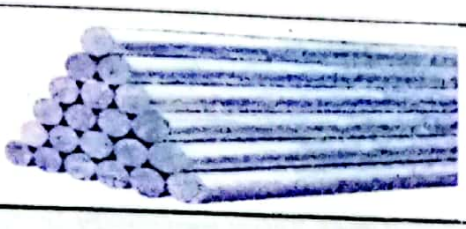


Aluminum

Colours of Metals

Metals occur in various colours. Gold is yellow, Copper is red, Silver is white, Tin and Nickel are light pink, whereas Zinc, Chromium and Aluminum are light blue in colour. Most of the metals are grey in colour.

Chromiun



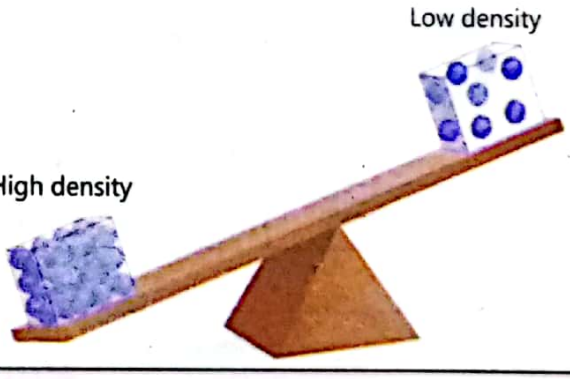
Aluminum

Zinc

Colour of Metals

Density

Look at the given picture. The volume of both the objects is same, but why one is at a more height? Two objects having equal volume may have different mass. You have seen in activity 4.10 that some objects float on water and some objects sink in water. What is the reason? The floating and sinking of objects depends on their density. The objects having less density than the density of water, float on water. The objects that have more density than the density of water sink in water.



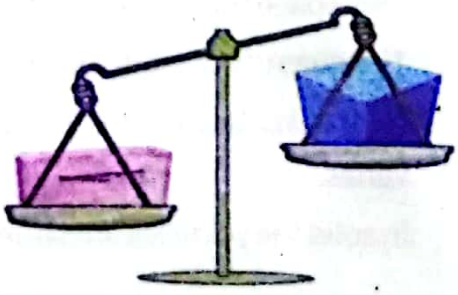
Density

The mass present in a definite volume is called its density.

The metals usually have more density. If you tap any metal you can hear the resonance of the metal. This is due to its density.

Activity 4.12

Put a brick on one pan of the balance and a bigger piece of foam on the other pan. Which pan will bend and why?

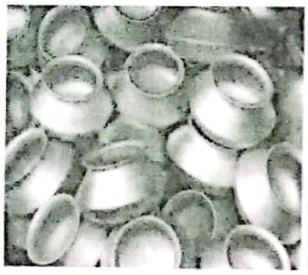
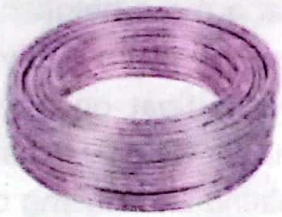


Do you know?

1. On the basis of density metal are called heavy metals (zinc, mercury, chromium etc.) and light metals (magnesium, aluminum and titanium etc.).
2. Some metals have magnetic properties and attracted by a magnet. Have you ever observed what metals are attracted to a magnet?

Metals as Conductors

Metals such as copper, aluminum and silver allow electricity to pass thus through them. These are good conductors of electricity. These types of metals are used to make electric wire. Metals are also good conductors of heat such as iron, copper and aluminum etc., therefore, the metals are used in cooking utensils.

			
Steel Utensil	Aluminum Utensils	Aluminum wire	Copper wire
Uses of Metals			

Key Points

1. Matter occurs in three states i.e., solid, liquid and gas.
2. Solid has definite shape and volume.
3. Liquid has definite volume but not definite shape.
4. Gas has no definite shape and volume.
5. The space that an object occupies is called it's volume.
6. The quantity of matter in any object is called its mass.
7. All the matters consist of very tiny particles. The arrangement of these particle varies.
8. In solid the particles are strongly attached with each other.

9. The particles of liquid are near to each other. The forces of attraction among them is weaker than solids.
10. The particles in gas are at more distance from each other. They move fast because of less forces of attraction.
11. The objects that allow heat to pass through them are called conductor. The objects that do not allow heat to pass through them are called non-conductor.
12. All the metals are lustrous.
13. Usually the metals are solid, some are soft, some are hard and strong.
14. The metals which are good conductors of electricity are used to make electric wire whereas the metals which are good conductors of heat are used to make cooking utensils.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter.

1.	Matter	https://www.nationalgeographic.org/video/definitions-field-matter/
2.	Factors for the change of state of matters.	https://www.youtube.com/watch?v=ydBcvY20mkc

Exercises

1. Tick (✓) the correct answer.

i. Which one of these has the most volume?

(a) Book (b) Pencil

(c) Scale (d) Cricket bat

ii. Which one of these group is the correct example of the three states of matter?

(a) Snow, Rain, Cloud

(b) Dew, Rain, Water vapours

(c) Snow, Cloud, Steam

(d) Rain, Water Vapours, Cloud

iii- In a cup of hot water put two spoons made of steel and wood. After few minutes the steel spoon became hot whereas the wooden spoon did not become hot. What does it show?

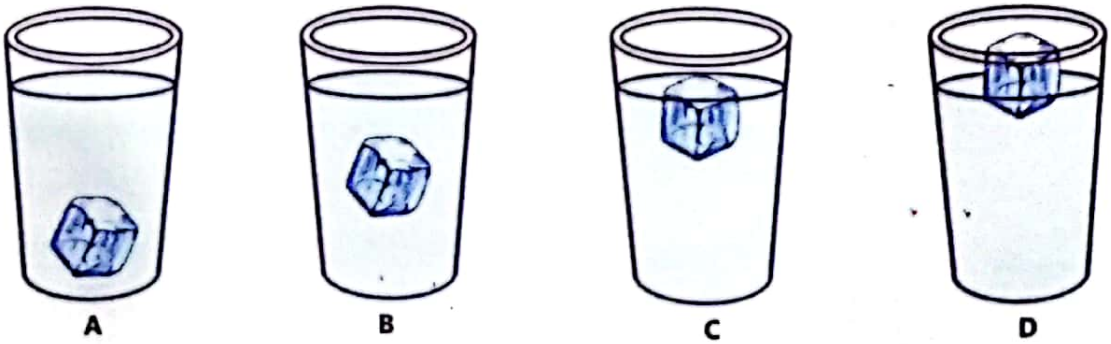
(a) The steel became hot soon in the presence of wood.

(b) Metal is a better conductor of heat than wood.

(c) Wood is a batter conductor of heat than metal.

(d) Metal heats the water quickly than wood.

iv- A piece of ice has been put into a glass of water. Which picture is showing the correct position of the ice?



v. Study the following table.

Properties of matter No.1	Properties of matter No.2
a. Transmits heat quickly b. Solid c. Does not dissolve in water	a. Transmits heat slowly b. Solid c. Dissolves in water

According to the above table which statement is correct about matter No.1 and matter No.2?

(a) Matter No. 1 is glass and matter No.2 is soil.

(b) Matter No.1 is copper and matter No. 2 is wood.

(c) Matter No. 1 is iron and matter No.2 is sugar.

(d) Matter No.1 is cork and matter No.2 is gold.

vi- Water, ice and steam all have different temperatures. What is the order from coldest to hottest?

(a) Steam, Ice, Water

(b) Ice, Steam, Water

(c) Steam, Water, Ice

(d) Ice, Water, Steam

2. Short Answer Questions

i- Define matter and write the name of its three states.

ii- Differentiate between solid and liquid.

iii- Which state of matter has lowest destiny?

iv- State the arrangement of particles in solid.

v- Why the cooking utensils are made of metals?

3. **Constructed response question:**

i- Why does the electrician wear rubber gloves during repairing of electric switch at your home ?

4. **Investigate:**

i- Why metal is used in the bell?

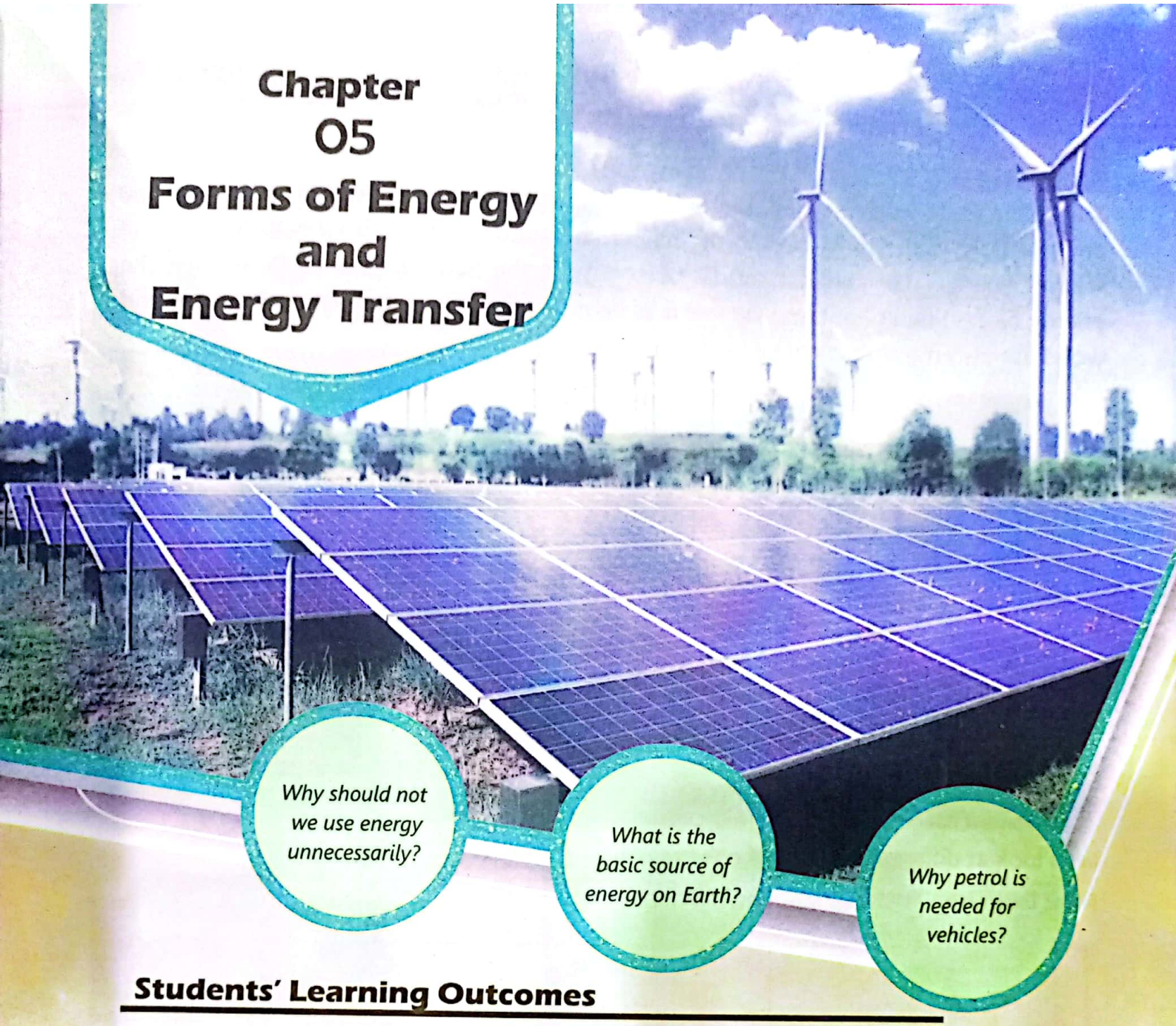
ii- Why metals are preferred for making ornaments?

5. **Project:**

Collect five types of metals. Observe them and write their properties.

Serial No.	Metal	Appearance	Texture	Colour
1.				
2.				
3.				
4.				
5.				

Chapter 05
Forms of Energy and Energy Transfer



Why should not we use energy unnecessarily?

What is the basic source of energy on Earth?

Why petrol is needed for vehicles?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Identify sources of energy (e.g., the Sun, flowing water, wind, coal, oil, gas).
2. Recognize that energy is needed to do work (e.g. for moving objects), heating and lighting.
3. Describe and demonstrate the transformation of energy.
4. Understand the importance of energy conservation.
5. Recognize the role and responsibility of humans to conserve energy resources.
6. Relate familiar physical phenomena (i.e., shadows, reflections, and rainbows) to the behaviour of light.
7. Relate familiar physical phenomena (i.e., vibrating objects, echoes) to the production and behaviour of sound.
8. Recognize that warmer objects have a higher temperature than cooler objects.
9. Investigate the changes that occur when a hot object is brought in contact with a cold object.
10. Identify ways to measure temperature and understand its unit.
11. Describe and demonstrate that electrical energy in a circuit can be transformed into other forms of energy (e.g., heat, light, sound).

    Explain and provide reasoning that a simple electric circuit requires a complete electrical pathway.

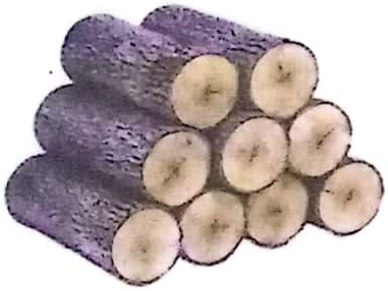
ENERGY

The ability to do work is called energy. Energy is used in the movements of humans and animals, light in the bulb, heat in the heater and sound of the school bell. From where we get energy? The biggest source of energy is the Sun. On the Earth, we see the energy of the Sun as light and we feel it as heat. The flowing water, air, coal, oil, gas and wood are also the sources of energy.

Sources of Energy

Coal

Natural Gas



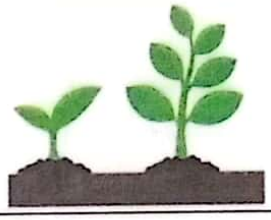
Wood

Fast Flowing Water

Oil

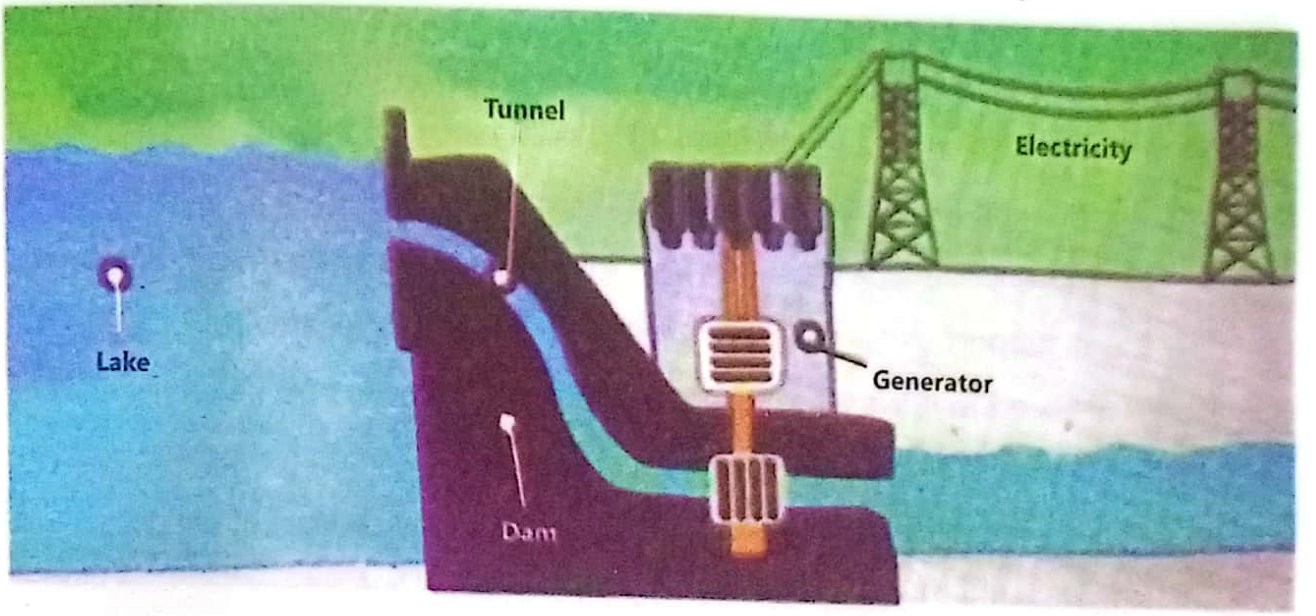
Let's look at different sources of energy.

Mini Exercise : Answer the following questions:

		
Which energy does the sail-boat use?	**From where do plants get energy for growth?**	**From where do we get energy to do work?**
		
How can we get energy from water?	**From where do the vehicles get energy?**	**Which energy runs a fan?**

Transformation of Energy

In our daily lives, we see that one form of energy can be transformed into another form. Electricity is produced from the fast-flowing water. It is called as hydroelectricity. For this purpose, a dam is built. The water of river is stored in a lake at a certain height. From there, the water flows very fast through a tunnel. The energy in the flowing water runs a turbine. The turbine runs a generator which produces electricity.



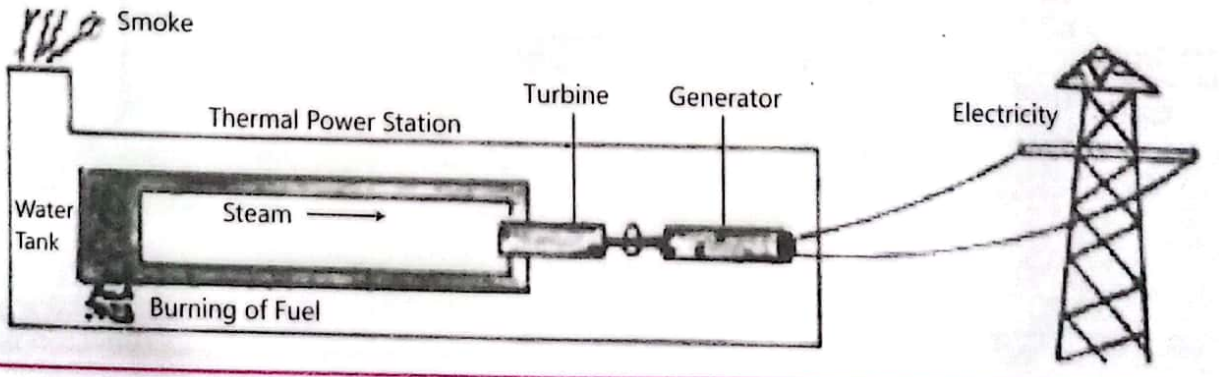
Let's Think!

Which energy is changed into hydro electricity?

Interesting Information

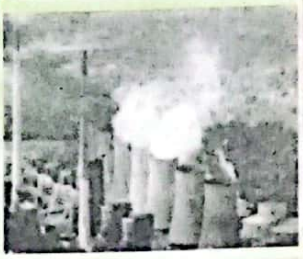
The world uses as much energy in 1 second as we can use in our car in 156 years. It means that with in a blink of eye, the world uses energy of 85,000 gallons of petrol.

In thermal power station, we burn coal, oil or gas to change water into steam. This steam is used to run a turbine. The turbine runs a generator to produce electricity



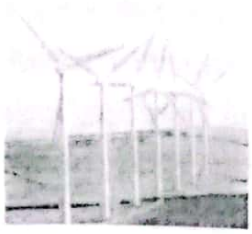
Task to Do?

Make a chart to show the transformations of energy in a thermal power station.



Do you know?

In windmill, electricity is produced from the energy of fast wind.

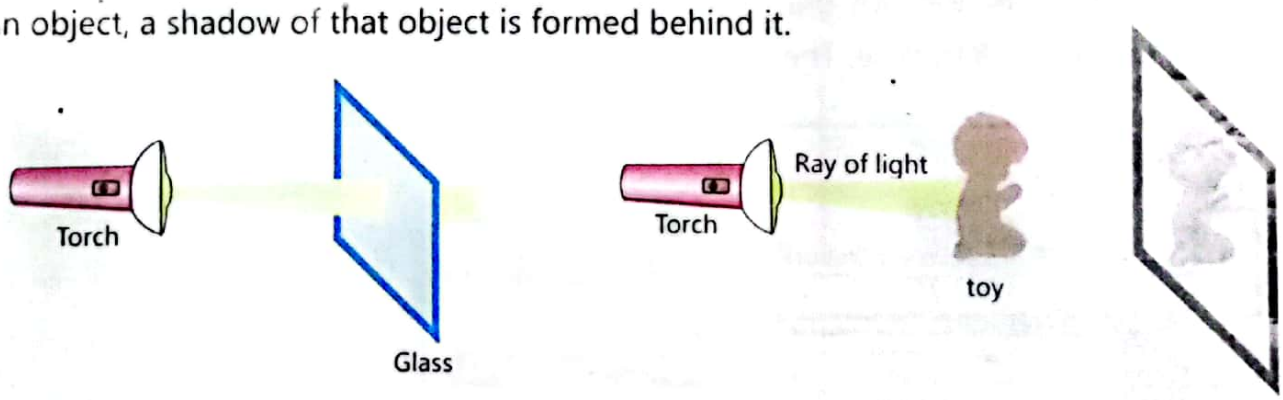


Conservation of Energy

There are limited reserves of the sources of energy like coal, oil and gas. We cannot increase the amounts of such sources because these are made in millions of years. However, we can save these sources. For this, we have to use them carefully. The energy sources cannot support us for long time to fulfil the needs of energy for fast growing population. We need to make a balance between facilities needed for better life and the supply of energy. Therefore, we need to create awareness among people to use the present sources carefully. We should also try to explore new sources of energy so that we and next generations have not to face problems of energy shortage.

Light

Light is a form of energy that helps us to see things around us. The Sun, stars and lightning are the natural sources of light. Candle, oil lamp, torch and electric bulb etc. are the artificial sources of light. When light leaves its source, it travels in all directions in straight lines. Light can pass through some objects. When light cannot pass through an object, a shadow of that object is formed behind it.



Activity 5.1

1. Light a candle or lamp in a dark room.
2. Put your hand between lighted lamp and the wall.
3. What do you see on the wall?
4. Is the shadow on the wall is like your hand?
5. Bring your hand near the lamp. How is the size of shadow affected?

Reflection of Light

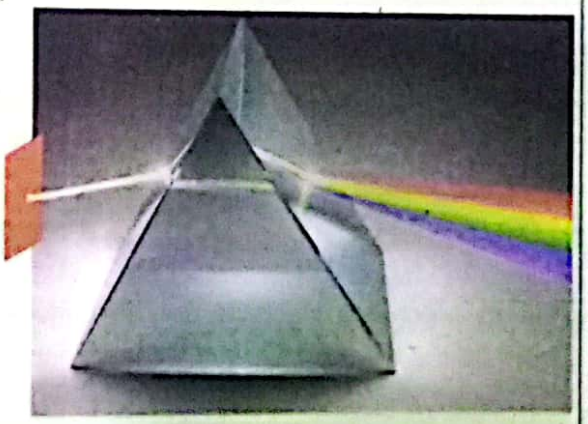
In the morning, you usually see your image in the mirror. Can you see your image in dark? When light strikes the shiny and smooth surface of mirror, it bounces back and enters our eye. So, we can see our image. It is called reflection of light.

