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2020  
PREPARATORY STAGE



# GETTING AHEAD IN SCIENCE

5



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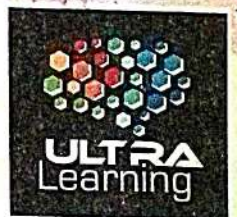
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# GETTING AHEAD IN SCIENCE



5

by  
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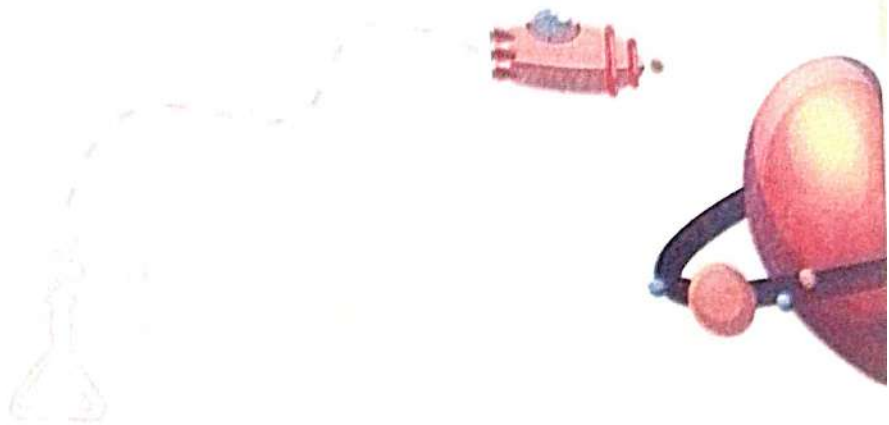
New Edition

*Editor*

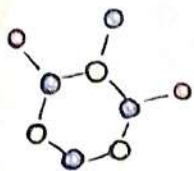
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When we hear the word 'Science' what come first in our mind? Sun and moon? Air and water? Test tubes and chemicals? Einstein? Dog eared textbooks? While all these represent various aspects of science, but none of these completely embodies science as a whole, because it is a multidisplinary field.

Science is both a body of knowledge (that represents the things we have already discovered) and the process of acquiring new knowledge (through observation and experimentation—testing and hypothesising). Both elements are essential. One cannot make progress in science without an understanding of both.

The series **GETTING AHEAD IN SCIENCE** helps students understand both the elements by orienting them to acquire knowledge through scientific skills of observations, evaluation, investigation and drawing conclusions. This series comprised of eight books for Classes 1 to 8, based on the guidelines of the **National Education Policy (NEP) 2020**, which aims at achieving holistic development of the students, ready to face the challenges of the 21<sup>st</sup> century.

**Some of the significant features of the series are:**

- Based on latest syllabus.
- Simple & easy to understand language.
- Concepts supplemented with neat & well-labeled diagram.
- **Pre-concepts** and **Learning objectives** are given at the start of each chapter.
- **Word meanings**, **Extra information**, **Questions in oral & written form** etc. are provided in each chapter.
- Each chapter followed by summary of the chapter in the form of **Mind map**.
- **Exercise** of each chapter includes objective type, very short answer type, short answer type and long answer type questions.
- **Creative Corner** deals with skills enrichment questions and activities
- **Three Quick Test Papers** between the units are attached in the book.
- **Half-yearly** and **Annual Assessment Papers** have been given at the end of each book.
- **Olympiad Model Paper** is also provided to prepare students for competitive examinations.

**[Note: Your Feedback, valuable suggestions and comments are always welcome.]**

## 21st CENTURY SKILLS

### LITERACY SKILLS



Information



Media



Technology

(Digital Resources)

### LEARNING SKILLS (THE FOUR C'S)



Critical Thinking



Creativity



Collaboration



Communication



Flexibility



Productivity



Leadership



Social Skills  
(Sensitivity)



Initiative



Health  
& Well Being

# GETTING AHEAD IN SCIENCE

## An Explicit Edition Based on NEP 2020



### What We Have Learnt?

- + Terrestrial plants
- + Aquatic plants
- + Insectivorous plants
- + Non-green plants

### What We Will Learn?

- + Reproduction from seeds
- + Reproduction through other parts
- + Crops

### What We Have Learnt?

It refers to the information about the topic that the learner already knows, thus helps to recall previous knowledge.

### Get Set Go!

It contains starter activities to arouse the interest in the chapter.

### What We Will Learn?

It defines the focused topics of the chapter, thus helps to be a familiar with it.

### Knowledge Zone

It gives interesting information related to the topic and highlight amazing facts to make learning joyful.

