General Science Mathematics

Grade 4

2021-22

Based on Single National Curriculum 2020

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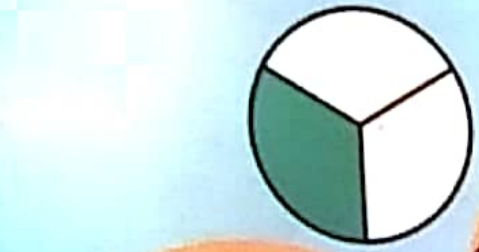

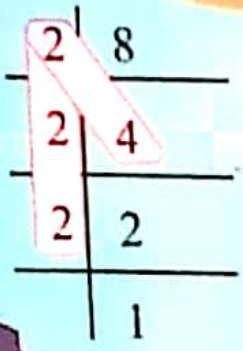

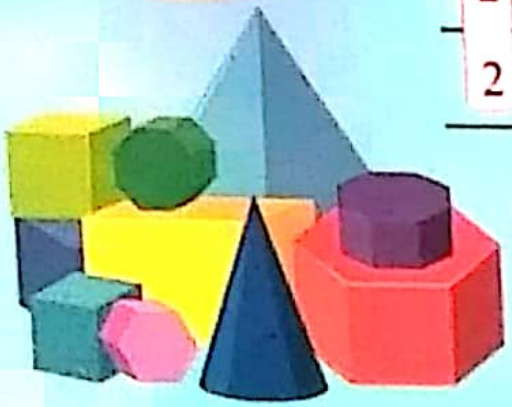

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GOVERNMENT OF THE PUNJAB

"Education is a matter of life and death for Pakistan. The world is progressing so rapidly that without requisite advance in education not only shall we be left behind others but may be wiped out altogether."

(September 28, 1947, Karachi)

Quaid-e-Azam
Muhammad Ali Jinnah
Founder of Pakistan

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تو نشانِ عزمِ عالی شان — ارضِ پاکستان
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ترجمانِ ماضی، شانِ حال — جانِ استقبال
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بِسۡمِ اللّٰہِ الرَّحۡمٰنِ الرَّحِیۡمِ

(In the Name of Allah, the Most Compassionate, the Most Merciful.)

GENERAL SCIENCE

4

Based on Single National Curriculum 2020

ONE NATION, ONE CURRICULUM

PUNJAB CURRICULUM AND
TEXTBOOK BOARD, LAHORE

This textbook is based on Single National Curriculum 2020 and has been approved by the National Review Committee.

CONTENTS

Chapter	Contents	Page No.
1	Characteristics and Life Process of Organisms	1
2	Ecosystem	20
3	Human Health	32
4	Matter and its Characteristics	44
5	Forms of Energy and Energy Transfer	58
6	Force and Motion	69
7	Earth and its Resources	83
8	Earth's Weather and its Climate	95
9	Solar System and our Earth	103
10	Technology in Everyday Life	116
	Glossary	132

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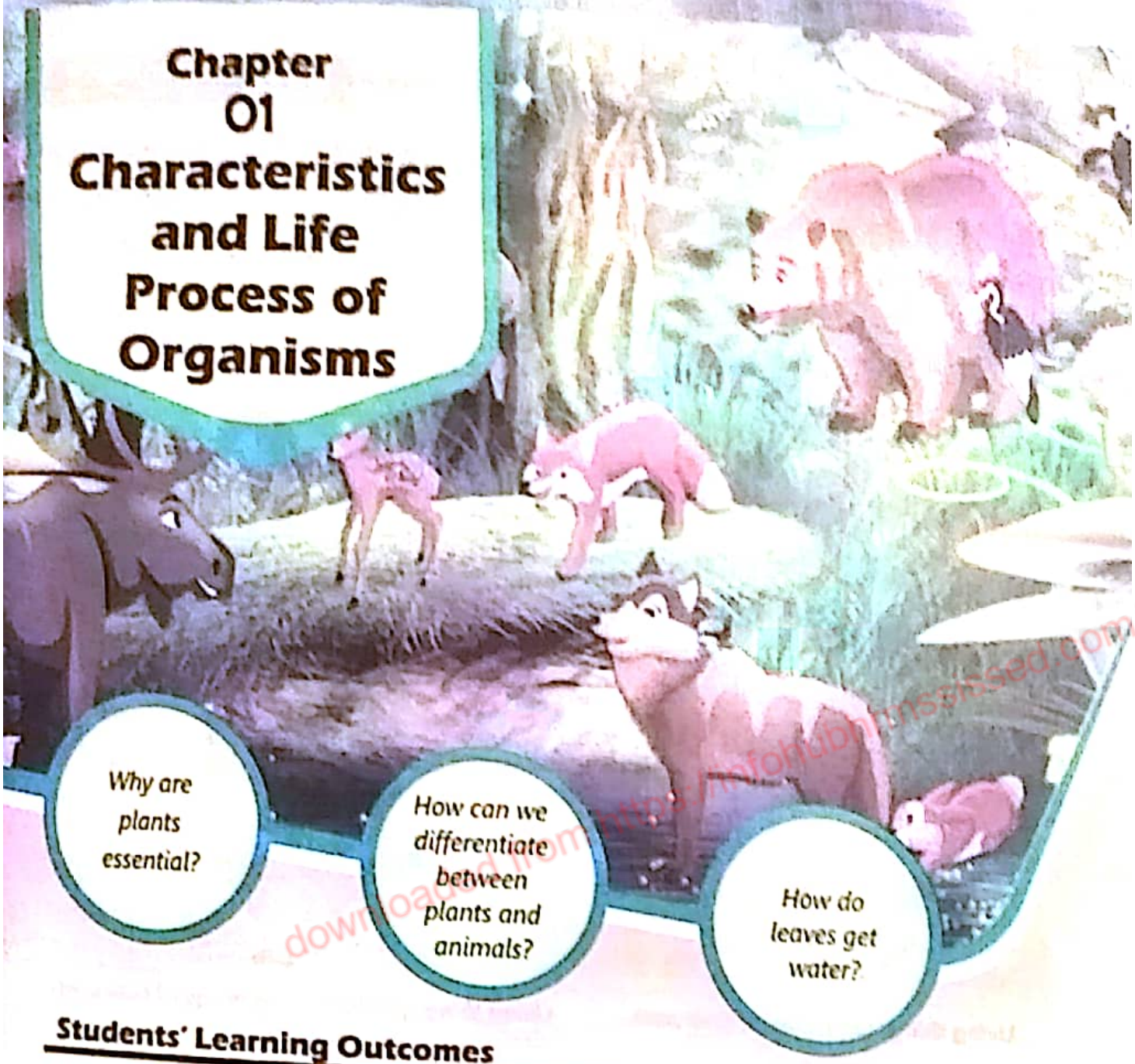
Chapter 01
Characteristics and Life Process of Organisms



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 terms of flowering and non-flowering plants 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 anchor the plant, leaves make food, the stem transports water and food, flowers produce seeds, and seeds produce new plants.

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

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 can grow.

Living things can sense.

- Can you think of some more qualities of living things?

Point to Ponder!

List down a 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 animals like butterfly, sparrow, goat, cow and fish. You might have also seen plants like trees of apples, bananas, orange and mangoes. 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 these two living things.

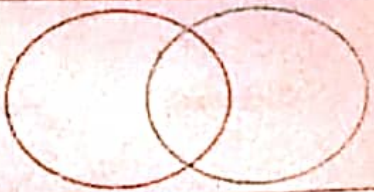
Plants are:
1. usually green in colour.
2. able to make their own food.
3. unable to move from one place to the other.

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

Animals are:
1. usually of various colours.
2. dependent on plants and other animals for their food .
3. able to move from one place to the other.

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 excretion 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 of your neck. Now move your hand downwards. 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 vertebr column or backbone.

Vertebrates: Animals having backbone.

Invertebrates: Animals having no backbone.

Pictures of some vertebrates are given below:

Fish Frog Lizard Pigeon Cat

Few vertebrates

Pictures of some invertebrates are given below:

Cockroach Honeybee Butterfly Starfish Millipede

Few invertebrates

Activity 1.3

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

assification of Plants

re are two major groups of plants:

- Flowering plants
- Non-flowering plants

Flowering Plants

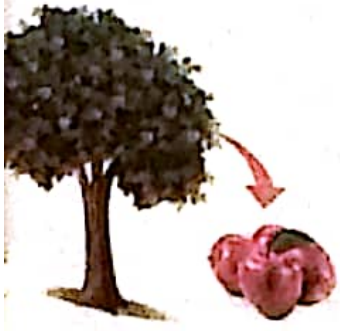
nts on which flowers grow are called flowering plants. Mustard, flower, rose, guava and lemon are examples of flowering plants. wering plants may be herbs, shrubs, and trees. Flowering plants are of ious colours and sizes.

tures of some flowering plants are given below:

Mustard

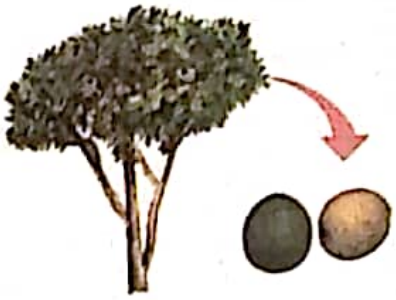
Rose

Sunflower



Apple

Lemon



Guava

Flowering plants

2. Non-Flowering Plants

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

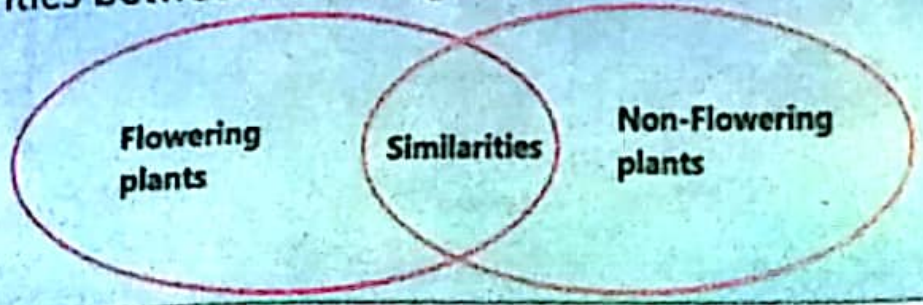
Non-flowering plants

Interesting Information

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

Activity 1.4

Draw this venn diagram in your scrapbook and write the difference
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 structures.

The number of the types of living things present 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 living things 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 in temperature on Earth and scarcity of water.

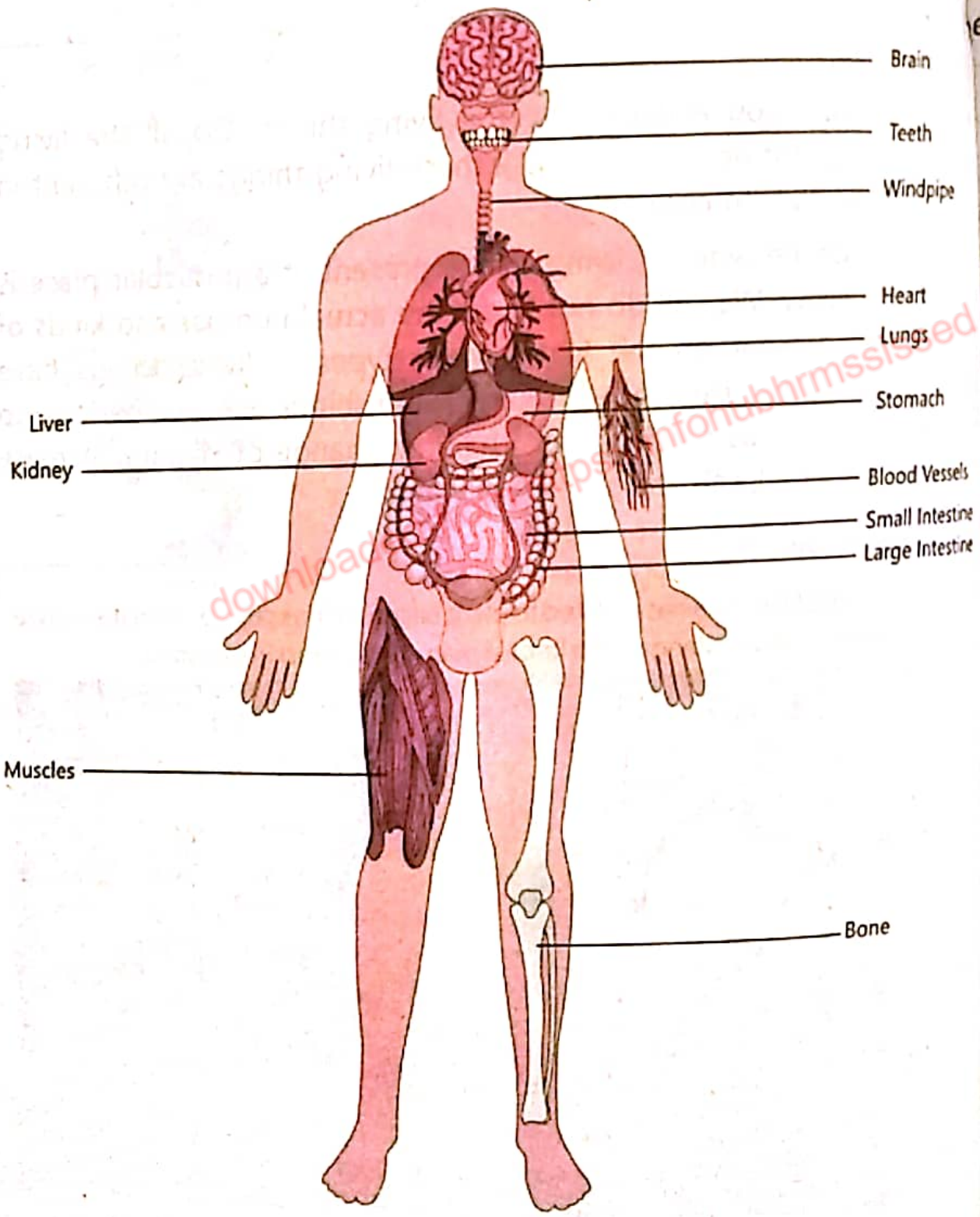
Do you know?

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.

The Changa Manga forest

Major Body Parts, Vital Organs and their Function

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



Major human body parts

eeth

an you swallow large pieces of bread or meat without chewing? Our eeth break our food into small pieces. There are four types of teeth that erform different roles in breaking the food.

Name	Picture	Functions
Incisor		Biting and cutting food
Canine		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. A tiger uses its canines for piercing the prey and rat uses its incisors for biting food or killing its prey.

Skull of a rat

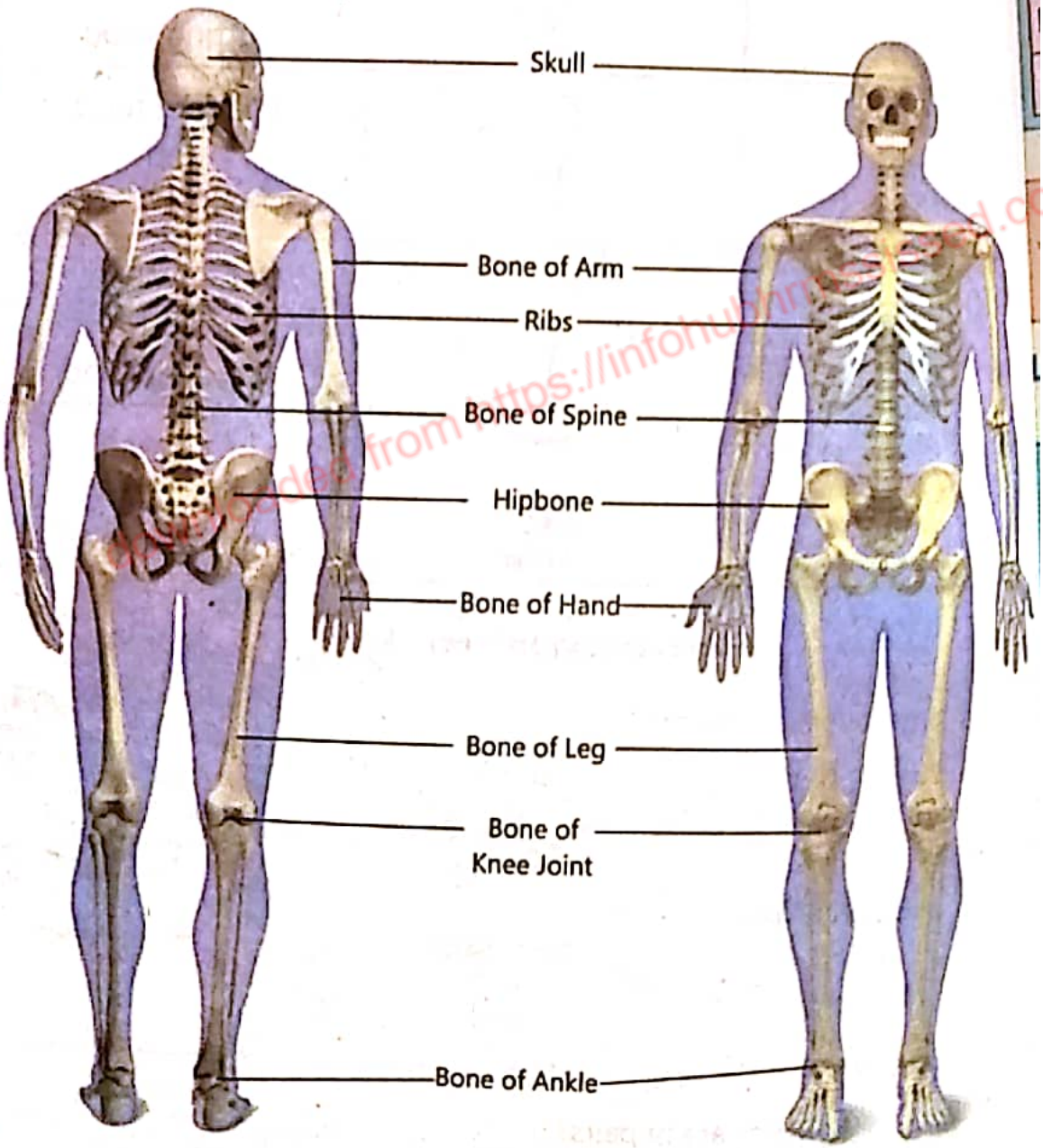
Skull of a tiger

Do you know?

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

Bones

Press any bone of your body. Is it hard or soft? Most bones are
They are of various sizes and shapes. For example the bones of th
are longer than those of fingers. All the bones are united wi
another at joints. All bones of the body make a frame called ske
Can you tell the functions of bones? What will happen if there are
bones in the human body?



Bones of the human body

Activity 1.6

Complete the table.

Name of the Bone	Function
Skull	
Ribs	
Bones of the hand	
Bones of the leg	

For Your Information

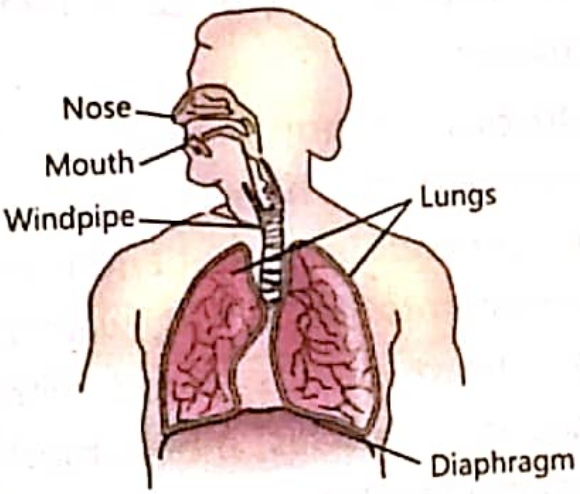
There are 206 bones in the human skeleton. The bones of the arm and leg are hollow. They have bone marrow. Blood is produced in bone marrow.

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 a windpipe?

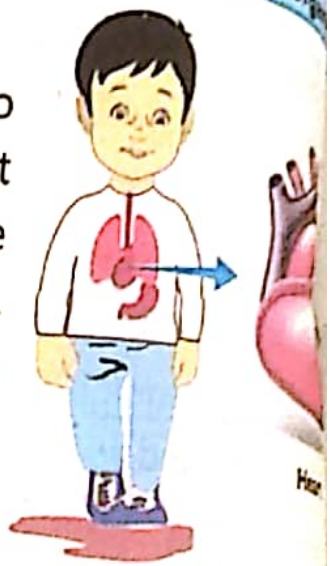
When we breathe, which part of our body is filled with air? During breathing air enters our lungs through nose. From nose, air goes into a windpipe. The windpipe opens in two lungs. The lungs are surrounded by ribs. Our lungs keep on expanding and contracting. The exchange of oxygen between blood and air takes place in the lungs.



Lungs

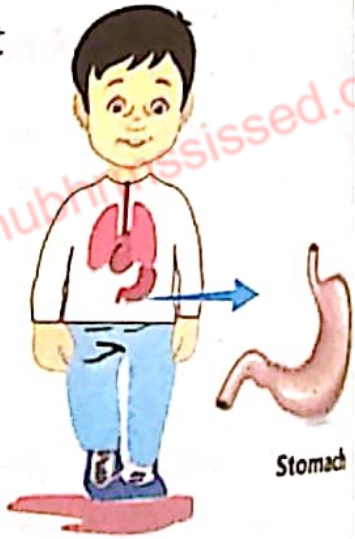
Heart

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



Stomach

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



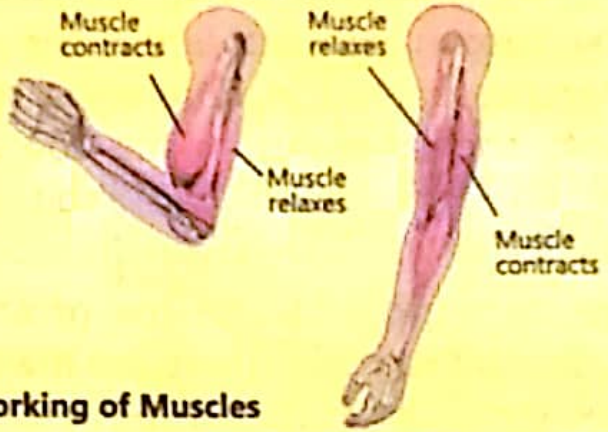
Muscles

Muscles are present in various parts of the body. Muscles are also attached with bones. They are soft are can contract and relax. They are pink or red in colour. 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 heart 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.

Do you know?

When the muscles attached with bones contract, they pull the bones. Due to this, bones move at the joint. A joint is where bones are connected, for example, elbow, wrist, knee etc. Muscles work in pairs. When one muscle contracts the other relaxes.



Working of Muscles

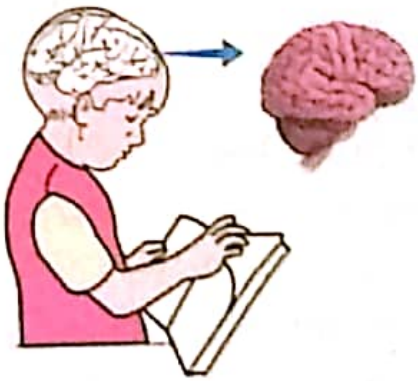
Interesting Information

When we smile, 14 muscles 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 the 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.

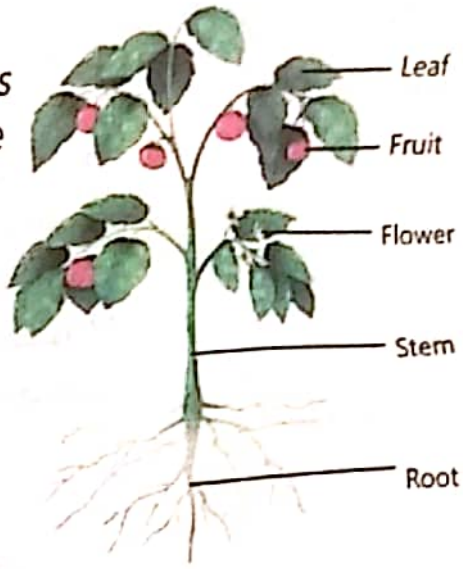
There are five important parts in a flowering plant. These are called root, stem, leaf, flower and seed. Each part performs its particular function.

Root

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.

Stem

The stem grows above the ground. A stem has many branches. There are many leaves on the stem and its branches. The stem transports water and minerals from roots to the leaves. It also supports the plant.

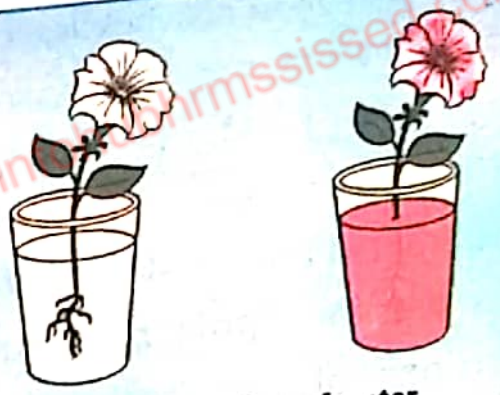


A Flowering Plant

Activity 1.9

Take two soft plants having white flowers, for example Petunia. Wash their roots thoroughly with water. Take two bottles or glasses. Pour water in both. Put few drops of red ink in one bottle. 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.