Rainbow

Activity 5.2

Prism is a three-faced transparent object, which divides light into different colours.

1. Use a pencil to make a narrow hole in a cardboard sheet.
2. Place this cardboard in front of sunlight to get a narrow ray of light.
3. Place a prism in front of this ray of light. Rotate the prism slowly till you see sunlight divided into different colours on the screen.



There are seven colours in sunlight (violet, indigo, blue, green, yellow, orange, red). After rain, some drops of water are suspended in the air. When sunlight passes through water droplets, they divide it into seven colours like a prism. This is called rainbow.

Sound Energy

Sound is the form of energy that is produced by vibrations in an object. These vibrations reach our ears through the particles of the air. In this way, we hear sound.

Activity 5.3

1. Shake the school bell strongly.
2. Do you hear any sound?
3. Touch the bell with your finger. Do you feel vibrations?
4. What is produced from the vibrations of the object (bell)?

The vibrating object produces sound. Sound needs some medium to travel. Most of the sounds reach us by travelling through air.

Do you know?

When we speak, the vocal cords present in our throat vibrate and produce sound.

Interesting Information

Sound cannot travel in space. This is the reason that we cannot hear the sound of explosions in the Sun.

Like light, sound also reflects. When sound bounces back from an object at a certain distance and we hear it again, it is called echo.

Interesting Information

Bat uses echo to catch its prey in darkness. It emits sound from its mouth. By using echo of its sound, it find the way in darkness to reach the prey.

Do you know?

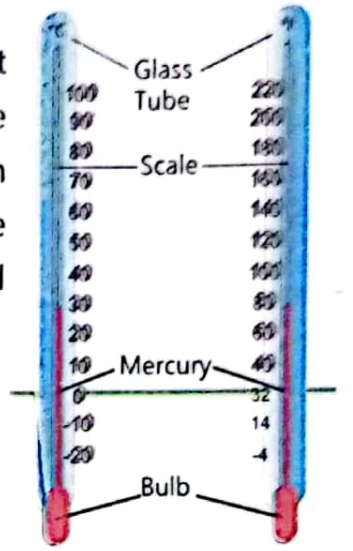
A hard and smooth object reflects sound better.

Do you know?

To hear a clear echo, the reflecting surface should be at least 17 metres away from the source of sound.

Heat

Heat is a form of energy that always travels from a hot object to the cold object. We use the term "temperature" to measure the hotness or coldness of an object. The temperature of an object shows how much hot or cold that object is. The instrument used to measure temperature is called thermometer.



Centigrade thermometer Fahrenheit thermometer

Let's Think!

Why do we wait that hot tea should turn less hot whereas we readily drink a cold drink to avoid it becoming warm?

Quick Quiz

Why does the hot tea become cold after some time?

Thermometer and Different Units of Temperature

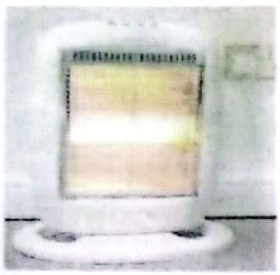
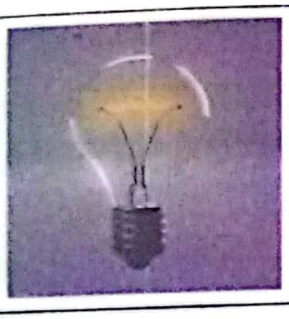
When the bulb of a thermometer touches a hot object, the mercury or alcohol present in its bulb expands. So, it rises in the glass tube of thermometer.

Similarly, when the bulb touches a cold object, the mercury or alcohol contracts. So, it falls down in the glass tube of thermometer.

Doctors usually measure temperature in Fahrenheit scale. It is represented as °F. Centigrade degree is also a unit of temperature. It is written as °C. We usually use Centigrade degree unit to describe the condition of weather.

Electrical Energy

Electricity or electrical energy is produced by generators. This electricity is supplied to our homes through wires. Cells and batteries are also the sources of electrical energy. These are used in toys, torch, clock and remote control etc. We use electric energy for running many devices in our homes. Electrical energy can be transformed into other forms of energy like heat, light and sound.

		
In heater, the electrical energy changes into heat.	In electric bulb, the electrical energy changes into light.	In loud speaker, the electrical energy changes into sound.

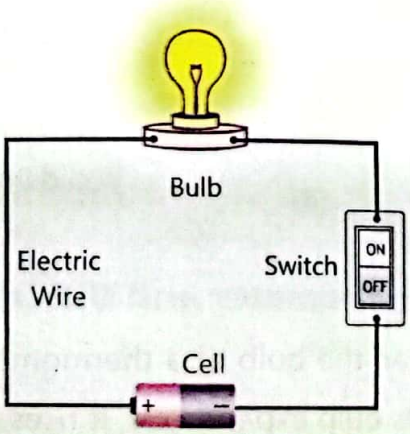
Simple Electric Circuit

The path of current is called an electric circuit. Let's make a simple electric circuit

Activity 5.4

1. Fix a torch bulb in a holder.
2. Use metal wires to join the bulb with a cell or battery and the switch as shown in the diagram.
3. Turn the switch"ON". Does the bulb light up?
4. Now, turn the switch "OFF". Why does not the bulb remain lighted?

When the switch is turned "ON", the path of electric current is complete and the bulb is lighted.



Key Points

1. The system of life is working due to transformations of one form of energy into another.
2. The natural sources of energy are limited. Therefore, we should use the energy wisely.
3. The Sun is the biggest source of energy on Earth.
4. Light helps us to see things. We see shadows, images and rainbow due to light.
5. Sound is produced by vibrating objects. Echo is the sound that is heard after the sound bounces back from an object.
6. Heat is a form of energy that always travels from a hot object to a cold object.

7. The temperature of hot objects is greater than the temperature of cold objects.
8. Electrical energy can easily be transformed into other forms of energy.
9. The path of current is called an electric circuit.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter

1.	Circuit	https://www.nationalgeographic.org/activity/circuits-friends/
2.	Rainbow	https://www.nationalgeographic.org/encyclopedia/rainbow/
3.	Echo	https://www.youtube.com/watch?v=K- zrBalt-38

Exercises

1- Tick (✓) the correct answer.

i. Which of the following is NOT a form of energy?

(a) Light (b) Sound

(c) Water (d) Heat

ii. We hear echo when sound:

(a) reaches us direct from the source.

(b) comes after bouncing back from a wall at a certain distance.

(c) comes from a loud speaker.

(d) is very loud.

iii. How many colours are present in sunlight?

(a) 1 (b) 3

(c) 5 (d) 7

iv. If you take your hand nearer to the lighted lamp than to the wall, the shadow of your hand:

(a) will not form. (b) will be smaller.

(c) will be bigger. (d) will be of the same size.

v. Electrical energy can be transformed into:

(a) heat. (b) light.

(c) sound. (d) all of these.

2- Write short answers.

i. Can light, sound and heat travel through space?

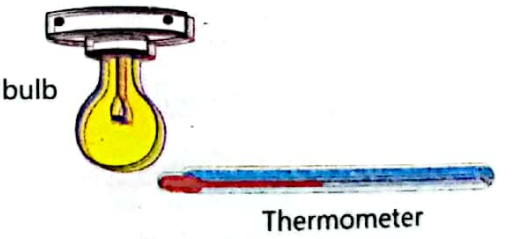
ii. How do we sense the buzzing of mosquito?

iii. Into which two forms, the electrical energy is transformed in a television?

iv. When can we see rainbow? How is it formed?

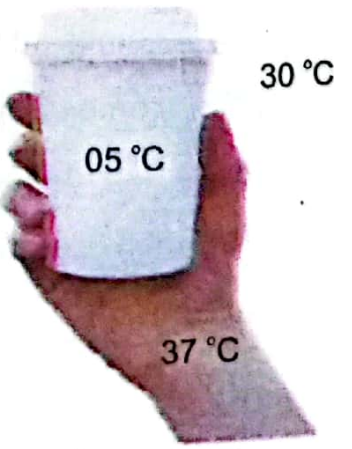
3. Constructed Response Questions:

i. If we bring a thermometer near a lighted bulb, will the thermometer show change in temperature?



If yes, would the temperature rise or fall? Explain.

ii. You are holding a glass of cold water in a room.



The temperature of different things is as follows:

Your temperature: 37 °C

Temperature of water: 05 °C

Temperature of room: 30 °C

Draw arrows in the picture to show the directions of the heat flow.

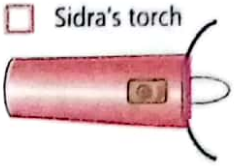
iii. Sidra has a reflector in her torch. There is no reflector in the torch of Ali. Which torch will throw more light on a wall at 5-meter distance? Tick (√) in

the right box.

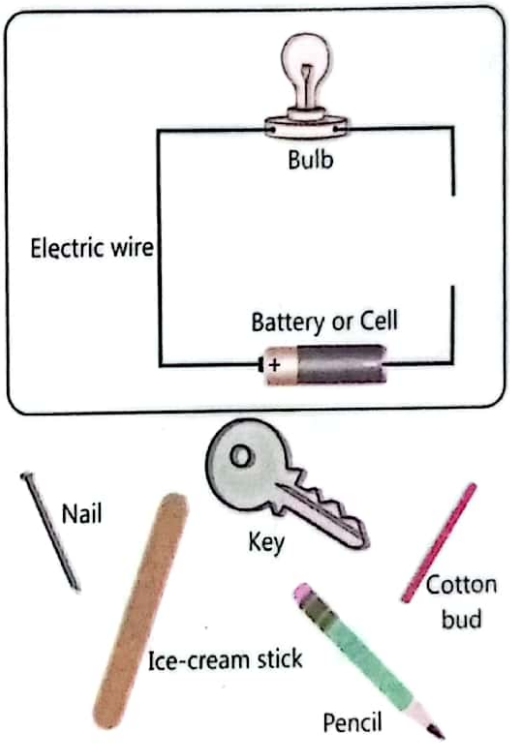
4. Investigate:

☐ Ali's torch

☐ Sidra's torch



A simple electric circuit consists of battery, bulb and electric wire. Its electric path has broken and the bulb is not glowing. We want to complete the electric path so that bulb can light up by using the electric energy of the battery. We have cotton bud, a plastic ball pen, an ice-cream stick, nail, a key and a pencil. Which thing should we join with the ends of the wire so that electric circuit is complete and the bulb lights up?

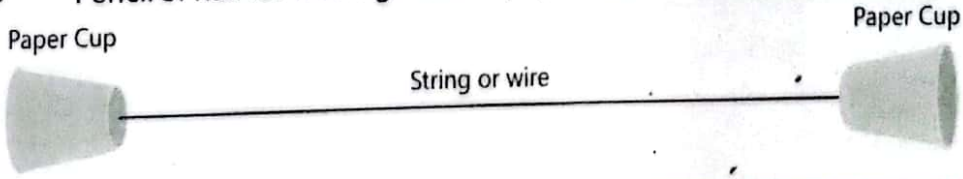


Project:

Let us make a telephone:

You need the following things for this project:

- Two paper cups
- Two small pieces of twig
- String or thin wire (7 metres)
- Pencil or nail for making holes in paper cups



Chapter 06

Force and Motion

Why are different bodies sometime found in a state of rest and motion?

If an object is thrown upwards, why does it always return to the Earth?

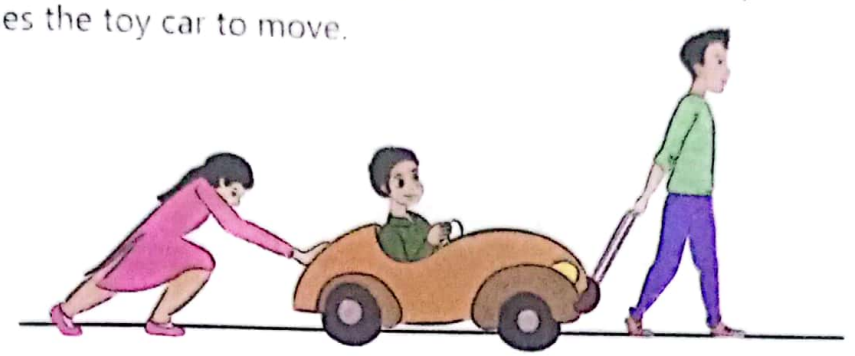
What is the importance of pedal in a bicycle?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Describe force and motion with examples from daily life.
2. Identify gravity as a force that draws objects to Earth.
3. Investigate that friction works against the direction of motion.
4. Provide reasoning with evidence that friction can be either detrimental or useful under different circumstances.
5. Recognize that simple machines, (e.g., levers, pulleys, gears, ramps) help make motion easier (e.g., make lifting things easier, reduce the amount of force required, change the distance or change the direction of the force).

Have a look at your surroundings. You will notice that some objects are stationary and some are moving. Can you tell how to produce motion in the bodies at rest? For example, how can a toy car be moved? When you push or pull the toy car with your hand, it causes the toy car to move.



Force

The act of pushing or pulling a body is called force. Force is used to move or stop the body. For example, to open a door, we either pull it towards us or push it away.

In fact push or pull are forces. Force increases or decreases the speed of a body. Force can also change the direction of motion. For example, applying force to a ball with a bat changes its direction of motion.

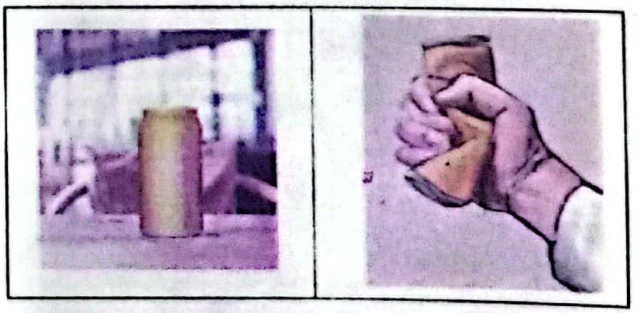
Do you know?

When you pick up an object, you are pulling it. When you throw an object, you are pushing it.

Interesting Information

Applied force changes the shape of bodies.

A force acting on a body can change its shape. For example, if we press an empty can, it will be compressed.

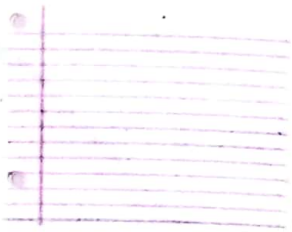


Point to Ponder!

Can you tell where force is used in everyday life?

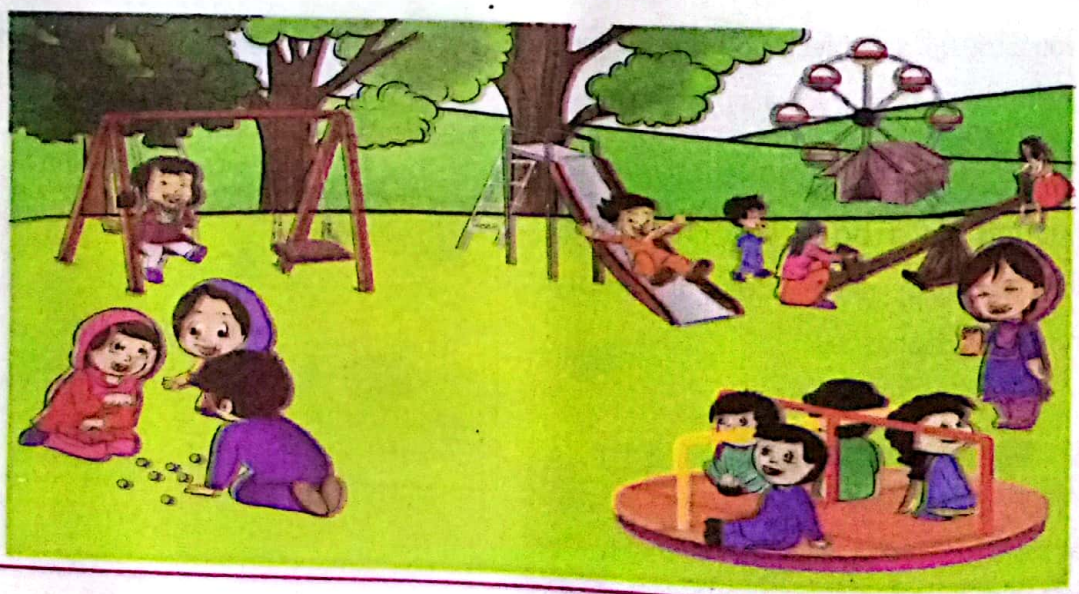
Activity 6.1

Which force (push or pull) will be applied to change the shape of the following objects?

		
Plastic bottle	**Paper clips**	**Paper**
		
Toothpaste	**Rubber bands**	**Play dough**

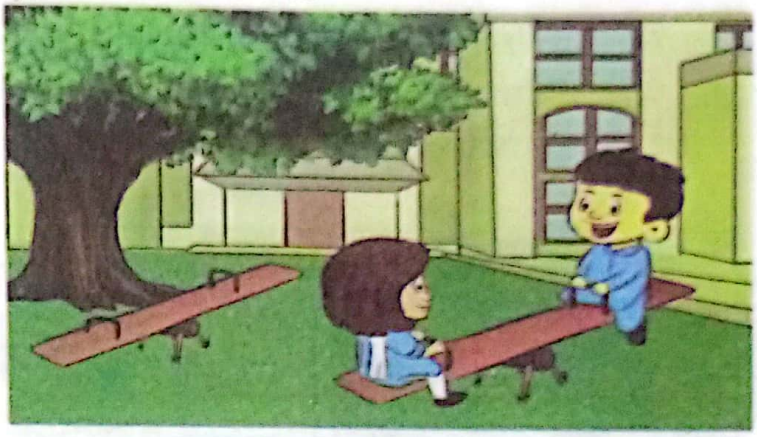
Motion

An object changing its position with respect to its surroundings, it is said to be in motion. You may have seen different types of swings in a park or playground. How do they move?

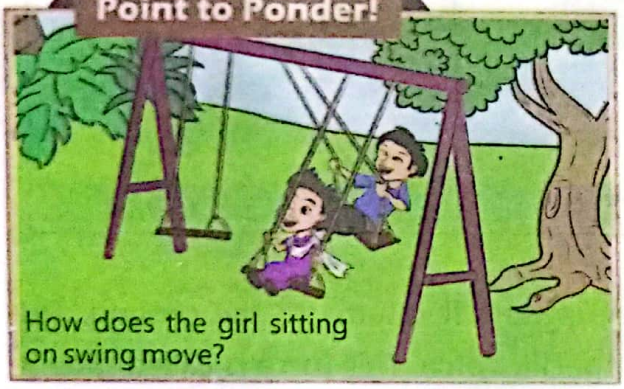


The see-saw moves up and down. The merry-go-round moves in a circle while the swing moves back and forth. What do you observe from it?

The body changes its position during movement. For example, a see-saw is in a state of rest in the park. Children sitting on see-saw apply force on it and see-saw starts moving up and down. The process in which a body changes its position is called motion.



Point to Ponder!



How does the girl sitting on swing move?

Activity 6.2

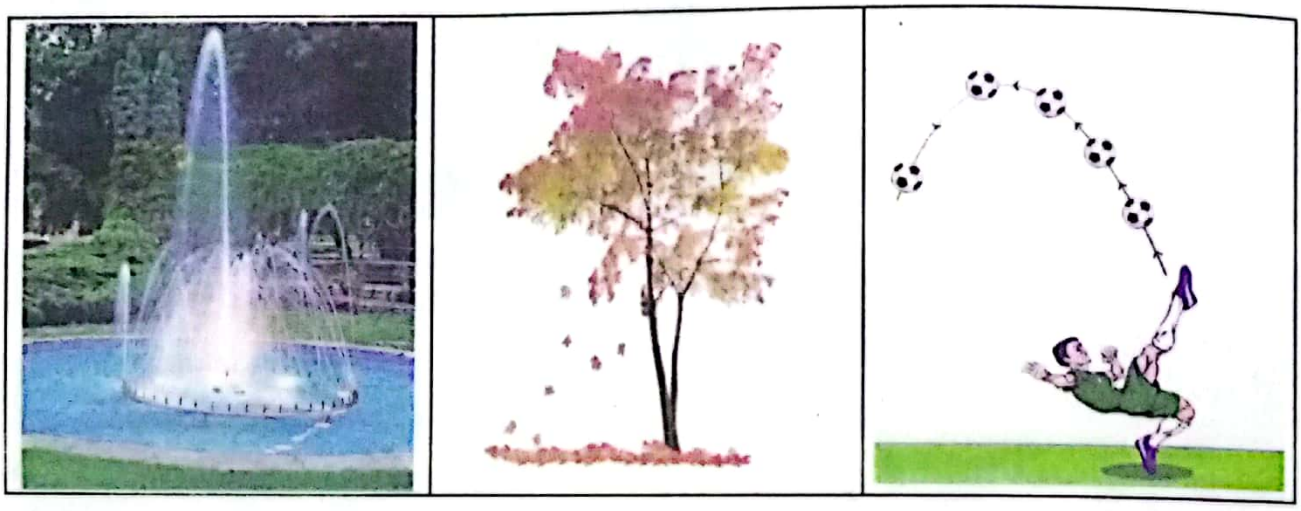
Observe the objects around you and tell:

1. Which object moves up and down?
2. Which object moves back and forth?
3. Which object moves in a circle?

Gravity

Look at the following pictures and tell:

1. Why do the leaves of a tree fall to the ground, after leaving branches?
2. Why does the fountain water fall on the ground?
3. Why does a ball thrown upward return to the ground after reaching a certain height?



You may have noticed that whatever is thrown upward, it returns to the ground. The Earth actually pulls bodies towards itself with a specific force. This force is called gravity of the Earth.

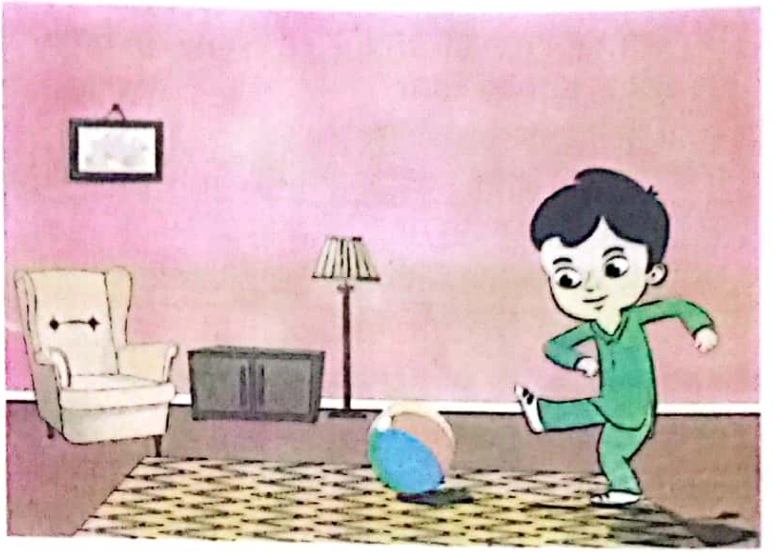
Activity 6.3

Tie a pencil to a piece of thread and hang it with something. Is gravity acting on the pencil? Now break this thread. What do you observe? When the thread breaks, the pencil falls to the ground. Explain the reason.