### Get Set GO!

Look at the following pictures of some fruits. Write whether each of these fruits have no seed, one seed, few seeds and many seeds.



### Quick Test

It contains the in-text questions within the topics to reinforce the knowledge of learners.

### Knowledge ZONE

A coconut can travel thousands of kilometre in sea without getting damaged.

### Word Bank

**Bud** : A small hump on the plant part from which new shoot, leaf, flower or new plant can grow

### Word Bank

For the simple meaning of tough words.

Literacy Skills (Information)

### QUICK TEST

Fill in the blanks with the correct words.

1. In sugar cane, stems are cut into small pieces are called .....
2. Potato and ginger are ..... stems.
3. Crops that grow in the winter are called ..... crops.

SOCIAL SKILL

LITERACY SKILL

LITERACY SKILL

COGNITIVE SKILL

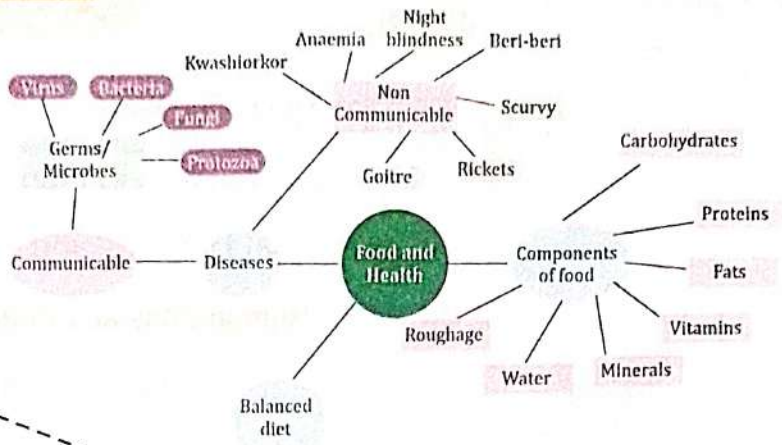
LEARNING SKILL

LITERACY SKILL

**MIND MAP**

**Mind Map**

It contains a brief and concise matter of the chapter in a flowchart form, thus helps in revision.



COGNITIVE SKILL

**FUN Activity**

Snails, mussels, woofers, cubs, colobus etc. are some kinds of sea food. With the help of internet find out their specific features and their places of findings.

**Fun Activity**

It contains different type of activities which enhance the ability of learners in many ways.

Digital Resources

**EXERCISES**

**Objective Type Questions**

**A. Tick (✓) the correct option.**

- The place where an animal lives is called its:
  - (a) forest
  - (b) home
  - (c) habitat
- Bodies of birds are covered with:
  - (a) scales
  - (b) skin
  - (c) feathers
- The outercase of snail is called:
  - (a) cell
  - (b) shell
  - (c) cover

**B. Fill in the blanks with the correct words.**

- The surroundings where an organism lives naturally and reproduces is called a .....
- Polar region and mountains are covered with .....

**Exercises**  
It contains a variety of questions to assess all around learning.

INTELLECTUAL SKILL

**Project Work**

Visit a zoo. Make a list of animals that you see there. Try to know whether they are wild animals or domestic animals. Write their shelter names also.

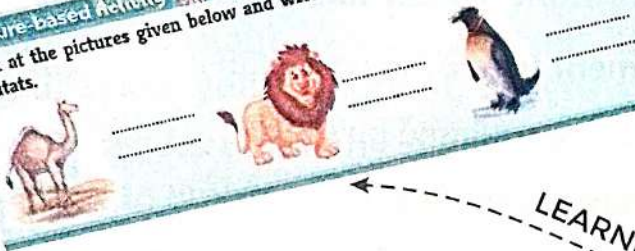
**Think Smart**

Some animals use sea and air current to guide them. Birds follow the coastline to find their direction while flying. Reindeers use the sun's rays to find their direction. Try to know how a bat, which has a very poor vision, comes to know the right direction for its flight.

**CREATIVE CORNER**

**HOTS Question**

How do the animals know the direction where to move?  
Look at the pictures given below and write the name of the animals and their habitats.



LEARNING SKILL

**Creative Corner**


It contains various activities based on 21st century skills like HOTS questions, Project Works, Subject Links, etc., that will help the learners to sharpen their skills.