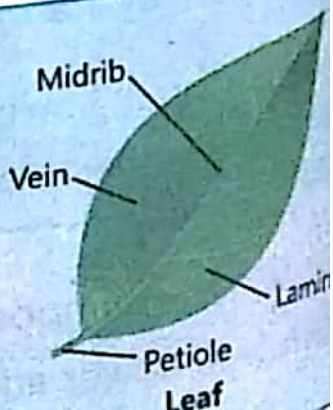
Transportation of water from roots to leaves

Leaves

Activity 1.10

Take a leaf. Draw its sketch. What is the shape of the leaf?

Collect a few leaves of various types. Keep them between newspaper and put heavy object such as, a 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, is its leaves. Leaves are of different sizes and shapes. Usually, the leaves are green. The important function of leaves is to make food for the plant.

Flowers

The flowering plants have beautiful flowers. Different plants have flowers of different sizes and colours. Fruits and seeds are formed from the flowers. Did you ever wonder about the purpose of these colourful flowers?

Flower

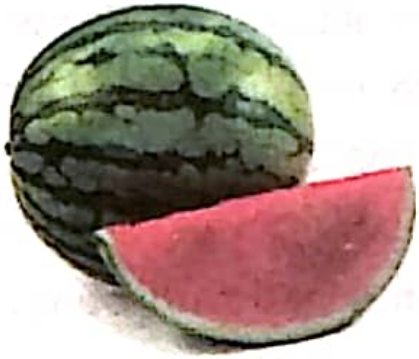
Seeds

Activity 1.11

Place soil in a box or flower pot and sow seeds in it. Pour some water on it. Daily observe the changes. You will notice tiny plants sprouting from the soil. Did you know that plants are formed by seeds?

When seeds are formed within the flower, the area surrounding the seed ripens into fruit. Some fruits such as mango, apricot, peach have only one seed. Some fruits have many seeds such as watermelon, 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 house. All the plants have become dried up. What will happen 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 th

Key Points

1. Living things are divided into two main groups; plants and anima
2. Plants make their food themselves whereas animals depend on pl or other animals for food.
3. Both plants and animals need food, sunlight, water and air.
4. Animals are divided into two groups; vertebrates and invertebrate
5. Plants are divided into two major groups; flowering and n flowering plants.
6. The number of the types of living things present in a particular plac called biodiversity.
7. Teeth, bones, lungs, heart, stomach, muscles and brain are the ma parts and vital organs of the human body.
8. The function of teeth is to chew food. Bones protect body parts a help in movements. The function of lungs is to bring air into the bo Heart pumps blood in the body. The function of stomach is to dig food. The muscles attached with bones move the body parts. T function of brain is to control the functions 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 minerals from roots to the upper parts of the plant.
12. The function of leaves is to make food and produce oxygen.
13. The function of flowers is to produce seed.
14. The seeds germinate and make 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

Exercise

1. **Tick (✓) the correct answer.**

i. What is common among butterfly, bird and bat?

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

ii. Many plants produce fruits:

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

iii. Fish are vertebrates and swim in water. What is true about fish?

(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) Flower (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 vertebrates?

(a) Have fur (b) Have more than four l

(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 types of teeth and their functions.

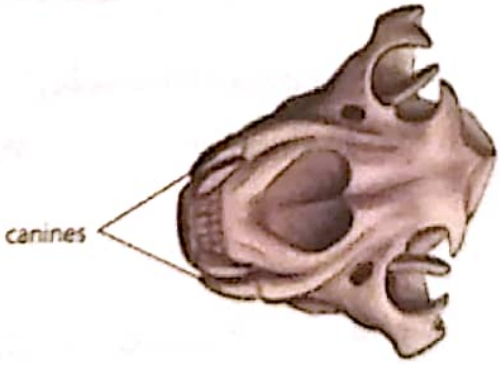
v. What functions do bones and muscles perform together?

vi. Describe the functions of lungs and heart.

3. Constructed Response Questions:

The diagrams show a tiger skull and a rat skull.

Skull of a rat



Skull of a tiger

A tiger has large canines. A rat has large incisors. Rats and Tigers 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 are invertebrates useful for humans?

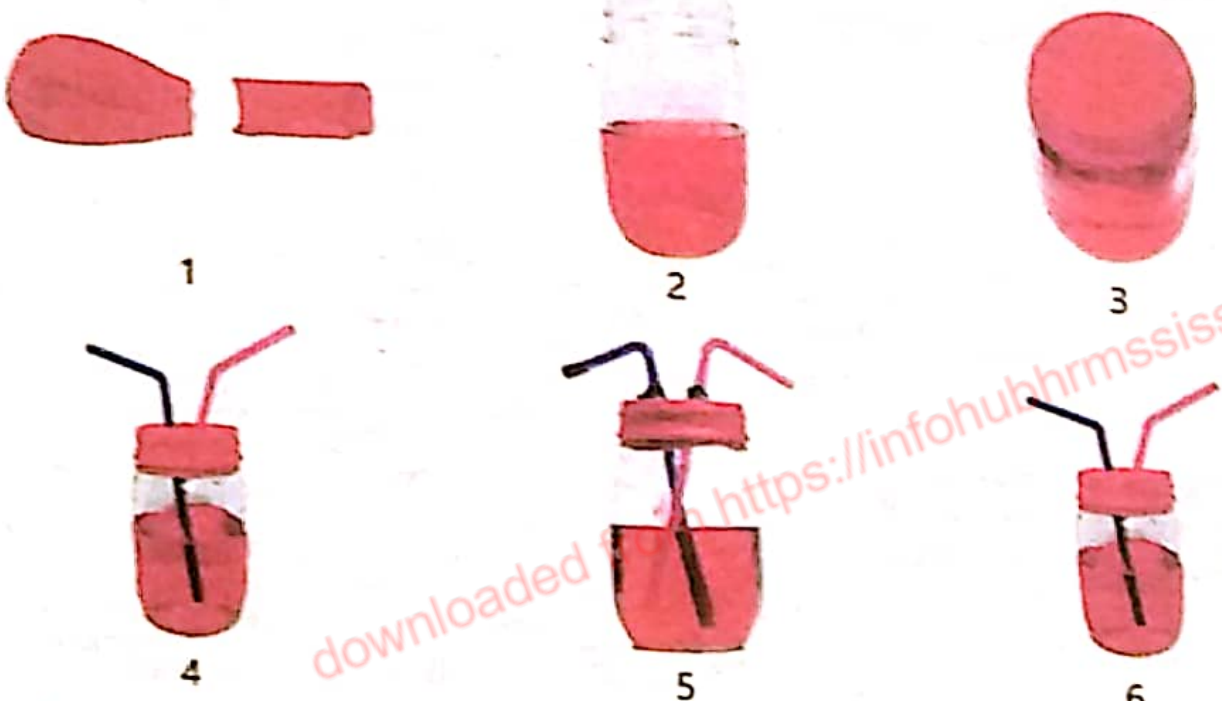
ii. What is the importance of biodiversity?

iii. What is the importance of a flower?

5. Project: Pumping of blood by the heart

List of things:

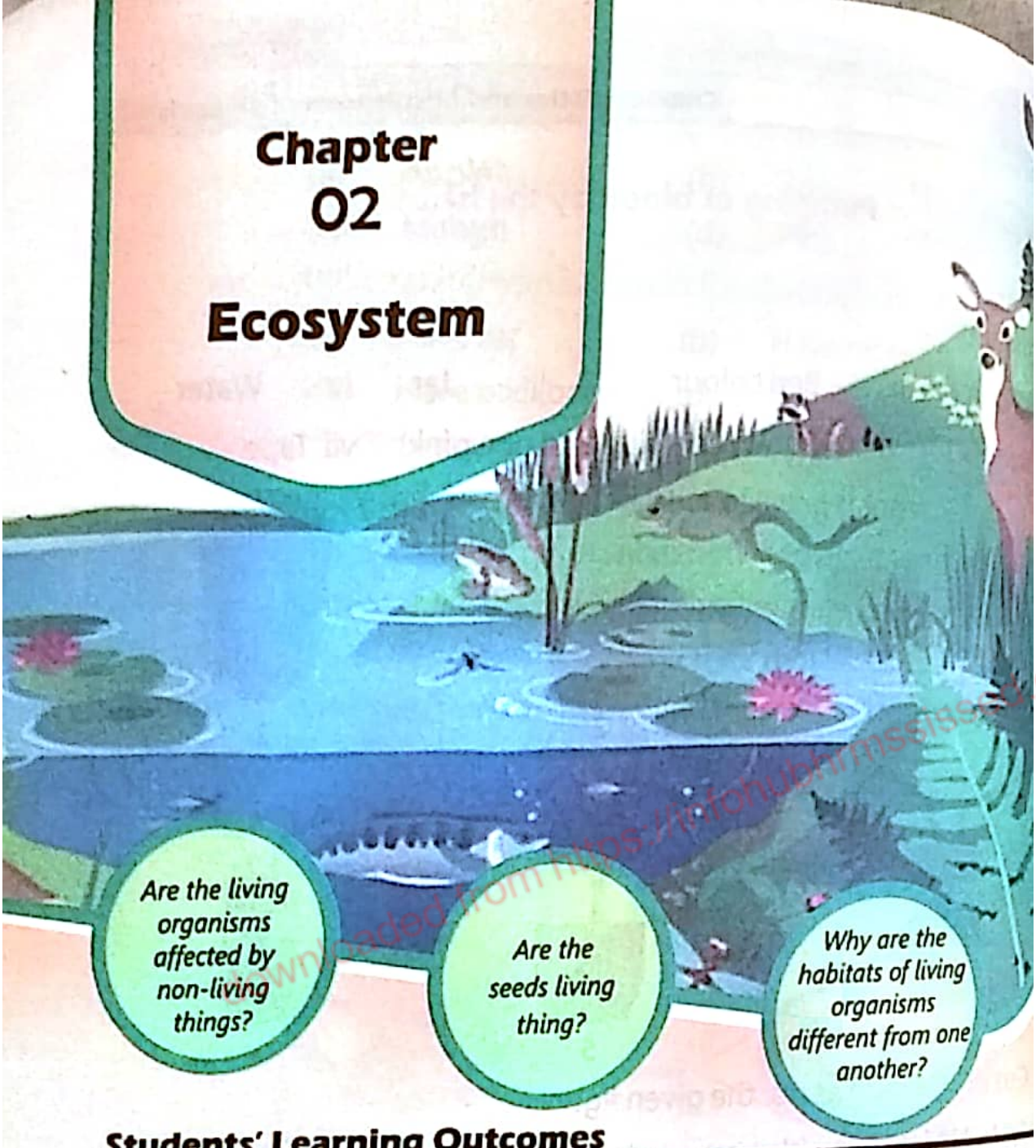
i. Balloon ii. Red colour iii. Jar iv. Water
v. Scissors vi. Straw (one blue and one pink) vii. Tape



i. Cut the balloon as per the given figure.
ii. Fill half of the jar with water and add few drops of red colour.
iii. As per the figure, cover the mouth of jar with a balloon.
iv. Make two holes on the balloon at a distance of about one inch. Put blue straw in one hole. Put pink straw in the other hole. The straws should fit into the holes, as shown in the figure.
v. Cover the holes around the straws with tape. Cover the opening of the blue straw with the tape. Keep the jar in a tray.
vi. Push the middle part of the two straws with your fingers.
vii. You will observe that red liquid comes out of the pink straw. In the same way, the blood is pumped by heart.

Chapter 02

Ecosystem



Are the living organisms affected by non-living things?

Are the seeds living thing?

Why are the habitats of living organisms different from one another?

Students' Learning Outcomes

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

1. Recognize an ecosystem (e.g., forests, ponds, rivers, grasslands and deserts).
2. Explain biotic (plants, animals and humans) and abiotic (light, temperature, soil and water) factors 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 produc own food; some animals eat plants, while animals eat the animals that eat plants).
7. Identify and describe common predator their prey.
8. Recognize and explain that some living thi an ecosystem compete with each other fo and space.
9. Recognize the value of a balanced ecosyst
10. Interpret that human actions suc urbanization, pollution and deforestation food chains in an ecosystem.
11. Identify various actions and roles that hu can play in preserving various ecosystems.

If we look around, we see a variety of living and non-living things. All the living and non-living things around us are called our environment. The environment consists of living and non-living components. Both these components interact with each other. Every living thing lives in a particular environment. Fish live in water, tigers live in forests whereas human beings live in villages and cities. The birds make nests on the trees and the ants live underground in colonies. Do you know other animals that live in particular environments?

Activity 2.1

Match the animals with their places of living:

Ecosystem

The living and non-living components of any environment make the ecosystem. Various types of ecosystems are found on our Earth for example, forests, grasslands, oceans, rivers, ponds, snowy areas and deserts.

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

Write the names of the following living things in their ecosystems:

Grass, Plant, Lotus, Thick Shrubs, Snake, Penguin, Polar Bear, Camel, Lion, Tiger, Elephant, Deer, Fish, Frog, Antelope, 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 consist of three groups, which are given below:

1. Producer

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

Producers

2. Consumer

The living things which obtain 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. All animals and humans are consumers.

Consumers

3. Decomposer

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

Fungi Bacteria

Decomposers

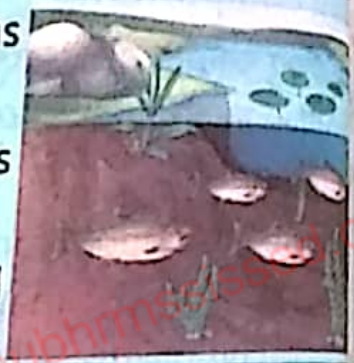
Interesting Information

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

Activity 2.3

Observe the picture and answer the questions given below.

1. Name some abiotic and biotic components in the environment.
2. In your opinion how do the abiotic and biotic components interact with each other?



Balanced Ecosystem

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

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

Point to Ponder!

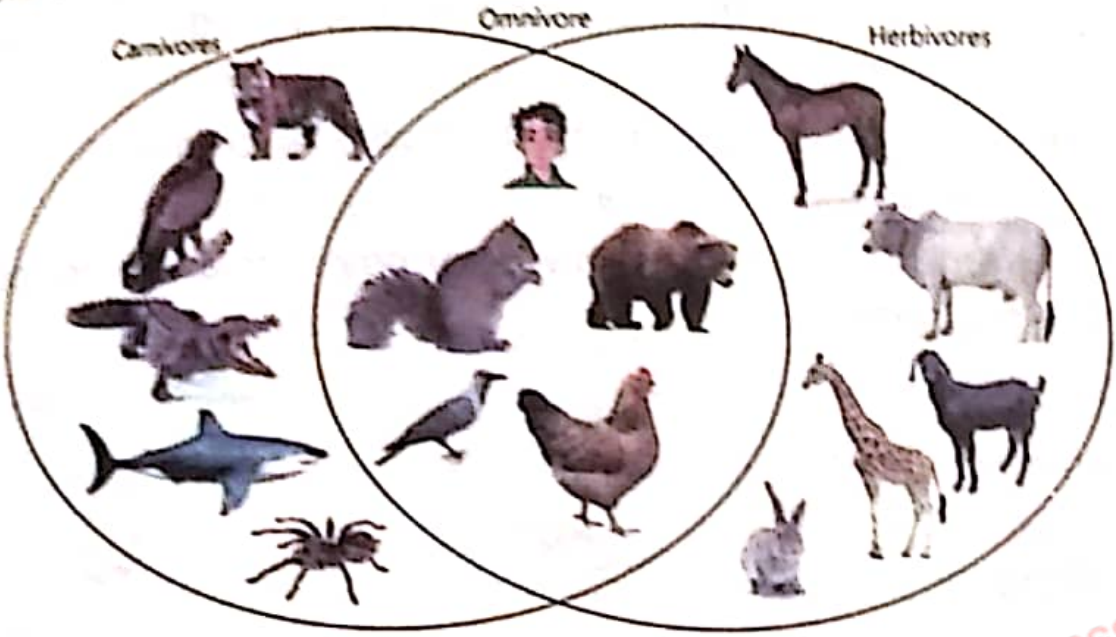
If the number of aquatic producers increases in a pond beyond the limit then fish and other living things die due to lack of oxygen. Why does it happen?

Food Chain

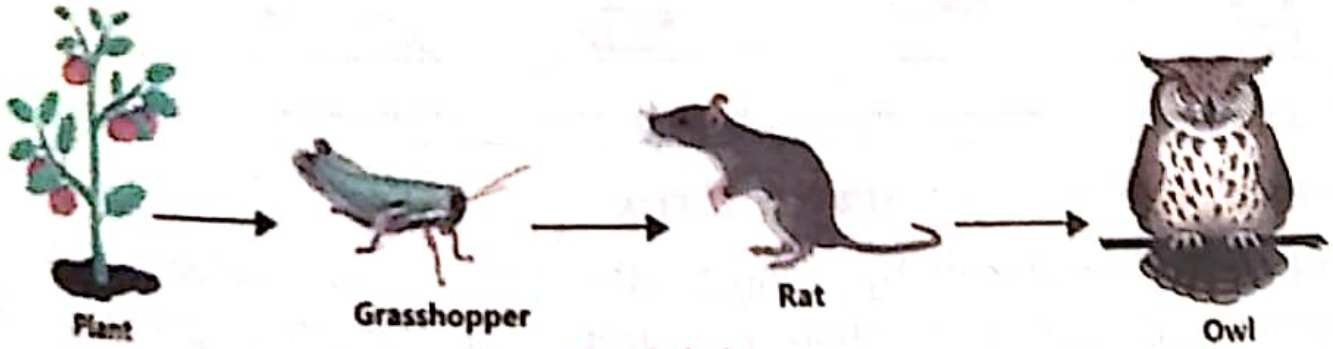
To obtain food, living things depend on one another. Plants make food with the help of sunlight and water. The animals which eat plants are called herbivores. Rabbit, goat, deer and cow are examples of herbivores.

The animals which eat other animals are called carnivores. Lion, tiger crocodile and shark are examples of carnivores.

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



Producers 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 a food chain. Grasshopper eats a plant and is eaten by a rat. The rat becomes a prey of an owl. This is an example of a food chain.



Food chain

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.

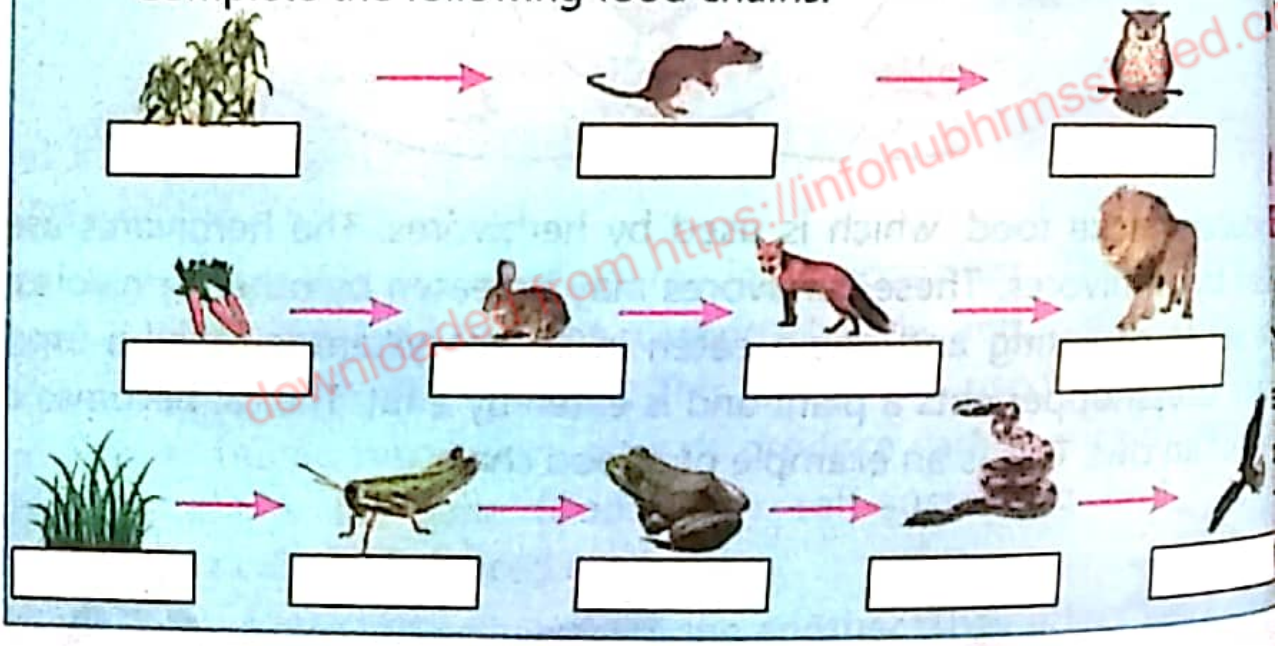
Links of Food Chain

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 thing 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 relationship between predator and prey is called predation. For example, a deer is killed and eaten by a lion. Here, the lion is the predator and deer is its prey. Similarly, goat is a 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. Due to limited resources in an ecosystem, the living things compete with each other for food and place. For example, in the grassland all the herbivore compete for grass.

Competition for food

Point to Ponder!

The animals which live in a grassland must be very alert and fast runners to survive in that environment. Why?

Impacts of Human Actions on Food Chain in an Ecosystem

In the ancient times, human actions had little impact on the environment. Now a days, there are very visible impacts of human beings on the environment. After the increase in the population, humans established cities. For this purpose, they cut forests, built roads and made 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 Humans to Save the Ecosystem

Humans have done irreversible damage to the environment, but they are trying to save the ecosystem as well. Following are some steps that are being taken to save the ecosystem.

1. Wildlife parks have been made to save the habitats of various species.

2. Tree plantation is being done and artificial forests are being created to provide 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 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 schools across Pakistan it is celebrated in August as 'tree plantation week'.

Tree Plantation

Key Points

1. The abiotic and biotic components of any environment form t ecosystem.
2. The two major components of ecosystem are abiotic and bio components.
3. The living things which prepare their own food are called produce The living things which get their food from plants or other animals a called consumers. Decomposers get their food by breaking down th dead bodies.
4. Any activity that may affect any component of an ecosystem, m 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 (consumer).
9. The animal that eats by killing other organisms is called a predator.
10. An organism that is killed and eaten by a predator is called a 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 the present day have great impact on the 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 wildlife parks and tree plantations for the protection and conservance of habitats.

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/

Exercise

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) Collection of abiotic and biotic components in ar 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 consume

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

iv. For the conservation of the 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 us then the population of birds will:

(a) increase.

(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 ecosyster

iv. Draw a simple food chain.

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

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

3. **Constructed Response Questions:**

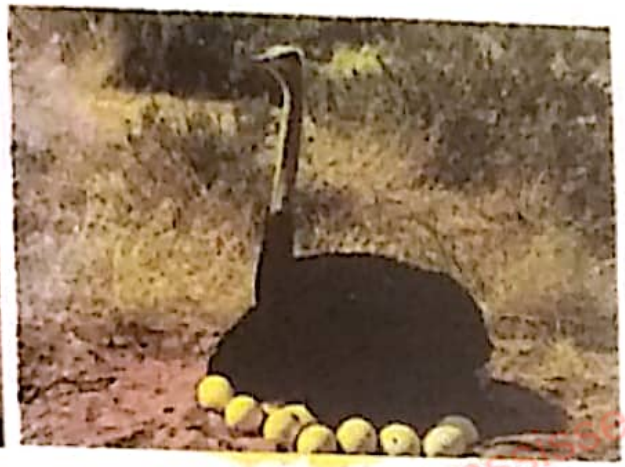
What is the relationship between biodiversity and competitio among living things in a balanced ecosystem?

4. Investigate

Ostrich are the largest and heaviest birds, but they cannot fly. To escape from the predator, they fight with their strong paws or run

away at a speed of 70 kilometre per hour. The light brown coloured female lays eggs, she sits on eggs at the day time. The black coloured male ostrich warms the eggs at night. Analyse the difference in the colour and state. Is their a relationship between the colour of an ostrich and its environment?