Friction

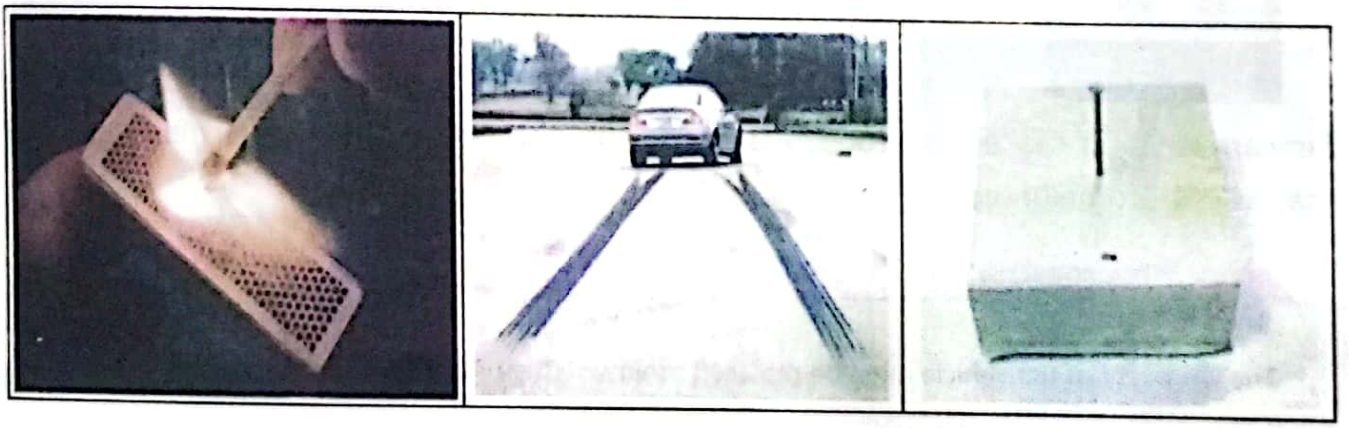
You have often observed that when you kick a football, it stops after covering a certain distance. Why does it stop? Certainly, there is a force acting on football that stops it. What force is this?

Friction is the force that stops or tends to stop moving objects. Friction occurs when a body moves in contact with another body. Friction always acts against the direction of movement.



Advantages of Friction

Friction plays very important role in our daily life. Igniting of the match stick, penetration of the nail into the wood or wall, slowing down of the vehicles and eventually stopping are all possible due to friction.



Do you know?

We cannot walk on Earth without friction. If there is less friction, it becomes difficult to walk.

Point to Ponder!

What will happen, if there were no friction?

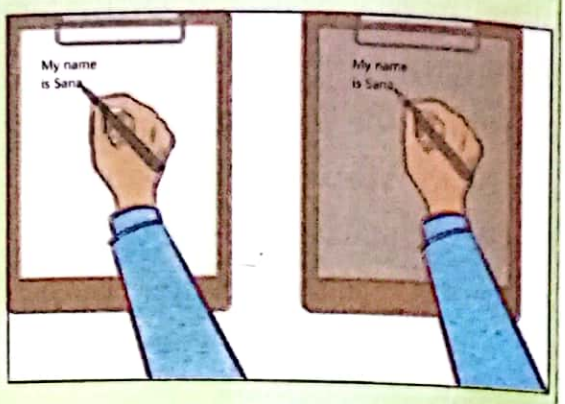
Let's observe the role of friction in daily life:

Activity 6.4

1. Stretch a paper sheet on a hardboard. Place a plastic sheet on another hardboard.
2. By using a pen write your name on both of them, turn by turn.
3. What do you observe?

It is easy to write on paper while it is difficult to write on plastic sheet.

Discuss its reason with your classfellows.

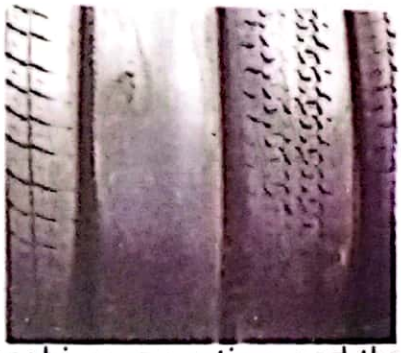


Disadvantages of Friction

Friction is very useful in our daily life but sometimes it can be harmful. For example, friction causes our shoes to wear out. Due to friction, the tyres of the car not only get worn over time but sometimes they can even burst.

Point to Ponder!

How can we reduce friction?



Similarly, friction causes wear and tear of moving parts of machines over time and the machines become unusable.

Do you know?

The worn tyre of the vehicle must be replaced otherwise the risk of accidents increases.

Simple Machines

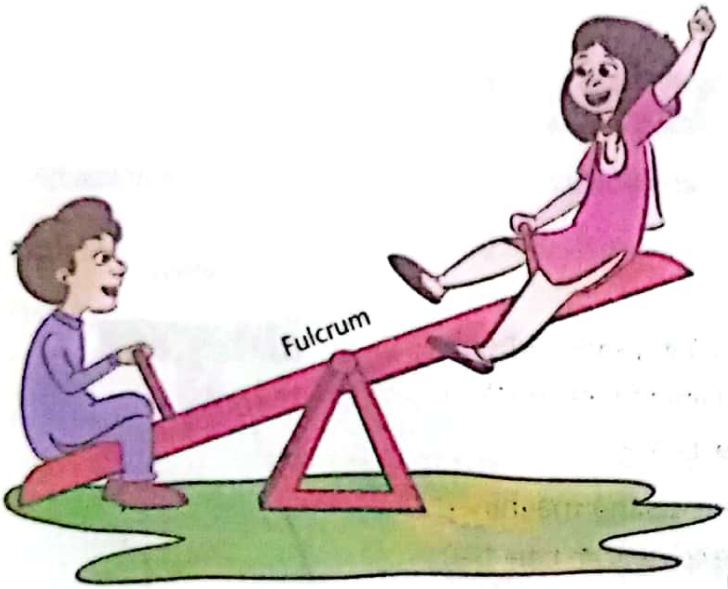
The use of machines in our lives is increasing day by day. What is the reason for this? Everything that makes our work easier is called a machine. The machine makes our work easier by changing the amount and direction of force. Lever, pulley, gear and ramp (inclined plane) are simple machines.

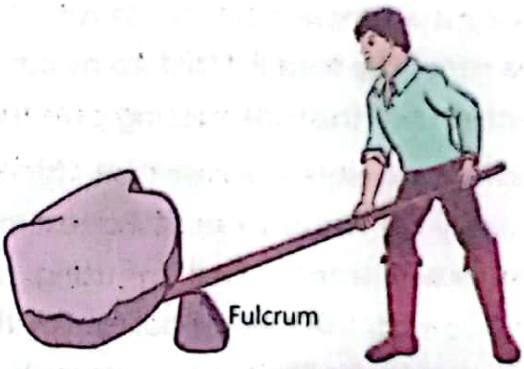
Do you know?

Modern machines, such as cars or watches, are made up of simple machines. Each machine has to be provided energy constantly to keep it working.

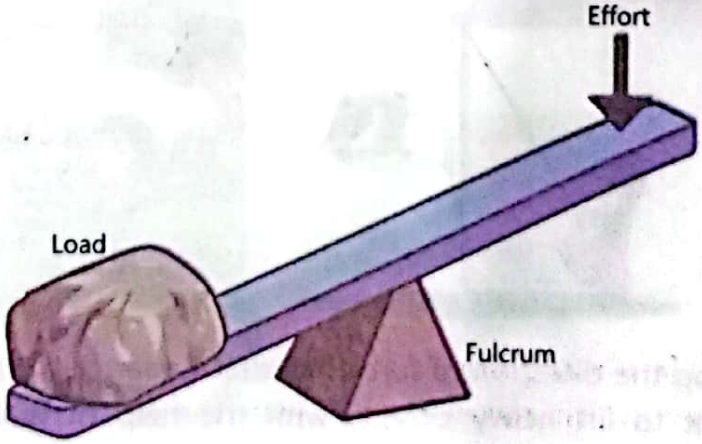
Lever

A lever is a simple machine that can be used to push or lift heavy objects. The lever is like a simple rod that turns around a certain point called fulcrum.



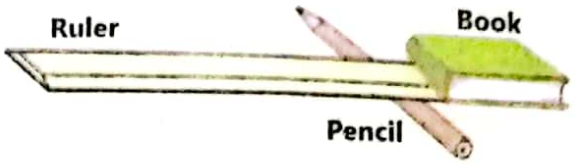


By applying force (effort) to one end of the lever, the weight (load) at the other end is lifted.



Activity 6.5

1. Take a metre rod, a pencil and a book.
2. Place one end of the metre rod under the book, as shown in figure.
3. Place the pencil under the metre rod near the book. Apply force on the other end of the metre rod to lift the book



4. What do you observe?

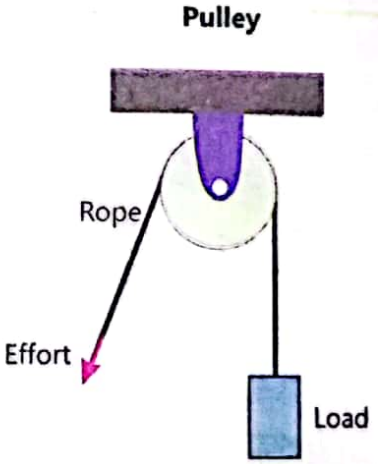
Point to Ponder!

If we change the position of pencil (fulcrum), what will be the effect on force (effort) and weight (load)?

Pulley

A pulley is a simple machine, consists of a grooved wheel and a rope. The load is lifted up by applying force (effort) on one end of the rope passing over the pulley.

As pulling a weight is easier than lifting it so the machine can easily lift heavy objects. For example, water can be easily drawn from a well by using pulley. The flag is raised up with the help of pulley. For this, when you pull the rope down, it lifts the flag upwards.

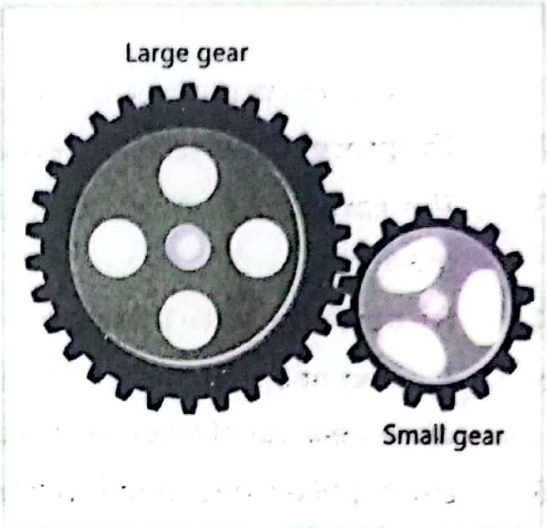


Changing the direction of force makes it easier to work with the pulley. For example, if we want to lift heavy objects with the help of pulley, we have to put the effort downwards.

Gear

Gear is a simple machine which consists of toothed wheels of different sizes. The teeth of these wheels fit in with each other and move together. With the help of gears, we can increase or decrease the speed.

In everyday life, gears of various sizes are used in bicycles, grinders and sugarcane juice machines.



Inclined Plane

Inclined plane is a simple machine with one end relatively higher than the other. It requires less force and energy to move objects from one place to another. It allows us to move objects easily from bottom to top and top to bottom. The pictures show different types of inclined planes.

Point to Ponder!

Which simple machines are used in a bicycle?

Key Points

1. The process of pushing or pulling of a body is called force.
2. The process in which a body changes its position is called motion.
3. The Earth pulls bodies towards itself with a specific force. This force is called gravity.
4. Friction is the force that stops or tends to stop moving objects.
5. Igniting of a match stick and walking on ground are the advantages of friction while wear out of tyres and parts of machines are the disadvantages of friction.
6. Lever, pulley, gear and inclined plane are simple machines that make our work easier.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter

1.	Gravity	https://www.science-sparks.com/gravity-experiments-for-kids-galileo/
2.	Friction	https://www.australiangeographic.com.au/education-resources/2017/12/ags-friction/

Exercises

1- Tick (✓) on the correct answer.

i. What is force?

(a) Push (b) Pull

(c) Lift (d) Push and pull

ii. When a body changes its position, it is called:

(a) friction (b) force

(c) motion (d) gravity

iii. All bodies are attracted towards the Earth due to:

(a) force (b) friction

(c) gravity (d) motion

iv. If we apply the same force on a toy car, it will travel longer on:

(a) rocky soil (b) marble floor

(c) floor of bricks (d) ground

v. Which machine consists of grooved wheel?

(a) Lever (b) Pulley

(c) Inclined plane (d) Gear

2- Write short answers.

i. How force and motion are related? Explain.

ii. What is meant by gravity? On which objects it acts?

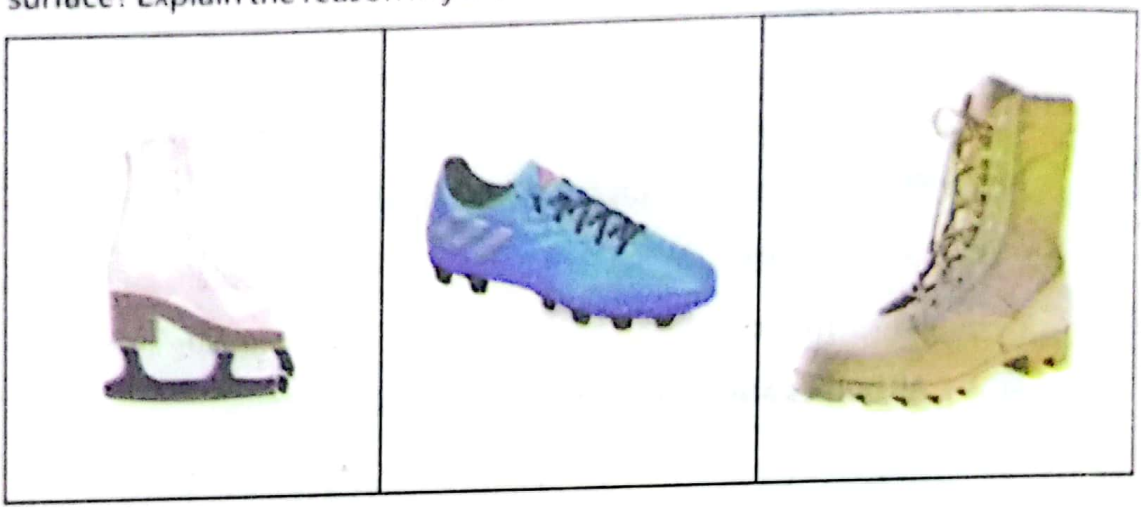
iii. Define friction. In which direction it acts?

iv. What is a machine and how does it work for us?

v. Why cannot we walk on ice easily?

3. **Constructed Response Questions:**

i. Look carefully at the pictures given below. Which one of these shoes is suitable for rocky soil, which one for playground and which one for icy surface? Explain the reason in your answer.



ii. The patient is sitting in a wheelchair. Which machine will be helpful to take him on stage and why?

4. Investigate:

Suppose you are writing on a notebook with a pencil. Answer the following questions based on observation:

a) What force do you use (push or pull) while writing?

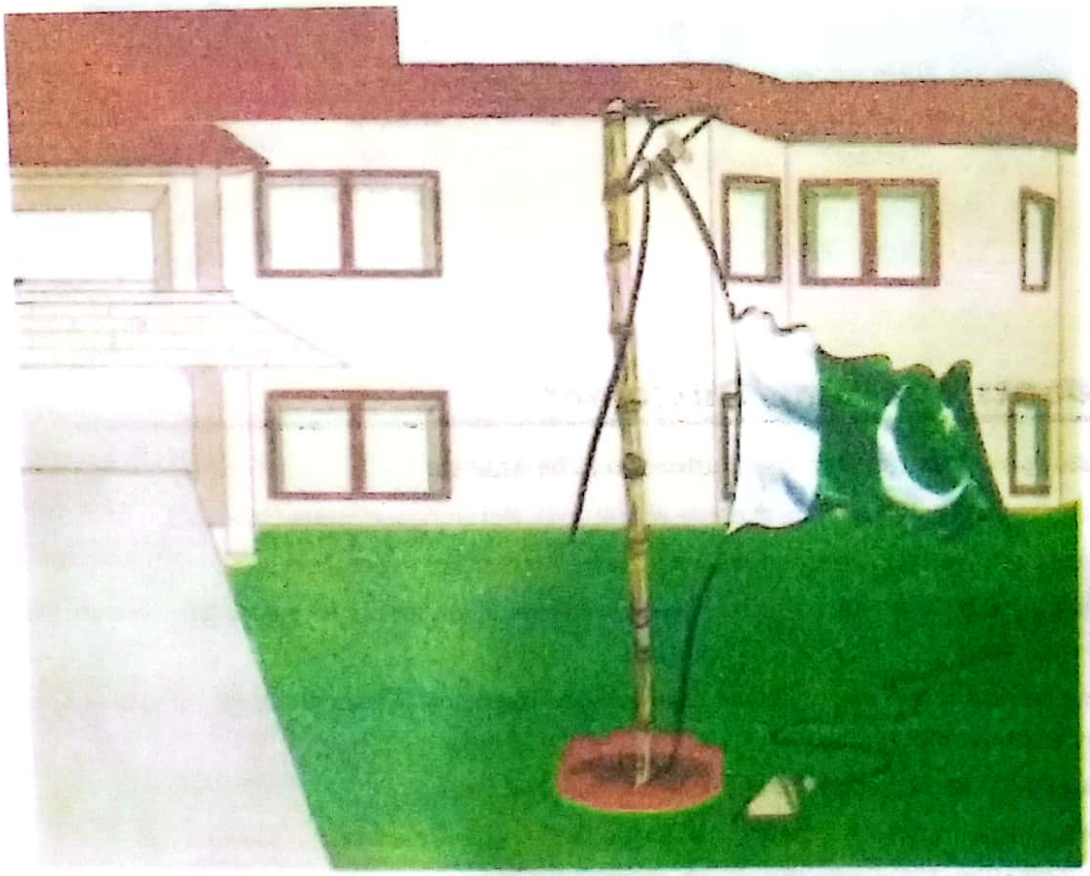
b) What is the role of friction in writing on paper with pencil?

c) After using the pencil, why do we need to sharp it?

5. Project:

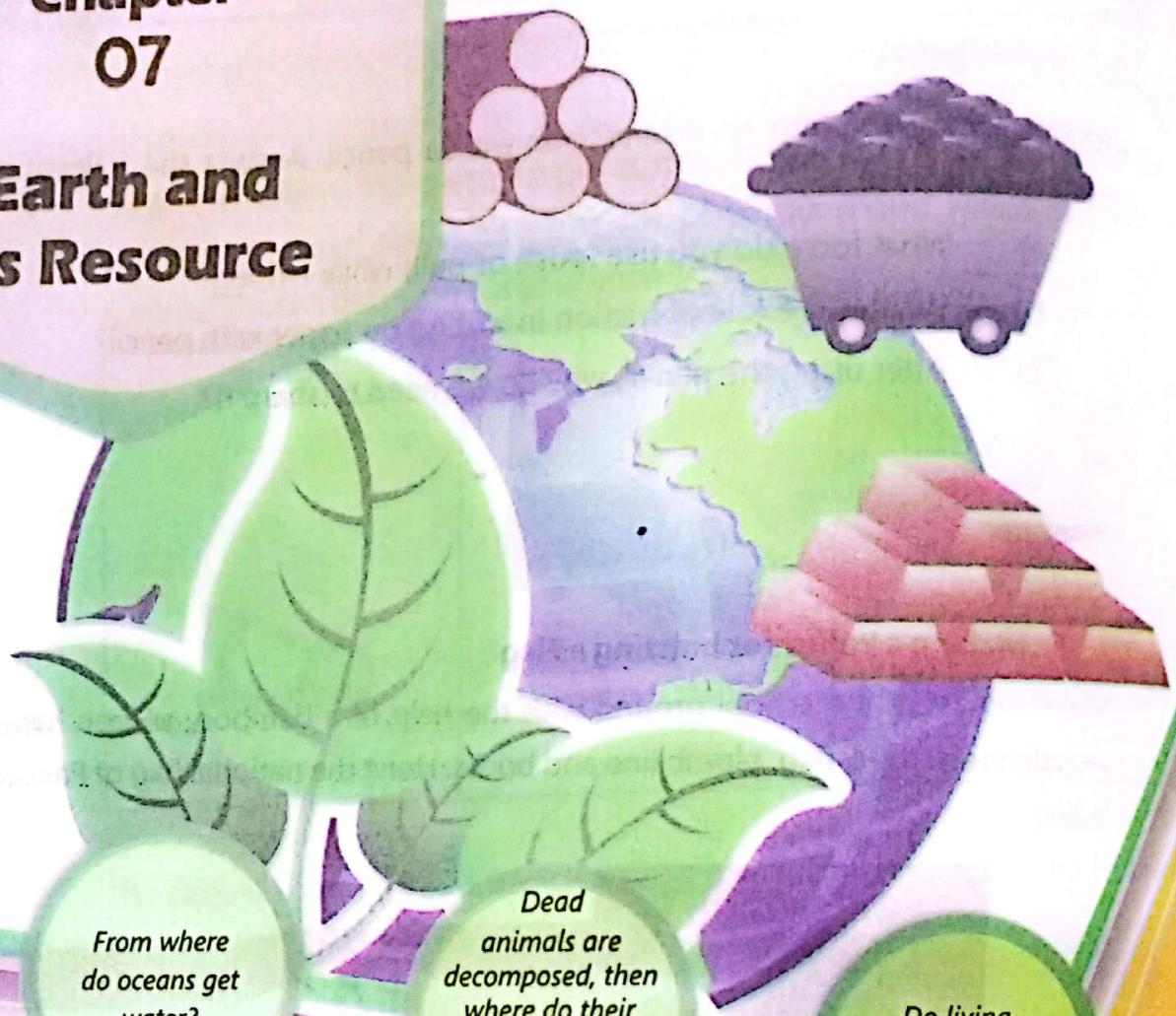
Making a Pulley for hoisting a Flag

Make a mast in the school ground with the help of a bamboo, an iron hanger, a small wooden reel, rope, flag, plumb line and bricks. Hoist the national flag of Pakistan with this pulley.



Chapter 07

Earth and its Resource



From where do oceans get water?

Dead animals are decomposed, then where do their skeletons kept in the museum come from?