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# Reproduction in Plants



## What We Have Learnt?

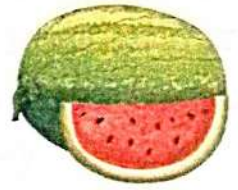
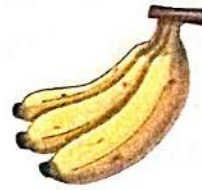
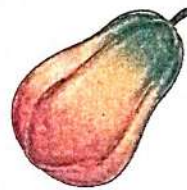
- + Terrestrial plants
- + Aquatic plants
- + Insectivorous plants
- + Non-green plants

## What We Will Learn?

- + Reproduction from seeds
- + Reproduction through other parts
- + Crops

## Get Set GO!

Look at the following pictures of some fruits. Write whether each of these fruits have no seed, one seed, few seeds and many seeds.

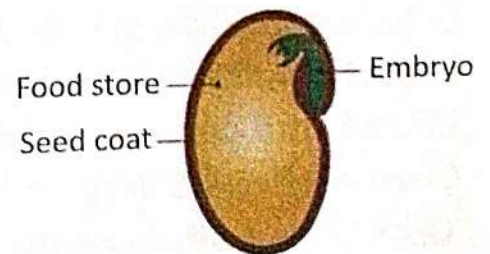


Plants are living things. They produce more of their own kind in different ways. Most plants reproduce through seeds but some plants reproduce by their vegetative parts such as roots, leaves or stems. Let us learn about the various ways in which plants reproduce.

## REPRODUCTION FROM SEEDS

Most plants bear flowers. Once flowers bloom, they turn brown, the petals fall off and they change into fruits. Fruits have seeds inside them. These seeds contain a new plant. When the seeds are sown into the soil, a new young plant starts growing.

A seed consists of a baby plant inside it called the embryo. The embryo has two ends. One end grows



Structure of a seed

into the root and the other end grows into the shoot. The outer covering of the seed is called a seed coat and it protects the internal parts of the seed. A seed also contains a seed leaf called **cotyledon**. It stores food for the baby plant inside.

Some seeds like maize, wheat and rice have only one cotyledon and are called monocotyledons. Other like gram, pea and bean have two cotyledons and are called dicotyledons.

## Seed Germination

The small plant which grows from a seed is known as a seedling. The seedling gets its food from the cotyledons till it forms new green leaves.

The process of growing of a seed into a seedling is known as **germination**. A seed usually has to wait for a long time before it finds the right conditions to grow or germinate. A seed will germinate only if it gets the right amount of water, air and sunlight (or warmth).

A seed requires water to soften the seed coat. Water also makes the food stored in seed leaves soluble so that it may be used by the baby plant. A seed needs air because it needs oxygen for breathing. A seed needs warmth to get active.

## Activity

**Aim :** To study suitable conditions for germination.

**Materials required :** Some seeds of Bengal gram, four dishes, cotton and water.

**Method :** Put about 10 seeds in each dish. In the first dish, put seeds without water at room temperature.

In the second dish, put seeds in moist cotton at room temperature.

In the third dish, keep seeds covered with water at room temperature.

In the fourth dish, keep seeds in moist cotton in an ice box or refrigerator.

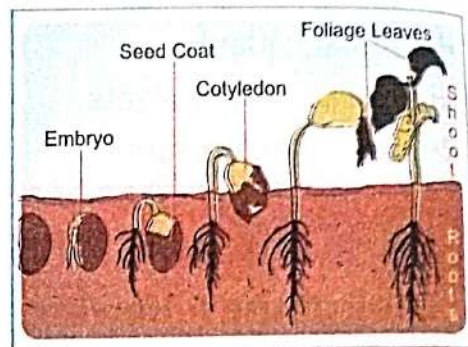
Observe after 4-5 days.

**Observation :** Seeds germinate only in the second dish, because water, warmth and air were available for germination.



### Word Bank

**Cotyledons** : Parts of the seed that contains food for the baby plant



Germination of a seed

EL

Experiential Learning

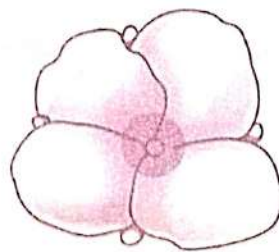


## Dispersal Of Seeds

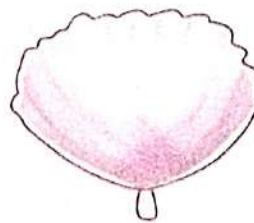
Plants produce a large number of seeds. However, if all the seeds fell near the parent plant, there would not be enough water and nutrients for all of them to grow well. The seeds need to separate from their mother plant to grow well. As plants are fixed to the ground and cannot move from one place to another on their own, the nature has arranged some ways by which the seeds get scattered to large distances. There are some agents in nature to scatter these seeds. They are called **agents of dispersal**. These agents carry the seeds away from their parent plant. The process of scattering of seeds or fruits away from the mother plant is called **seed dispersal**.