Female Ostrich



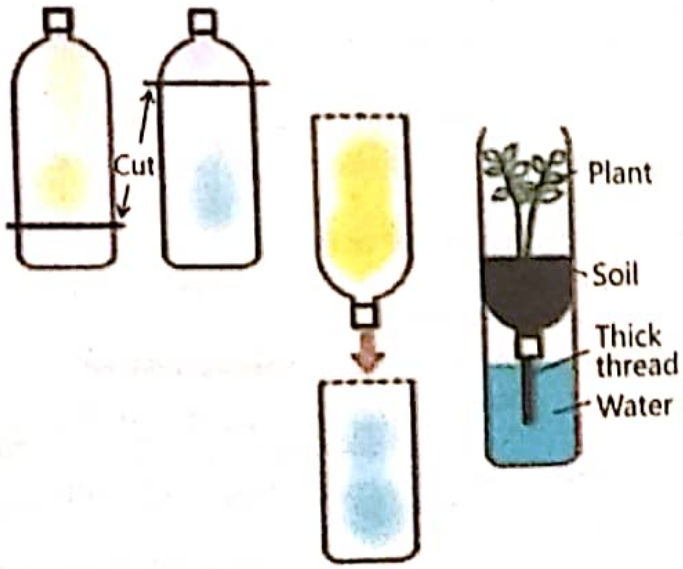
Male Ostrich

5. Project: Make a model of ecosystem using abiotic and biotic components of the ecosystem.

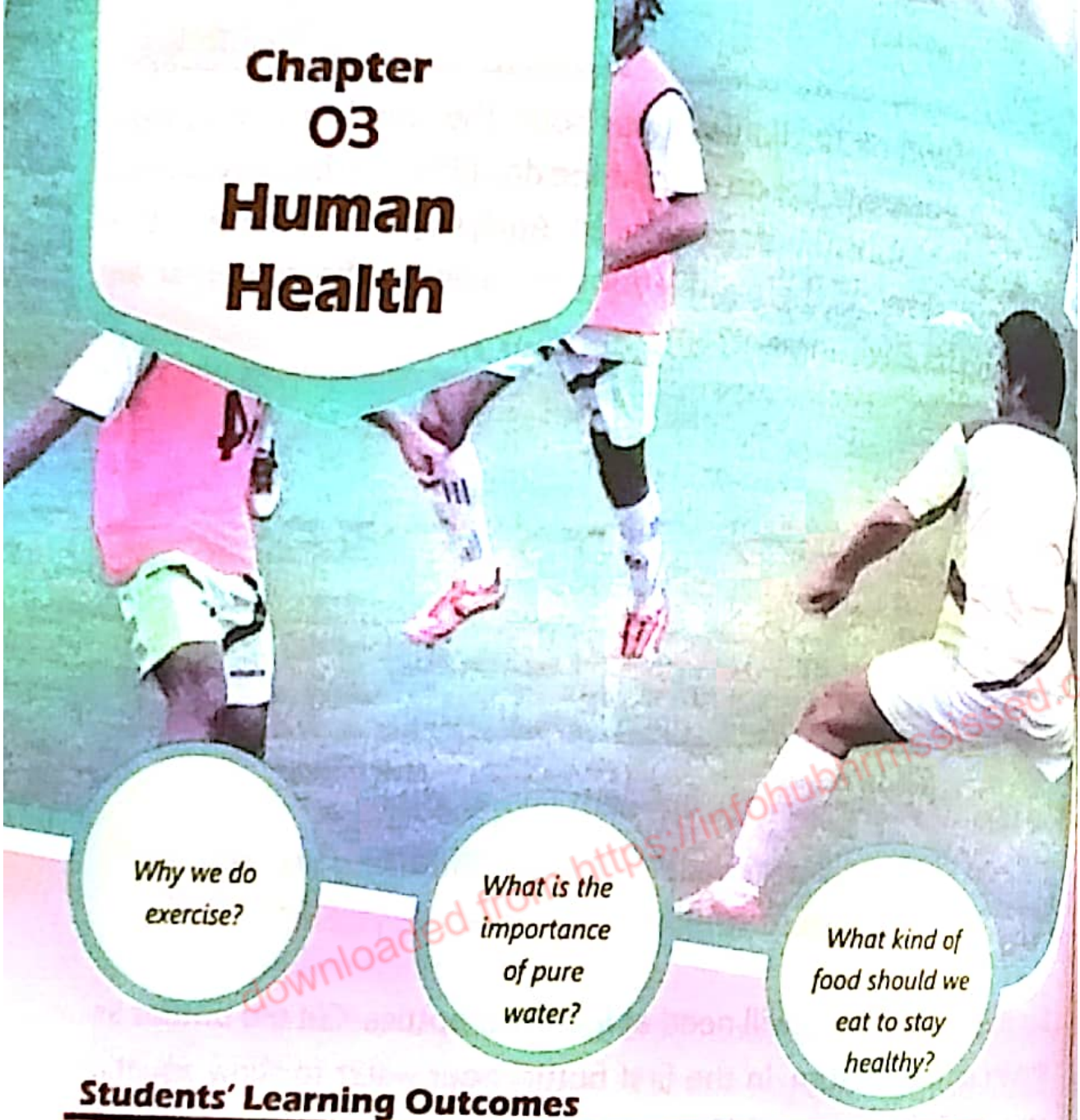
For this project, you will need at least two bottles. Cut the bottles as shown in the picture. In the first bottle, pour water to show aquatic ecosystem. In the second bottle, to show the land ecosystem, put soil and a small plant.

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, flu) and non-contagious diseases (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 promo good health (e.g., a balanced diet, drinking cle water, exercising regularly, brushing teet getting enough sleep).
7. Define balanced diet and explain its compone
8. Identify common food sources included i balanced diet (e.g., fruits, vegetables, grains, m and meat group).
9. Understand the value of clean drinking water a inquire about the factors that generally ma unclean.
10. Explore a few ways that can help make water cl and suitable for drinking (water filtration, 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. Similarly, every diseases has specific symptoms e.g., cough, fever, flu, sore throat etc.

The human body temperature is 98.6 °F or 37 °C. When our body temperature exceeds this limit, 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 a symptom of 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 the thermometer.
4. The coughing removes obstruction (e.g., dust or mucous) from the windpipe.
5. Sneezing helps us to remove the virus and bacteria present in the nose.
6. Flu is a disease as well as symptom of many diseases.

Fever

Flu

Coughing

Contagious Diseases

If any one of your class fellows suffers from flu then usually the teacher advises him to take rest at home. Why does the teacher say this? The teacher advises because the other children may not get flu. Flu is a disease which is transmitted from one person to other.

The disease which can be transmitted from one person to the other person 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 patient

Polio is caused by a particular germ called virus. This virus remains present in the throat and intestine of a person. 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 germ called bacteria. It usually affects lung TB, flu and COVID-19 are transmitted from one person to another through coughing, sneezing, use of articles of the affected person a conversation. The inflammatory condition of the liver is called hepati The germs of this disease are transmitted through polluted water, foo or blood.

Interesting Information

The causes of Covid-19 is a virus, which is called corona virus. It affects the entire body including lungs. In 2019-2020, this virus affected the entire world due to which millions of people died. It is transmitted from one person to another through social contact and respiration.

Non-Contagious Disease

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

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

Cancer can attack in any part of the body for example liver, stomach, intestine and blood. In cancer, there is uncontrolled increase in the number of cells in the affected organ. 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 in Pakistan that treat cancer.

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 our hands after using toilet.

Seven Steps for Hand Wash

Wet your hands with water and rub soap on both hands. After it, use the following steps:

1. Rub hands palm to palm.		2. Rub the back of both hands.	
3. Palm to palm with the fingers interlocked.		4. Back of fingers to opposing palm, with interlocked fingers.	
5. Rub the thumb in a rotating manner followed by the area between index finger and the thumb. Repeat for both the thumbs.		6. Rub the finger tips into the palm of your opposite hand. Repeat for both hands	
		7. Rub both wrists in a rotating manner, rinse and dry thoroughly.	

Do you know?

Global hand washing day is celebrated on 15th October of every year.

Wearing a Mask

What do you know about a mask as a protection against Covid-19? What are the benefits of wearing a mask? Mask is a protective barrier between your nose and mouth and the environment. It does not allow germs to enter from environment into the body through the nose and mouth. Do you know the proper way to wear the mask? Do not use a used mask. Dispose of the used mask in a proper way.

Proper way to put on mask

Vaccination

Do you know about vaccination? It is a method of treatment in which weak or killed germs of a disease are injected into the body. The body produces antibodies against the weak or killed germs. These antibodies remain in body to fight the germs. Government of Pakistan has launched a campaign to administer vaccine against polio. Polio is a dangerous disease, which causes lifelong disability. Polio drops should be administered to children up to the age of five years. Have you been given polio drops?

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 good health? We can maintain a good health by following few basic ways, for example:

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

Activity 3.1

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

Do you know?

If you do not sleep at night then how will you 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 the most? Which food you take the least? Can you remain healthy by taking only meat or vegetable?

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

1. **Milk group:** It includes milk and things made of milk such as butter, cheese and yogurt etc.

2. **Grain group:** It includes wheat rice, barley, pearl millet, ma... pulses etc.
3. **Meat group:** It includes beef, mutton, fish, chicken, and eg...
4. **Fruit and Vegetable group:** It includes fruits such a... orange, banana, mango, grapes, papaya etc., and vegetab... as ladyfinger, 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 groups to fulfill the needs of our body. We can strengthen our defence (immune) system by maintaining a balanced diet. A strong immune system helps as stay healthy and energetic. However, it is important to know that food requirements vary from person to person according to their age and working style. A diet that contains different kinds of food in proper quantities to fulfill 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. For example, calcium is found in milk, yogurt etc.

Point to Ponder!

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

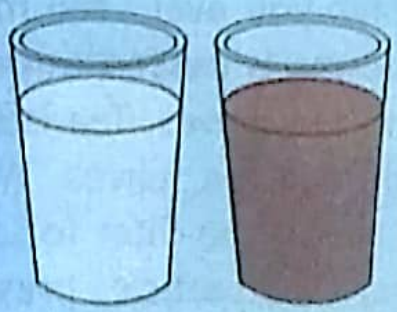
Activity 3.3

1. Design a menu for your lunch box. Give reasons why these food items were chosen?
2. Prepare a list of food items that will provide a balanced diet.

Value of Clean Drinking Water

Activity 3.4

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 from which of the two glasses you would like to drink water? What will be your answer? Give reasons for your choice.



Clean water is necessary because water is life. Sixty percent of the human body consists of water. Blood circulates in the body and provides oxygen and food to every part of the body due to water. However, consuming polluted water may lead to diseases like cholera, typhoid, and hepatitis since it is infected with germs. Therefore, to lead a healthy life we must insist on drinking clean water.

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 gases, dirt and particles. All of these mix with water. Such rain water reaches ponds, canals, rivers and lakes and pollutes them. The poisonous water coming from homes, factories, insecticides, fertilizers and garbage is also polluted.

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.

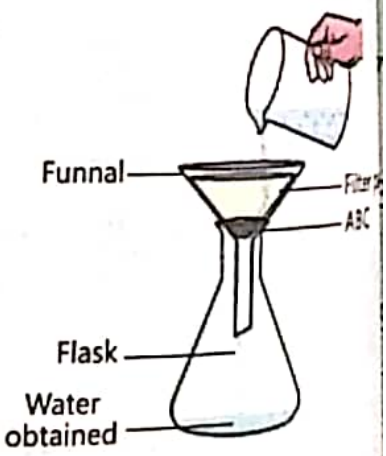
Boiling

Continue to heat water in a pot till it reaches boiling point. 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.

To boil water

Filtration

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



The process of filtration

Point to Ponder!

Does the filtration process kill the germs present in water? Why is chlorine used in large filtration plants?

Simple filtration plant

Key Points

1. The human body temperature is 98.6°F or 37°C. If the temperature of our body increases above this, it is called fever.
2. Fever also occurs during flu.
3. The diseases transmitted from one person to another are called contagious diseases, for example, TB, polio, hepatitis and Covid-19 etc.
4. Preventive measures that can be taken to avoid contagious diseases are; hand washing, wearing a mask, and getting vaccinated.
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 diet having proper proportion of food components from each group is called a balanced diet.
7. Balanced diet, drinking clean water, exercise, brushing teeth, having sound and deep sleep are necessary for good health.
8. Food has been divided into four groups i.e., milk, grain, meat, fruits and vegetables.
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.	Filtration	https://kids.nationalgeographic.com/explore/books/how-things-?work/water-wonders/

Exercise

1. Tick (✓) the correct answer.

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

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

ii. Which food has the highest calcium content?

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

iii. What steps will you take to ensure others do not get th from you?

(a) Wash hands (b) Sleep for more time
(c) Sit in the sun (d) 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 hands, vaccination
(b) Wearing mask, washing hands, sitting in the Sun
(c) Washing hands, sitting in the Sun, sleeping more
(d) Vaccination, washing hands, not sitting in the Sun

2. Write short answers.

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

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 a filter?

ii. Can filtration also stop 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 below.

No.	Principles	No.	Principles
1.		4.	
2.		5.	
3.		6.	

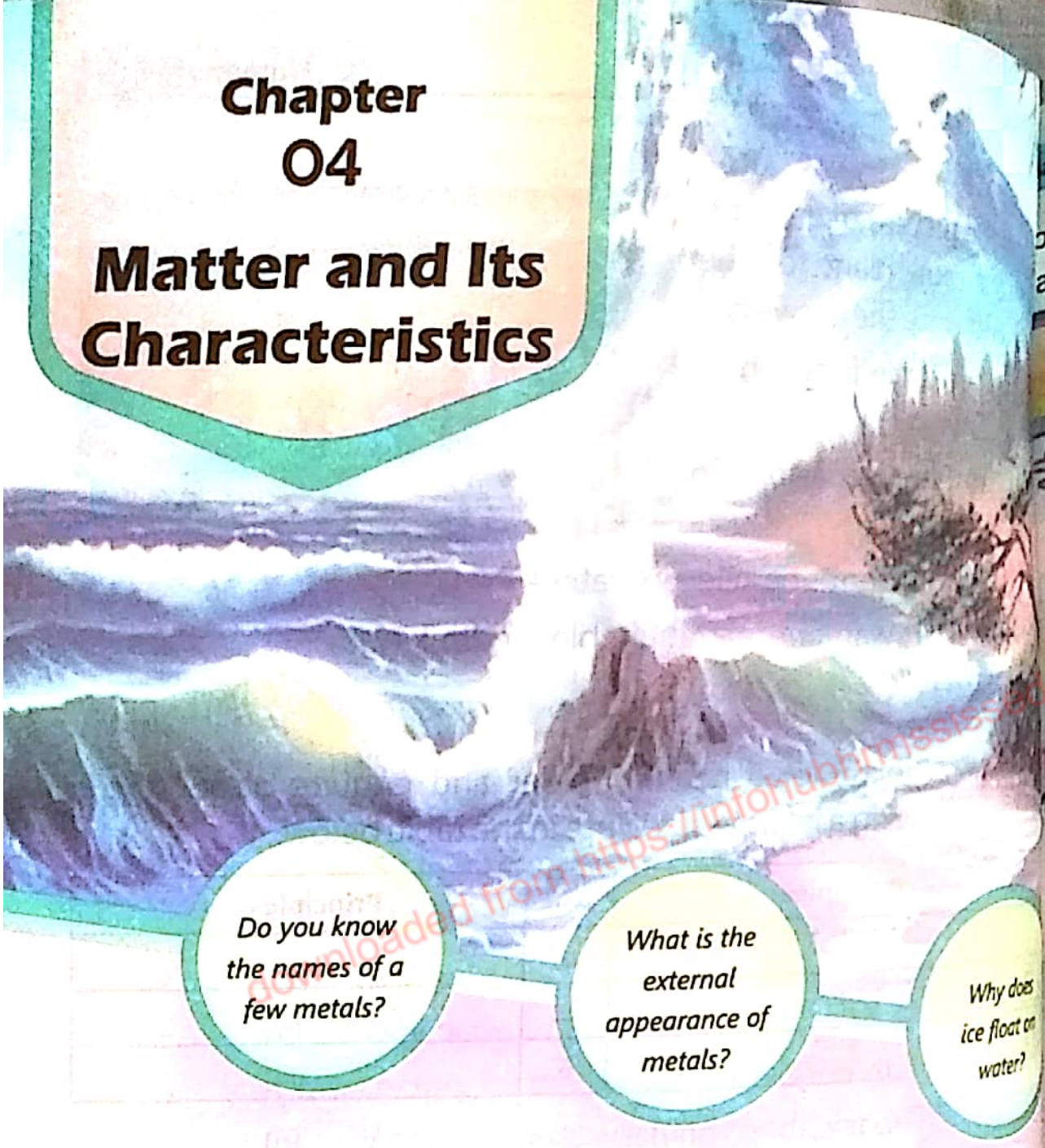
5. Project:

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

No.	Factor	Diseases which may spread	Way of Prevention
1.			
2.			
3.			
4.			
5.			

Chapter 04

Matter and Its Characteristics



Do you know the names of a few metals?

What is the external appearance of metals?

Why does ice 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 (appearance, texture, colour density).
5. Identify properties of metal (conducting and electricity) and relate these properties the use of metals (i.e., a copper electric an iron cooking pot).

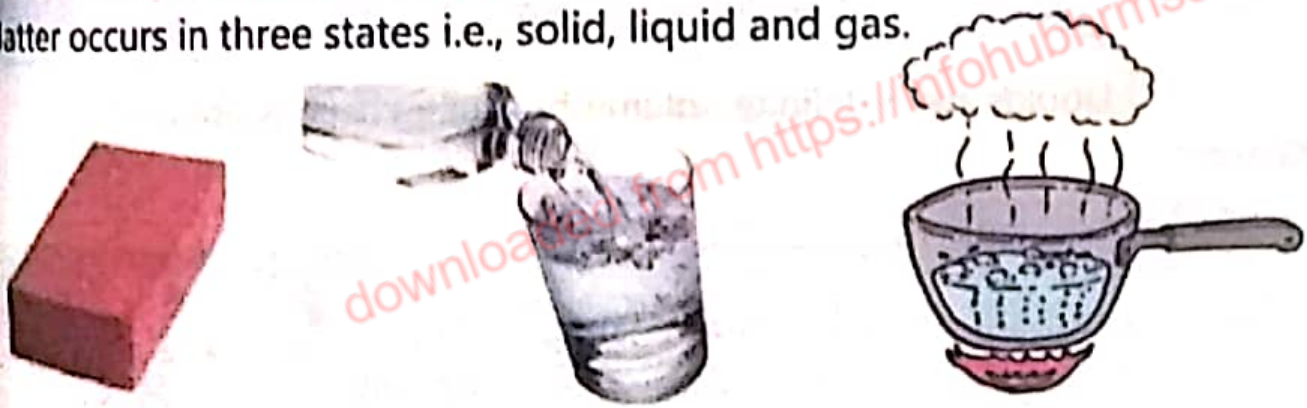
Observe the pictures given below. What are the objects shown in pictures made up of? Do all of these items have mass and occupy space?

Various Objects

Everything which has mass and occupies space 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

Let us study the properties of solid, liquid and gas.

Solid

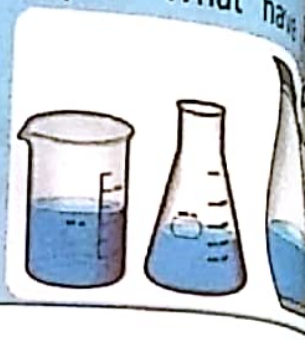
Press your book, table, pen or chair. Have these things become smaller on pressing? Many things do not become smaller on pressing. Their volume does not change. Such things are called solids.

Solids have definite shape and volume.

Liquid

Activity 4.1

Pour water in three vessels of different shapes. What have observed? Is the shape of water in these vessels 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

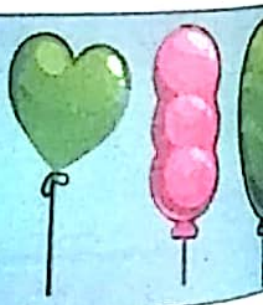
Take a cup of water and pour it into a glass. Does the volume of water is the same as it was in the cup? Does it become less or more? Remember that water changes its shape but its volume remains fixed.

Liquids have definite volume but their shape is not definite.

Gases

Activity 4.3

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



Air is the mixture of various gases. Gases have no definite shape and no definite 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 do not have a fixed shape and do not have any definite volume.

Point to Ponder!

Why does an inflated ball burst when placed in the sun

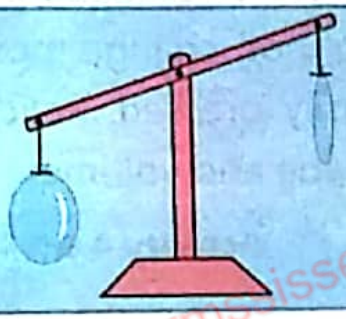
assification of Objects on the Basis of Physical operties

jects are classified on the basis of their physical properties. These ysical properties include mass, volume, temperature, ability to conduct at or electricity, ability to float or sink in water.

ass

Activity 4.4

e a balloon which is not inflated at one end of the ooden rod. Tie an inflated balloon at the other end f the wooden rod as shown in the picture. Which nd of the wooden rod bends down and why?



Quantity of matter in an object is called mass.

Do you know?

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

olume

Activity 4.5

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

Football

Book

Pen

Glass

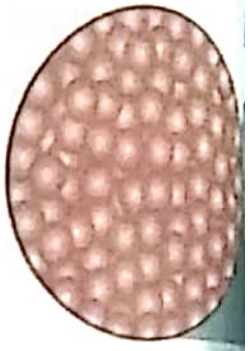
Space that an object occupies is called its volume.

States of Matter and Arrangement of Particles

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

Arrangement of Particles in Solid

In solids the particles are strongly attached with each other. These particles have strong forces of attraction. The particles vibrate but do not change position. Solids cannot be easily pressed. Solids maintain their definite shape and volume.



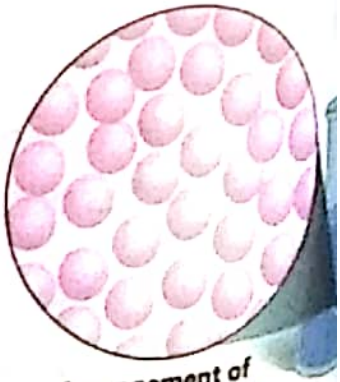
Arrangement of particles in solids

Activity 4.6

Put a piece of wood in a cloth bag. Make a small hole at the bottom of the bag. Try to remove the wood through the small hole. It will not come out because the shape of the solid remains the same.

Arrangement of Particles in Liquid

The particles of liquid are near to each other. They are in constant motion. They keep colliding with each other. Since the forces of attraction among the liquid particles are weaker than solids, they can flow.



Arrangement of particles in liquids

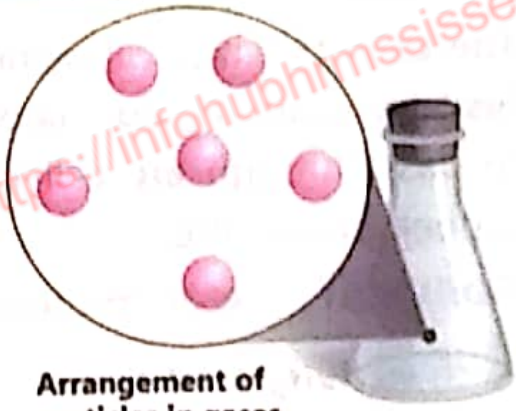
The volume of liquids is definite, but their shape is not definite. A l takes the shape of the vessel in which it is poured. We have proved th Activity 4.2.

Activity 4.7

1. Pour water in a plastic bag and tie a knot at its top. Now make a hole at the bottom of the plastic bag. Observe what happens?
The water flows out of the hole. Because of weak forces of attraction among the liquid particles, 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.

rrangement of Particles in Gas

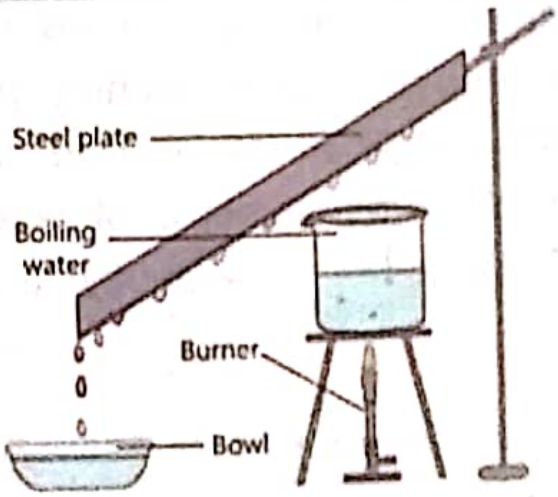
he particles in a gas are at a greater distance rom each other. They move fast because of he weak forces of attraction. They can move reely in any direction to occupy all the vailable space. This is the reason that they ave no definite shape and volume.



Arrangement of particles in gases

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 liquid water. Heat it more. Keep a steel plate in an inclined way over the beaker. The water will change into vapours i.e., gas. Vapours will gather at the steel plate. After becoming cool, the vapours will change into drops. The drops will be collected in the cup. Now, if you put this water in a freezer then after a few hours it will be changed into solid ice. What conclusion have you made from this activity? Write your observations.



Heat Conductor

Activity 4.9

Put a few objects such as a steel spoon, plastic scale, pencil beaker or glass as shown in the picture. Pour some warm w the beaker. Wait for 1-2 minutes. Touch the outer end of each Write your observation in the following Table:

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

The objects which allow heat to pass through are called conduc heat for example, iron, copper, etc. The objects which do not allo to pass through are called non-conductors of heat for example rubber, plastic, 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 what happens?

1. Write the names of objects which float on water.
2. Write the name of objects which sink in water.

Physical Properties of Metals

Activity 4.11

Make a list of objects present in your home which are made of m and observe their properties. There are many objects around us w are made of metals; for example ornaments, knives, spoons, coo utensils.

Chapter 04

tal is a specific type of matter having the following properties:

ppearance of Metals

the metals are lustrous.