Do living organisms in the soil breathe?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Recognize that Earth's surface is made up of land and water and is surrounded by air.
2. Recognize that water in rivers and streams flows from mountains to oceans or lakes.
3. Identify some of Earth's natural resources (e.g., water, wind, soil, forests, oil, natural gas, minerals) that are used in everyday life.
4. Recognize that some remains (fossils) of animals and plants that lived on the Earth a long time ago are found in rocks, soil and under the sea.
5. Differentiate between renewable and non-renewable resources.
6. Investigate the impact of human activities on the Earth's natural resources.
7. Suggest the ways to conserve the natural resources.

Many of us do not know the importance of natural resources. We know from where we get our required items. But where do these items come from, we hardly ever thought. We obtain the basic material for making necessary items from land, sea or air.

"The basic material that humans get from land, sea or air are called natural resources."

There is no substitute for natural resources. If humans do not use these resources properly, there is a danger that these will be unavailable soon.

Point to Ponder!

What will happen if natural resources run out?

For Your Information

About 11% of the land is cultivated.

Earth and its Physical Characteristics

If you look at the globe of the Earth, you will see that most of the area is blue which represents water. You will see a small as green or khaki which indicates land. The Earth's surface consists of land and water. The Earth is surrounded by air. About 71% of the Earth's surface is water and the remaining 29% is land. Although we do not see air, but it is present everywhere on the Earth. Air is present even in soil and water.

Activity 7.1

1. Take a plastic bottle and make a small hole in its lid with the help of hot nail.
2. In the same way, make another hole in the bottom of the bottle.
3. Fix a small piece of paper on the lid of the bottle with the help of tape or glue. One end of paper should stick to the surface of the lid while the other end should remain free.

4. Fix the opening of the balloon on the lid of the bottle.
5. Press the bottle repeatedly.
   What do you observe?

Air entered the bottle, through the hole in the bottle, and inflated the balloon. It means that air is present everywhere around us.

Distribution of Water on Earth's Surface

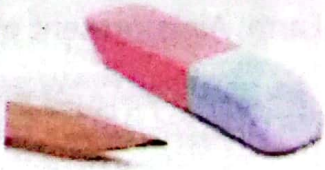
About 97% of the water present on Earth is in the oceans. The remaining 3% is present in glaciers, rivers, streams and lakes. Rainwater is added in rivers and streams. From here, the water flows to lakes and oceans. The snow falling on mountains also melts and becomes water. This water also flows to rivers and streams and finally falls into the lakes and oceans.

Earth's Resources

The Earth is rich in many resources including water, air, soil, forests, coal, oil, natural gas and minerals, etc. We use natural resources to make different things in our daily life. The properties of natural resources make them useful for a variety of purposes. For example, clay is used to make bricks and pottery while sand is commonly used to make buildings and glass.

Do you know?

The pencil in your geometry box is made from the wood of a tree while the rubber is obtained from the secretion of a specific tree.



Let us understand some important natural resources and their importance in daily life:

Water

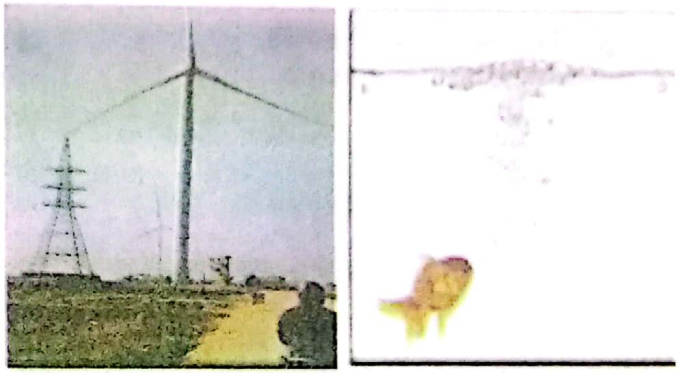
All living things need water to survive. We use water for drinking, cooking and washing clothes and dishes. Water is also very important for plants and crops. Running water is also used to generate electricity.

Activity 7.2

Take a glass and put some soil in it. Then slowly add some water to the soil and shake it for a while. Air bubbles start coming out of the soil. This proves that there is air in the soil.

Air

Air is very important for the survival of life on Earth. Air is present all around the Earth surface. It is also present in soil and water due to which living beings can breathe inside soil and water. Fast blowing air is also used to generate electricity.



Soil

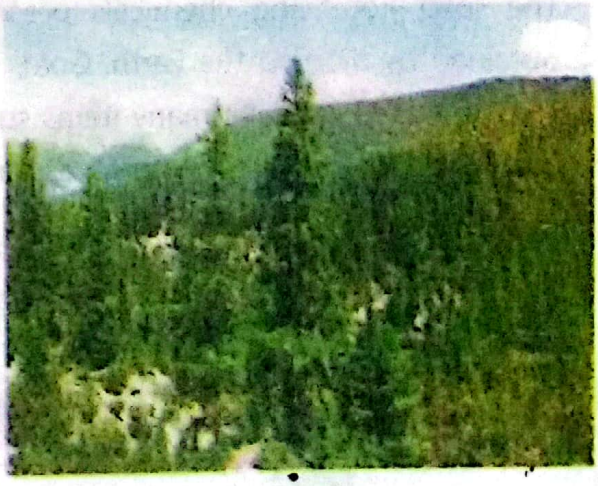
Soil is the outer layer of the Earth which contains water, air, fertile matter and gravel. Soil provides essential nutrients to plants for growth. It also provides shelter to many organisms. It is also used to make bricks, glass and utensils.

Interesting Information

World Soil Day is celebrated on 5th December every year.

Forests

The part of the Earth that is completely covered with trees is called a forest. Forests not only provide us timber but are also natural habitats for animals. They also provide us fresh and oxygenated air.



Do you know?

Forests cover 5.2% of the total area of Pakistan. Pakistan's largest natural forest is located in the city of Ziarat in Balochistan province.

Natural Oil

Crude oil found underground, is a major source of energy for humans. We use this oil as fuel in vehicles and other means of transport. We also generate electricity by burning this oil.

Point to Ponder!

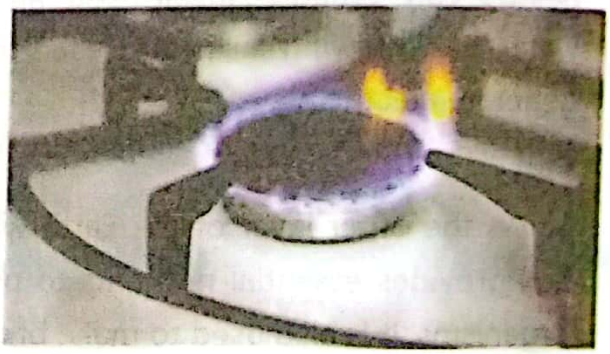
Which natural resources are used to generate electricity?

For Your Information

We produce kerosene, petrol, diesel, engine oil, grease, petroleum jelly and tarcoal from the crude oil which we get from the Earth.

Natural Gas

Natural gas is got from the Earth. It is used for heating and to generate electricity. Natural gas is used as a fuel for cooking in homes. It is also used to make fertilizers.



Quick Quiz

What is the difference between charcoal and mineral coal?

Interesting Information

The second largest mine of natural salt in the world is located at Khewra (Pind Dadan Khan) in Pakistan.

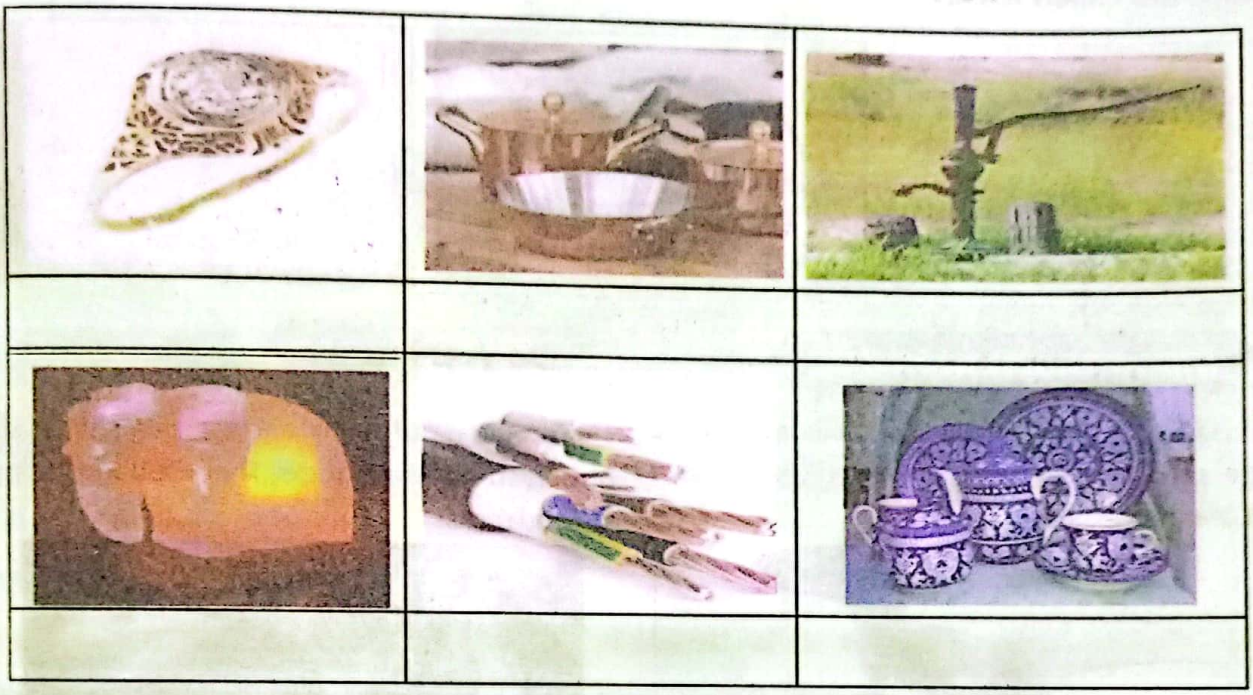
Minerals

The solid non-living chemicals present in the Earth are called minerals. They are obtained by digging the Earth. Gold, silver, copper, iron and salt, etc. are all minerals. They are used to make many items such as wires, coins, jewellery and utensils. Mineral coal is also an important natural resource that is used as a fuel.

Gold | Silver | Salt

Activity 7.3

Which minerals are used to make the items given in the following pictures?



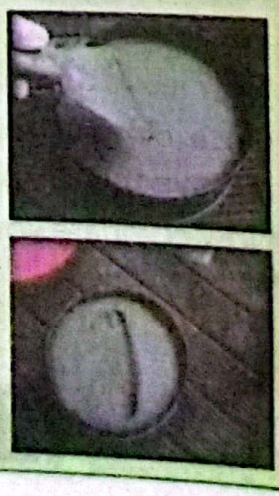
Fossils

Have you ever noticed that when you walk on soil, your footprints are imprinted on it? Can these marks be preserved forever? Let us know this through an activity:

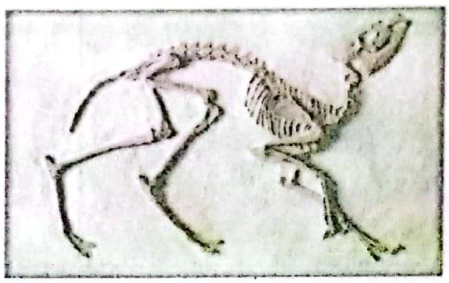
Activity 7.4

1. Make a mixture in a pot by adding water into one part cement and two parts sand.
2. Now level the surface of this mixture.
3. Make your footprint on it and leave it for a week.

You will notice that the mixture in the pot has become solid and turned into stone. Your footprint is also preserved in it.



Thousands of years ago, there were many organisms that do not exist in this world now but their imprints or remains are found under rocks, soil and sea. These imprints or remains are called fossils.


Interesting Information

Dinosaurs were lizards-like giant animals. They were present on Earth millions of years ago but are now extinct.

Do you know?

The skeletons of many ancient animals are still preserved in soil and rocks. They are dug out from soil and rocks.

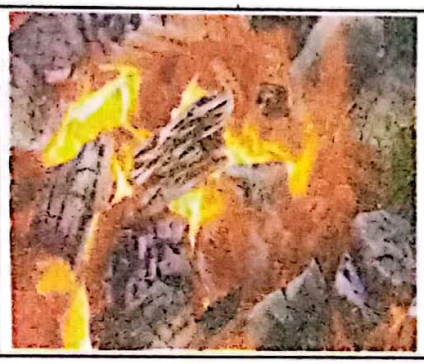
Activity 7.5

1. Take a cardboard or plastic disposable glass. Fill it half with wet soil.
2. Press a small plastic toy, coin or oyster (sea-shell) into this soil to make a mark.
3. Now put a quarter of plaster of paris in another glass and mix it with water to make a thin mixture.
4. Pour this mixture over the mark in the first glass.
5. Now leave this glass for two to three days so that it dries.
6. Once dry, cut the glass and remove the fossil present inside. Use a brush to remove the soil present on fossil.
7. Now compare your fossil with the imprint that you have made in the soil.

Non-Renewable Resources

Some natural resources such as coal, petrol, diesel and natural gas take millions of years to form. Such limited resources are called non-renewable resources. Once they are used, they can not be replaced by new ones easily.

Natural Gas



Coal

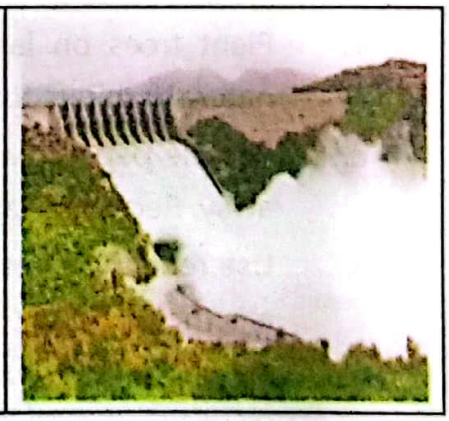
Petrol

Renewable Resources

Those unlimited resources which can be replaced after use are called renewable resources. Air, water, soil, forests and solar energy are renewable resources. Some of these resources are also used as fuel substitutes.

Solar Energy

Wind Energy

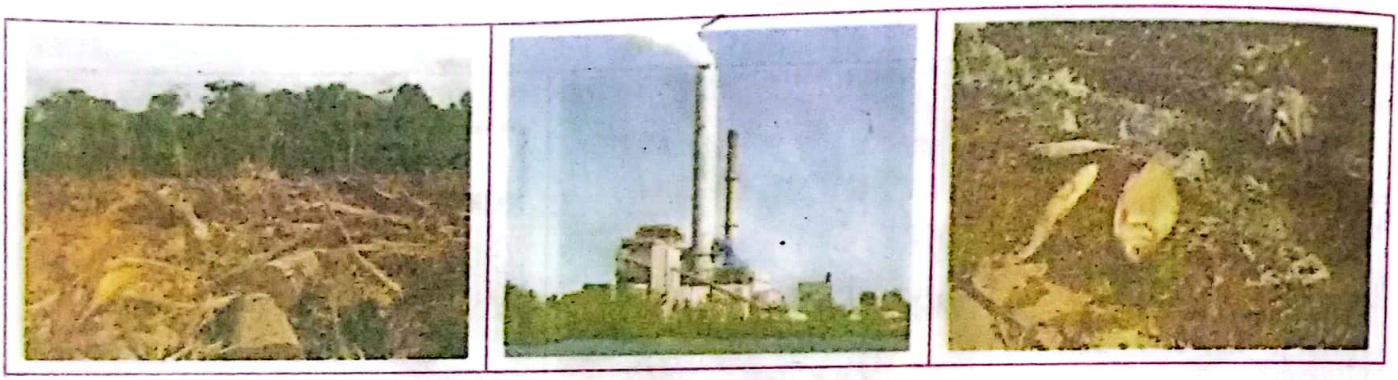


Hydro-Power

Effect of Human Activities on Natural Resources

The lavish use of natural resources is causing irreparable damage to our environment. Growing population, excessive use of fossil fuels and deforestation, etc. are rapidly reducing land resources. Due to it, humans are facing problems such as climatic change, pollution and lack of clean drinking water.

If we do not use natural resources carefully then a stage will come when renewable resources like trees, animals, soil, water and air will also run out or will become unusable. That is why the careful use of natural resources and their preservation is very essential.

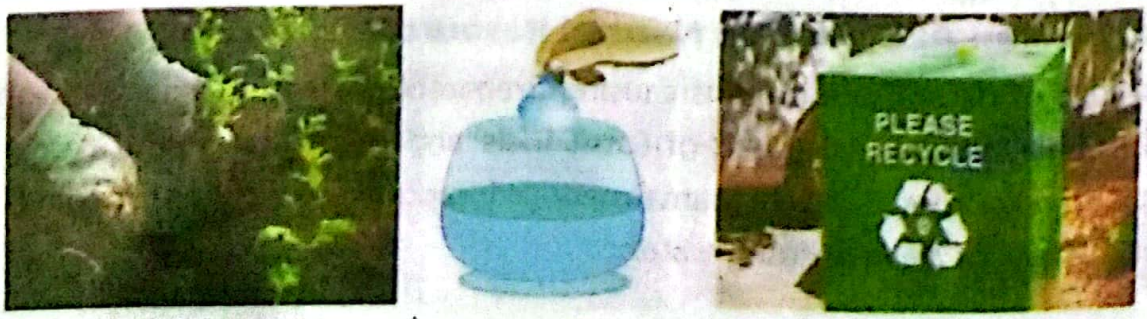


Conservation of Natural Resources

All living bodies depend on natural resources to survive. No matter whether we live in city or village, we need air to breathe, clean water to drink and food to eat. Nature provides us all these things. Everyone can contribute to the conservation of natural resources.

We should:

1. Plant trees on large scale. Trees not only provide oxygen but are also natural habitats for many animals.
2. Recycle paper, plastic, glass and other materials instead of throwing them away. Recycling saves natural resources by reusing such items.
3. Use renewable resources such as wind, water and solar energy to generate electricity.
4. Protect air, water and land from pollution.
5. Use water and electricity carefully.



Key Points

1. The Earth's surface consists of land and water which is surrounded by air.
2. About 71% of the Earth's surface is water and the remaining 29% is land.
3. When water falls from the sky as rain then it joins the rivers and streams that flow towards lakes and oceans.
4. The Earth is rich in many resources including water, air, soil, forests, oil, natural gas and minerals.
5. The imprints or remains of dead organisms are called fossils.
6. Some natural resources such as coal, petrol, diesel and natural gas, etc. take millions of years to form. Such limited resources are called non-renewable resources.
7. Unlimited resources that can be obtained after their use are called renewable resources.
8. Man's careless use of natural resources is causing irreparable damage to Earth's environment.
9. Recycling saves natural resources by making things reusable.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter

1.	Fossils	https://www.youtube.com/watch?v=bRuSmxJo_iA
2.	Minerals and Gems	https://www.nationalgeographic.com/science/earth/inside-the-earth/minerals-gems/
3.	Conservation of water resources	https://www.nationalgeographic.com/environment/freshwater/water-conservation-tips/

Exercises

1- Tick (✓) the correct answer.

i. Glass is made from:

(a) soil. (b) sand.

(c) salt. (d) rubber.

ii. About what percentage of the Earth's surface is land?

(a) 1 percent (b) 21 percent

(c) 29 percent (d) 30 percent

iii. The solid non-living chemicals present in the Earth are:

(a) soil. (b) minerals.

(c) stones. (d) fossils.

iv. To make things reusable is called:

(a) recycling. (b) conservation of resources.

(c) care. (d) cycling.

An example of non-renewable resources is:

(a) oil. (b) soil.

(c) air. (d) solar energy.

2- Write short answers.

i. What are fossils? About which organisms do they provide information?

ii. Why are forests called renewable resources?

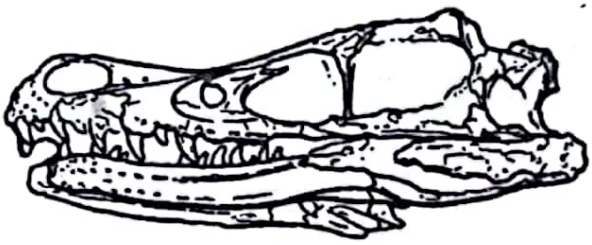
iii. How does water reach oceans and lakes?

iv. Describe any two advantages and disadvantages of deforestation.

v. Differentiate between renewable and non-renewable resources.

3. Constructed Response Questions:

i. We found the skulls of various animals during the excavation. How do we know about their feed?



ii. Jellyfish is a soft invertebrate. Can we obtain fossil of jellyfish?

4. Investigate:

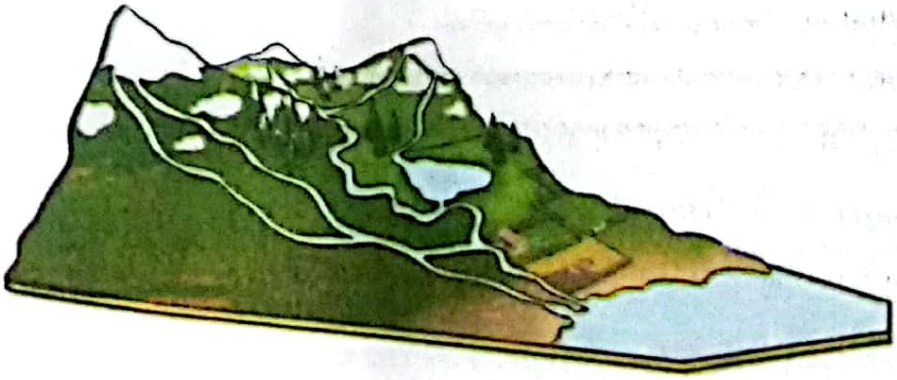
i. Is there anything that is not made from natural resources?

ii. Water is a renewable resource. There should be plenty of water for every human being on the Earth but why is it not so?

iii. Is it possible that we have more resources than those of the past?

5. Project:

Make a model of the flow of water from glacier to sea. With help of chipboard, clay, soil, sand, water, lime, green and blue colours, toy carts and pebbles.



Chapter 08

Earth's Weather and Climate

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Understand the difference between weather and climate.
2. Relate that weather changes with changing geographical location.
3. Recognize that average temperature and precipitation can change with seasons and location.

In our daily life, we observe that sometime it rains, sometime it is sunny, sometime the weather becomes cold and pleasant and sometime it becomes hot. Occasionally, this weather change occurs suddenly and sometimes it takes many days. Sunlight, air pressure, rain and cloud etc. play important role in the change of weather.

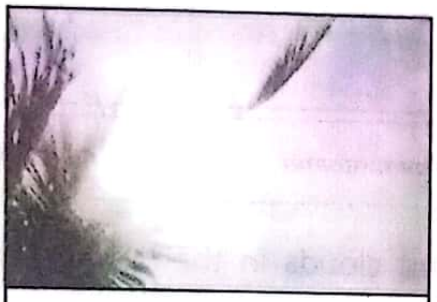
Weather and Climate

The daily condition of the environment or atmosphere of a location is called its weather. The duration of weather may be one or more days. Weather is described in terms of temperature, humidity in air, precipitation (rain or snow), clouds and winds of that particular location.