### Agents Of Dispersal

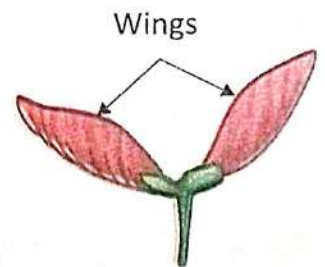
**Wind** : Seeds are usually small, flat, dry and light in weight. These seeds have wings to float in the air and drop down to grow. Seeds of maple, dandelion, cotton, etc. are easily carried away by the wind.



Cotton seed



Dandelion seed



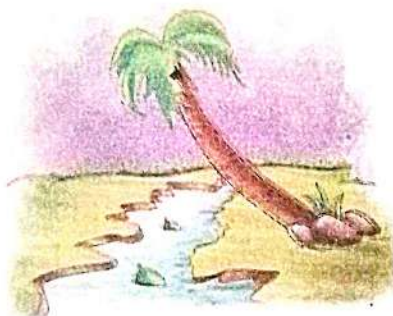
Maple

Dispersal by wind



The lotus has a spongy and light fruit.

It floats far away dispersing its seeds on the way



Coconut has thick fibrous

coat to help it to float far away

**Water** : Seeds of plants growing near water get dispersed by water e.g., lotus and coconut.

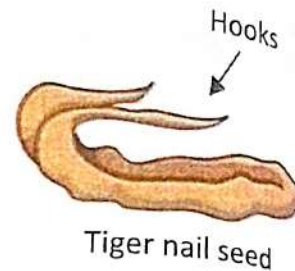
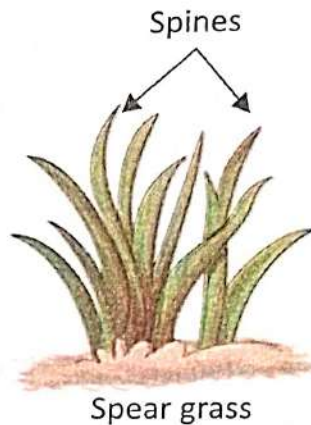
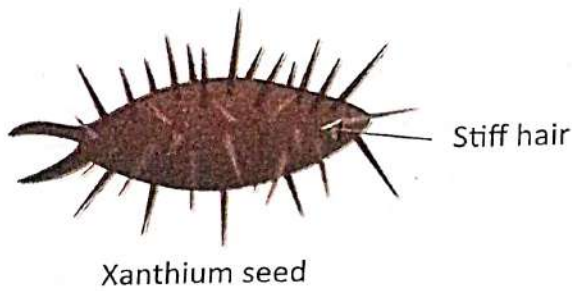


### Knowledge ZONE

A coconut can travel thousands of kilometre in sea without getting damaged.

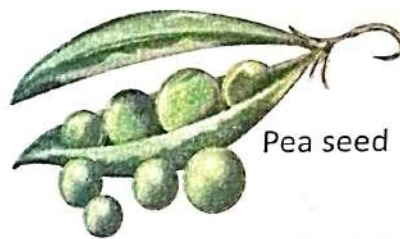
**Animals** : Birds and animals eat fruits and throw away their seeds.

Some seeds have hooks or spines. They get stuck to the hairy skin of animals and are carried away. Seeds of castor, burdock and mimosa plant have hooks, spines or glue. They cling to the fur of animals, wings of birds or clothes of human beings and reach far off places.



Dispersal by animals

**Explosion :** Some fruits like peas and lady finger burst or explode when dry. When the pod bursts open, the explosion helps the seeds to come out and for away from the parent plant.



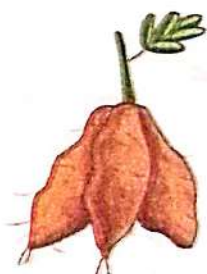
Dispersal by explosion

## REPRODUCTION THROUGH OTHER PARTS

Root, stem, leaf are known as vegetative parts of the plant. In many plants, the stem, leaves, roots and spores can give rise to new plants. It is the simplest method of reproduction in plants.

### Through Roots

Plants like sweet potato, dahlia, etc. produce new plants from their roots. The roots of these plants are swollen and tuberous due to storage of food. When these roots are planted in the soil, new plants grow out of them.