Appearance of metals

exture of Metals

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

Copper Gold Aluminium

Texture of metals

For Your Information

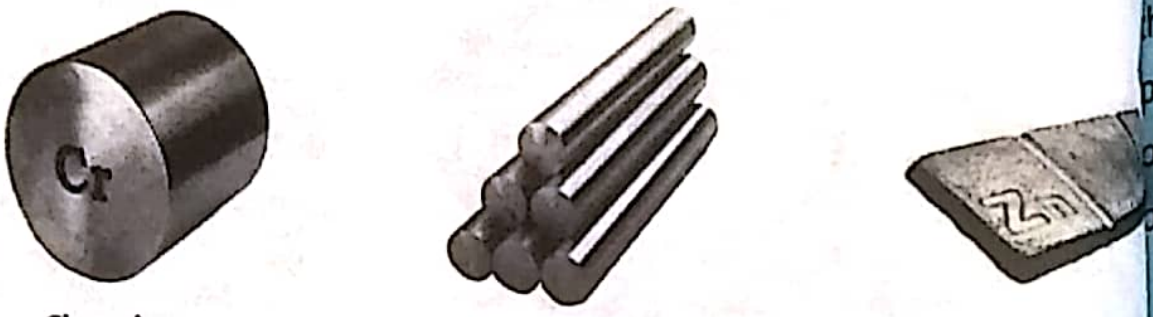
Silver foils are used in beautification of sweets. Aluminium foil is used to cover cooked food and other things.

Silver coating

Aluminium foil

Colours of Metals

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

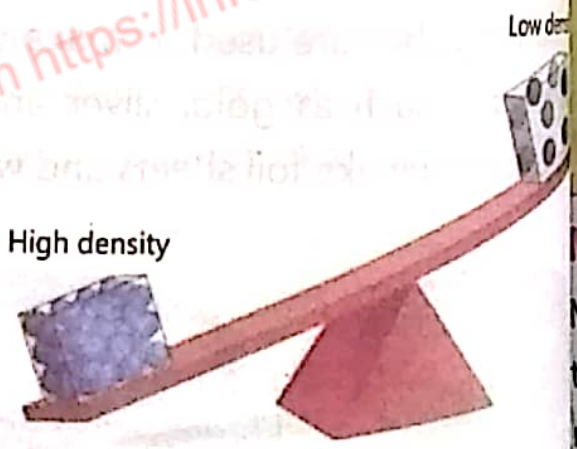


Chromium Aluminium Zinc

Colour of Metals

Density

Look at the given picture. The volume of both the objects is the same, but why is one at a 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 den of water, float on water. The objects that have more density than density of water sink in water.



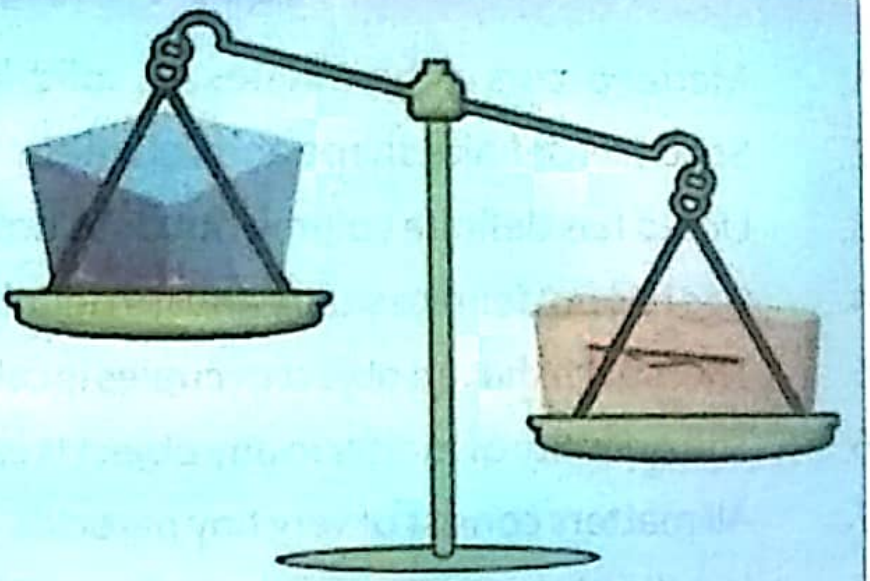
Density

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

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

Activity 4.12

ut a brick on one pan of he balance and a bigger iece of foam on the ther pan. Which pan will end and why?



Do you know?

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

Metals as Conductors

Metals such as copper, aluminuim and silver allow electricity to pass through them. These are the conductors of electricity. These types of metals are used to make electric wires. Metals are also good conductors of heat such as iron, copper and aluminium etc., Therefore, these metals are used in cooking utensils.

Steel utensils

Aluminium utensils

Aluminium 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 does not have a definite shape.
4. Gas has no definite shape and no definite volume.
5. The space that an object occupies is called its volume.
6. The quantity of matter in any object is called its mass.
7. All matters consist of very tiny particles.
8. In solid, the particles are strongly attached to each other.
9. The particles of liquid are near to each other. The force attraction among them is weaker than solids.
10. The particles in a gas are at more distance from each other. move fast because of weak forces of attraction between them.
11. The objects that allow heat to pass through them are c conductors of heat. The objects that do not allow heat to through them are called non-conductor of heat.
12. All the metals are lustrous.
13. Usually metals are solid. Some metals are soft, some are hard strong.
14. The metals which are good conductors of electricity are used to m electric wires. The metals which are good conductors of heat are to make cooking utensils.

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

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

Chapter 04

Exercise

Tick (✓) the correct answer.

i. Which one of the following has the most volume?

(a) Book
(b) Pencil
(c) Scale
(d) Cricket bat

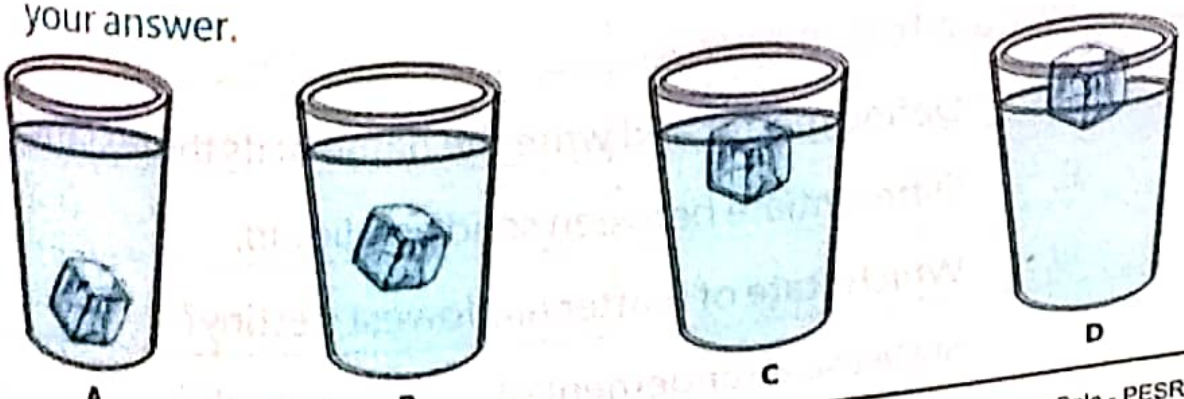
ii. Which one of these groups is the correct example of the three states of matter?

(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 a few minutes the steel spoon will become hot, whereas the wooden spoon will 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 better 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 cube? Give reasons for your answer.



v. Study the following Table.

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

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 are cooking utensils made of metals?

Constructed response question:

i. Why does the electrician wear rubber gloves while repairing the electric switch at your home ?

4. Investigate

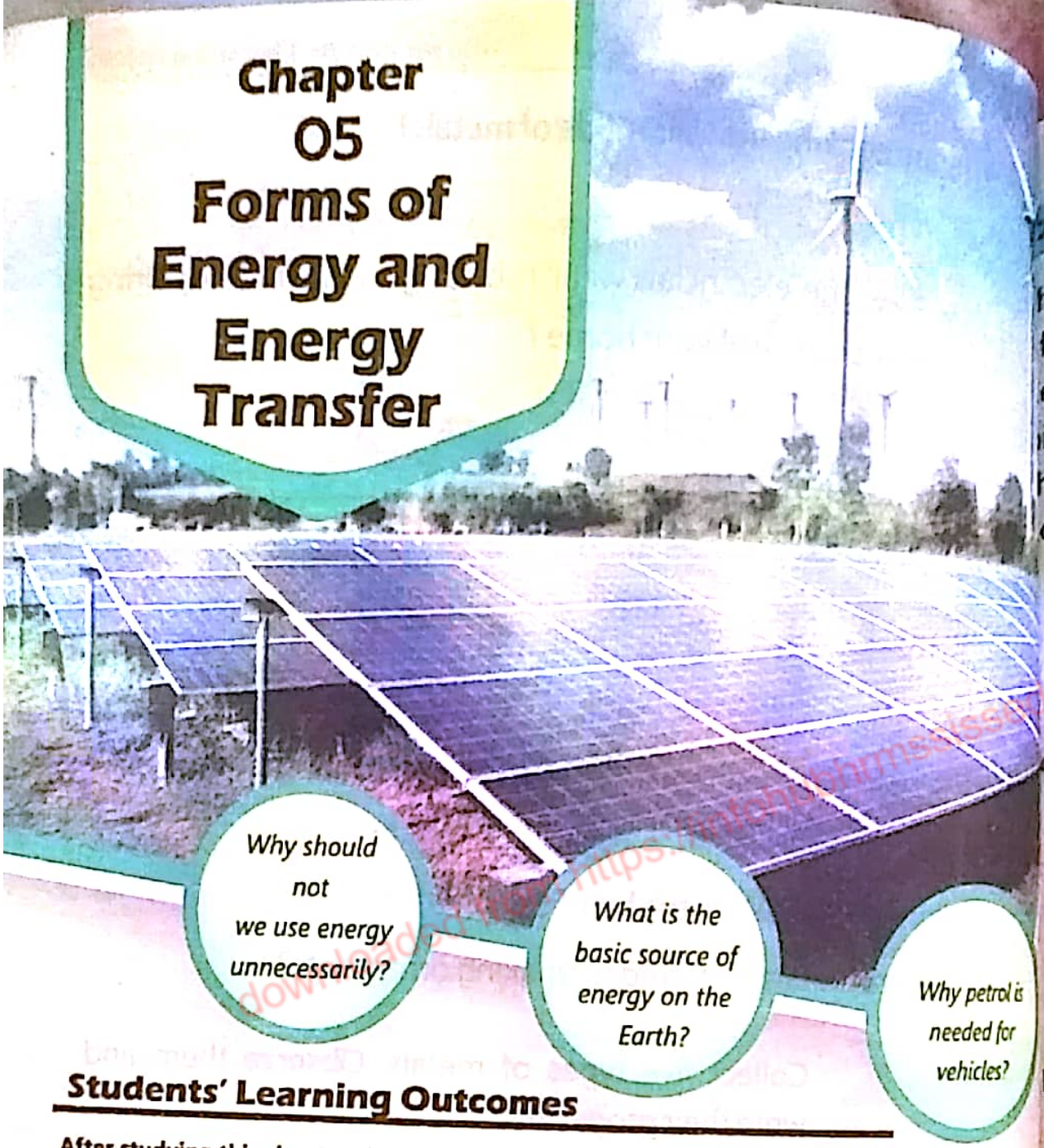
i. Why is metal used in the bell?

ii. Why are metals 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 the Earth?

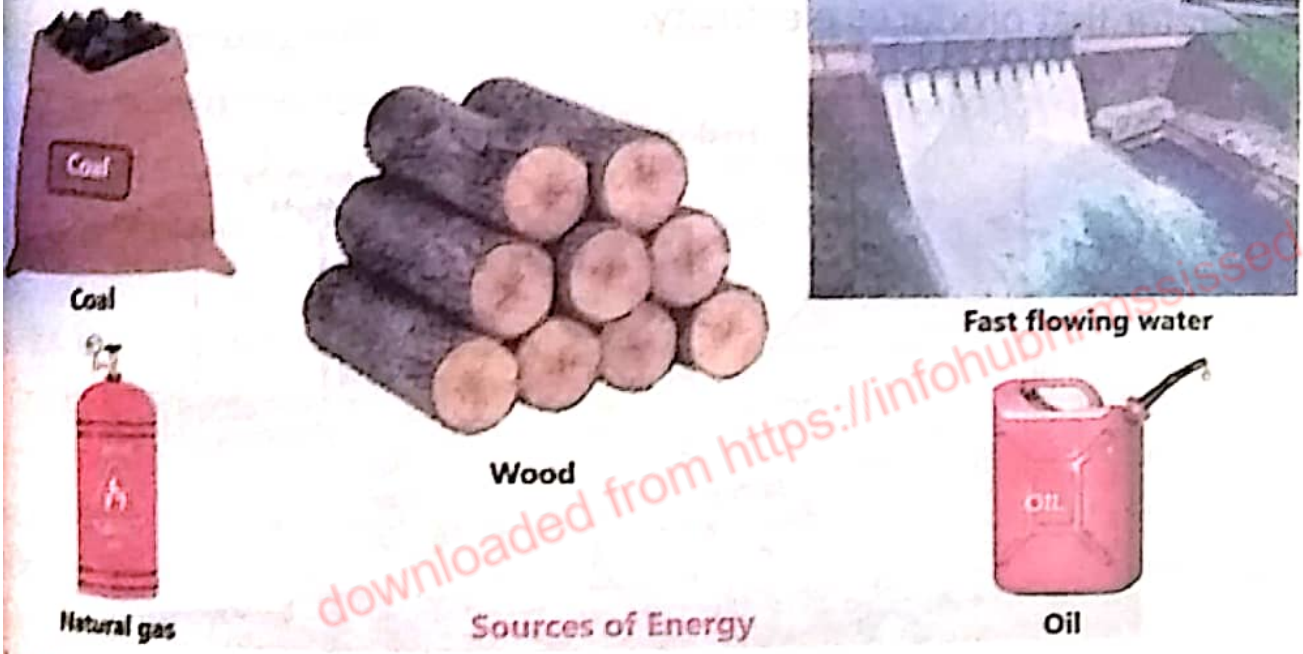
Why petrol is needed for vehicles?

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

The ability to do work is called energy. Energy is used in the movements of humans and animals. It also produces, light in the bulb, heat in the heater and sound of the school bell. From where do we get energy? The biggest source of energy is the Sun. On the Earth, we receive energy of the Sun in the form of 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

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?

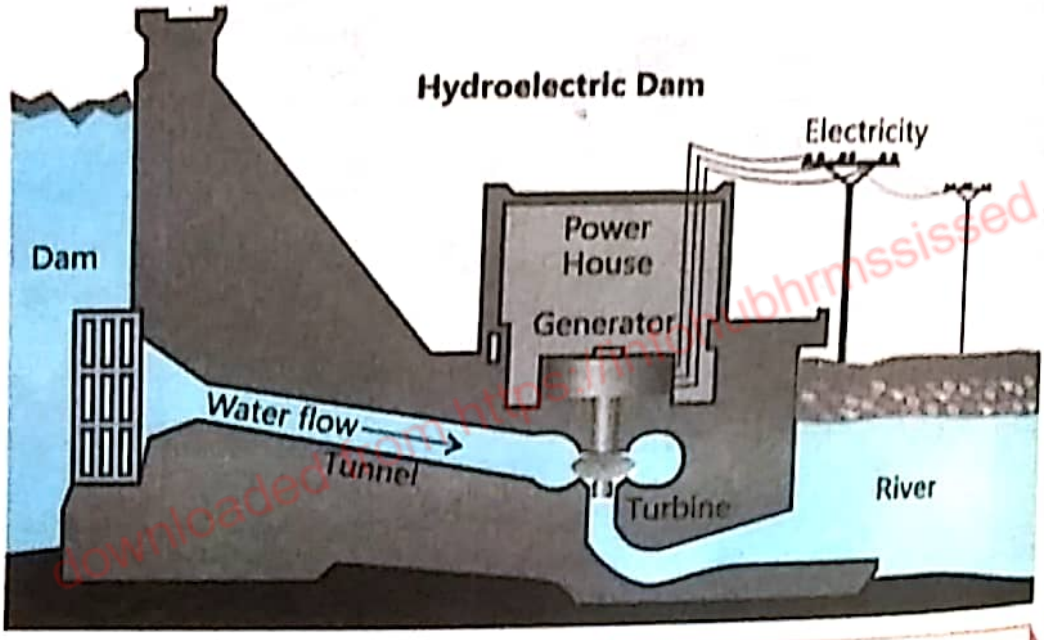
How can we get energy from water?

From where do the vehicles get energy?

Which energy runs a ceiling fan?

Transformation of Energy

In our daily life, we see that one form of energy can be transform another form. Electricity is produced from fast flowing water, it hydroelectricity. For this purpose, a dam is built. The water of a stored in a lake at a certain height. From there, the water flows th tunnel. The energy in the flowing water runs a turbine which generator that produces electricity.



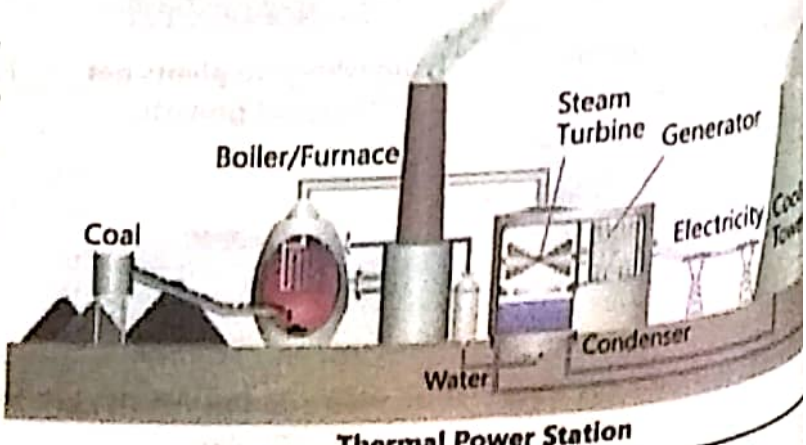
Let's Think!

Which energy is changed into hydroelectricity?

Interesting Information

The world uses as much energy in 1 sec as we can use in our car in 156 year means that within a blink of an eye, the w uses energy of 85,000 gallons of petrol.

In a 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.



Thermal Power Station

Task to do

ake a chart to show he transformation of nergy in a thermal ower station.

Do you know?

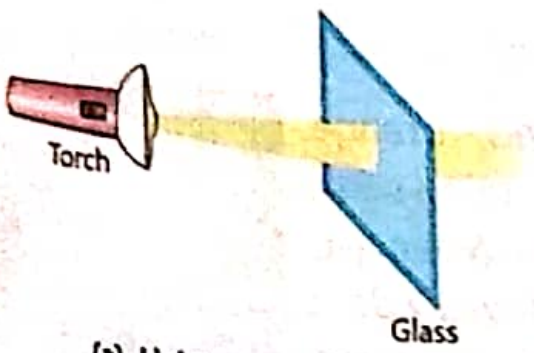
A windmill produces electricity from strong wind.

Conservation of Energy

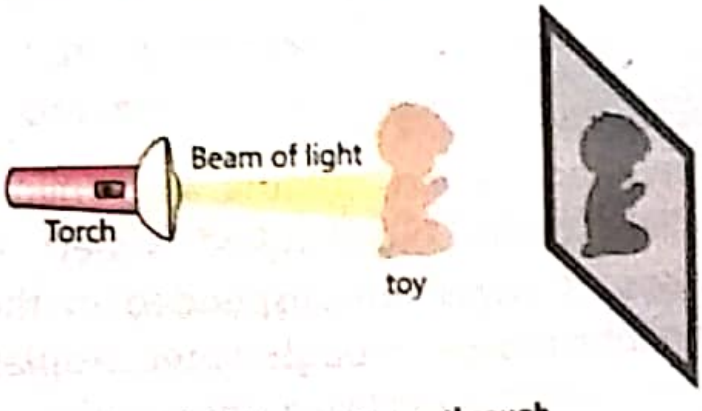
here are limited reserves of the natural sources of energy like coal, oil nd gas. We cannot increase the amounts of such sources because these re made over millions of years. However, we can save these sources. For his, we have to use them carefully. The energy sources cannot support us for a long time to fulfil the needs of energy for the 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 the next generations do not 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 natural sources of light. Candle, oil lamp, torch and electric bulb etc. are 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.



(a) Light passes through



(b) Light does not pass through

Activity 5.1

1. Light a candle or a 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 like your hand?
5. Bring your hand near the lamp. How is the size of the sh affected?

Reflection of Light

In the morning, you usually see your image in the mirror. Can you see your image in the dark? When light strikes the shiny and smooth surface of a 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 you see the sunlight divided into different colours on the screen.

There are seven colours in sunlight (red, orange, yellow, green, blue, indigo, violet). After rain, some drops of water are suspended in the air. When the sunlight passes through water droplets, they divide it into seven colours like a prism. This is called a 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 vigourously.
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 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 the dark. It emits sound from its mouth. By using echo of its sound, it find the way in the dark to reach the prey.

Do you know?

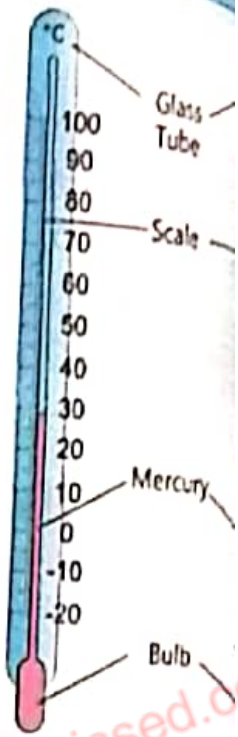
A hard and smooth object reflects sound better.

Do you know?

To hear a clear echo, the reflecting surface should be at least 17 metres away from the source of the 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 the object is hot or cold. The instrument used to measure temperature is called thermometer.



Centigrade 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 merc alcohol present in its bulb, expands. So, it rises in the glass tu thermometer.

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

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

Electrical Energy

Electricity or electrical energy is produced by generators. This electric supplied to our homes through wires. Cells and batteries are also sources of electrical energy. These are used in toys, torch, clock remote control etc. We use electric energy for running many device

ur homes. Electrical energy can be transformed into other forms of nergy like heat, light and sound.

a heater, the electrical energy changes into heat.

In electric bulb, the electrical energy changes into light.

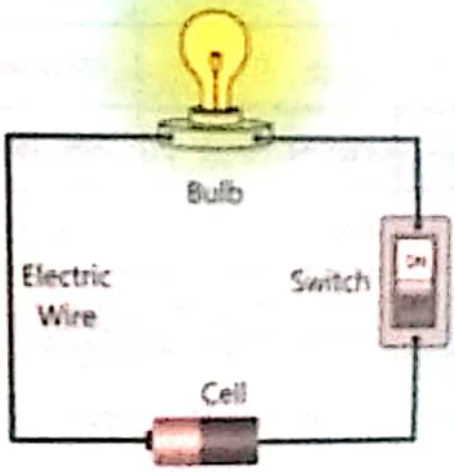
In loud speaker, the electrical energy changes into sound.

imple Electric Circuit

he path of the current is called an electric circuit. Let's make a simple lectric 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 the bulb not remain lighted?



When the switch is turned "ON", the path of the 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 r due to light.
5. Sound is produced by vibrating objects. Echo is the sound heard after the sound bounces back from an object.
6. Heat is a form of energy that always travels from a hot object to object.
7. The temperature of hot objects is greater than the tempera cold objects.
8. Electrical energy can easily be transformed into other for 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 cha

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

Exercise

1. Tick (✓) the correct answer.

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

(a) Light (b) Sound (c) Water (d) Hea

ii. We hear echo when sound:

(a) reaches us direct from the source.
(b) comes after bouncing back from a wall at a ca distance.
(c) comes from a loud speaker.
(d) is very loud.

iii. How many colours are present in the sunlight?

(a) 1 (b) 3 (c) 5 (d) 7

iv. If you take your hand near 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.

Write short answers.

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

ii. If sound cannot travel through space, how do the astronauts talk with each other?

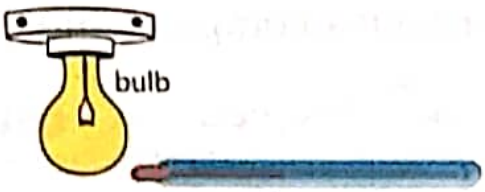
iii. How do we sense the buzzing of a mosquito?

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

v. When can we see a rainbow? How is it formed?

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.

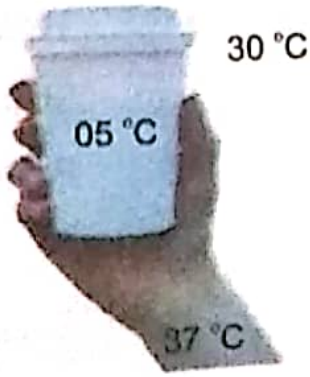
The temperature of different things is as follows:

Your temperature: 37 °C

Temperature of water: 05 °C

Temperature of room: 30 °C

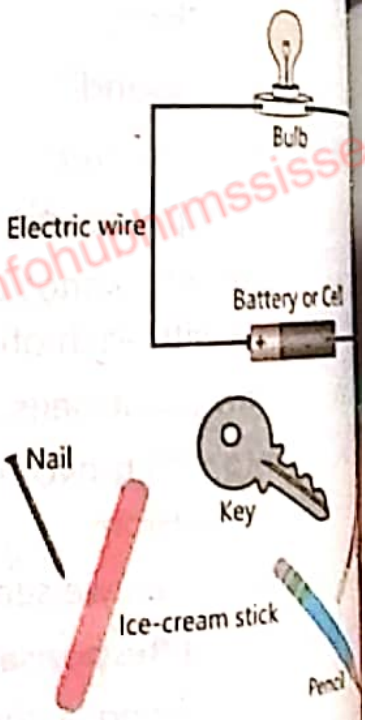
Draw arrows in the picture to show the directions of the heat flow.



iii. Sidra has a reflector in her torch. There is no reflector in Ali's torch. Which torch will throw more light on a wall at a 5-metre distance? Tick (✓) in the right box.