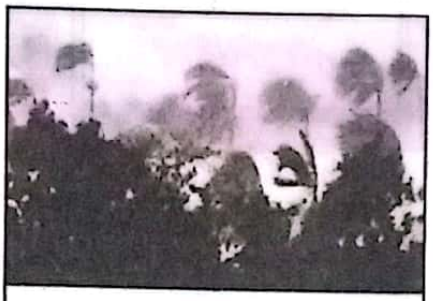
Do you know?

Annual rotation of the Earth around the Sun and the tilt of the Earth on its axis are responsible for changes in the weather.

Rain



Intensive sun (summer)



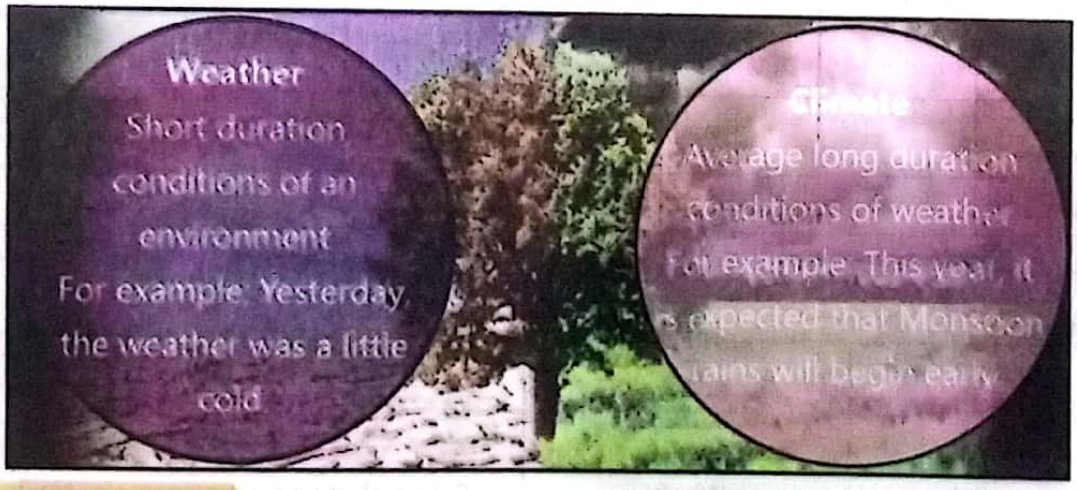
Storm

Is your region hot or cold? The general conditions of an area are called climate. It is the average weather conditions of an area. In fact climate describes the general and long-lasting weather conditions of an area.

Do you know?

The study of weather conditions is called Meteorology. The people related to this study are known as Meteorologists.

Difference between Weather and Climate

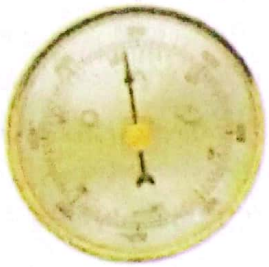
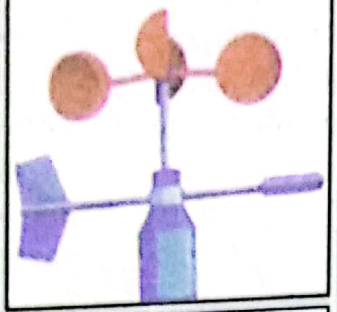


Do you know?

The climate of a region affects the living habits, diet, growth and colour of people. In the regions of cold climate, people wear warm dresses, sweaters and gloves while, people of the regions of hot climate wear thin and light dresses.

Interesting Information

Weather conditions are described by using he following instruments:

Instrument to measure the air pressure	Instrument to measure the speed and direction of wind	Instrument to measure the amount of rain	Instrument to measure the temperature of air
			
Barometer	**Anemometer**	**Rain Gauge**	**Thermometer**

The movement of winds and clouds in the upper atmosphere of a region helps us predict the change in weather conditions for the next few days. Meteorologists (weather experts) keep us informed about changes in the weather for the next few days. They provide us information about rain, wind or storm etc. in advance.

Activity 8.1

Observe the weather and temperature for one week and complete the following table:

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Maximum Temperature							
Minimum Temperature							
Weather							

You can use the following symbols to represent average conditions of the weather of the day.

 Warm and dry	 Windy	 Rain with thunder	 Hailing
 Partial cloudy	 Cloudy	 Drizzling	 Snowing

Do you know?

The maximum rain in one day in Pakistan was on 23rd July 2001 in Islamabad. On that day, 62 centimetre rain was recorded.

Interesting Information

The maximum day temperature of 58 degree Centigrade was recorded in 1922 in the desert of Libya (Africa).

Relationship between Geographical Location and Climate

Geographical location of a region is an important factor for determining its climate. Many other factors affect the climate of any geographical location. These include temperature, air pressure, speed and direction of wind, humidity rain and snow, etc. Have you ever thought why does the weather change with the arrival of spring, summer and winter?

The climate or weather changes of any region depend upon falling of Sun rays vertically or slanting.

On the basis of climate, we can divide the Earth into three zones:

1. Tropical Zone
2. Temperate Zone
3. Polar Zone

Do you know?

The maximum temperature in Pakistan was 53.5 degree Centigrade in Mohenjo Daro (Sindh) on 26th May, 2010 and in Turbat (Baluchistan) on 28 May 2017.

Do you know?

The Equator is an imaginary line that divides the Earth into two equal parts.

1- Tropical Zone

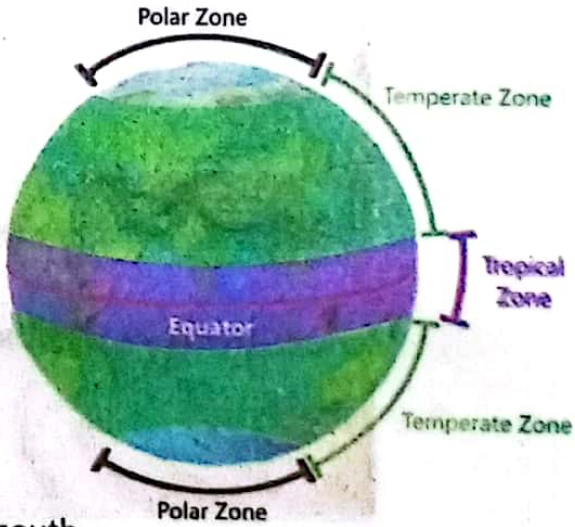
Tropical Zone consists of the regions located around the equator. Here, the Sun rays fall vertically. That is why the climate of this zone is hot.

2- Temperate Zone

Temperate Zone is located between Tropical and Polar Zones. Here, the Sun rays fall slant. The climate of this zone is mild due to weak Sun rays.

3- Polar Zone

It consists of the areas around the north and south



poles of the Earth. Here, the Sun rays are more slanted and weak. Therefore, the climate of this Zone is the coldest.

As we move away from the equator, the climate becomes less hot. Eventually, the temperature is minimum at the poles, hence these are the coldest regions of the Earth.

Climate of Regions near Waterbodies

Waterbodies make the climate of the adjacent land areas mild.

Climate of High Regions

With the rise of height from the sea level, the climate becomes cooler and the duration of winter season increases.

Do you know?

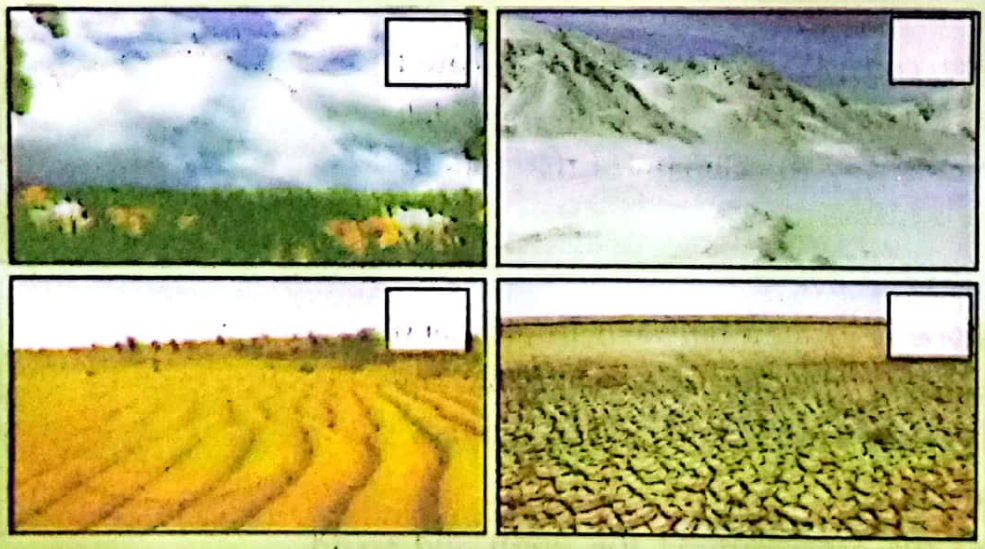
The minimum temperature in Pakistan was -18 degree Centigrade in Quetta on 8th January 1970 whereas it was -51 degree Centigrade at K-2 peak.

Global Change in Climate

The heat, smoke and gases released from factories, vehicles and other human activities not only pollute our environment but also cause an increase in the average temperature of the Earth. It is called global warming. Global warming is very harmful for climate and life on land and in water.

Activity 8.2

Identify the climate (dry, mild, desert and snow) in the following pictures:



Key Points

1. The temporary change in the conditions of an environment is called weather.
2. The general weather conditions of a region are called its climate.
3. Weather conditions and climate affect the natural ecosystem.
4. Many factors affect the weather and climate of a geographical location.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter

1.	Weather map	https://www.nationalgeographic.org/activity/create-weather-map/
2.	Climate	https://www.nationalgeographic.com/science/earth/earths-atmosphere/climate/
3.	Change in climate	https://kids.nationalgeographic.com/explore/science/climate-change/

Exercises

Tick (✓) the correct answer.

i. If it rains suddenly, what do you observe?

(a) Weather condition (b) Climate
(c) Weather and climate (d) Location

ii. Which zone of the Earth receives vertical Sun rays?

(a) Temperate (b) Tropical
(c) Polar (d) All of these

iii. The climate of the regions of Polar Zones is

(a) extremely cold. (b) warm.
(c) humid. (d) mild.

iv. Due to the smoke and gases emitted from factories and vehicles, the average temperature of the Earth is

(a) increasing.
(b) decreasing.
(c) not affected.
(d) sometime increasing and sometime decreasing.

v. In how many zones the Earth is divided on the basis of climate?

(a) 2 (b) 3
(c) 4 (d) 5

2- **Write short answers.**

i. Differentiate between weather and climate.

ii. What is the relation between climate and the height from sea level?

iii. Why does climate change with distance from the equator?

iv. Why is the climate of Polar Zone very cold?

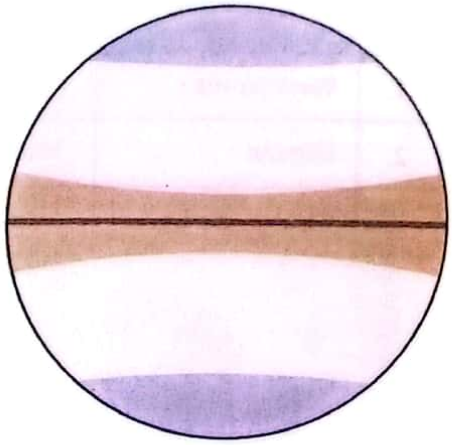
v. In which zone our country is located on the basis of climate? Explain.

3. **Constructed Response Questions:**

i. Identify the different zones on the figure of the Earth, on the basis of climate.

ii. What is the climate of these zones? Describe the reasons.

iii. In winter, the temperature of Skardu, a city of Gilgit Baltistan is below zero degree centigrade while the temperature of Karachi is mild. Why is it so?



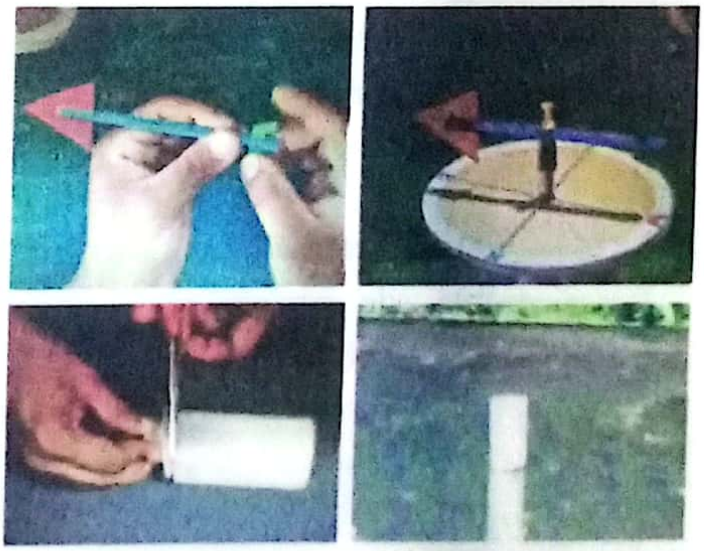
4. Investigate:

How many weathers are there on the Moon? Does the Moon also have storms, rains and snowfall like our Earth? What is your opinion about the climate of the Moon?

5. Project:

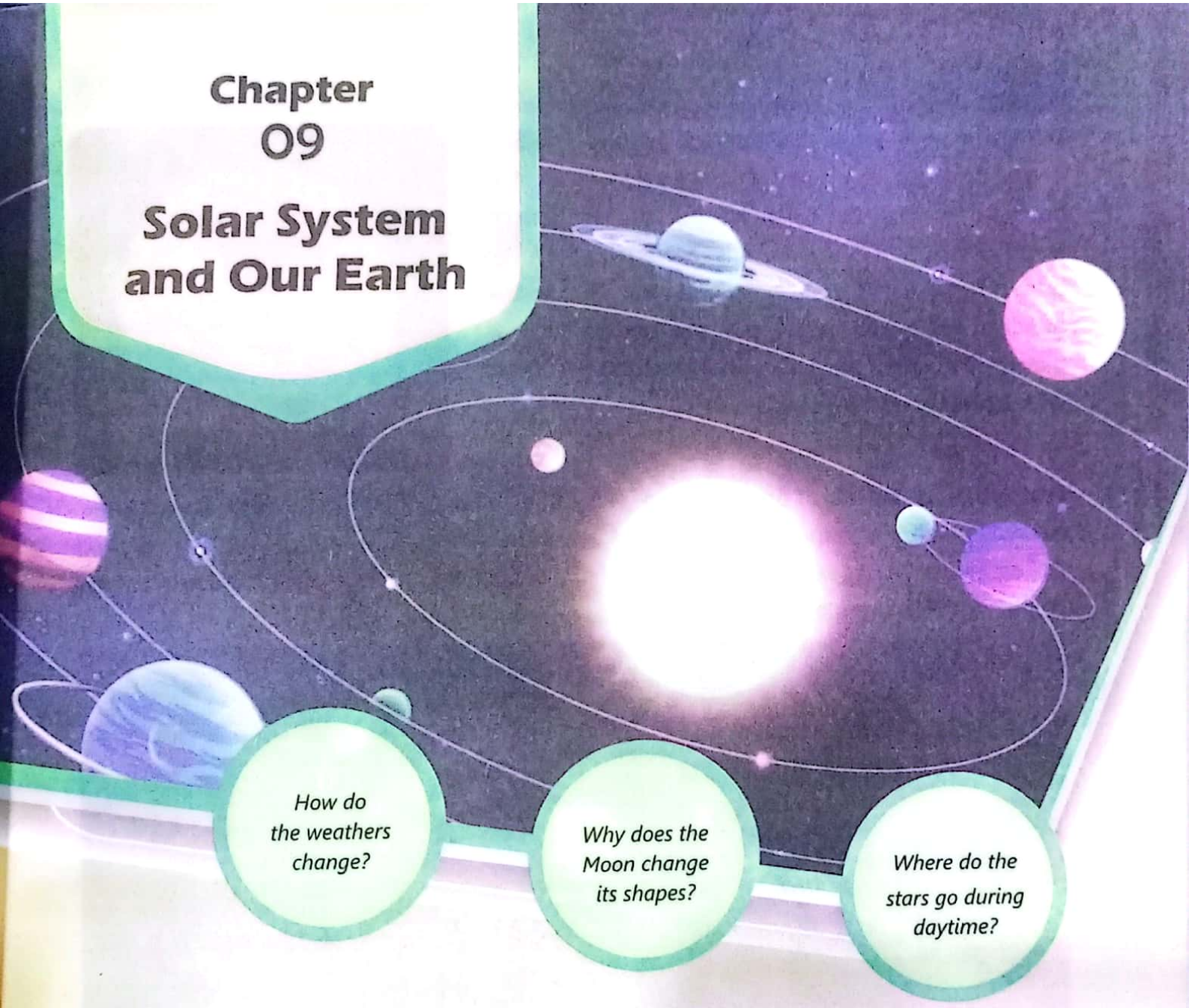
i. Construct a simple wind vane by using cardboard or old carton, scissors, straw, board pins and coloured chart paper according to the diagram.

ii. Make a simple rain gauge by using transparent plastic bottle, scissors, sellotape and paper strip (marked in millimetre scale).By using this rain gauge, compare the amount of rain during three days in a rainy season.



Chapter 09

Solar System and Our Earth



How do the weathers change?

Why does the Moon change its shapes?

Where do the stars go during daytime?

Students' Learning Outcomes

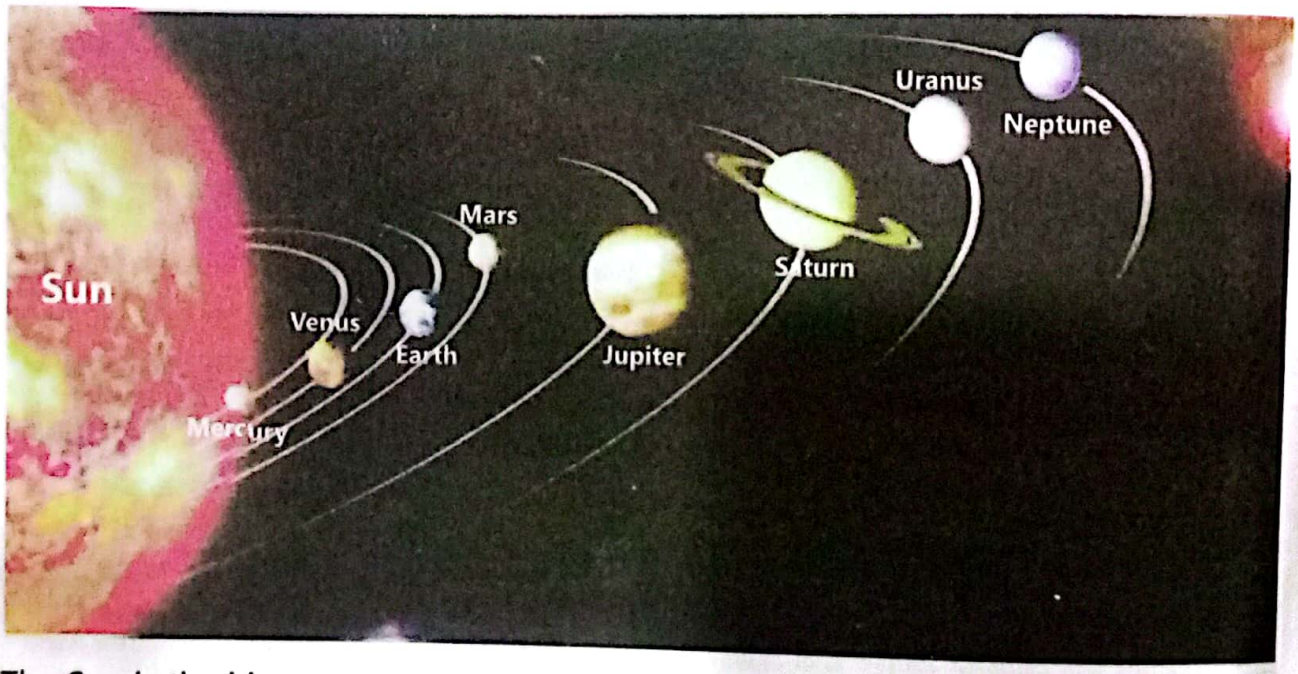
After studying this chapter, the students will be able to:

1. Describe and demonstrate the Solar System with the sun at the centre and the planets revolving around the sun.
2. Identify the sun as a source of heat and light for the Solar System
3. Recognize that the Earth has a Moon that revolves around it, and from earth the Moon looks different at different times of the month.
4. Investigate and describe how day and night are related to Earth's daily rotation about its axis.
5. Provide evidence of Earth's rotation from the changing appearance of shadows during the day.
6. Describe how seasons in Earth's Northern and Southern hemispheres are related to Earth's annual movement around the Sun.
7. Illustrate and explain how solar and lunar eclipses occur.

We see many stars at night on a clear sky. The Sun is one of these medium-sized stars. However, it is much larger than the Earth. Have you ever thought what the Sun is? The Sun is a huge sphere of burning gases that emits light and heat. Due to the gravity of the Sun, many celestial bodies such as planets including our Earth and the Moon, comets and asteroids, etc. revolve around it.

Solar System

The Sun is the centre of Solar System. The closest star to Earth is the Sun. Solar system consists of all the planets which revolve around the Sun. The first planet that revolves closest to the Sun is Mercury. After it, the planets are Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune respectively.



The Sun is the biggest source of light and heat for our Earth. In fact, life on the Earth exists due to the Sun.

Do you know?

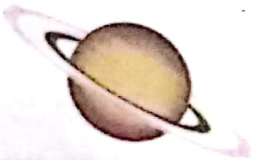
Why does the Sun look bigger than the other stars? It is due to the fact that Sun is very near to the Earth, as compared to other stars.

Point to Ponder!

Have you ever thought that why cannot we see stars in the day time?

Do you know?

The circular path of a planet around the Sun is called an orbit. The time taken by a planet to complete one orbit, is called a period.

Planets	Relative size	Distance from the Sun (Million kilometres)	Diameter (kilometres)
Mercury		50	4,900
Venus		110	12,100
Earth		150	12,800
Mars		228	6,780
Jupiter		780	142,800
Saturn		1,430	120,800
Uranus		2,870	51,800
Neptune		4,497	49,400

Do you know?

Each Planet has a different speed and distance from the Sun. That is why the duration of the day on each planet is different.

Venus is the third brightest thing in the sky after Sun and Moon. Jupiter is the largest planet in the Solar System.

Do you know?

In addition to the eight planets in the solar system, fire dwarf planets, including Pluto, million of asteroids and comets are moving in their orbits around the sun.

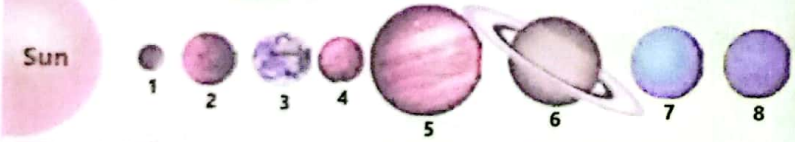
Activity 9.1

Work in groups. Each group will make a model of Solar System.