Sweet Potato



Stem cutting in sugarcane Sown in ground New plant of sugarcane

### Through Stems

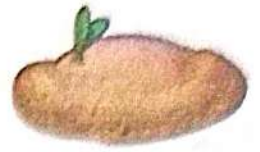
Plants like rose, mint, hibiscus, sugarcane, etc. can be grown by their stems. Stems of these plants bear buds. When these stems are planted into the soil, new plants grow. In sugarcane, stems are cut into small pieces.

These pieces are called stem cuttings.

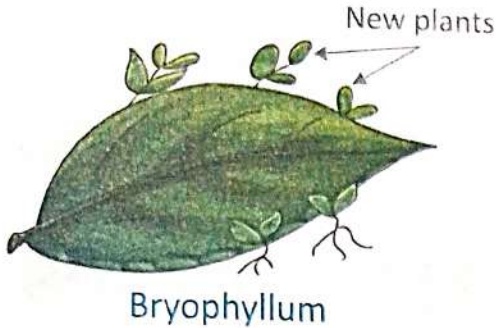
Potato and ginger are actually underground stems. They have eyes on them. Each eye can grow to become a bud. When buds are planted in the soil, they grow to become new plants.



Ginger



Potato



Bryophyllum

### Through Leaves

The bryophyllum plant can grow into many new plants from its leaves. It has thick and fleshy leaves. Young buds arise along the edges of bryophyllum leaves. When the buds drop down on the ground, they start growing into new plants.

### From Spores

The plants which do not have reproductive parts, for example, mushroom, fern and mosses do not produce flowers, they produce tiny spores that grow on the underside of their leaves. When the spores fall to the ground, each of these spores grows into a new plant.



Fern plant

### QUICK TEST

Answer these questions.

1. What is explosion?
2. Name a plant that grows by stem cutting.
3. Name a plant that reproduces by leaves.

### Word Bank



**Bud** : A small hump on the plant part from which new shoot, leaf, flower or new plant can grow

### CROPS

Plants, that are grown in large quantities to provide food and other useful substances, are called crops. This practice of growing large quantities of plants for food and other purposes is called agriculture.

There are different kinds of crops:

- Food crops, such as rice, maize and wheat.
- Fibre crops, such as cotton, jute and hemp.
- Oil producing crops, such as peanut, mustard and linseed.

To grow properly, all crops require sunlight, water, air and fertile soil. Some crops, however, may require one of these in a greater or lesser amount. So, they are grown in different seasons and in different areas.

Crops that grow in the winter are called rabi crops. They are harvested in March. Wheat, gram, cabbage and cauliflower are some examples of rabi crops. Crops that grow in the summer are called kharif crops. They are harvested at the end of the monsoon season. Rice, maize, brinjal and pumpkin are some examples of kharif crops.

### Stages of Agriculture

The farmer works very hard to get a good yield for a good healthy crops. The various stages of a crop production are given below:



1 Ploughing the field



2 Adding manure



3 Sowing the seeds



4 Irrigating the field



5 Spraying pesticides or fertilisers



6 Harvesting

### Protection Of Crops And Storage Of Seeds

We need to protect our crops against :

- Grazing animals like cows and goats.
- **Pests** such as locusts, grasshoppers and caterpillars.
- Different infections and diseases.

Bigger animals can be kept away by proper fencing. After harvesting, grains need to be protected against moisture. They have to be kept safe from rats, moles, birds, squirrels and insects. So, they must be stored in airtight and sealed containers.