4. Investigate

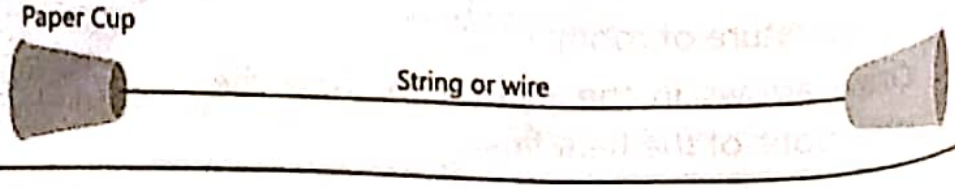
A simple electric circuit consists of a battery or cell, bulb and electric wire. Its electric path has broken and the bulb is not glowing. We want to complete the electric path so that the bulb can light up by using the electrical energy of the battery. We have cotton bud, a plastic ball pen, an ice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



5. Project: Let us make a telephone:

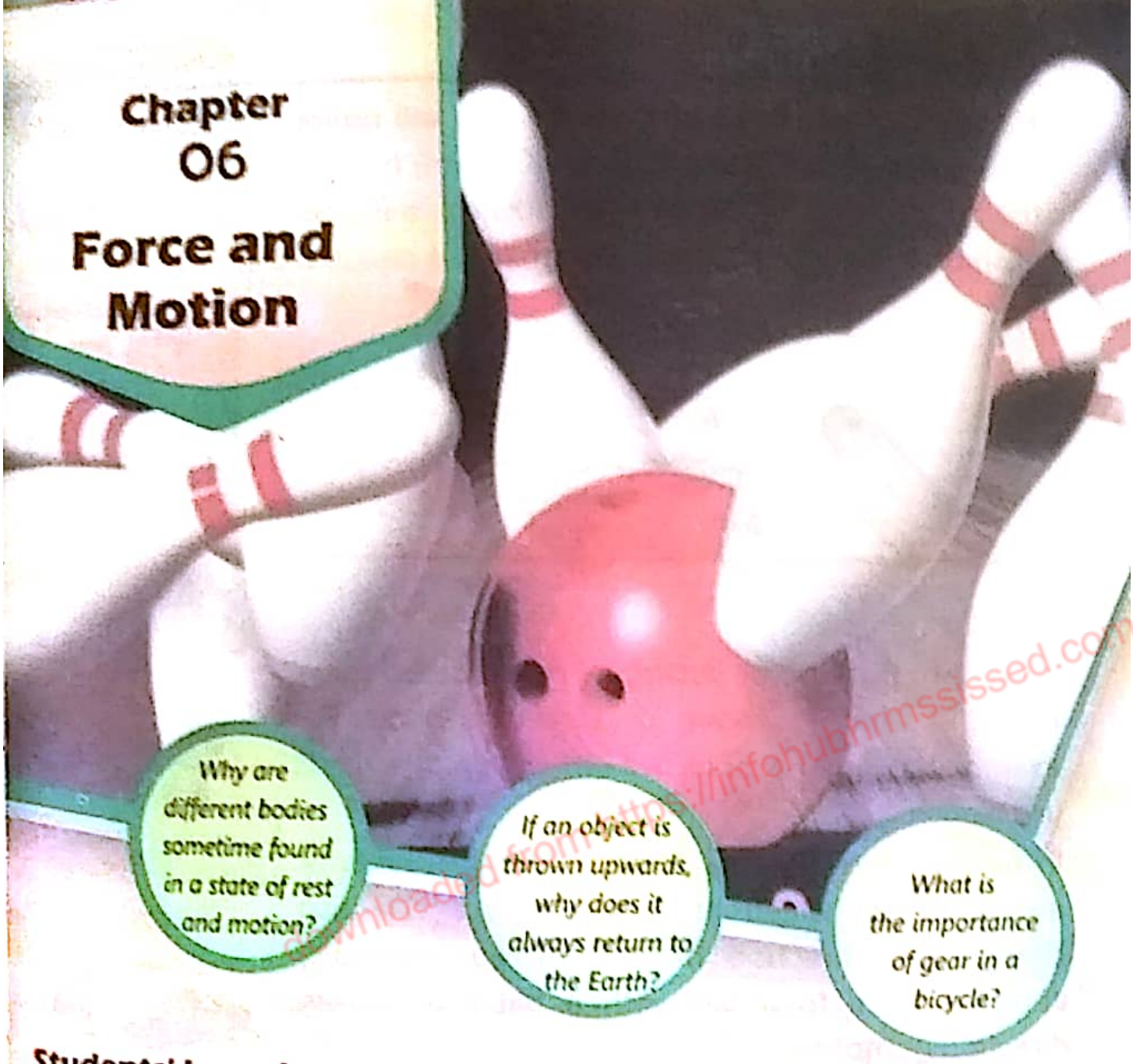
You need the following things for this project:

- Two paper cups
- Two small pieces of twig
- String or thin wire (7 metres)
- Pencil or nail to make 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 gear 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 objec stationary and some are moving. Can you tell how to produce mo the bodies at rest? For example, how can a toy car be moved? Whe push or pull the toy car with your hand, it causes the toy car to mov

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

A force changes the shape of bo

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

Empty Can

Crushed C

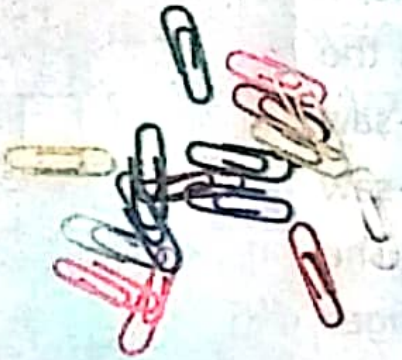
Point to Ponder!

Can you tell where force is used in everyday life?

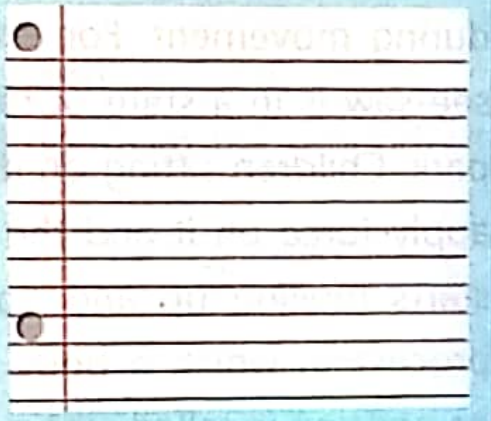
Activity 6.1

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

Plastic Bottle



Paper Clips



Paper

Toothpaste

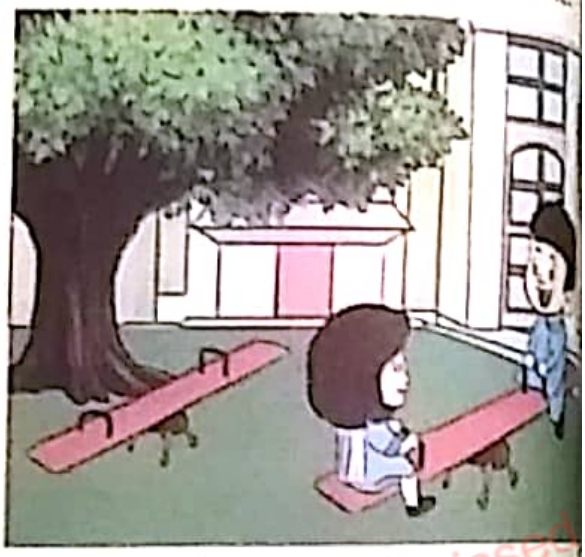
Rubber Bands

Play Dough

Motion

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 c 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 a see-saw apply force on it and the see-saw starts moving up and down. The process in which a body changes its position is called motion.

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?

Point to Ponder!

How does the girl sitting on the swing move?

Gravity

Look at the following pictures and tell:

1. Why do the leaves of a tree fall to the ground, after leaving the 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?

Fountain

Falling Leaves

Kicked Football

You may have noticed that whatever is thrown upward, 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.

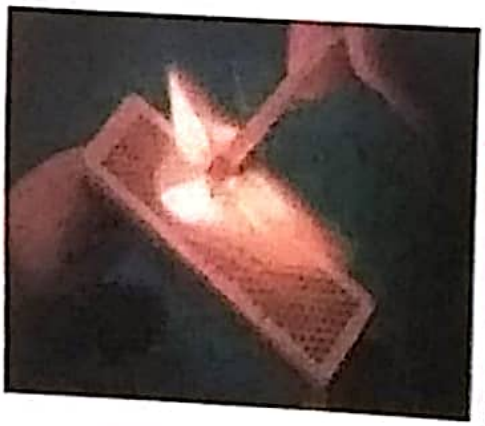
Friction

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

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

Advantages of Friction

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



Igniting match stick

Car braking

Nail into wood

Do you know?

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

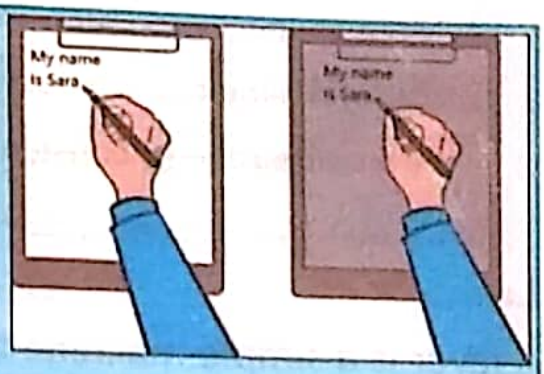
Point to Ponder!

What will happen, if there were no friction?

et'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?



t is easy to write on a paper while it is difficult to write on a plastic heet.

isadvantages of Friction

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

Wear out shoes

Point to Ponder!

How can we reduce friction?

Worn over tyres

imilarly, friction causes wear and tear of moving parts of machines over me and the machines become unusable.

Do you know?

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

imple Machines

he use of machines in our lives is increasing day by day. What is the eason for this?

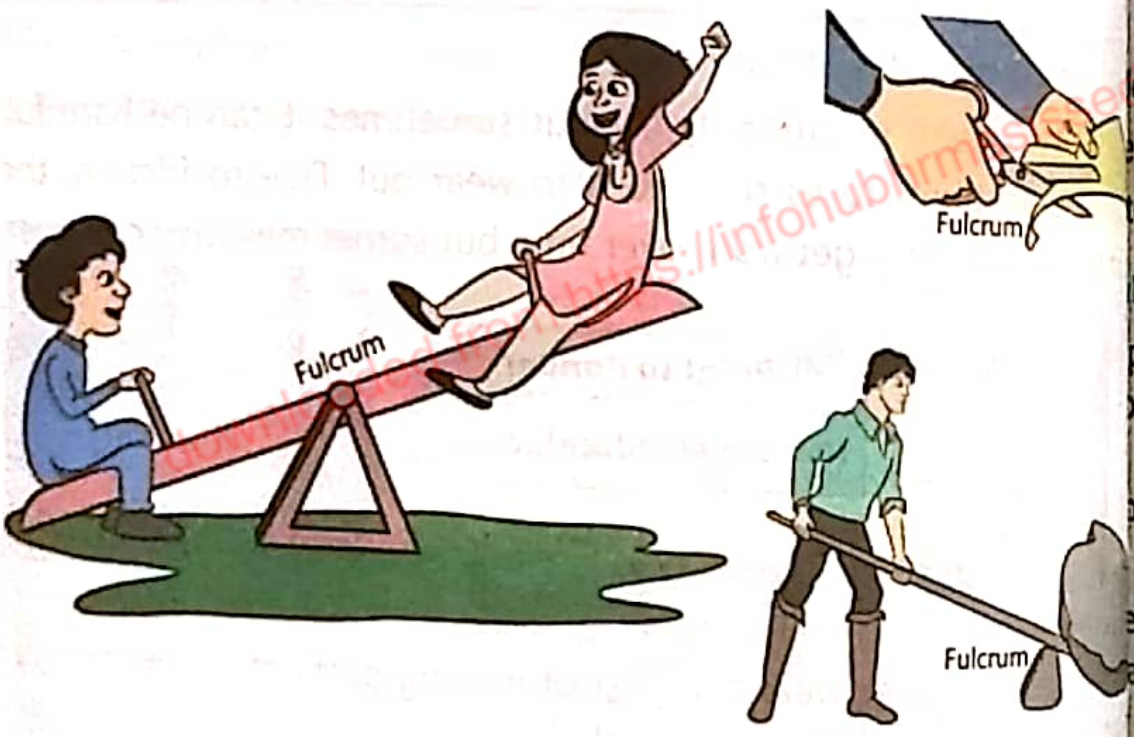
verything that makes our work easier is called a machine. The machine akes our work easier by changing the amount and direction of force. ever, pulley, gear and ramp (inclined plane) are simple machines.

Do you know?

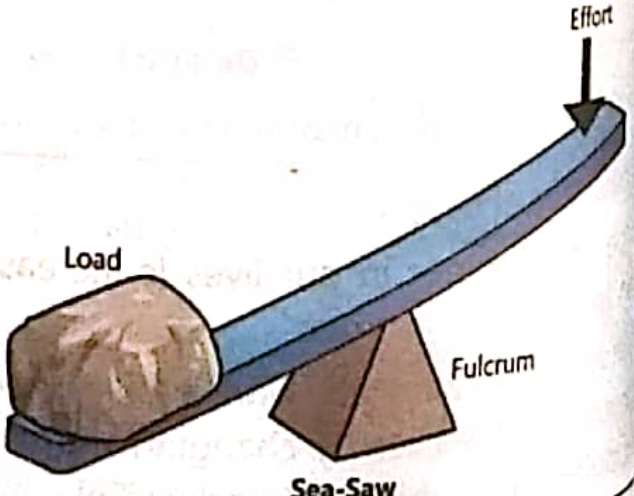
Modern machines, such as cars or Bicycle, are made of simple machines. Each machine has to be provided energy constantly to keep it working.

Lever

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



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



Sea-Saw

Activity 4.5

Take a metre rod, a pencil and a book.

Place one end of the metre rod under the book, as shown in figure.

Place the pencil under the metre rod near the book. Apply force on the other end of the metre rod to lift the book

What do you observe?

this activity, pencil will act as crum while the book will be a ight (load) which can be easily ed with the help of force (effort).

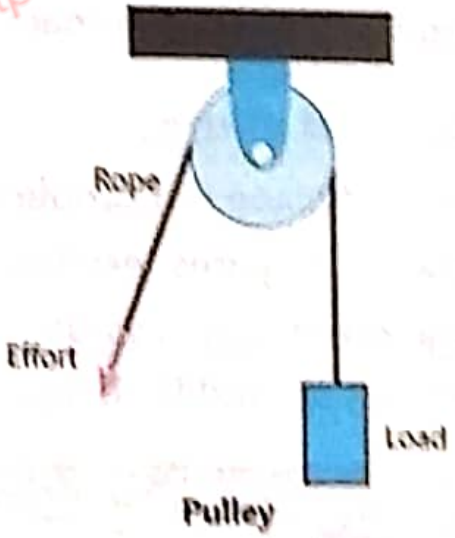
Point to Ponder!

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

ley

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

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



Pulley

Flag hoisting

Water being drawn from a well

Changing the direction of force makes it easier to work with the
For example, if we want to lift heavy objects with the help of a p
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 tha
other. It requires less force and energy to move objects from one
to another. It allows us to move objects easily from bottom to top
pictures show different types of inclined planes.

Inclined Plane

Load carried up on inclined plane

Point to Ponder!

Which simple machines are used in a bicycle?

Key Points

The process of pushing or pulling of a body is called force.

The process in which a body changes its position is called motion.

The Earth pulls bodies towards itself with a specific force. This force is called gravity.

Friction is the force that stops or tends to stop moving objects.

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.

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/

Exercise

1. Tick (✓) on the correct answer.

i. What is force?

(a) Push (b) Pull

(c) Lift (d) Push a

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 far

(a) rocky soil (b) marble

(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 are force and motion related? Explain.

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

iii. Define friction. In which direction does it act?

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

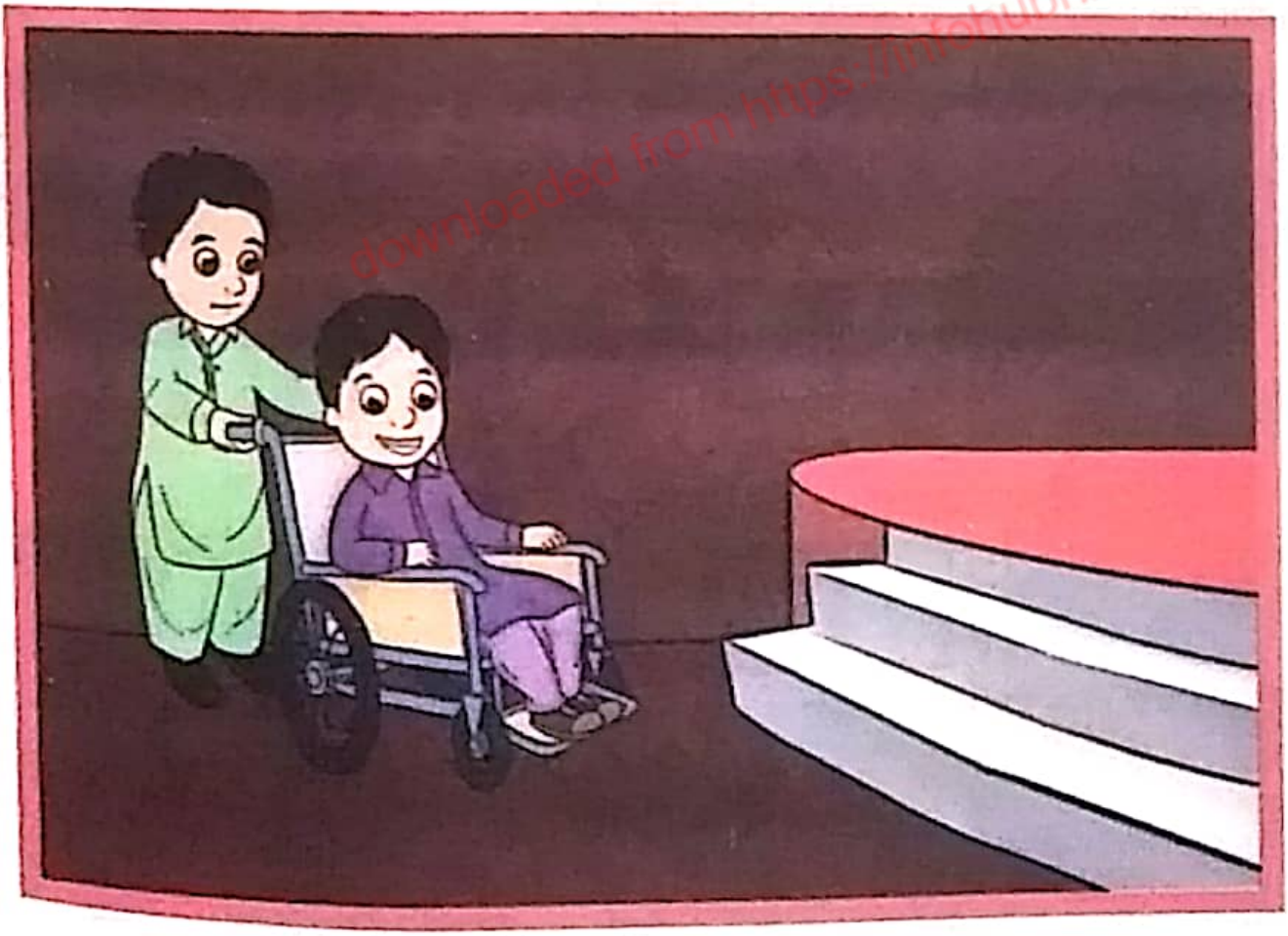
v. Why cannot we walk easily on ice?

3. Constructed Response Questions:

i. Look carefully at the pictures given below. Which one shoes is suitable for rocky soil, which one for playgro

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. Answ following questions based on observation:

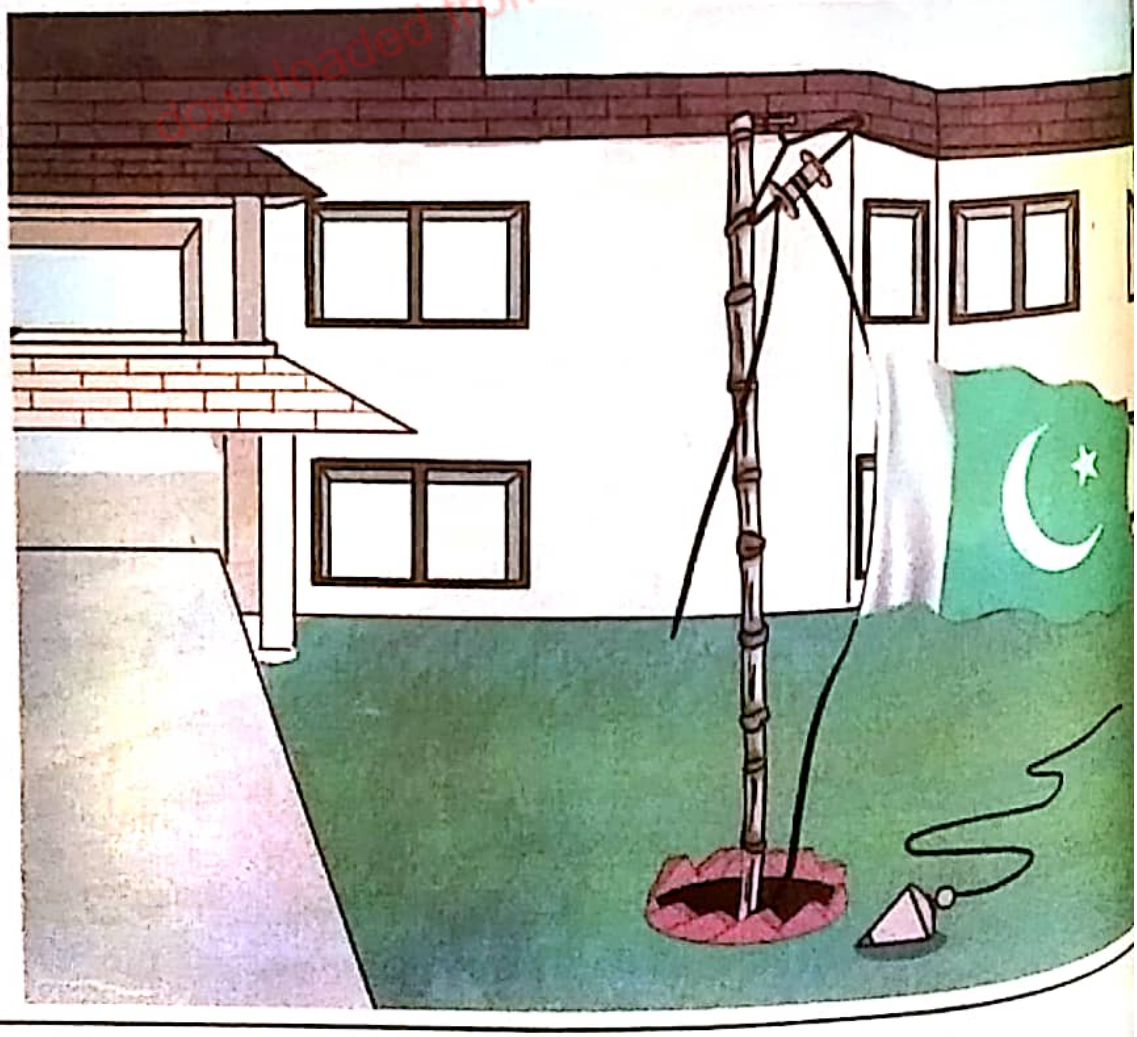
a) What force do you use (push or pull) while writing?

b) What is the role of friction in writing on paper with a p

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

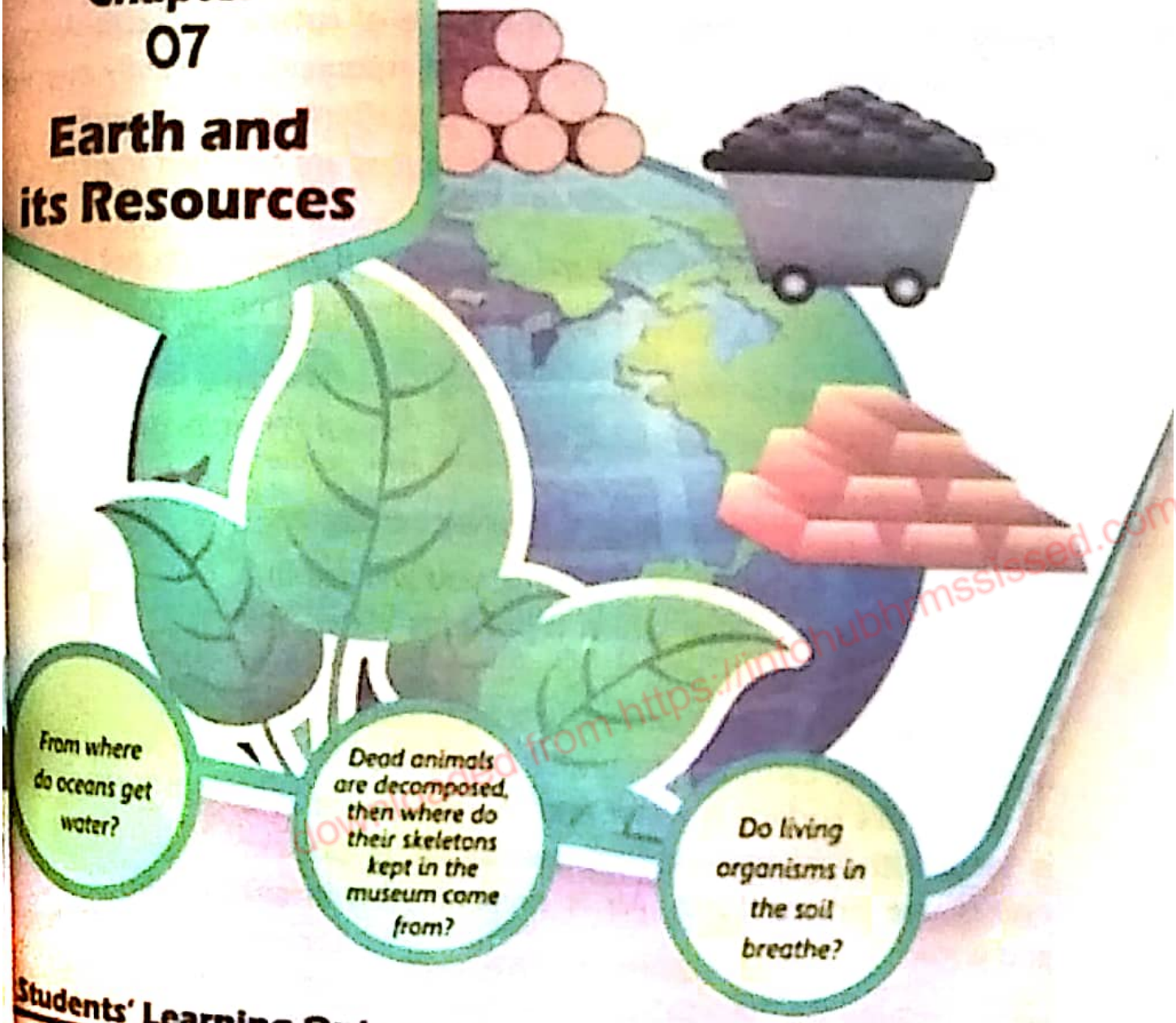
5. Project: Making a Pulley for hoisting a Flag

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



Chapter 07

Earth and its Resources



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 where to find various natural resources, we hardly e where these come from neither do we pay attention to their origi How many of us know that natural resources are obtained from or air?