1. Collect eight objects of round shape of different sizes. For example, collect a grain of gram for Mercury, a little walnut for Venus, big walnut for Earth, playing marble for Mars, basketball for Jupiter, football for Saturn, grapefruit for Uranus, and tennis ball for Neptune.
   You may also make (as alternatives) balls of different sizes from clay or plasticine and paint them with different colours.
2. Make your model of Solar System according to the order and size of the planets and arrange it on the table.
3. Show the Sun also in your model.

Some groups will make model of Solar System on charts according to sequence and size of planets. They will colour and hang their charts in the classroom.

Quick Quiz



Write the names of the planets in this picture.

Moon

The brightest objects appearing in the sky after the Sun is the Moon. It is a natural satellite of the Earth. Moon completes one revolution around the Earth in about 29.5 days. We see the Moon almost in a new shape everyday. Sometime we see a very thin Moon which is called crescent. Sometime we see a complete Moon which is called Full Moon (badar). Among all celestial bodies, Moon is the closest to the Earth. It is at a distance of about 384,000 kilometres from the Earth. The size of the Moon is much smaller than that of Earth. Its diameter is about 3,500 kilometres.

Interesting Information

Moon also rotates about its own axis. The duration in which it completes one trip around the Earth, it also completes one rotation about its own axis. That is why we can see only the same one half of the surface of the Moon. We never see the other half.

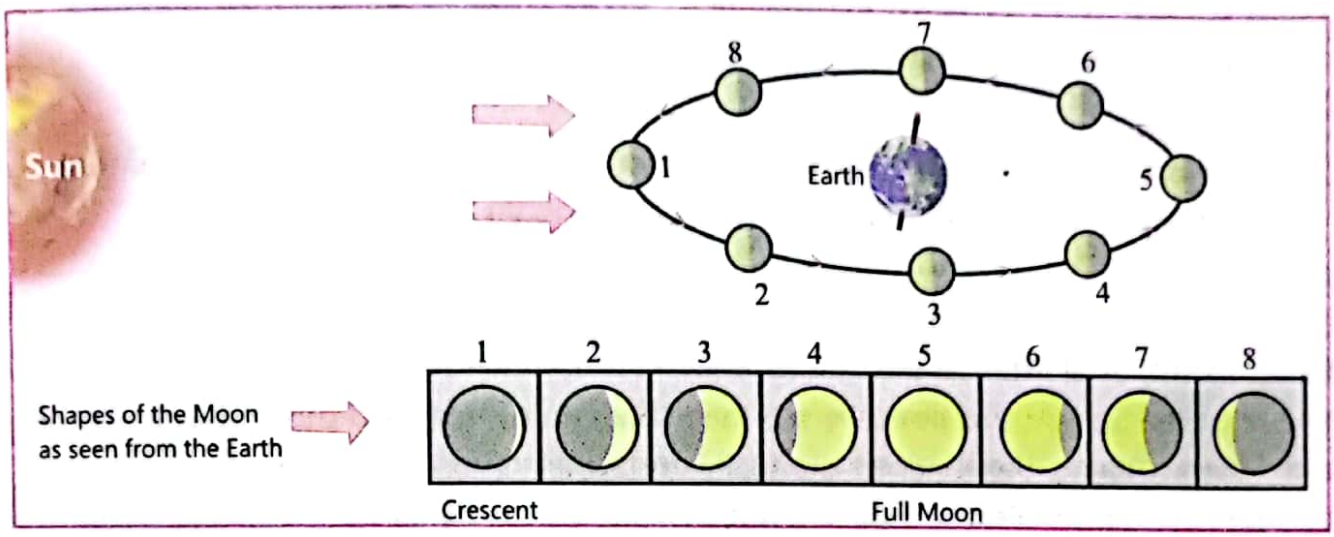
Do you know?

The Moon completes one round around Earth in 27.3 days. Since the Earth is also moving, a complete round of Moon is completed for us in 29.5 days.

Ebb and Flow of Moon

Does the Moon have the same shape all the times? How the Moon of Eid-ul-Fitar looks like? On that day, what is the date of lunar month?

The ebb and flow of the Moon in the sky is due to its rotation around the Earth. As the Moon reflects the Sun rays towards the Earth so when the Sun rays are falling on the part of Moon that is opposite to the Earth, we cannot see the Moon. On the first day of lunar month, we see very narrow sunlight on the edge of the Moon. This is called crescent. It is shown at position 1 in the figure. During its rotation around the Earth, it travels through position 2 to position 5. In this period, its size gradually increases. At position 5 it becomes full moon (badar). After this its bright part gradually decreases and eventually it disapperas.



Do you know?

The Moon has no atmosphere. Moreover, there is no water on the Moon. That is why, no life exists on the Moon.

Interesting Information

All planets of Solar System have Moons except Mercury and Venus. Jupiter and Saturn have the maximum number of Moons.

Rotational Movement of Earth

Our Earth not only revolves in its orbit around the Sun but it also rotates about its own axis. The axis is an imaginary line that passes through the north and south poles of the Earth.

It is day at the part of the Earth, which is in front of the Sun. While it is night at the other part which is opposite to the Sun. The Earth completes one rotation around its axis in 24 hours.

Interesting Information

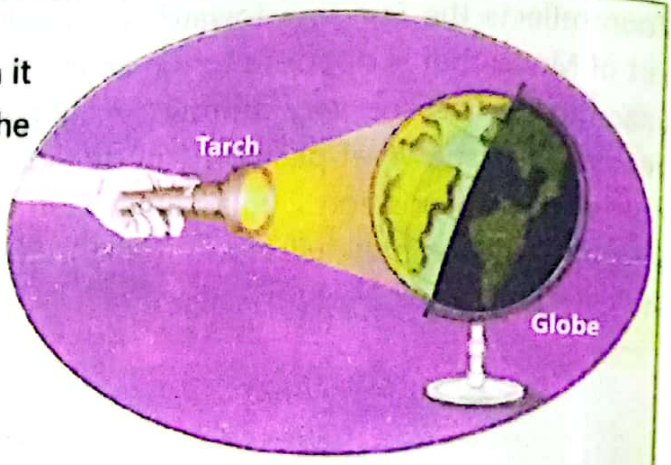
Day and night are due to the rotational motion of the Earth. The Earth rotates from west to east. This is the reason that the Sun appears to rise in the east and sets in the west.

Do you know?

Every planet is at a different distance from the Sun and revolves at different speed. Therefore, the duration of day is different on different planets.

Activity 9.2

1. Take a globe and throw torch light on it at one side. Here, globe represent the Earth and torch represents the Sun.
2. Is the entire surface of the globe lighted? Is only one half of the globe that is in front of torch lighted? Is the other half dark that is opposite to torch?



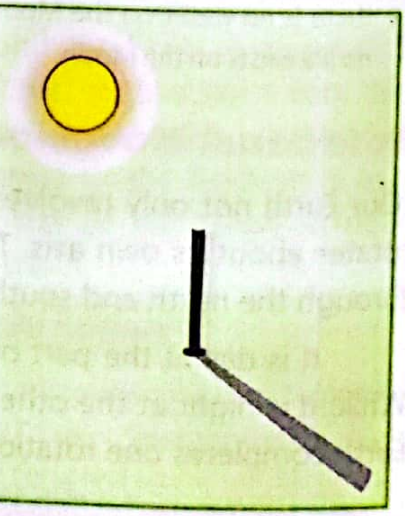
3. Now rotate the globe slowly in front of the lighted torch. It is day at the part of the Earth which is in front of light whereas it is night at the remaining part.

Relation of Changing Shadows with Axial Rotation of Earth

During Earth's axial rotation the Sun appears to rise in that part of the Earth that comes in front of the Sun. At this time, we see long shadows of trees and other objects. As the Earth keeps rotating, the shadows gradually decrease in size. At the noon, the shadow of any object is the smallest in size. On further rotation of the Earth, the size of shadows gradually increase in opposite direction. Just before the Sun set, the shadows again become long as they were in the morning.

Activity 9.3

1. Select location in your school playground where there is sunlight. Fix a stick at this location in the ground.
2. Observe the shadow of this stick three or four times (e.g. at 08:00 am, 10:00 am, 12:00 noon and 02:00 pm) and mark the length of shadows with line each time.



Did you observe the difference in the length of shadows?

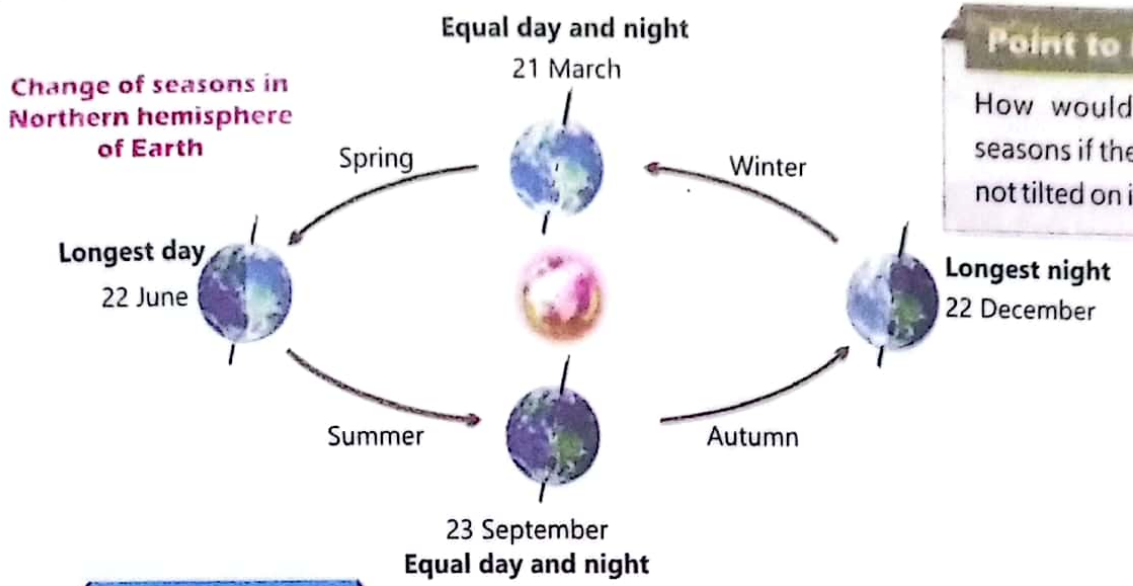
The size of shadows changes from long to short and then from short to long.

Annual Rotation of Earth around the Sun

The revolution of the Earth around the Sun is called orbital motion. The path of Earth's revolution around the Sun is almost circular. The Earth completes one revolution around the Sun in about 365 days. This period is called one year. The Earth's axis is

tilted towards one side. Due to it, the Sun rays fall vertically at the northern hemisphere of the Earth. Therefore, the duration of day increases and that of night decreases there. Hence, it is summer season in the northern hemisphere.

During the same time, the southern hemisphere of the Earth receives slanting Sun rays. Therefore, in this part, duration of day decreases and that of night increases and it is winter there.

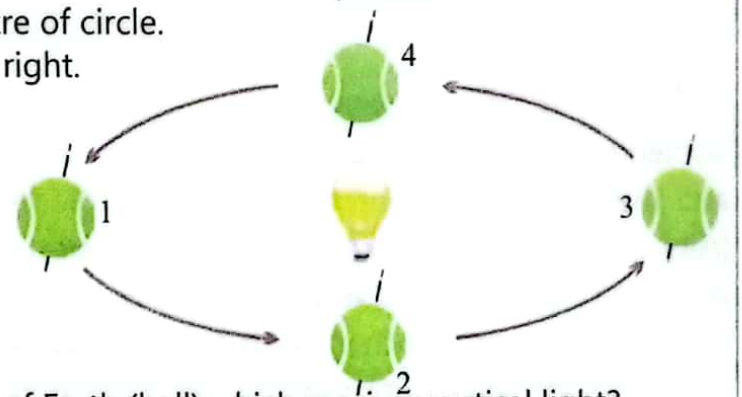


Point to Ponder!

How would have the seasons if the Earth were not tilted on its axis?

Activity 9.4

1. Pass a long needle through a rubber ball.
2. Draw an almost circular path on the table, as shown in picture.
3. Light an electric bulb at the centre of circle.
4. Bend the needle a little towards right.
5. Hold the ball by needle and place it at points 1, 2, 3 and 4 of the path so that the tilt does not change.
6. Observe the light falling on the ball, when it is at these four points.



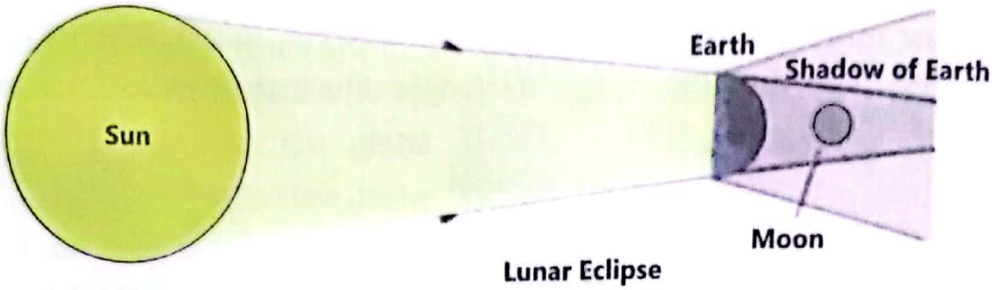
What will be the season in the part of Earth (ball) which receives vertical light?
What will be the season in the part of Earth (ball) at which light is slanting and does not fall vertically?

The annual rotation of the Earth and the tilt in its axis cause changes in seasons.

Lunar Eclipse

During the rotation of the Moon around the Earth, sometime the Earth comes between the Sun and the Moon. Due to it, the sunlight does not reach the Moon. Therefore, a

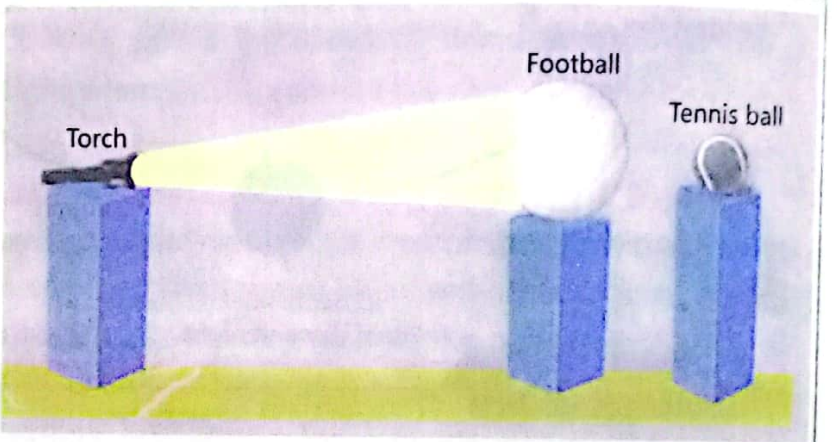
shadow of the Earth is formed on the Moon and it looks dark. This is called lunar eclipse.



Lunar Eclipse

Activity 9.5

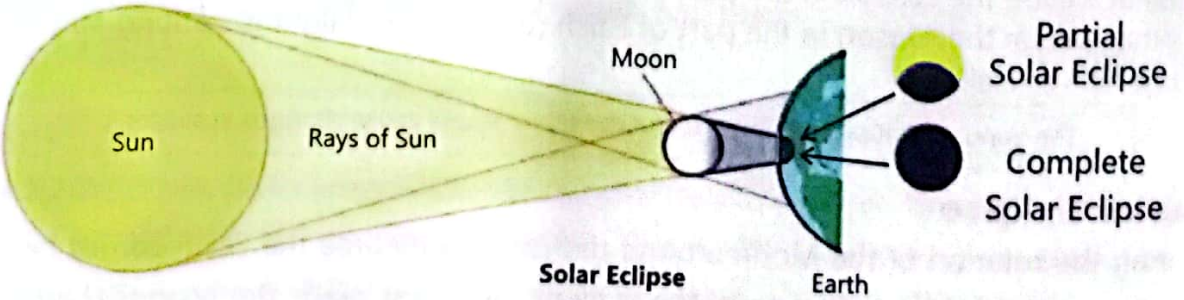
1. Place a torch, a football and a tennis ball in one line as shown in figure.
2. Light the torch and observe the shadow of football on the tennis ball.



If you consider the tennis ball as Moon, football as Earth and torch as Sun, does this model shows lunar eclipse? Explain.

Solar Eclipse

Sometime, during its rotation around the Earth, the Moon comes between the Earth and the Sun. In this condition, the Sun is hidden behind the Moon and is not visible from the Earth. A shadow of the Moon falls on the Earth. It is called solar eclipse. The complete solar eclipse is very rare. Usually, we see partial solar eclipses. It is because the Moon is much smaller than Earth. So, its shadow falls only at a small part of the Earth. Therefore, the solar eclipse can be seen only in those parts of the Earth.



Solar Eclipse

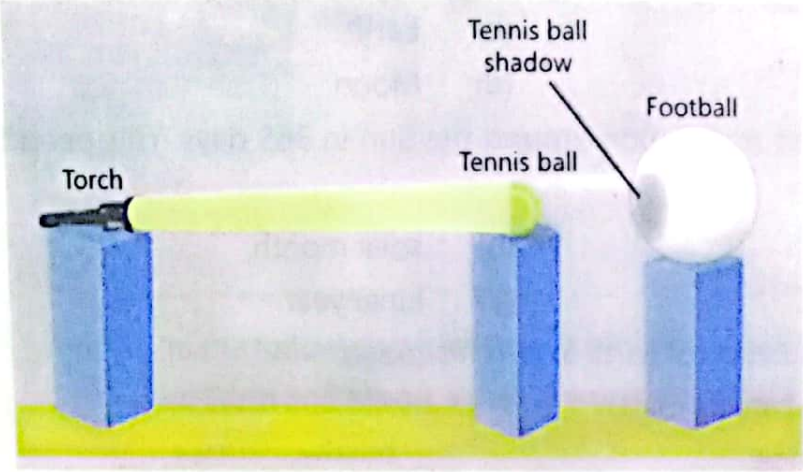
Activity 9.6

1. Place a torch, a football and a tennis ball in one line as shown in figure.
2. In this activity, place the tennis ball nearer to the football.
3. Light the torch and observe the shadow of tennis ball on the football.

Does the shadow fall only on some part of the football?

If you consider the tennis ball as the Moon, football as the Earth and torch as the Sun, does this model show solar eclipse? Explain.

Why is the solar eclipse usually partial.



Point to Ponder!

Can any planet come between Sun and Earth, during its rotation? Explain.

Point to Ponder!

Which force is responsible for the movement of Moon around Earth?

Does the force of Sun also act on Moon?

Key Points

1. Our Solar System consists of Sun, eight planets, asteroids, and comets.
2. Sun is the source of light and heat not only for our Earth but also for the entire Solar System.
3. The Moon completes its rotation around the Earth in 29.5 days.
4. Day and night are formed due to Earth's rotation around its axis.
5. Seasons change during the year due to annual rotation of the Earth and the tilt of its axis.
6. When it is winter in the northern hemisphere of the Earth, it is summer in the southern hemisphere.
7. Solar eclipse occurs when the Moon comes between the Earth and the Sun. In this condition, shadow of the Moon falls on the Earth.
8. Lunar eclipse occurs when the Earth comes between the Sun and the Moon. In this condition, shadow of the Earth falls on the Moon.

Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter.

1.	Solar system	https://www.nationalgeographic.org/topics/resource-library-solar-system/
2.	Phases of the moon	https://www.natgeokids.com/au/discover/science/space/the-phases-of-the-Moon/
3.	Solar and Lunar eclipse	https://www.nationalgeographic.org/encyclopedia/eclipse/

Exercises

1- Tick (✓) the correct answer.

i. The gravity of which body keeps the planets and other celestial bodies together in the Solar System?

(a) Jupiter (b) Earth
(c) Sun (d) Moon

ii. The Earth completes its rotation around the Sun in 365 days. This period is called:

(a) solar year. (b) solar month.
(c) lunar month. (d) lunar year.

iii. Due to the annual rotation of Earth and its tilt its axis:

(a) day and night are formed.
(b) seasons change.
(c) eclipses are formed.
(d) shadows are formed.

iv. On the globe, in which part of the Earth is Pakistan situated?

(a) Northern hemisphere
(b) Southern hemisphere
(c) Equator
(d) Half in northern and half in southern hemisphere

v. Which planet of the Solar System does not have any Moon?

(a) Jupiter (b) Venus
(c) Mars (d) Saturn

2- Write short answers.

i. We can only see one side of the Moon. Explain.

ii. If there were no tilt in the Earth's axis, how would have it affected the seasons?

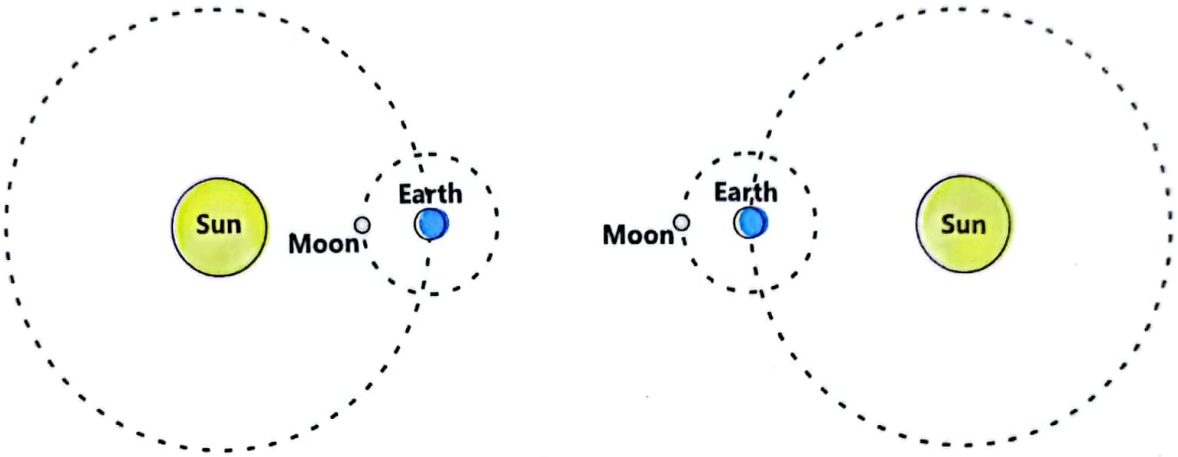
iii. When it is winter in the northern hemisphere then what will be the season in southern hemisphere?

iv. Which planet is closest to the Sun?

v. Why is the solar eclipse usually partial?