#### Word Bank

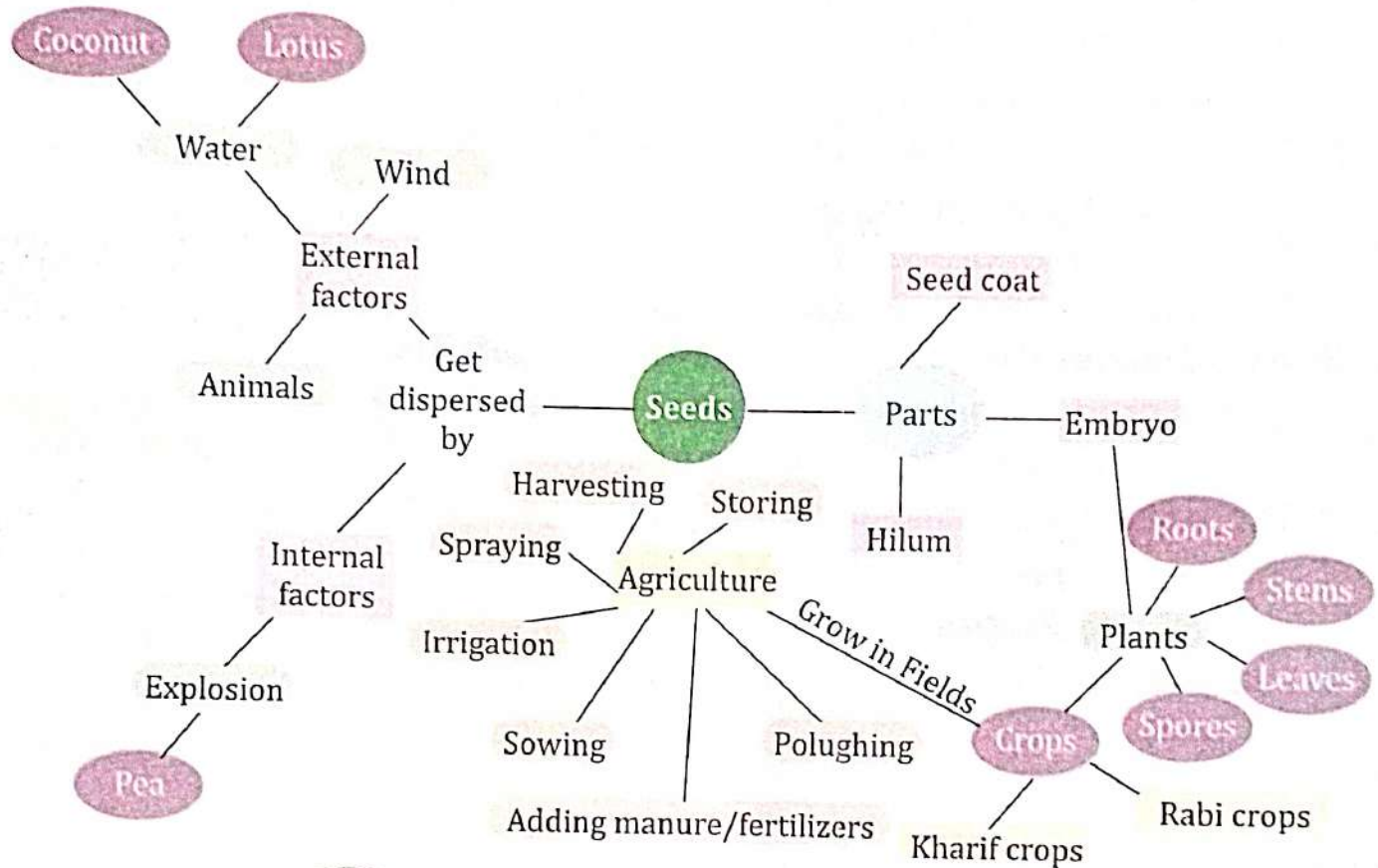
**Pests** : Insects and animals that harm the crops.

**QUICK TEST**

Fill in the blanks with the correct words.

1. In sugar cane, stems are cut into small pieces are called .....
2. Potato and ginger are ..... stems.
3. Crops that grow in the winter are called ..... crops.

**MIND MAP**



**EXERCISES**

**I. Objective Type Questions**

**A. Tick (✓) the correct option.**

1. Cotton seeds are dispersed by :  
 (a) wind  (b) water  (c) animals
2. New plants can grow from the leaves of :  
 (a) ginger  (b) sweet potato  (c) bryophyllum

3. Which of the following reproduces through spores?  
 (a) Mushroom  (b) Wheat  (c) Banana
4. Which of the following is not an agent of dispersal?  
 (a) Air  (b) Water  (c) Plant
5. Which of these is a kharif crop ..... of the plants.  
 (a) gram  (b) maize  (c) wheat

**B. Fill in the blanks with the correct words.**

1. A seed consists of a baby plants inside it called the .....
2. The small plant which grows from a seed is known as a .....
3. Seeds of plants growing near water get dispersed by.....
4. Wheat and gram are ..... crops.
5. The practice of growing large quantities of plants for food and other purposes is called.....

**C. State whether the following statements are True or False.**

1. Plants produce a large number of seeds.
2. The winter crops are called kharif crops.
3. The seed does not need water during germination.
4. Seeds are formed inside the fruits.

**D. Match the following.**

- |                |                            |
|----------------|----------------------------|
| 1. Seed leaves | (a) dispersed by explosion |
| 2. Coconut     | (b) dispersed by wind      |
| 3. Pea seed    | (c) dispersed by water     |
| 4. Cotton seed | (d) cotyledons             |

**II. Very Short Answer Type Questions** 

**E. Write two examples for each of the following.**

1. Seeds dispersed by explosion ..... ..
2. Rabi crops ..... ..
3. Kharif crops ..... ..

**F. Write one word for the following.**

1. A dispersal agent for wing-shaped seeds .....
2. The process in which a new plant grows from a seed .....
3. The process by which a seed produces a seedling .....
4. The method of seed dispersal in the pea plant .....