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

Point to Ponder!

What will happen if natural resources run out?

For Your Informa

About 11% of the land is c

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 area that is green or khaki, which indicates dry 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, it is present everywhere on the Earth. Air is present even in soil and water.

Globe

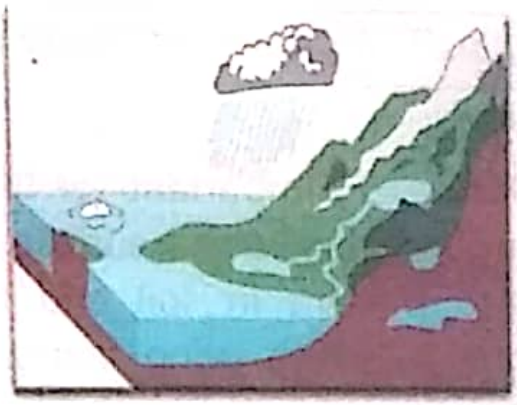
Activity 7.1

1. Take a plastic bottle and make a small hole in its lid with the help of a 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 he tape or glue. One end of the paper should stick to the surface 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?

r enters the bottle, through the hole in the bottle, and inflates the loon. It means that air is present everywhere around us.

istribution of Water on Earth's Surface

out 97% of the water present on Earth is the oceans. The remaining 3% is present in e form of glaciers, rivers, streams and lakes. inwater is added in rivers and streams. om here, the water flows to lakes and eans. The snow falling on mountains also elts and becomes water. This water also ows to rivers and streams and finally falls nto lakes and oceans.



Water on Earth

arth's Resources

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

et us understand some mportant natural resources nd their importance in daily

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.

Water

l living things need ater to survive. We use ater for drinking, cooking nd washing clothes and ches. Water is also very portant for plants and ops. Running water is also ed to generate electricity.

Drinking water

Water sprinkling on plants

Activity 7.2

Take a glass and put some soil in it. Then slowly add some wate soil and shake it for a while. Air bubbles will start coming ou soil. This proves that there is air in the soil.

Air

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

Wind Mill

Fish inside w

Soil

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

Interesting Information

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

Plant Growth

Pot Making

Forests

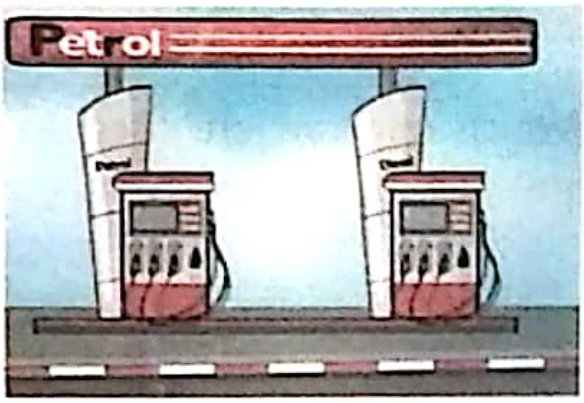
The part of the Earth that is completely covered with trees is called a forest. Forests not only provide us timber but are also natural habitats for animals. They also provide us fresh and oxygenated air.

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 crude oil which we get from Earth.

Natural Gas

Natural gas obtained from the Earth 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.

Gas Burning

Quick Quiz

What is the difference between charcoal and mineral coal?

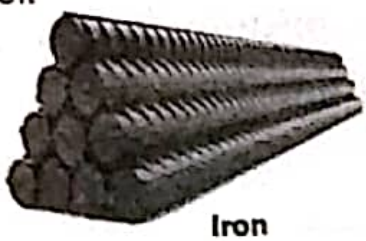
Interesting Information

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



Iron

Salt

Activity 7.3

Which minerals are used to make the items given in the follo 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:

Footprints

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.

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 ga millions of years to form. Such limited resources are called renewable resources. Once they are used, they cannot be replaced e

Petrol

Coal

Gas

Renewable Resources

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

Solar energy

Wind energy

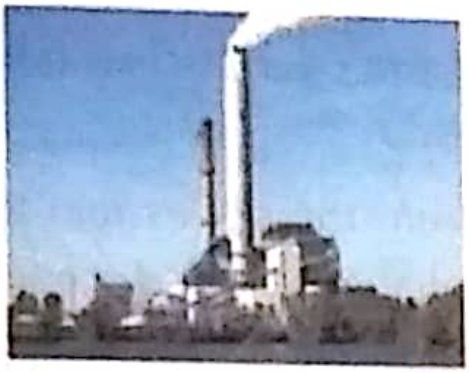
Fast flowing water

Effect of Human Activities on Natural Resources

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

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

Tree cutting



Burning natural fuel

Dying fish

...nservation of Natural Resources

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

...e should:

Plant trees on large scale. Trees not only provide oxygen but are also natural habitats for many animals.

Recycle paper, plastic, glass and other materials instead of throwing them away. Recycling saves natural resources by reusing such items.

Use renewable resources such as wind, water and solar energy to generate electricity.

Protect air, water and land from pollution.

Use water and electricity carefully.

Tree plantation

Save water

Key Points

1. The Earth's surface consists of land and water which is surrou air.
2. About 71% of the Earth's surface is water and the remaining land.
3. When water falls from the sky as rain then it joins the rive streams that flow towards lakes and oceans.
4. The Earth is rich in many resources including water, air, soil, fo 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 natura etc. take millions of years to form. Such limited resources are non-renewable resources.
7. Unlimited resources that can be obtained after their use are renewable resources.
8. Man's careless use of natural resources is causing irrepa 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 ch

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

Exercise

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.

v. An example of non-renewable resources is:

(a) oil. (b) soil.
(c) air. (d) solar energy.

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?

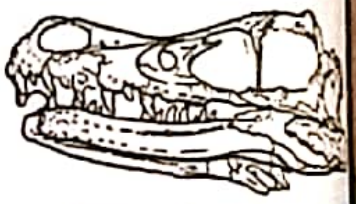
iv. Describe any two advantages and disadvantages of deforestation.

v. Differentiate between renewable and non-renewable resources.

Constructed Response Questions:

i. We found the skulls of various animals during an 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 water for every human being on the Earth but why is it so?

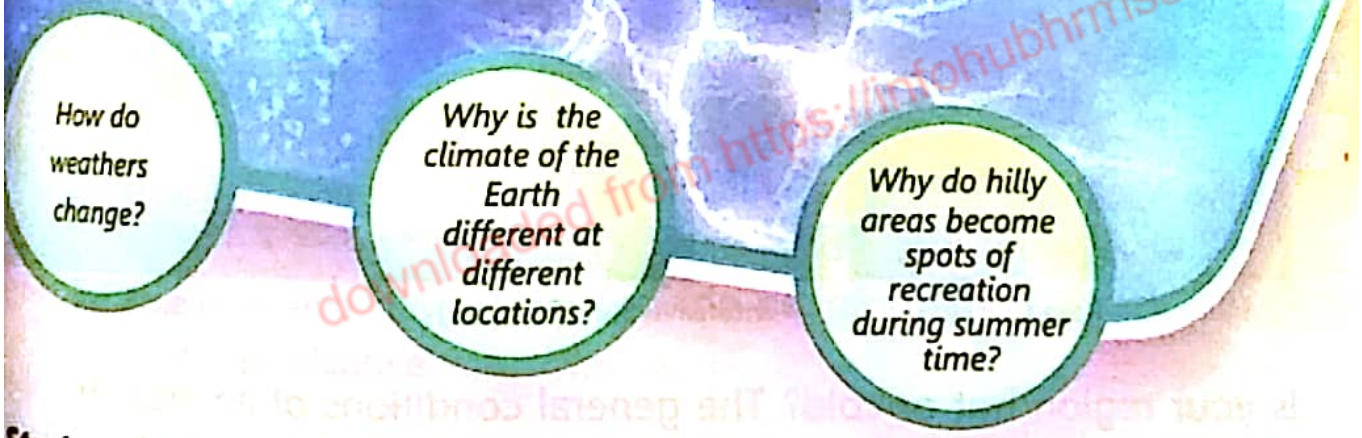
iii. Is it possible that we can have more resources than those the past?

5. Project:

Make a model of the flow of water from glacier to sea with the 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 sometime the weather becomes cold and pleasant and some becomes hot. Occasionally, this weather change occurs sudden sometimes it takes many days. Sunlight, air pressure, rain and clo play an 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 Earth around the Su the tilt of the Earth axis are responsib changes in the weathe

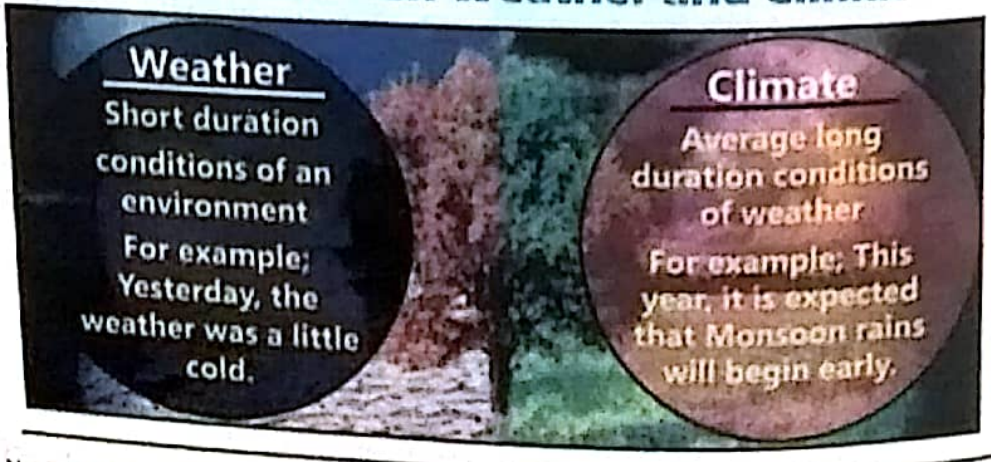
Rain

Intensive Sun (Summer)

Storm

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

Difference between Weather and Climate



Do you kn

The study of w conditions is Meteorology people related study are kn Meteorologist

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 in the regions of hot climate wear thin and light dresses.

Interesting Information

Weather conditions are described by using the following instruments:

Instrument to measure the air pressure

Barometer

Instrument to measure the speed and direction of wind

Anemometer

Instrument to measure the amount of rain

Rain Gauge

Instrument to measure the temperature of air

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


Partial cloudy


Cloudy


Drizzling

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 Inform

The maximum day temper degree centigrade was re 1922 in the desert of Libya

Relationship between Geographical Locatio 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 the weather changes with the arrival of spring, summer and winter?

The climate or weather changes of any region depend upon falling of Sun rays either 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

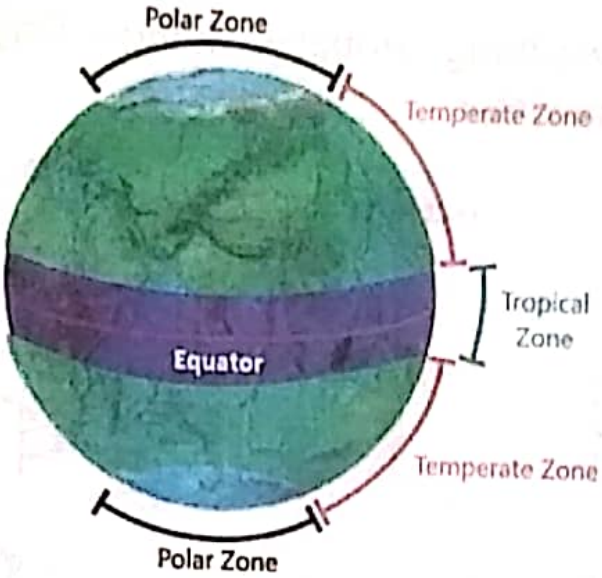
The maximum te in Pakistan was 53.5 centigrade in Mohe (Sindh) on 26th May 2 in Turbat (Baluchista May 2017.

Do you know

The Equator is an i line that divides the E two equal parts.

Tropical Zone

pical Zone consists of the regions ated around the equator. Here, the n rays fall vertically. That is why the mate of this zone is hot.



Temperate Zone

mperate Zone is located between pical and Polar Zones. Here, the Sun s fall diagonally. The climate of this ne is mild due to slanting Sun rays.

Polar Zone

consists of the areas around the north and south poles of the Earth. ere, the Sun rays are more slanted. Therefore, the climate of this Zone is e coldest.

s we move away from the equator, the climate becomes less hot. entually, the temperature is minimum at the poles, hence these are the dest regions of the Earth.

limate of Regions near aterbodies

aterbodies make the climate of the djacent land areas mild.

limate of High Regions

ith the rise of height from the sea level, e climate becomes cooler and the uration of winter season increases.

lobal Change in Climate

e heat, smoke and gases released from ctories, vehicles and other human ctivities not only pollute our environment t also cause an increase in the average mperature of the Earth. It is called global

Do you know?

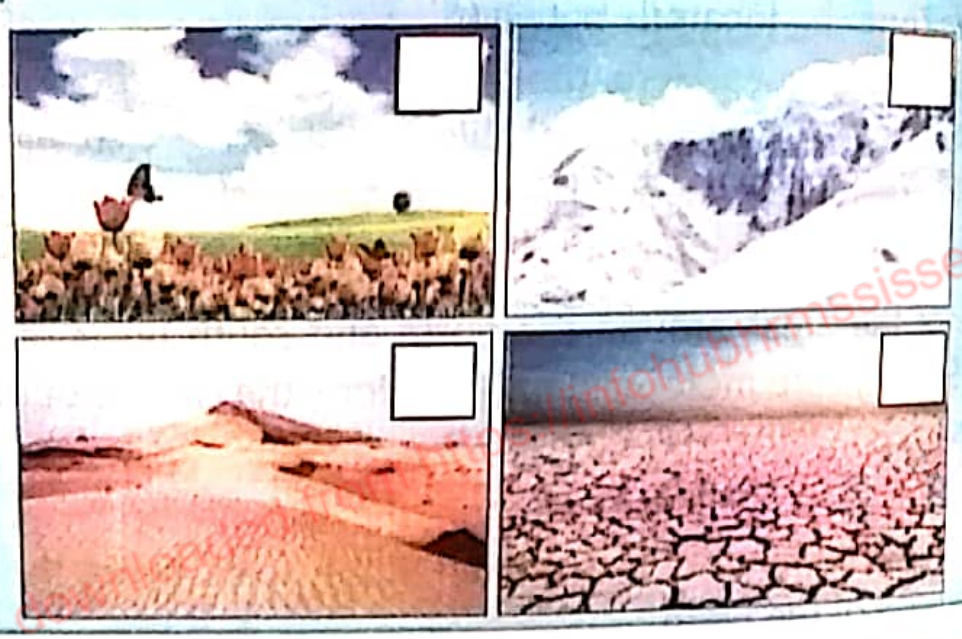
The minimum temperature in Pakistan was -18 degree centigrade in Quetta on 8th January 1970 whereas it was -51 degree centigrade at K-2 peak.

Human activities on Earth

warming. Global warming is very harmful for climate and life on la in water.

Activity 8.2

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



Key Points

1. The temporary change in the conditions of an environment is c 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 geograp location.

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

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

Exercise

Tick (✓) the correct answer.

i. If it rains suddenly, what does this indicate?

(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) fluctuating.

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

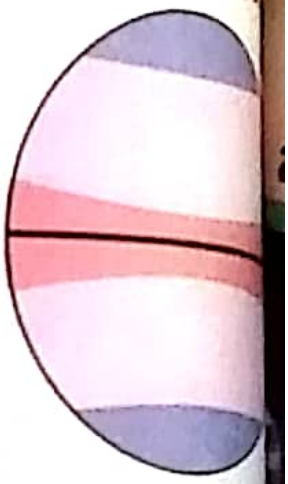
(a) 2 (b) 3
(c) 4 (d) 5

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 is our country located on the basis of the climate? Explain.

3. Constructed Response Questions:

i. Identify the different zones on the figure of the Earth on 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?

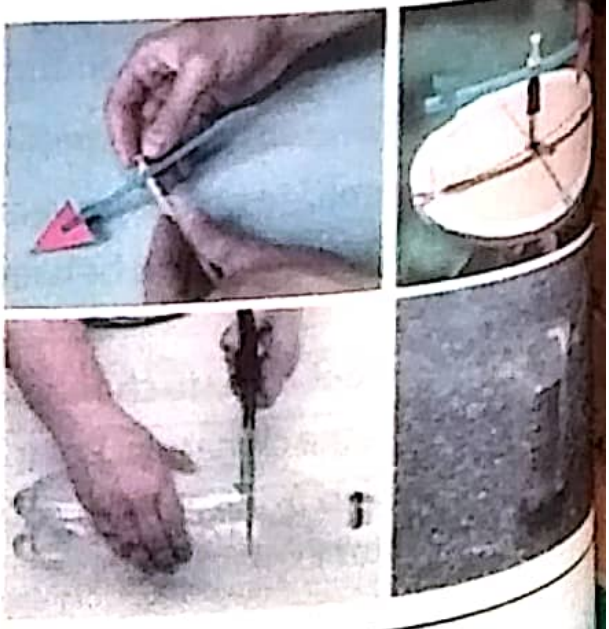
4. Investigate

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

5. Project:

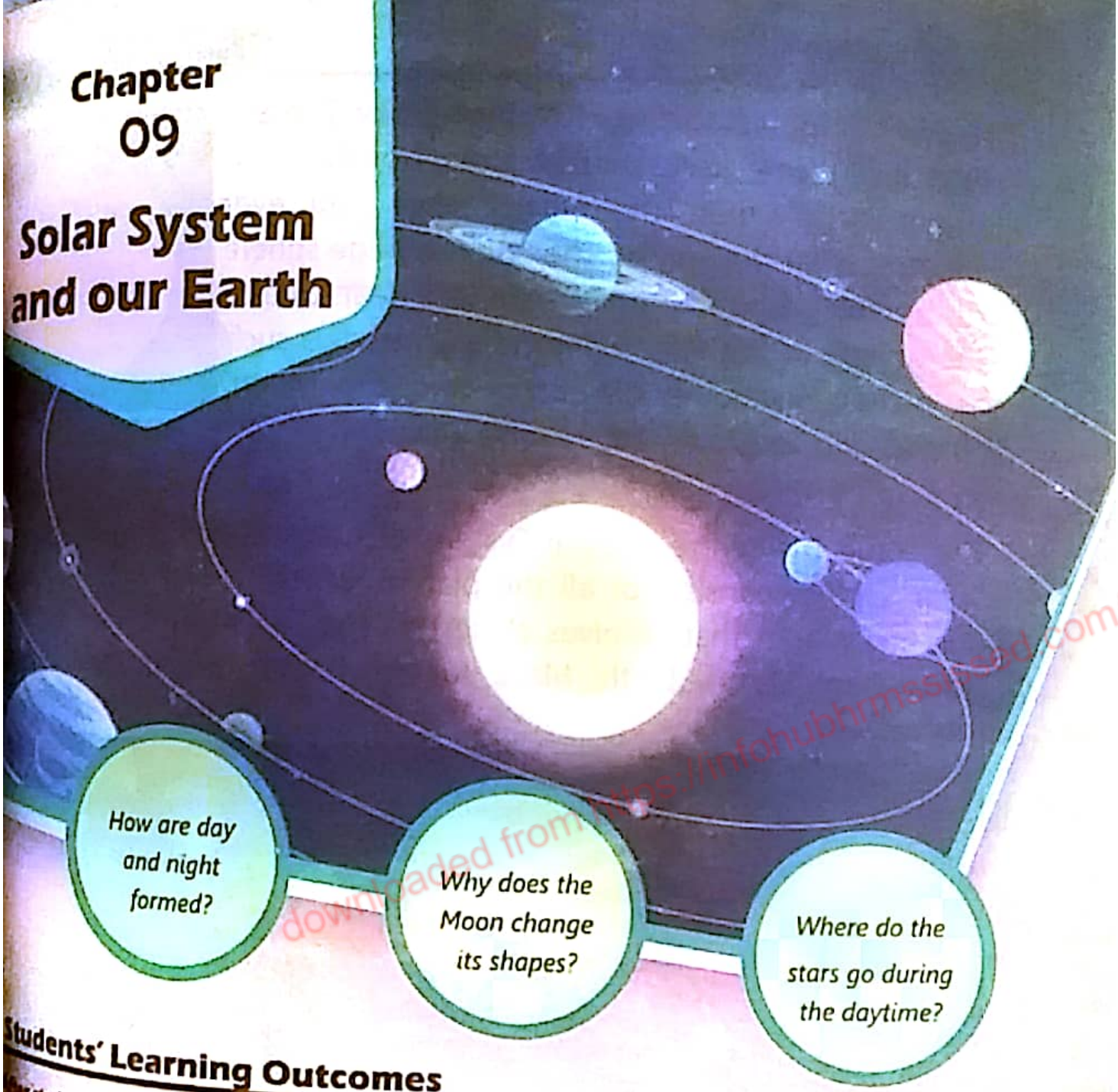
i. Construct a simple wind vane by using cardboard or old ca scissors, straw, board pins and coloured chart paper according to diagram.

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 are day and night formed?

Why does the Moon change its shapes?

Where do the stars go during the daytime?