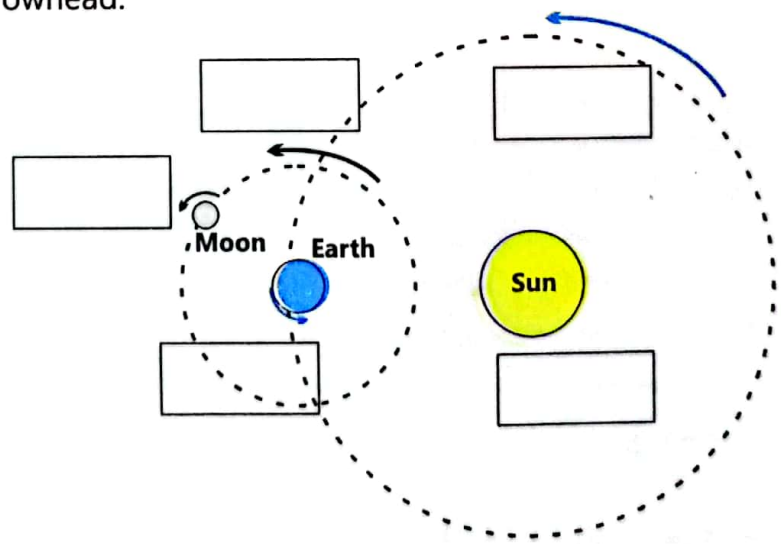
3. Constructed Response Questions:

i. Which phenomena are shown in the following figure?



_____ _____

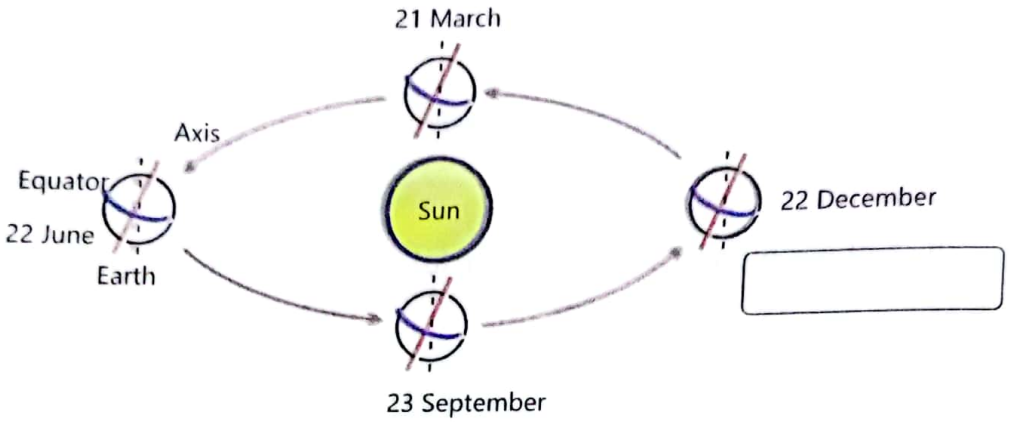
ii. In the following picture, each arrowhead shows the axial or orbital movement of Earth and Moon. Write the correct type of movement in the box given near each arrowhead.



In how many days, the Moon completes its one rotation around the Earth? _____

In how many days, the Earth completes its one rotation around the Sun? _____

iii. Identify the season in the southern hemisphere as per given figure. Write the correct season in the boxes given near the dates.



4. Investigate:

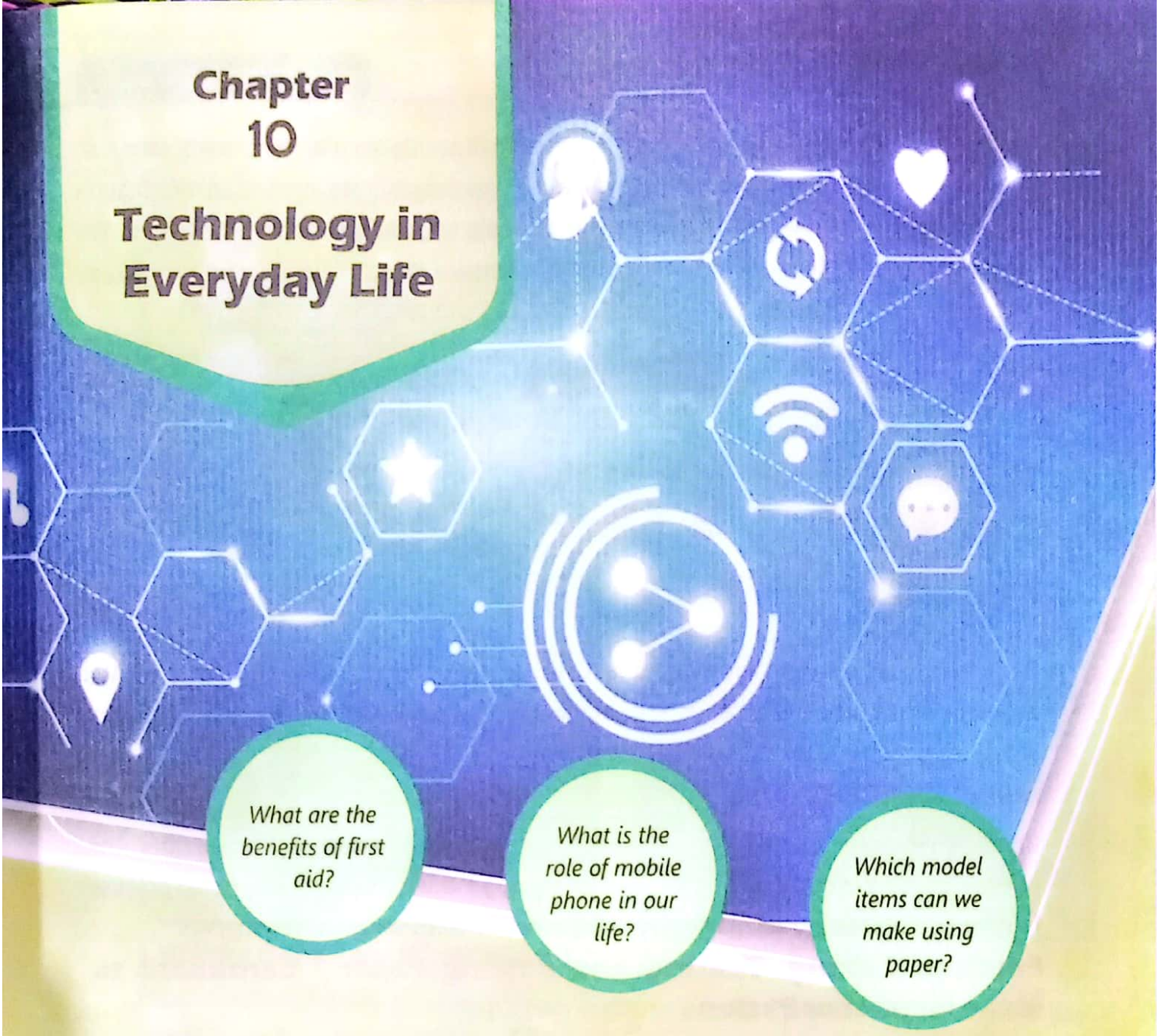
If the Sun stops providing light and heat, what will be its effects on the Earth? Would life be possible on the Earth?

5. Project:

Make two groups in the class. One group will make the model of lunar eclipse and the other group will make model of solar eclipse.

Chapter 10

Technology in Everyday Life



What are the benefits of first aid?

What is the role of mobile phone in our life?

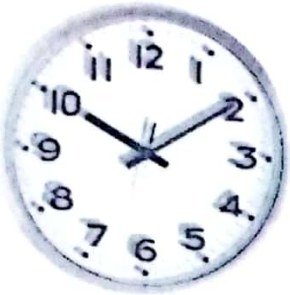
Which model items can we make using paper?

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Practice techniques of folding, cutting, tearing and pasting papers, cardboard to make objects and patterns.
2. Design paper bags, envelopes, cards and face mask.
3. Design models of sphere, cube, prism, cylinder and cone with clay or play dough.
4. Design hammer, wheels, rollers and gears using clay or play dough.
5. Operate tablets/mobile phones for use of calculator, alarm clock and calendar.
6. Operate mobile phones for taking snapshots
7. Recognize the items of first aid box.
8. Use digital and clinical thermometer externally to measure body temperature.
9. Check blood pressure by digital blood pressure monitor.

Making new models of various items is a human nature. Model making of aeroplane, car, bus, train, dress, furniture, etc. has always been a necessity. We are living in an information age. We remain in touch with our dears with the help of computer and mobile phone. We can get many other tasks using mobile phone. It is now a clock, a calendar and a camera as well.



Clock

Calendar

Camera

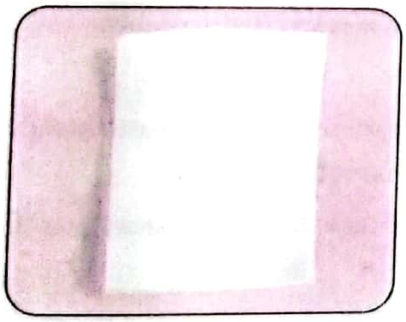
We should also be able to know about first aid. This helps during emergency situation. We should not only have the knowledge of human body temperature and blood pressure but also the procedure to check them.

Basic Craft Making

Unless we do some task with our own hand, we cannot understand its complexities. The paper is not only used for writing but also for making models. The students should practise folding, cutting, tearing and pasting to make various shapes using old newspapers.

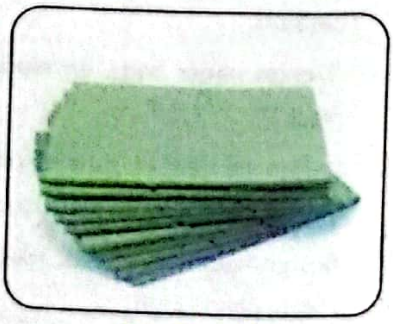
Folding, Cutting, Tearing and Pasting Paper / Cardboard to Make Objects or Pattens

Making models of different objects such as a boat, an aeroplane, a windmill, a bus, etc. is an interesting activity. Most commonly used materials for making objects and patterns are paper and cardboard.



White paper

Coloured paper



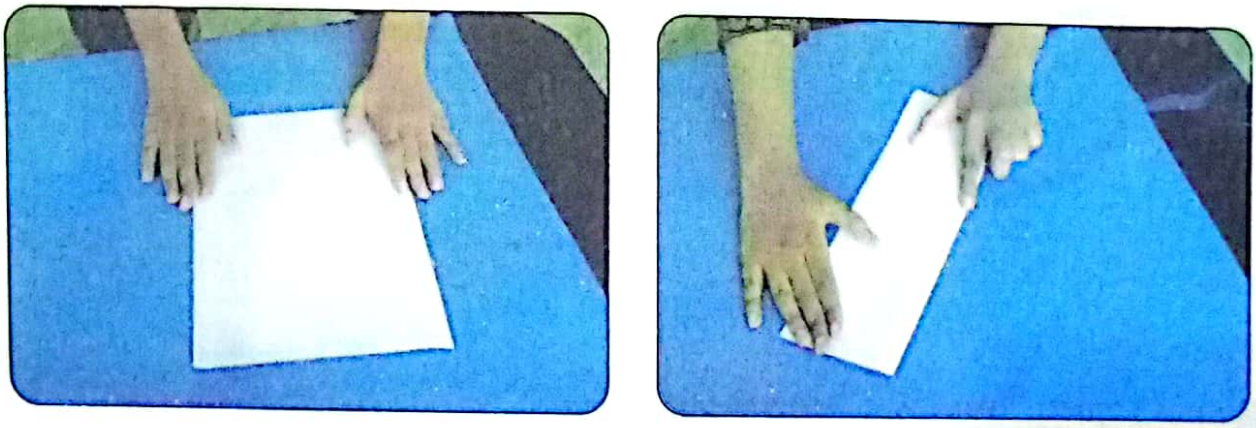
Cardboard

We need some skill for folding, cutting, tearing and pasting paper and cardboard. Let us practise these processes by the following activities:

Folding

Activity 10.1

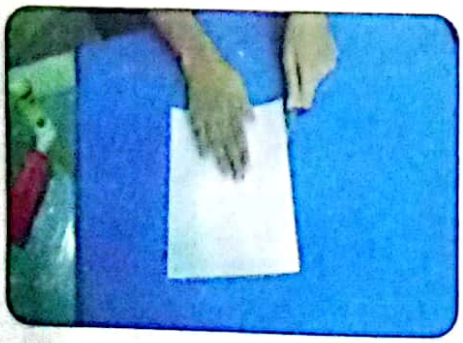
1. Stretch the sheet of paper on a flat smooth surface preferably on a table top. Draw a line from where to fold the paper.
2. Keep pressing one edge of the paper with your one hand, turn the paper with your other hand to fold it along the line. To make a crease rub your finger over the fold or use a ruler edge to press the fold.



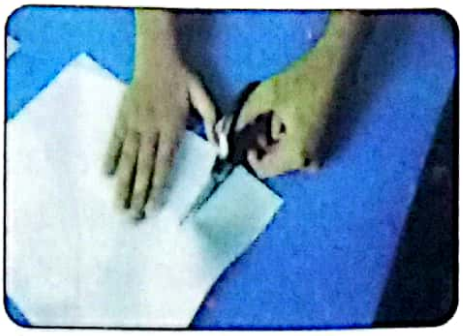
Folding paper

Cutting Paper and Cardboard

Paper can be cut easily by using a paper cutter or a knife. Paper is folded along the line where it is to be cut. Blade of paper knife is inserted inside the fold. Then pressing the fold with one hand, the paper cutter is pushed forward as shown in Figure. Paper and cardboard can also be cut with the help of scissors. It is better if we draw a line before start cutting and then cut along the line carefully.



Cutting paper with cutter



Cutting paper with scissors

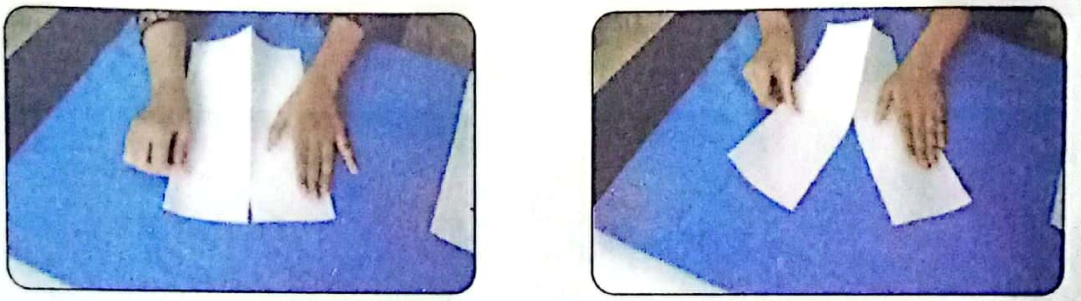
Quick Quiz

Why is use of paper cutter better than the scissors?

Tearing

Activity 10.2

1. If you want to tear apart a paper, first fold it and make a crease. Tear a little of it at edge by pulling it apart on both sides with your two hands.
2. Then spread the paper on a flat surface. Keep on pressing the paper on one side of crease with your one hand, pull away the other part of the paper with your second hand.



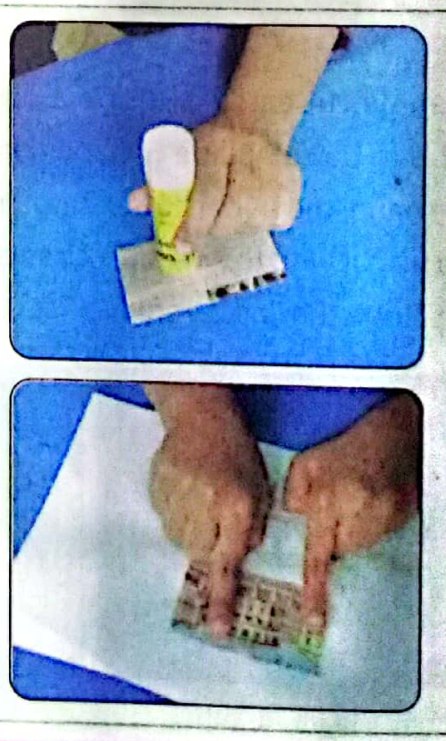
Tearing from the crease

Pasting a Paper

Normally, gum or glue is applied on the back side of the paper to be pasted.

Activity 10.3

1. Put the paper on a flat surface with its front side facing downward. Then apply the glue evenly on all over the paper.
2. Pick the paper up and place it carefully on the desired place keeping the glued side downward. Rub it with your finger to paste it evenly.



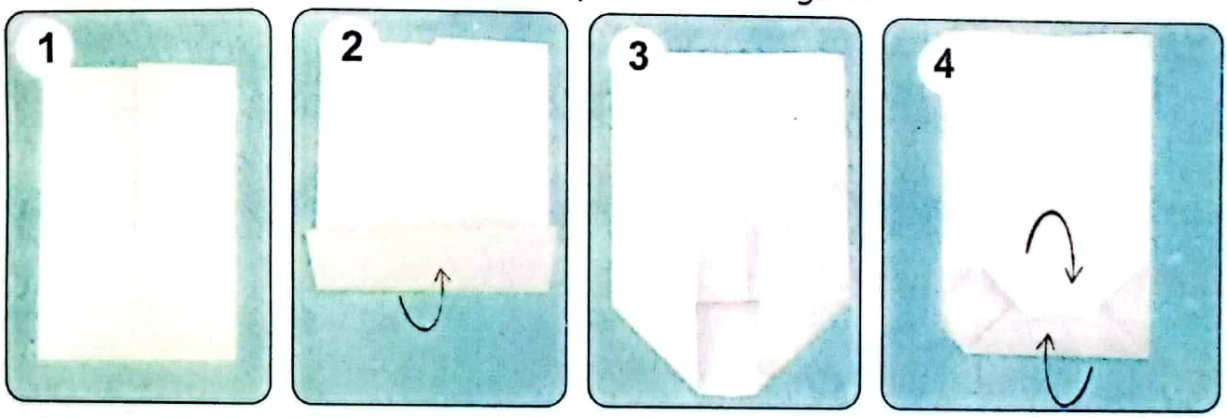
Making a Paper Bag

When we buy things from a shop, the shopkeeper puts these things in a paper bag so that we can take them home easily. Let us know how a paper bag can be made?

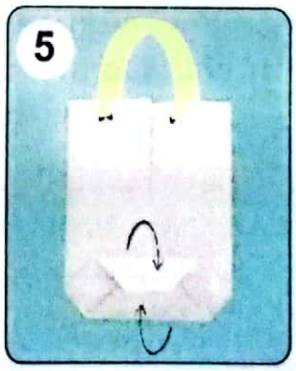
Activity 10.4

You need a sheet of paper (A4 Size) and glue for it.

1. Fold the sheet from two sides such that the two edges overlap in the middle. Glue the edges to join them together.
2. Fold a small part from the bottom inward as shown by a curved arrow.
3. Pull apart both sides of the folded flap as shown in Figure.



4. Fold up a little more than half of the lower flap. Repeat the same for the upper flap and paste over the lower flap by using glue. Your paper bag is ready. You can open it from the top to put anything in it.
5. You can attach two strips on both sides on top of the bag to hold it.



Making Envelope

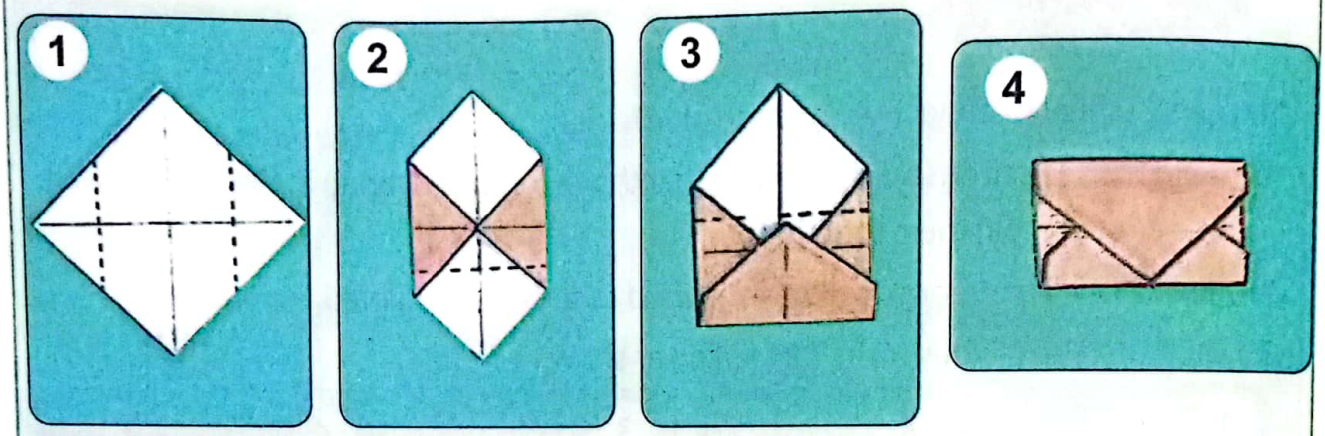
Activity 10.5

1. Take a paper of square shape. Fold the paper vertically in half. Open this fold and fold it horizontally in half. Then open it. Place the paper on the table in such a way that its corners be on vertical and horizontal lines.

Do you know?

Polythene shoppers spread around are big cause of trash and sewage blockage. Harmful gases are produced when they are burnt. Therefore, it is advised to use paper bags instead of polythene shoppers.

2. Fold the left corner to meet at the centre. Repeat with the right corner.
3. Fold the bottom corner up a little above the centre. Apply glue along its edges and fix it on the sides of envelop

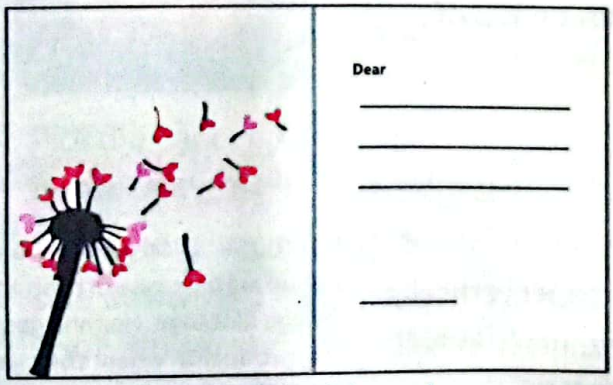


4. Similarly fold the top corner upto a little below the centre. This becomes the top flap. This can be glued after putting a card or a letter in the envelope.

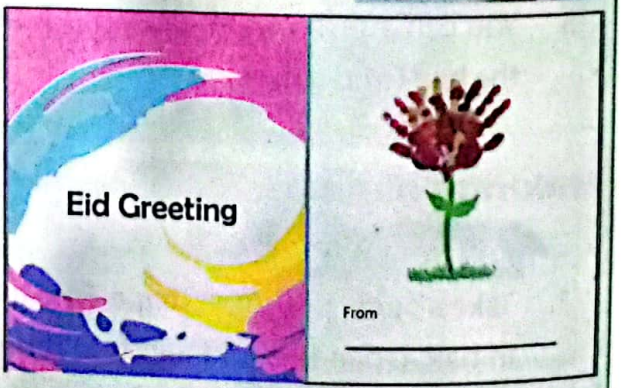
Making a Greeting Card

Activity 10.6

1. Cut a card in the size of your choice. Create or trace a design of balloons and ribbons on it with a pencil. Express your sentiments by writing "Eid Greeting".
2. Fill colours in it using markers.