### III. Short Answer Type Questions ?

G. Answer the following questions briefly.

1. What is function of a seed coat?
2. What is germination?
3. When does a fruit explode to disperse the seeds inside?

### IV. Long Answer Type Questions ?

H. Answer the following questions in detail.

1. What are the agents of dispersal? Explain.
2. Explain the process of germination of seeds.
3. Explain the structure of a seed.
4. What do you mean by agriculture? Differentiate between rabi crops and kharif crops.

### CREATIVE CORNER

#### HOTS Question ?



Critical Thinking



A papaya has many seeds. Each papaya seed can grow into a new tree. However, it does not happen. Why?

#### Project WORK



Experiential Learning

Take the stem of a money plant. Place it in a bottle of water. Expose it to the sunlight. What do you see? Write your observation in your words.

#### Think Smart



Curiosity



For the growth of plants, farmers add fertilizers to the plants. Try to know the constituents of the fertilizers and how they are helpful in the growth of plants?

#### Subject Link (Social Studies)



Cross Curricular

Plants grow well in suitable regions. Can you match the following plants to the state in which they grow?

- |            |                   |
|------------|-------------------|
| 1. Coconut | (a) West Bengal   |
| 2. Mango   | (b) Gujarat       |
| 3. Cotton  | (c) Tamil Nadu    |
| 4. Pine    | (d) Uttar Pradesh |

# Animal Habitats and Adaptations

## What We Have Learnt?

- ✦ Adaptations to environment
- ✦ Adaptations for food
- ✦ Adaptations for protection
- ✦ Extinct and endangered animals

## What We Will Learn?

- ✦ Habitat
- ✦ Adaptation
- ✦ Breathing in animals
- ✦ Movements in animals

## Get Set GO!

Different animals live in different habitats. Match the animals with their habitats.

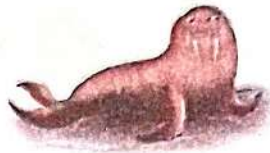
1.



(a)



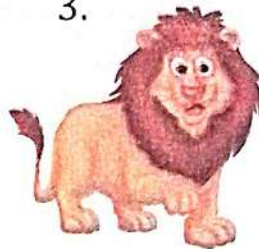
2.



(b)



3.



(c)



4.



(d)



## HABITAT

The surroundings where an organism lives naturally and reproduces is called a habitat. Different animals live in different habitats. Animals obtain food, shelter, air and water from their habitat. Let us learn about the different habitats of animals.

## Forest

A variety of animals such as lion, tiger, deer, elephant, snakes, rabbits, birds and monkeys live in forests. These animals live in different places, for example, lion and tiger live in dens, birds and monkeys live on trees, snakes and rabbits live in burrows, deer, elephant and insects live on the forest land. These animals



Forest habitat

have well-developed **limbs** that help them to run and walk. Limb also help them to hunt or run away from **predators**.

## Desert

Desert habitats are sandy lands with very little rainfall. Most deserts are very hot and dry during the day and become cold at night. Animals that are generally found in deserts are camel, rat, rattlesnake, etc.



Desert habitat

## Polar Regions And Mountains

Polar regions and mountains are covered with snow and are cold throughout the year. During winter, the temperature can drop to very low degrees. Animals that are found in the polar regions are polar bear, penguin, seal and walrus. Animals like polar bear have thick fur on their body that keeps them warm. Penguins have a layer of fat under their skin called the **blubber**. It helps to keep the body warm.



Polar habitat

## Ocean

Oceans are the world's largest habitat. Animals that are found in oceans are crabs, starfish, sharks, whales, prawns, sea turtles, sea horses, jellyfish, octopus and many other types of animals.



Ocean habitat

### Word Bank

**Limbs** : Hands and legs

**Predator** : An animal that kills and eats other animals

## Freshwater

Ponds, lakes, streams and rivers are freshwater habitats. Different kinds of fish, snakes and frogs live in this habitat. Water birds like duck and swan are able to swim in water with their webbed feet. Cranes have long legs to wade through water.



Freshwater habitat

## ADAPTATION

The features and habits of organisms that help them to survive in their habitats are called adaptation. Let us know about some of the adaptation shown by animals.

### Body Coverings

Animals that live in different habitats have different body coverings. Let us learn about them.