Students' Learning Outcomes

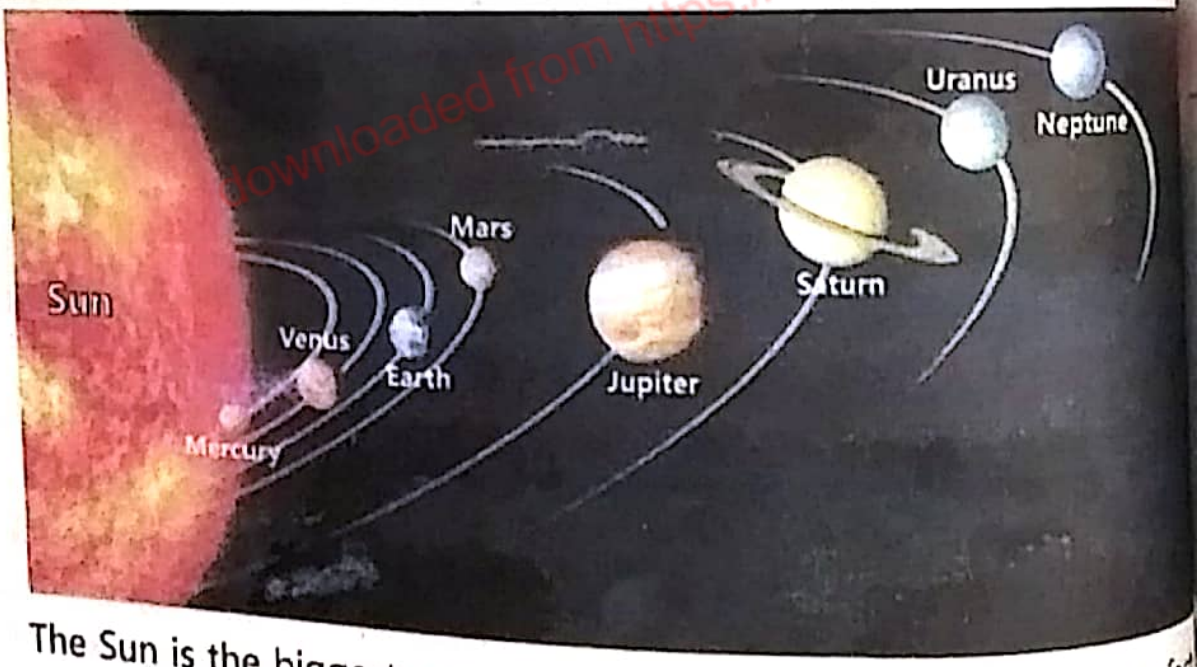
After studying this chapter, the students will be able to:

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



The Sun is the biggest source of light and heat for our Earth. In fact 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 the Sun is very near to the Earth as compared to other stars.

Point to Ponder!

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

Do you know?

The circular path of a p around the Sun is call orbit. The time taken planet to complete one 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.

Interesting Information

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, five dwarf planets, including Pluto, millions of asteroids and comets are moving in their orbits around the Sun.

Activity 9.1

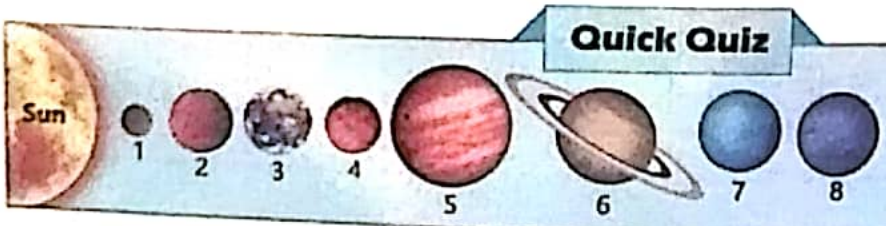
Work in groups. Each group will make a model of Solar System.

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 c or plasticine and paint them with different colours.
2. Make your model of Solar System according to the order and siz the planets and arrange it on the table.
3. Show the Sun also in your model.

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

Quick Quiz



Write the names of t planets in this pictur

Moon

The brightest object appearing in the sky after the Sun is the Moon. It i natural satellite of the Earth. Moon completes one revolution around t Earth in about 29.5 days. We see the Moon almost in a new sha everyday. Sometime we see a very thin Moon which is called cresce Sometime we see a complete Moon which is called Full Moon (bada Among all celestial bodies, Moon is the closest to the Earth. It is at distance of about 384,000 kilometres from the Earth. The size of th Moon is much smaller than that of Earth. Its diameter is about 3,5 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 around 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.

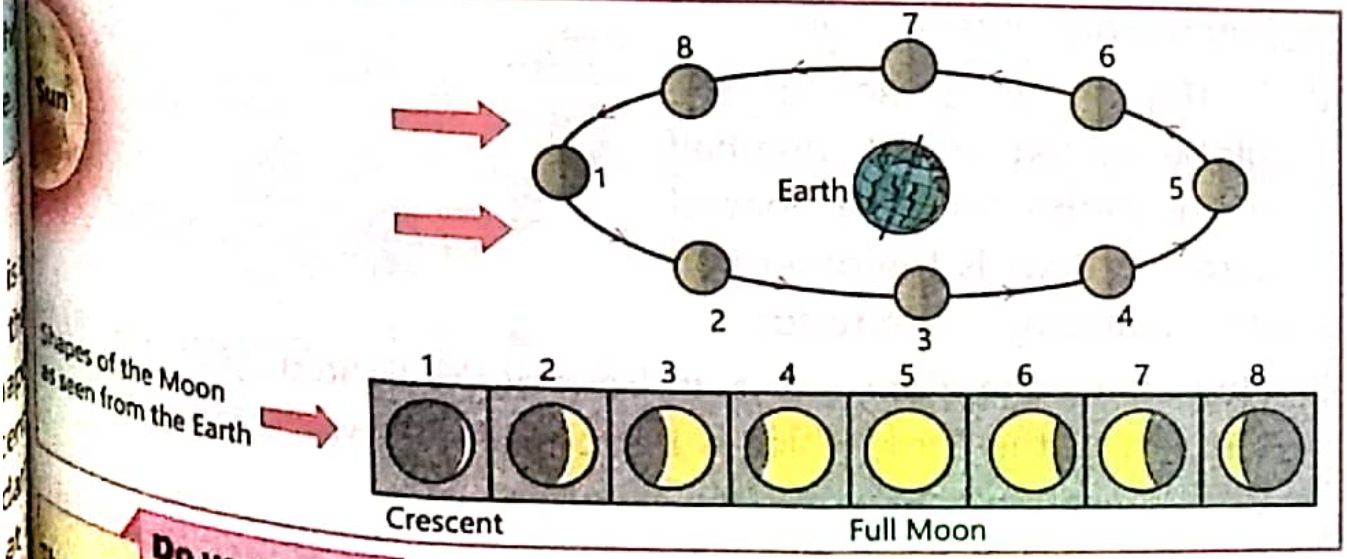
Do you know?

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 time? What does the Moon of Eid-ul-Fitr look like? On that day, what is the date of the 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 disappears.



Do you know?

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

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

Interesting Information

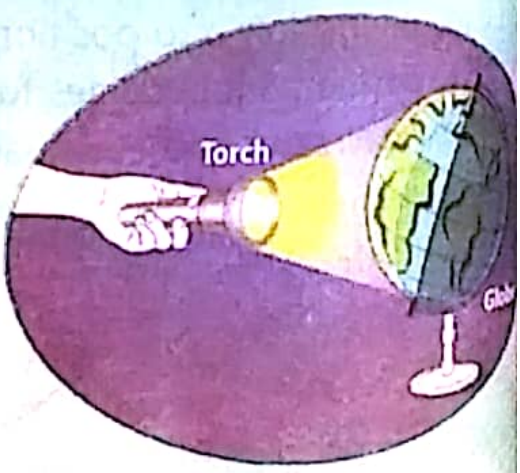
Day and night are due to the rotational motion of the Earth. The Earth rotates from west to east. This is the reason that the Sun appears to rise in the east and sets in the west.

Do you know?

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

Activity 9.2

1. Take a globe and throw torch light on it at one side. Here, globe represents 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 da the part of the Earth which is in front of light whereas it is night the remaining part.

Relation of Changing Shadows with Axial Rotati of Earth

During Earth's axial rotation the Sun appears to rise in that part of E Earth that comes in front of the Sun. At this time, we see long shadows

ees and other objects. As the Earth keeps rotating, the shadows adually decrease in size. At noon, the shadow of any object is the nallest in size. On further rotation of the Earth, the size of shadows adually increase in opposite direction. Just before the sunset, the adows again become long as they were in the morning.

Activity 9.3

Select location in your school playground where there is sunlight. Fix a stick at this location in the ground.

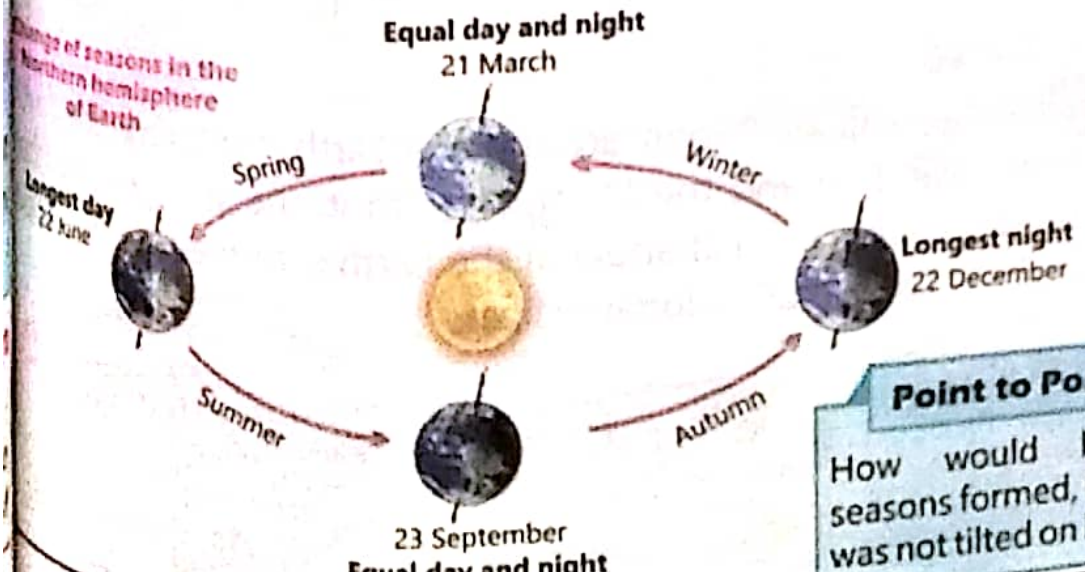
Observe the shadow of this stick three or four times (e.g. at 08:00 am, 10:00 am, 12:00 noon and 02:00 pm) and mark the length of shadows with lime each time.

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



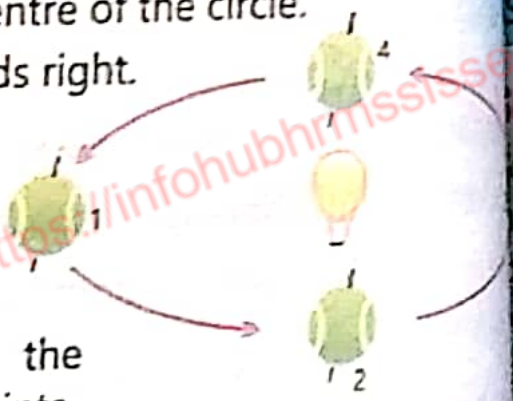
Point to Ponder!

How would have the seasons formed, if the Earth was not tilted on its axis?

Sun rays fall vertically at the northern hemisphere of the Earth, the duration of the day increases and that of the night decreases it is summer season in the northern hemisphere. During the s the southern hemisphere of the Earth receives slanting s Therefore, in this part, duration of the day decreases and the night increases and it is winter there.

Activity 9.4

1. Pass a long needle through a rubber ball.
2. Draw an almost circular path on the table, as shown in the pic
3. Light an electric bulb at the centre of the circle.
4. Bend the needle a little towards right.
5. Hold the ball by the 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.



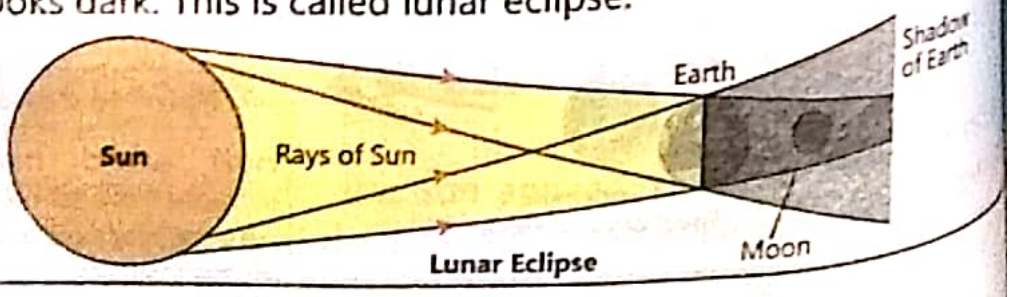
What will be the season in the part of Earth (ball) which receives v light?

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

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

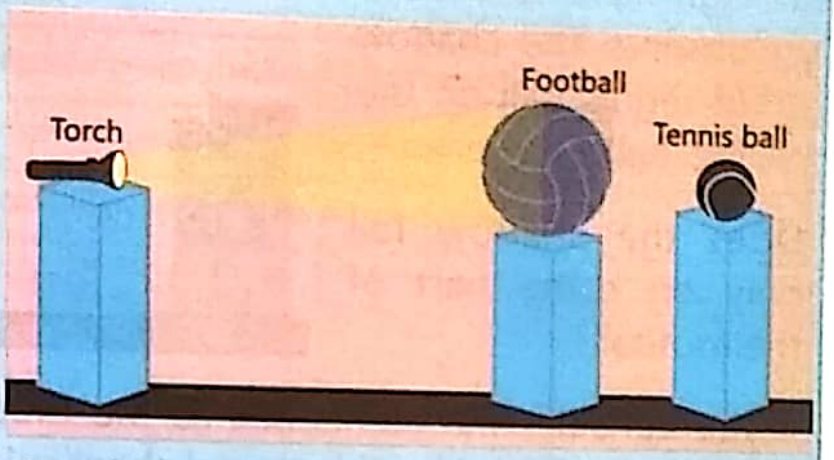
Lunar Eclipse

During the rotation of the Moon around the Earth, sometime the comes between the Sun and the Moon. Due to it, the sunlight does reach the Moon. Therefore, a shadow of the Earth is formed on the M and it looks dark. This is called lunar eclipse.



Activity 9.5

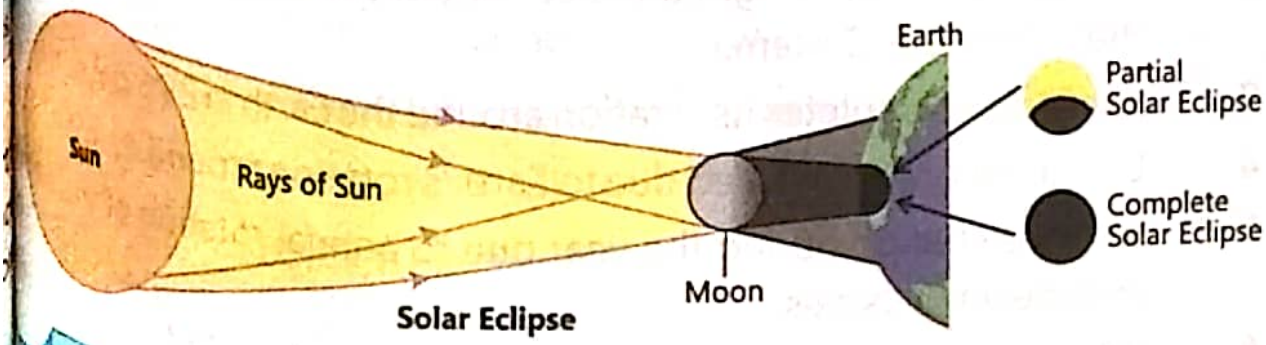
1. Place a torch, a football and a tennis ball in one line as shown in figure.
2. Light the torch and observe the shadow of football on the tennis ball.



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

Solar Eclipse

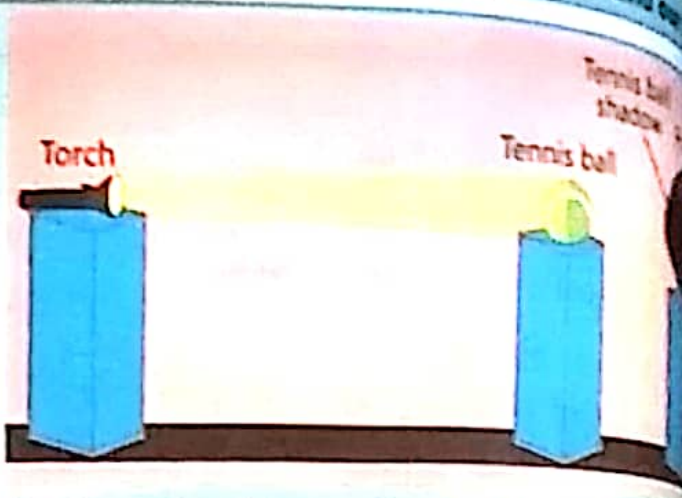
Sometime, during its rotation around the Earth, the Moon comes between the Earth and the Sun. In this condition, the Sun is hidden behind the Moon and is not visible from the Earth. A shadow of the Moon falls on the Earth. It is called solar eclipse. The complete solar eclipse is very rare. Usually, 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.



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 Ear 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 the Sun and Earth, during its rotation? Explain.

Point to Ponder!

Which force is responsible for movement of Moon around Earth? Does the force of Sun also act on Mo

Key Points

1. Our Solar System consists of Sun, eight planets, asteroids comets.
2. Sun is the source of light and heat not only for our Earth but a 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 and the tilt of its axis.
6. When it is winter in the northern hemisphere of the Earth, it is su in the southern hemisphere.
7. Solar eclipse occurs when the Moon comes between the Earth 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 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.

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

Exercise

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 tilt on 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 affected the seasons?

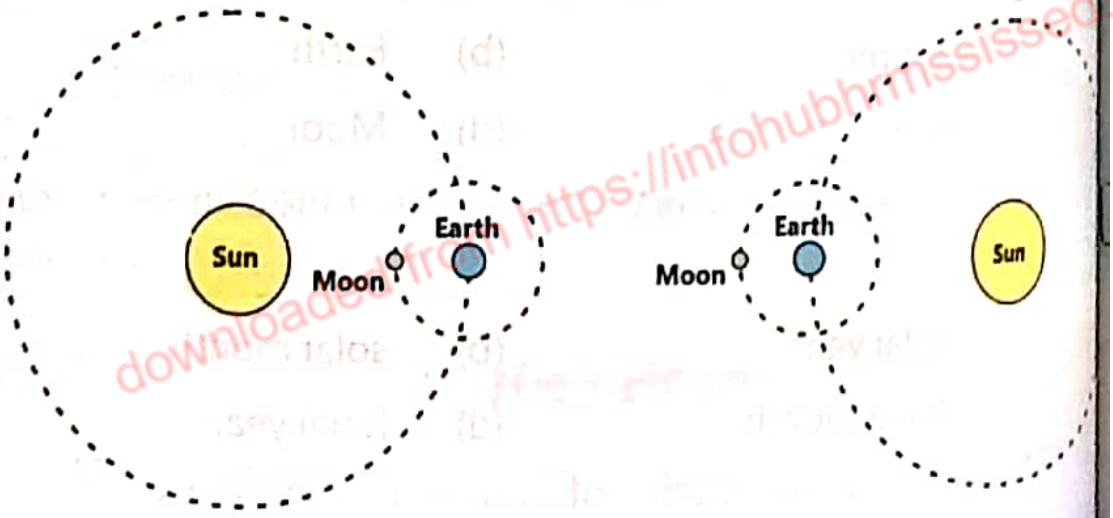
iii. When it is winter in the northern hemisphere then what the season in southern hemisphere?

iv. Which planet is closest to the Sun?

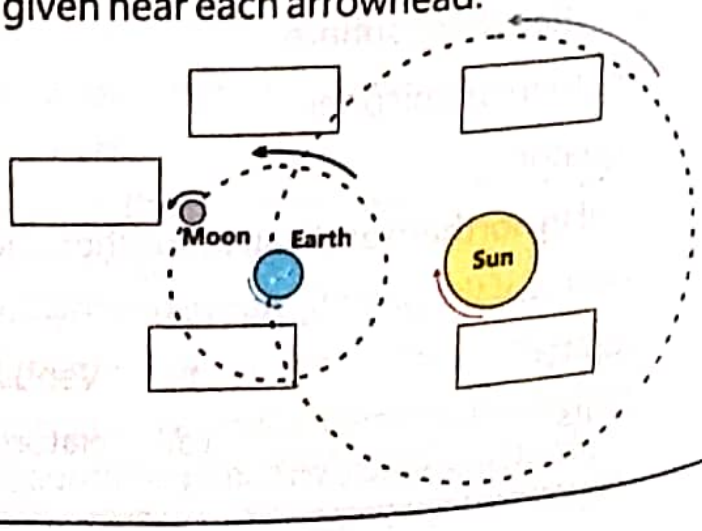
v. Why is the solar eclipse usually partial?

3. Constructed Response Questions:

i. Which phenomena are shown in the following figures?



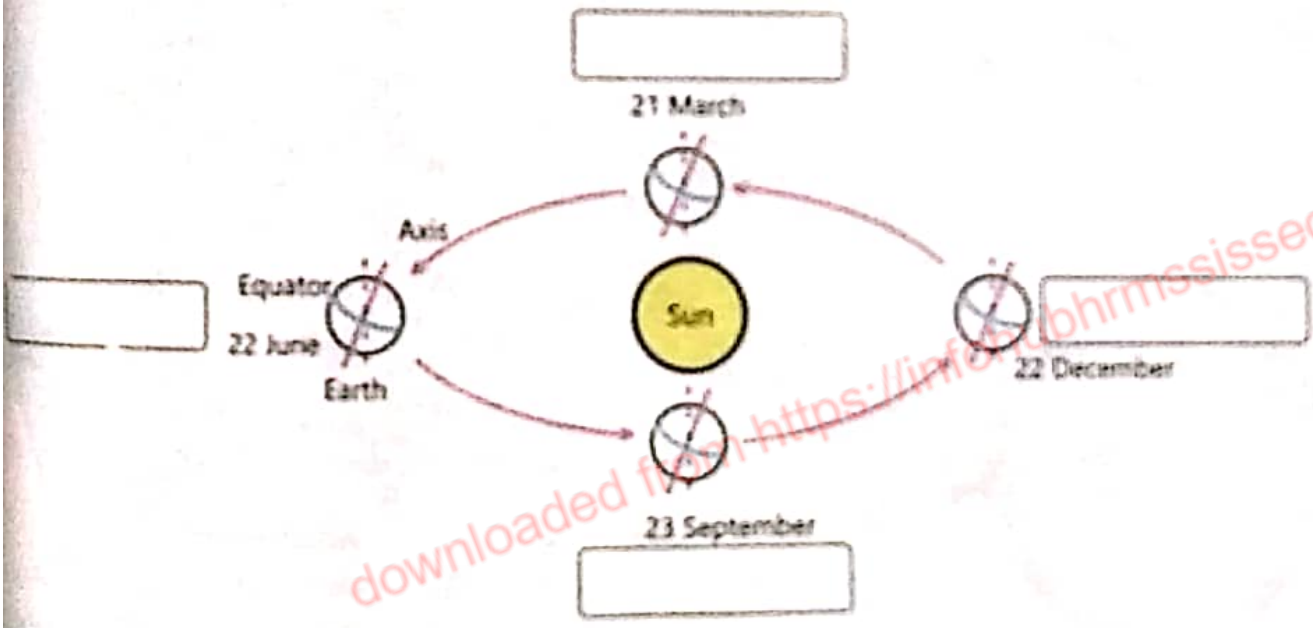
ii. In the following picture, each arrowhead shows the axial or o movement of Earth and Moon. Write the correct type of move in the box given near each arrowhead.



In how many days does the Moon complete one rotation around the Earth? _____

In how many days does the Earth complete one rotation around the Sun? _____

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



4. Investigate

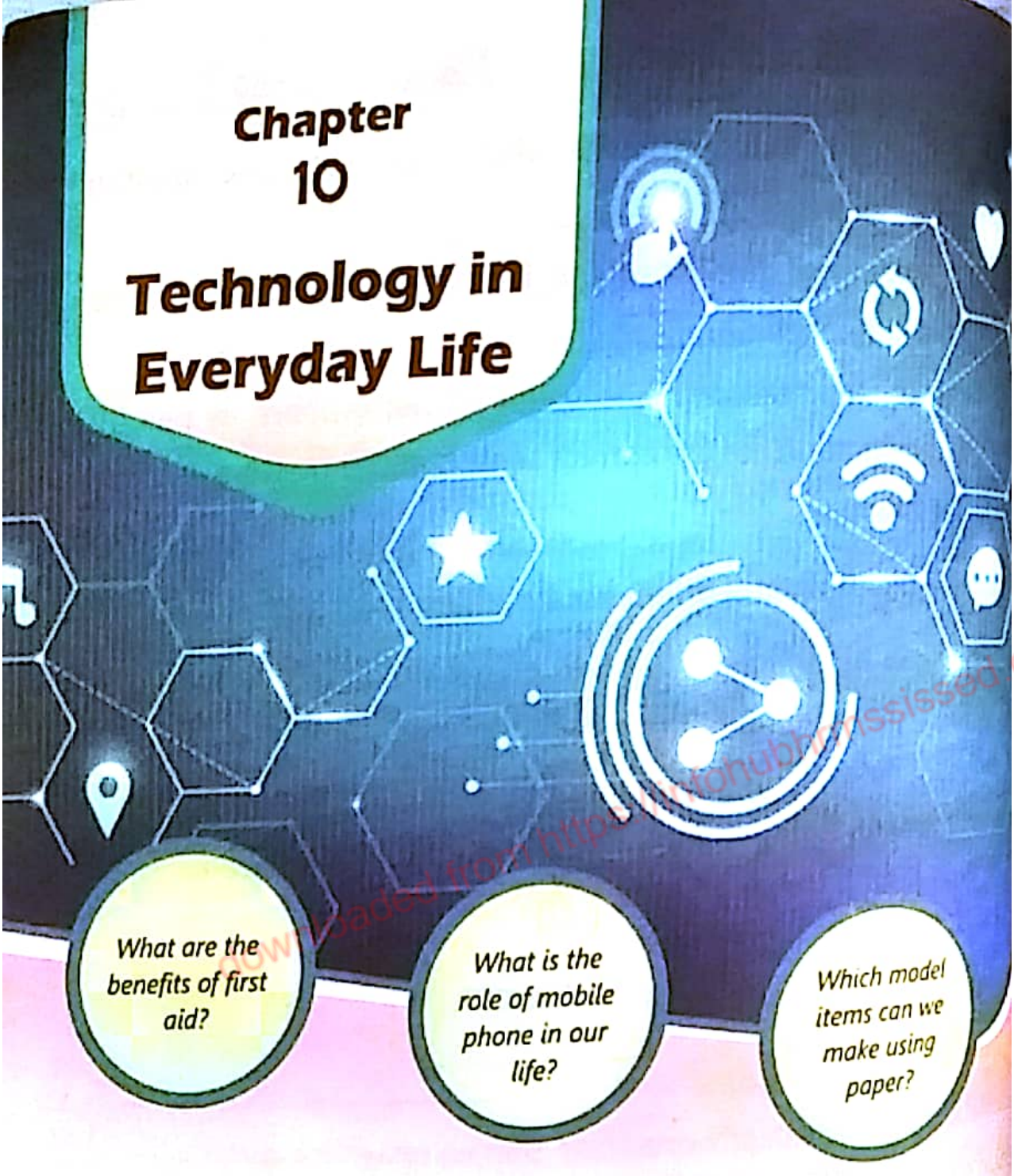
If the Sun stops providing light and heat, what will be its effect on the Earth? Would life be possible on the Earth?