Inner of the card



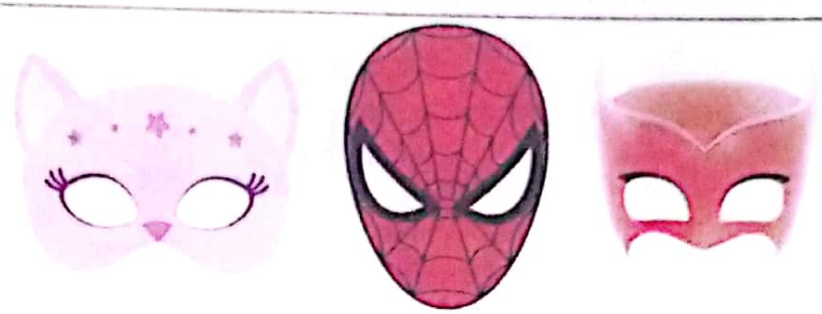
Outer of the card

Make a card for your teacher or parents.

Activity 10.7

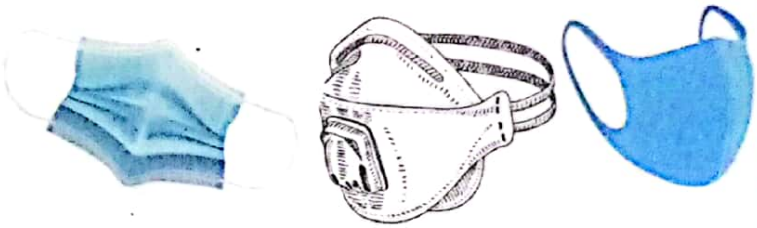
Making Mask

Make face masks of various designs using cardboard or chart paper yourself.



Interesting Information

Face mask made of clothes are used to protect from germs to protect from infectious diseases during pandemic.



Activity 10.8

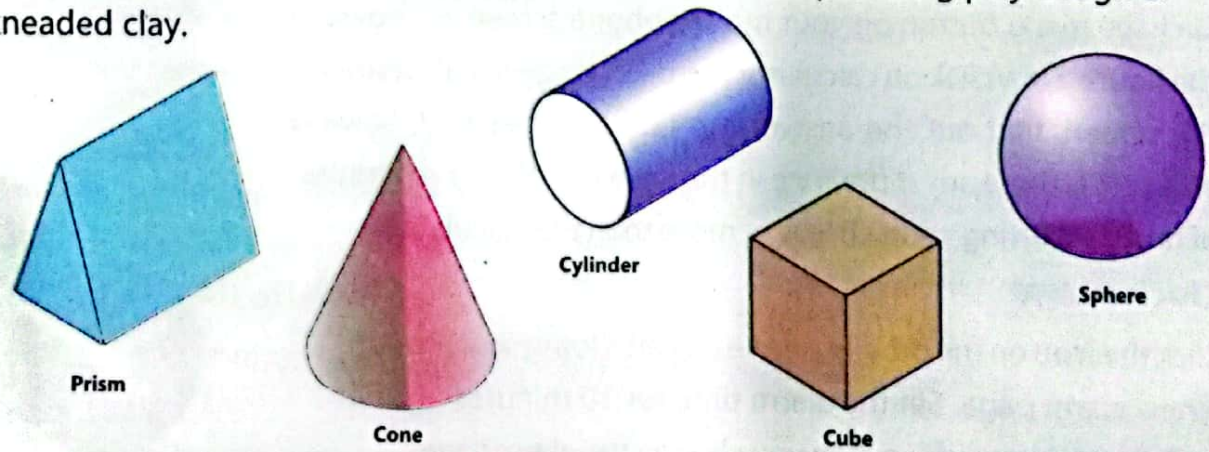
Preparation of Clay for Making Models

1. Take some clay.
2. Mix a little water in it and make a dough of clay.
3. Stretch and compress it many times like a dough of flour which is made for chappati / bread.
4. This dough of clay is called kneaded clay which can be used for making clay models.

Let us learn to make the models of various shapes using kneaded clay.

Activity 10.9

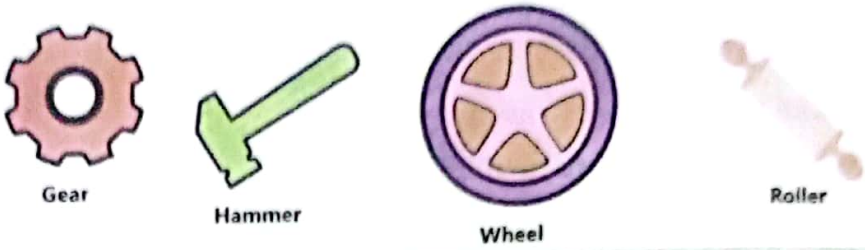
Do you recognize the following shapes? Make these shapes using play dough or kneaded clay.



Can you make any other shape other than the given above?

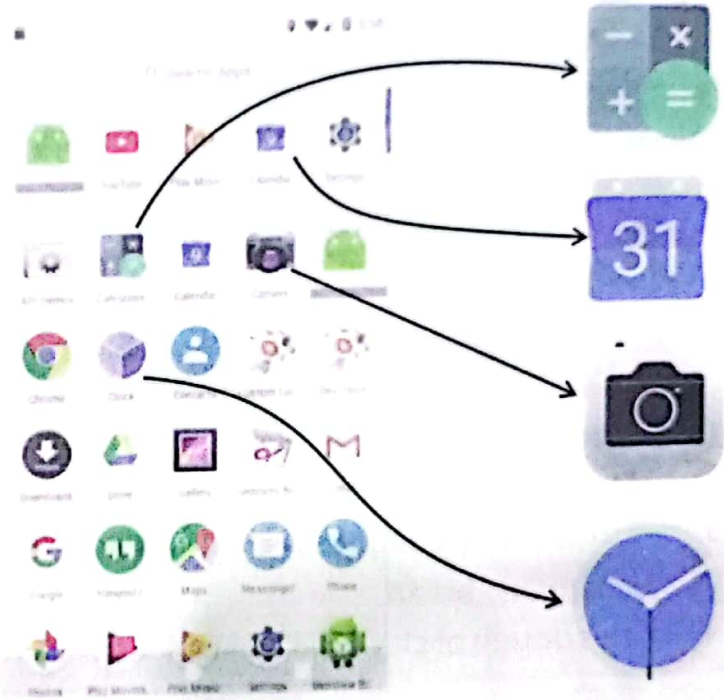
Activity 10.10

Make a model of given shapes using play dough or kneaded clay.



Use of Mobile Phone

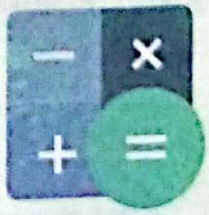
Mobile phone is usually used to make a call. The smart phone has got many Apps which are very helpful to us. For example, it can be used as an alarm clock, calendar and also as a camera. Let us learn some uses of mobile phone.



Activity 10.11

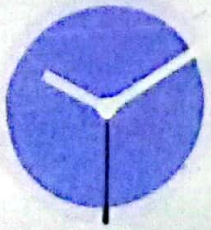
Calculator

Click the menu button on your mobile phone screen as shown in the figure. Now click on calculator icon. As you get a calculator on the screen, find out the answer for 129x27. After that, solve it yourself. Is there any difference in the answers? Was the duration of time for solving yourself less or more than the calculator?


Calculator

Clock Alarm

Click the icon on the mobile phone screen. Doing so will open a new alarm page. Set the alarm time for 10 minutes after it and observe its working. Can you change the alarm tone?

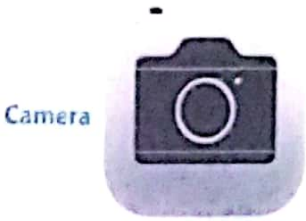

Clock

Calendar

Tap the calendar icon. As the calendar appears on the screen, find the day of your birthday. Does this calendar indicate the important days of the year?

Camera

Click on the camera icon on your phone screen. Take snaps of your friends. How will you take your own picture? What is it called? Can you make a video also?



If you do not see any application in the menu of your mobile phone, then what can you do?

First Aid Box

A temporary and emergency care given to an injured or a sick person is called first aid. Purpose of first aid is to provide immediate relief to the victim.

Have you ever seen a First Aid Box?

First Aid Box is a collection of such items which are used to provide instant first aid to a patient or victim of an accident. A first aid box contains the following items:

First Aid Box

Handbook of First Aid Box

This book provides basic informations to measure temperature, dressing wounds, blood loss and other treatments of affected person.

Tweezers and Scissors

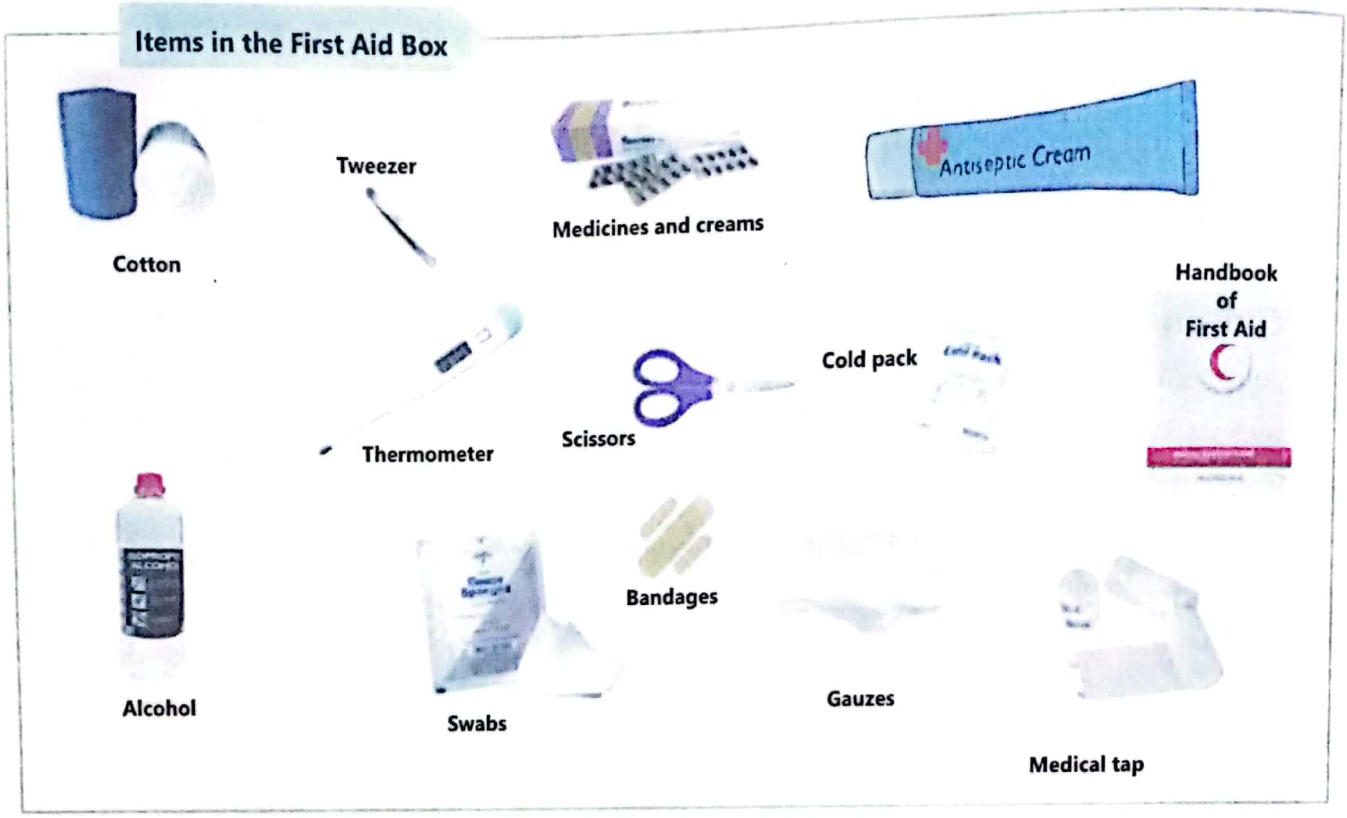
Tweezer is used to pick glass pieces, thorns and bits from the wound. The scissors is used to cut the bandages.

Cotton and Alcohol

Cotton and alcohol are used to clean the wound before bandaging.

Bandages

Sticking tapes on bandages are used for small wounds.



Gauzes

Gauzes are used to cover wounds and for absorbing blood seeping.

Medical Tape

It is used to dress up the bandages.

Medicines and Creams

Some medicines and creams are also kept in the box to relieve the pain, inflamation and minor injuries.

Instant Cold Pack

It is a pack which cools like ice on shaking. It is used to reduce inflamation and pain.

Thermometer

It is a device used to measure body temperature.

First Aid Box is available from the pharmacy or medical store. We can make our own by keeping some basic required items at a place.

Activity 10.12

Make your own First Aid Box using items available at your home.

Measuring Body Temperature using First Aid Box

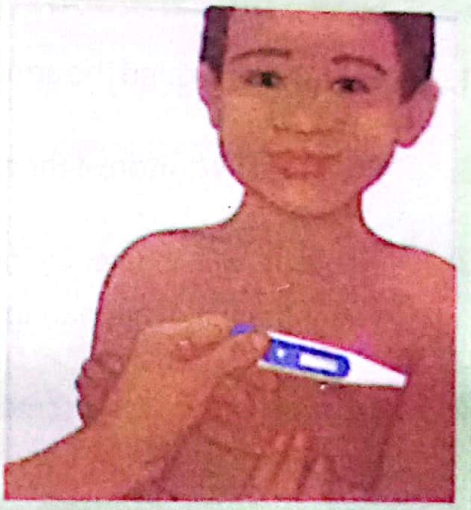
Body temperature indicates whether a person has a fever or not. Clinical thermometer and thermal strips are used to measure body temperature. Let us learn its use.

Activity 10.13

1. Take a thermal strip from the first aid box.
2. Place it on the forehead of a person or a child as shown in the Figure.
3. Keep it pressed for one minute.
4. Read the temperature shown on the scale and note it.

Activity 10.14

1. Take a digital or clinical thermometer from the first aid box. Ensure that its bulb is sterilized.
2. Give it a few jerks to bring the mercury or alcohol level down into the bulb. It is not needed for digital thermometer.
3. Put the bulb of the thermometer under the armpit of your friend for one minute.
4. Remove thermometer from armpit of your friend and read the temperature on its scale.
5. Add 1 in this reading. This will give you the correct internal temperature of the body.



Do you know?

The normal temperature of human body is 98.6°F. If the temperature of a person is more than this, it indicates fever.

Interesting Information

A doctor can measure body temperature by putting thermometer under the tongue.

Activity 10.15

Check your temperature. When doctor says that a person has 100°F fever, what does it mean?

Checking Blood Pressure

The blood pressure of a person is required to remain with in a limit for human health. Its normal limit is 120/80 mm Hg. Having high or low blood pressure can lead to different health problems.

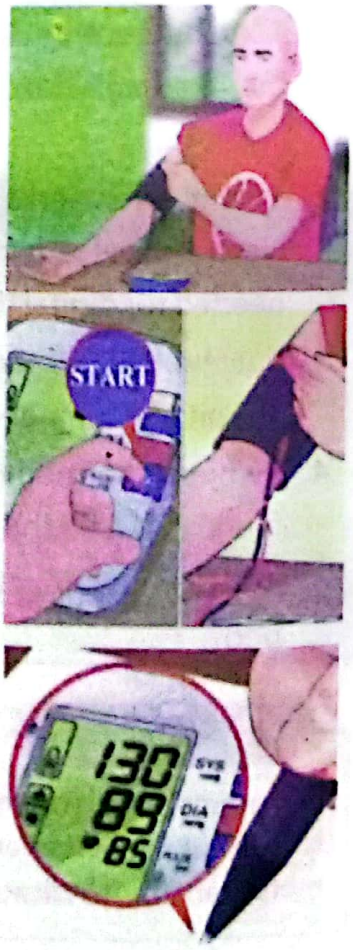
The instrument used to measure blood pressure is called blood pressure apparatus. We can also check it using digital blood pressure monitor.

Do you know?

Pressure of blood on our vessels is called blood pressure.

How to Use Digital Blood Pressure Monitor

1. Put the cuff around the arm as shown in the figure.
2. Push the ON button of the automatic model.
3. The cuff will inflate by filling air inside it and reading will start appearing on the display screen.
4. Look at the display screem to see your blood pressure reading.
5. Push the exhaust button to release the air from the cuff and remove it from the arm.
6. Keep the record of blood pressure of the patients.



Key Points

1. Paper or cardboard is used to make various objects and pattern.
2. Envelopes, bags, cards and face masks can be made using paper.
3. Play dough is soft material like clay of some colour. It can be used to make shapes and models of various objects.
4. Mobile phone is basically used for making calls.
5. We can use mobile phone as a calculator, alarm clock and a calendar.
6. Mobile phone is also used to take pictures.
7. First Aid Box has a collection of such items which are used to provide first aid to victims of some accidents.
8. Clinical or digital thermometer is used to measure the human body temperature.
9. Blood pressure monitor is used to check the blood pressure of a person.

Weblinks

Use the following weblinks to enhance your knowledge about the topics in this chapter .

Origami for kids	1.	https://www.natgeokids.com/uk/kids-club/entertainment/general-entertainment/ origami-for-kids/
Thermometer	2.	https://www.nationalgeographic.org/encyclopedia/thermometer/
First Aid kit	3.	https://www.nationalgeographic.com/news/2017/03/sponsor-content-not-all-first-aid-kids-are-created-equal/

Exercises

1. Tick (✓) the correct answer.

i. Clinical thermometer is used to:

a. to check wounds
b. measure inflamation in the body
c. check fever
d. measure blood pressure

ii. The number of corners of a prism are:

a. 3
b. 4
c. 5
d. 6

iii. The surfaces of a cube are:

a. 3 b. 4

c. 6 d. 8

iv. Taking photographs of oneself is known as:

a. portrait b. selfie

c. landscape d. oneself

v. Which item is used to reduce inflamation as a first aid?

a. medical tape b. tweezer

c. thermometer d. instant cold pack

vi. The blood pressure 160/100 is:

a. low blood pressure b. high blood pressure

c. normal blood pressure d. not possible

2. Write short answer.

i. What is the difference between a cone and a prism?

ii. Can an envelope be made from a square shape paper? Explain.

iii. Why a line is drawn on a paper before cutting it with a scissors?

iv. Why a clinical thermometer is given jerks for a few times before using it?

v. Why any soil cannot be used to make a model?

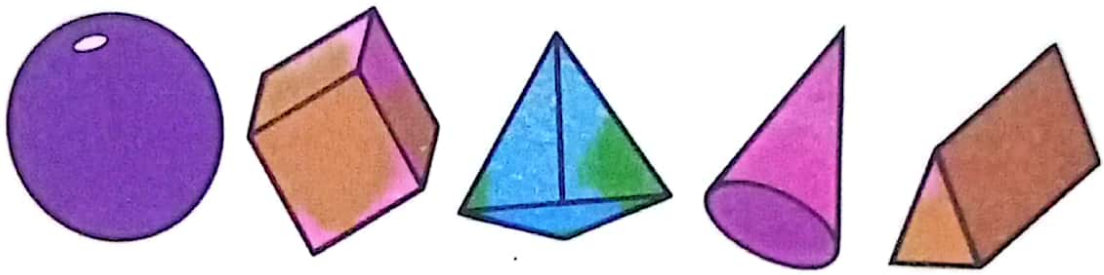
3. Constructive Response Questions.

i. A circular shape is cut as shown in the following figure. What is the value in fraction of the total in each case? Write below each shape.

_____ _____ _____ _____ _____

ii. Identify the various items used in everyday life which look like a circle, a cube, a cylinder, a cone and a prism. Give two examples of each shape.

iii. Write below each shape, number of its corners, edges and surfaces.



Corners	_____	_____	_____	_____	_____
Edges	_____	_____	_____	_____	_____
Surfaces	_____	_____	_____	_____	_____

4. Investigate:

Why mobile phone technology is progressing rapidly? How will be the mobile phone of the future?

5. Project — Making a Nest

For the project you will need an empty pack of juices or milk, cotton or cloth, various items for decoration.

1. Cut the empty pack side for entering and leaving the birds as shown in the figure.
2. Make it comfortable using cotton and cloths.
3. Mak a hole and insert a wire through the upper edge so that it can be hanged on a tree.
4. Use colour ribbon and cardboard to make it fancy.
5. Hang it somewhere near your home or school so that birds can use it. Observe if the birds use it as their nest or not.

GLOSSARY

Abiotic components:	Non-living components of ecosystem (air, water, light, soil)
Anemometer:	Instrument to measure the direction and speed of air (wind)
Axial motion:	Movement of Earth around its own axis
Balanced diet:	Diet in which all components of food are present in proper amounts
Barometer:	Instrument to measure the pressure of air
Biodiversity:	Number of the kinds of organisms present in a specific region
Biotic components:	Living organisms in an ecosystem (producer, consumers, decomposers)
Climate:	General weather conditions of a region
Consumer:	Organisms which get food from other organisms (e.g. animals)
Contagious disease:	A disease which can transmit from one individual to others
Decomposer:	Organisms which decompose the dead bodies into simple components (some bacteria and fungi)
Echo:	Sound which is heard when it bounces back after striking a body
Ecosystem:	Collective system of the living and non-living components of environment
Energy:	Ability to do work
Environment:	All objects present in the surrounding of an organism
Equator:	Line which divides the Earth into two equal parts
Fever:	Condition in which the temperature of body rises beyond 98.6 °F
Filtration:	Method of separating the harmful matter from water through filter
Flowering plants:	The plants which have flowers
Food chain:	Series of organisms, where one organism eats another and then is eaten by another organism
Force:	Pull or push
Friction:	Force that opposes motion of a body

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Friction:	Force that opposes motion of a body

Thermal power station: Place where electricity is generated by burning coal, oil or gas

Thermometer: Instrument to measure temperature

Vaccination: Creating defence against diseases by introducing the dead or weakened germs of diseases

Vertebrate: Animals which have backbone

Vibration: Quick back and forth movements in a body

Volume: Space occupied by a body

Weather: Daily conditions of the environment of an area

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- بدعنوانی ملکی ترقی کی راہ میں سب سے بڑی رکاوٹ ہے۔
- بدعنوانی اخلاقی دیوالیہ پن کو جنم دیتی ہے۔
- بدعنوانی سے خود بھی بچیں اور دوسروں کو بھی روکیں۔

قومی احتساب بیورو بلوچستان

قومی ترانہ

پاک سَرزمین شادباد کِشورِ حَسین شادباد
تُو نِشانِ عَزمِ عالی شان اَرضِ پاکِستان
مرکزِ یقین شادباد
پاک سَرزمین کا نِظام قُوّتِ اُخُوّتِ عوام
قوم، مُلک، سَلطنت پائِندہ تابِندہ باد
شادباد منزِلِ مُراد
پَرچَمِ سِتارہ و ہِلال رَہبرِ تَرَقّی و کمال
ترجمانِ ماضی، شانِ حال جانِ اِستِقبال
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