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 the 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?

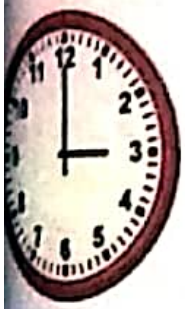
Which model items can we make using paper?

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 calculator, alarm clock and calendar.
6. Operate mobile phones for taking snapsh
7. Recognize the items of first aid box.
8. Use digital and clinical thermometer exter measure body temperature.
9. Check blood pressure by digital blood pr monitor.

king new models of various items is human nature. Model making of roplane, car, bus, train, dress, furniture, etc. has always been a necessity. e are living in the information age. We remain in touch with our dear ones h the help of computers and mobile phones. A mobile phone can form a variety of tasks such as telling the time, keeping us organized and turing precious moments. Therefore a mobile phone can act as a clock, a lender and a camera.



Clock

Calendar

Camera

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

asic Craft Making

less we do some tasks with our own hand, we cannot understand its mplexities. The paper is not only used for writing but also for making odels. Students should practise folding, cutting, tearing and pasting to ake various shapes using old newspapers.

olding, Cutting, Tearing and Pasting Paper / ardboard to Make Objects or Patterns

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

White paper

Coloured paper

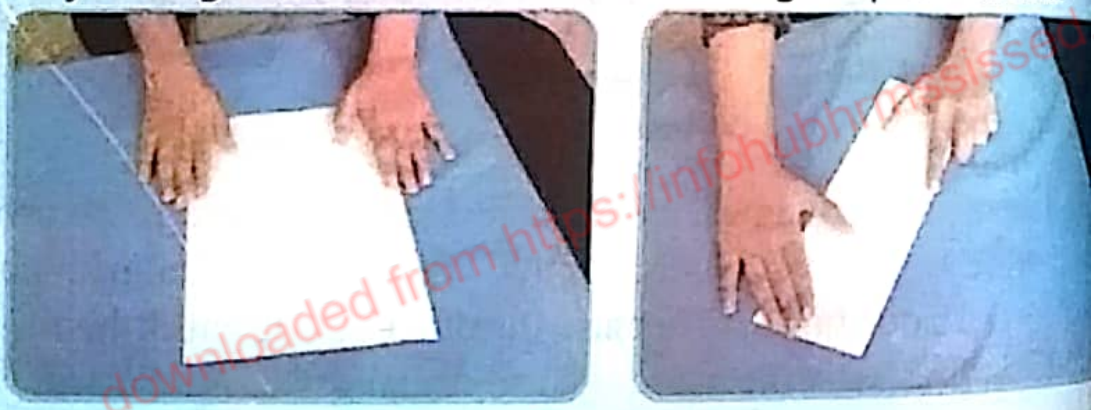
Cardboard

We need some skill for folding, cutting, tearing and pasting pap cardboard. Let us practise these processes using the following activit

Folding

Activity 10.1

1. Stretch a sheet of paper on a flat smooth surface preferably table top. Draw a line from where to fold the paper.
2. Keep pressing one edge of the paper with one hand, turn the p with your other hand to fold it along the line. To make a crease 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 fo along the line where it is to be cut. Blade of paper cutter is inserted i the fold. Then pressing the fold with one hand, the paper cutter is pus forward as shown in the figure below. Paper and cardboard can also be with the help of scissors. It is better if we draw a line before we start cu and then cut along the line carefully.

Cutting paper with cutter

Cutting paper with scissors

Quick Quiz

Why is use of p cutter better t 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 the edge by pulling it apart on both sides with both hands.
2. Then spread the paper on a flat surface. Keep on pressing the paper on one side of the crease with one hand, pull away the other part of the paper with your second hand.

Tearing from the crease

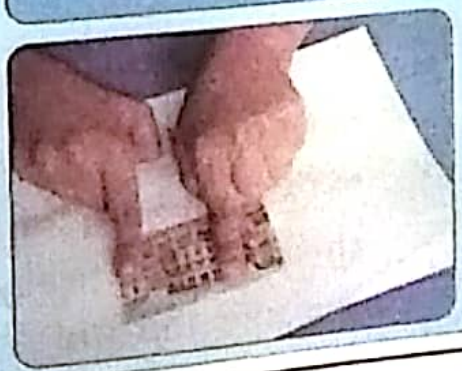
Pasting of Paper

Normally, gum or glue is applied on the back 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.



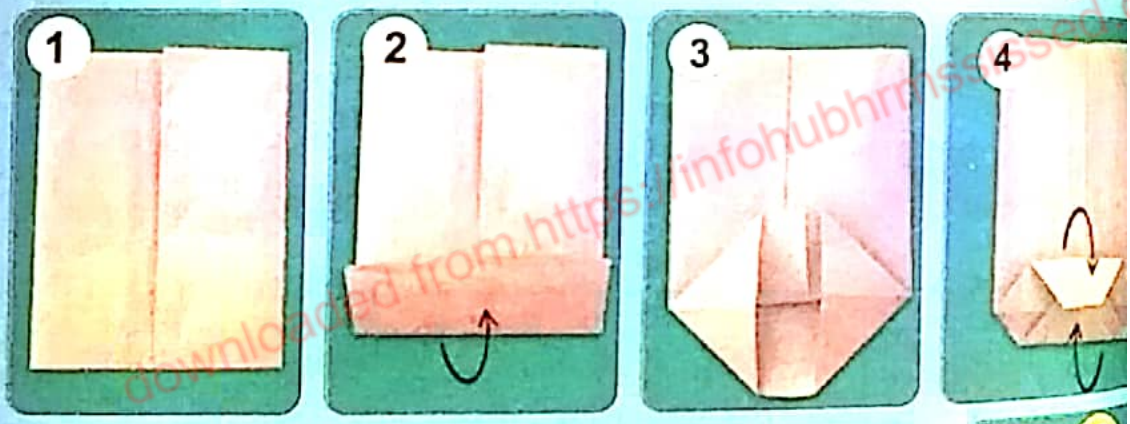
Making a Paper Bag

When we buy things from a shop, the shopkeeper puts these thi paper bag so that we can carry them home easily. Let us know how a 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 middle. Glue the edges to join them together.
2. Fold a small part from the bottom inward as shown by the curved
3. Pull apart both sides of the folded flap as shown in the Figure b



4. Fold 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

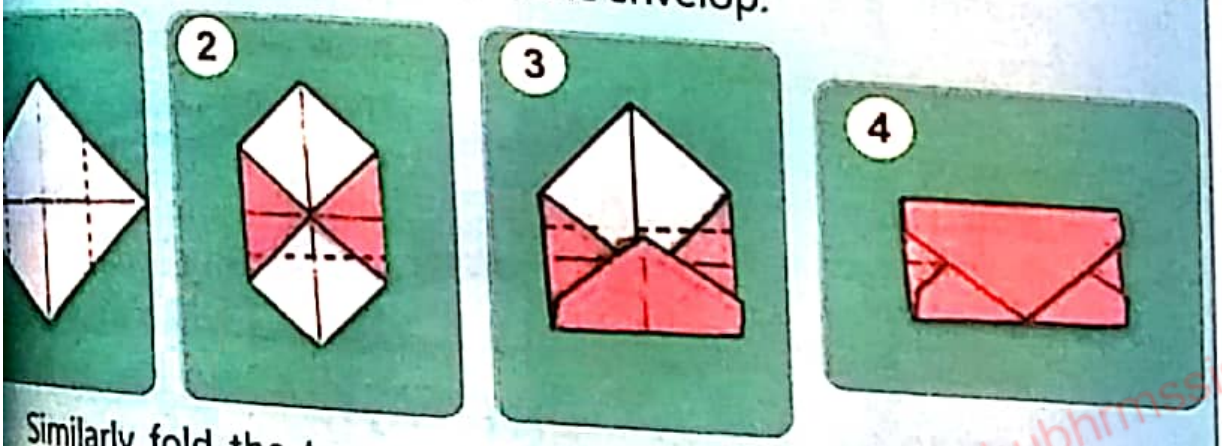
Do you know?

Polythene shoppers spread arou big cause of trash and sewage blo Harmful gases are produced whe are burnt. Therefore, it is advised paper bags instead of polyt shoppers.

half. Then open it. Place the paper on the table in such a way that its corners are on vertical and horizontal lines.

Fold the left corner to meet at the centre. Repeat with the right corner.

Fold the bottom corner up a little above the centre. Apply glue along its edges and fix it on the sides of the envelop.

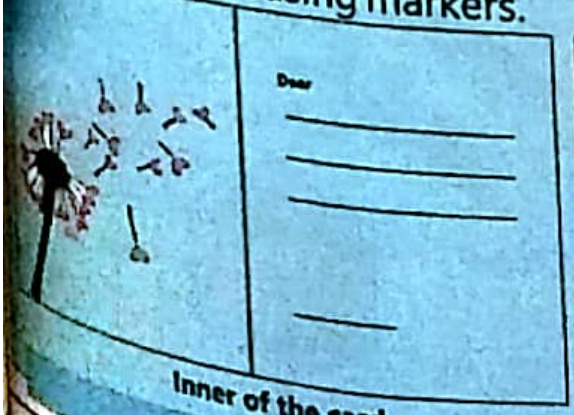


Similarly fold the top corner upto a little below the centre. This becomes the top flap. This can be glued after putting a card or a letter in the envelope.

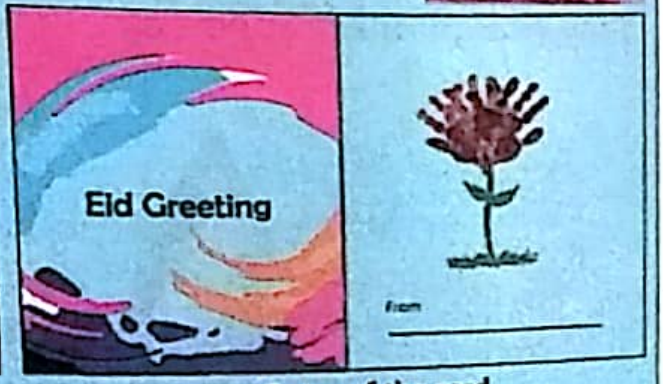
aking a Greeting Card

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.
2. Express your sentiments by writing "Eid Greetings."
3. Fill colours in it using markers.



Inner of the card



Outer of the card

Make a card for your teacher or parents.

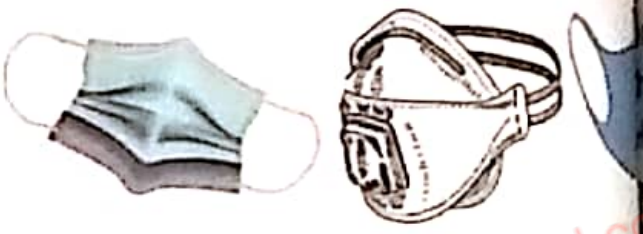
Activity 10.7

Making Mask

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

Interesting Information

Face mask made of cloth are used to protect from germs and infectious diseases during a pandemic.



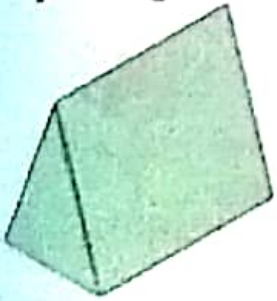
Activity 10.8 Preparation of Clay for Making Models

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 models of various shapes using kneaded clay.

Activity 10.9

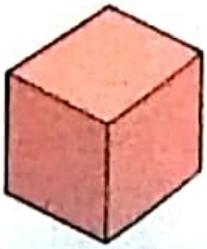
Do you recognize the following shapes? Make these shapes using play dough or kneaded clay.



Prism

Cone

Cylinder



Cube

Sphere

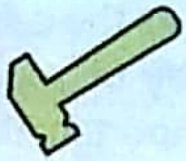
Can you make any other shape other than the given above?

Chapter 10

Activity 10.10

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


Gear


Hammer


Wheel


Rolling pin

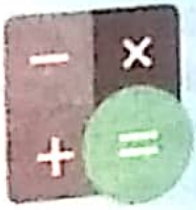
Use of Mobile Phone

Mobile phones are usually used for making calls. 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 a mobile phone.

Activity 10.11

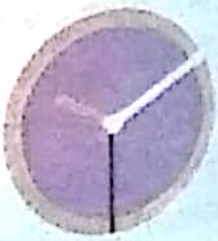
Calculator

Click the menu button on your mobile phone screen as shown in the figure. Now click on the 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 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 birth. 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 should 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 aid to a patient or victim of an accident. A first aid box contains the following items:

Handbook of First Aid Box

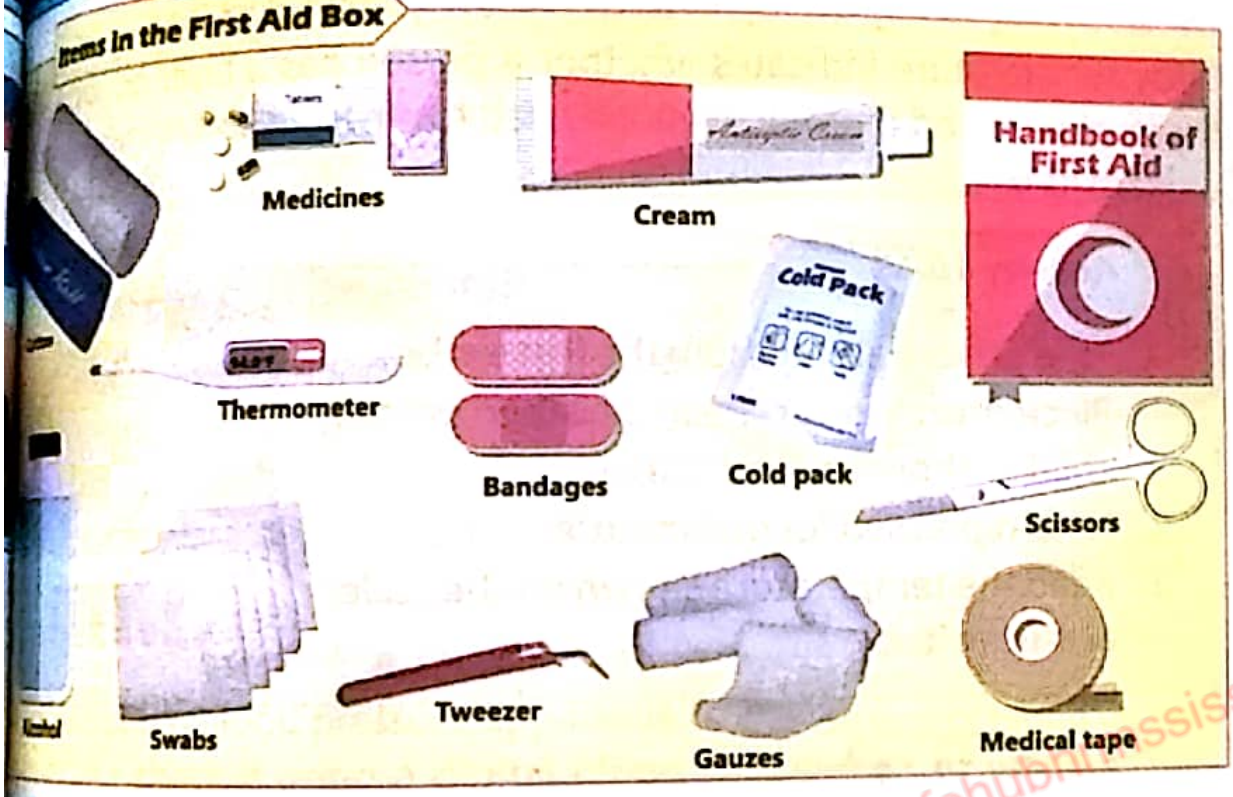
This book provides basic information to measure temperature, dress wounds, blood loss and other treatments of the affected person.

Tweezers and Scissors

A tweezer is used to pick glass pieces, thorns and bits from the wound. Scissors are used to cut bandages.

Cotton and Alcohol

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



dages

king tapes on bandages are used for small wounds.

uzes

zes are used to cover wounds and for absorbing blood seepage.

dical Tape

used to dress up bandages.

dicines and Creams

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

tant Cold Pack

s a pack which cools like ice on shaking.

used to reduce inflammation and pain.

ermometer

a device used to measure body temperature.

Aid Box is available from the pharmacy or dical store. We can make our own by keeping e basic required items at one place.

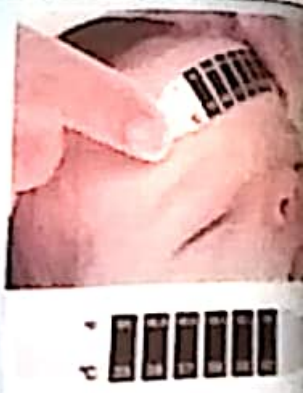
Activity 10.12

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. C thermometer and thermal strips are used to measure body temperatur us learn its use.

Activity 10.13



1. Take a thermal strip from the first aid box. Place it on the forehead of a person or a child as shown in the figure.
2. Keep it pressed for one minute.
3. 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. The digital thermometer does not need the jerks.
3. Put the bulb of the thermometer under the armpit of your friend one minute.
4. Remove the thermometer from the armpit of your friend and re the temperature on its scale.
5. Add 1 in this reading. This will give you the correct inter 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 bo temperature by putting thermometer under the tongu

Activity 10.15

heck your temperature. When the doctor says that a person has 100°F ver, what does it mean?

ecking Blood Pressure

blood pressure of a person is required emain within a limit for human health. Its rmal limit is 120/80 mm Hg. Having high ow blood pressure can lead to different lth problems.

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

Do you know?

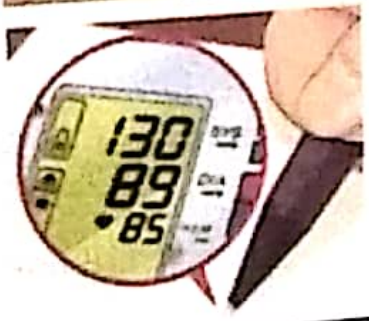
Pressure of blood on our vessels is called blood pressure.

w to Use Digital Blood Pressure Monitor

Put the cuff around the arm as shown in the figure.

Push the ON button of the automatic model.

The cuff will inflate by filling air inside it and reading will start appearing on the display screen.



Look at the display screen to see your blood pressure reading.

Push the exhaust button to release the air from the cuff and remove it from the arm.

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 minor 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

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

Exercise

Tick (✓) the correct answer.

i. Clinical thermometer is used to:
   (a) make shapes
   (b) measure inflammation 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 inflammation as a first aid?
   (a) medical tape (b) tweezers
   (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

Write short answers.

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

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

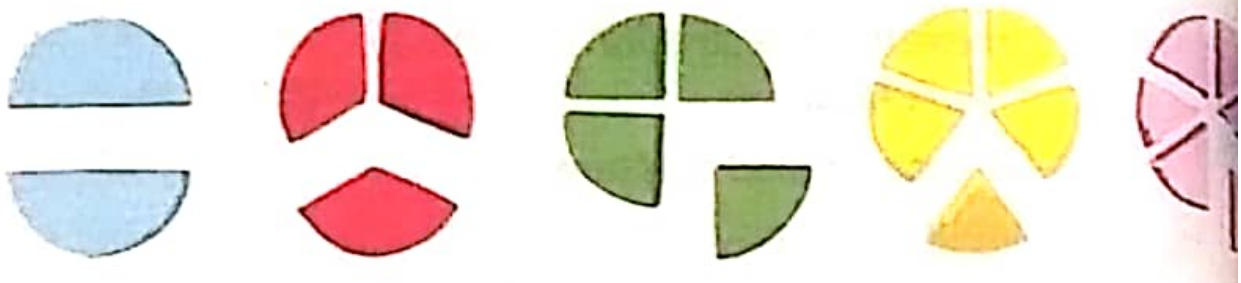
iii. Why is a line drawn on a paper before cutting it with scissors?

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

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

3. Constructive Response Questions.

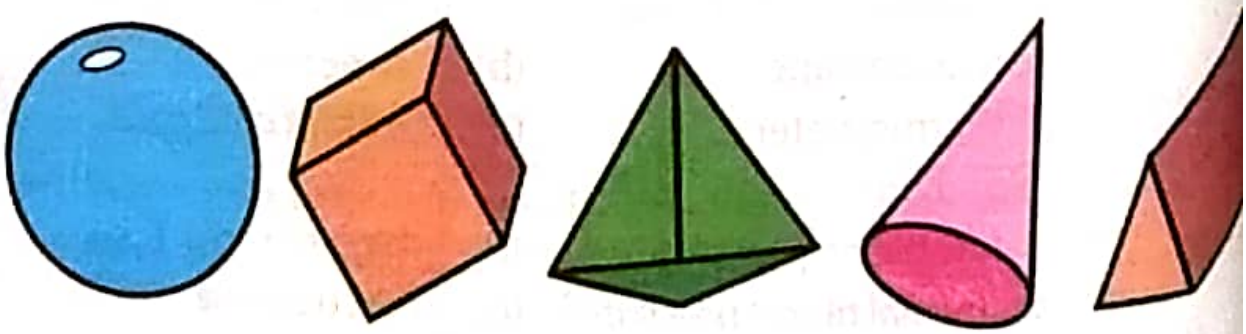
i. A circular shape is cut as shown in the following figure. Wh the value in fraction of the total in each case? Write below shape.



_____ _____ _____ _____ _____

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

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



_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Investigate

Why is the mobile phone technology progressing rapidly? What will the mobile phones of the future look like?

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 cloth.
3. Make 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 (e.g. light, soil).

Anemometer: Instrument to measure the direction and speed (wind).

Axial motion: Movement of Earth around its own axis.

Balanced diet: Diet in which all components of food are 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 (producers, consumers, decomposers).

Climate: General weather conditions of a region.

Consumer: Organisms which get food from other organisms (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 goes beyond 98.6 °F.

ation:	Method of separating the harmful matter from water through filter.
vering plants:	The plants which have flowers.
d chain:	Series of organisms, where one organism eats another and then is eaten by another organism.
e:	Push or pull.
ion:	Force that opposes motion of a body.
:	State of matter which has no specific shape and no specific volume.
r:	Simple machine which increases or decreases speed.
erator:	Machine which produces electricity.
bal warming:	Increase in the average temperature of Earth, due to pollution.
rt:	Organ responsible for the circulation of blood in body.
droelectricity:	Electricity produced by the movement of water.
ertebrate:	Animals without backbone.
nt:	The point where two or more bones join.
ver:	Simple machine used to lift heavy objects.
ht:	Type of energy that helps us to see the things of the surrounding.
uid:	State of the matter that has a specific volume but has not specific shape.
ngs:	Organs responsible for the exchange of gases between blood and air.
ss:	Amount of matter in a body.
tion:	Change in the position of a body.
bital motion:	Earth's annual rotation around the Sun.

Organ: Part of the body which performs specific

Producer: Organisms which prepare their food th (plans, algae etc.).

Pulley: Simple machine that consists of groov and a rope.

Rain gauge: Instrument to measure the amount of ra

Ramp (Incline plane): Simple machine of slanting shape used t objects up and down.

Reflection: Phenomenon in which light comes ba striking a shiny surface.

Skeleton: The overall structure made of the bone body.

Soil: Outer part of the Earth surface consists of t

Solar System: The Sun and the eight planets which around it.

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

Thermometer: Instrument to measure temperature.

Vaccination: Creating defence against diseases by intro 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 a