**Fur or Wool :** The bodies of animals like sheep, bear and human beings are covered with fur or wool all over their body. Fur or wool helps them in living in specialized habitat.



Sheep



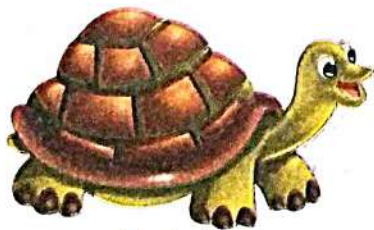
Parrot

**Feathers :** Bodies of birds are covered with feathers that help them to fly and protect them from rain. Feathers also keep their bodies warm and protect them from cold.

**Scales :** Scales are present on the outer body of many animals. Fish, snakes, crocodiles, lizards, etc. have scales on the outer covering of their body. Fish have scales that overlap each other. These overlappings do not allow water to enter their body. Horny scales of snakes, crocodiles, etc. prevent water loss from their body.



Fish



Tortoise

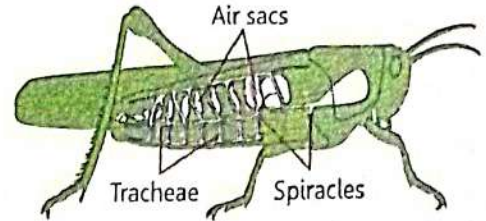
**Shell :** Snail, tortoise and turtle have an outer case. This case is called shell. This is very hard. When these animals feel danger, they withdraw their head and fit into the shell. A shell works as a shield.

## BREATHING IN ANIMALS

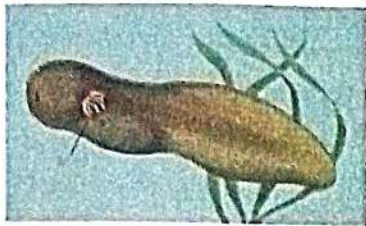
All animals need air to live. They take in oxygen. The oxygen is burnt in the body to release energy to carry out different activities. The breathing organs are different for different groups of animals.

### Through Spiracles

Insects have spiracles on their body. The spiracles lead into trachea inside the body. Air enters the spiracles and then passes through the trachea and get absorbed by the tissues of the body.



Insect-spiracles



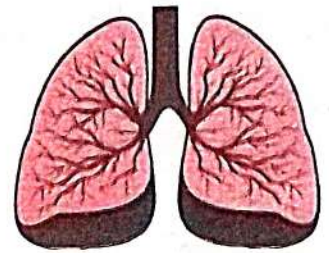
Tadpole-gills

### Through Gills

Fish, tadpoles and other aquatic animals breathe through gills. They take in water through their mouth. When this water passes through the gills, oxygen in the water is absorbed and carbon dioxide is allowed to pass out.

### Through Lungs

Birds, reptiles and mammals breathe through their lungs. The air they inhale, enters through the nose, reaches the windpipe and goes into the lungs. Here the gases are exchanged and carbon dioxide is thrown out of the body through the nostrils.



Human-lungs



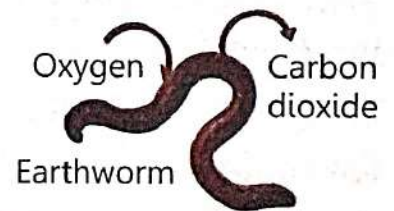
Dolphin-Blow hole

### Through Blowholes

Even though whales and dolphins are aquatic animals, they are mammals and breathe through lungs. Hence, we often see them coming to the surface of the water to breathe in air. They breathe through blowholes.

### Through Skin

An earthworm breathes through its skin. A frog breathes through its skin in water, while on land, it breathes through lungs.



Earthworm-skin

## FUN Activity

Snails, mussels, woofers, cubs, colobus etc. are some kinds of sea food. With the help of internet find out their specific features and their places of findings.



Digital Resources



## MOVEMENT IN ANIMALS

Animals move from one place to another in search of food and shelter. They move about to protect themselves from their enemies.

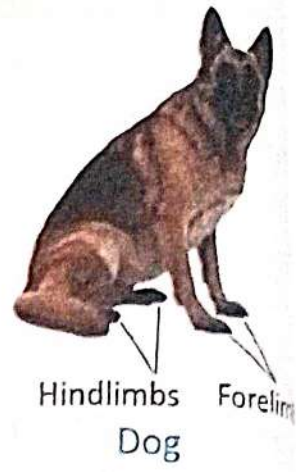
### Land Animals

Most animals usually have four limbs, two in the front and two at the back. Their frontlimbs are called forelimbs and back limbs are called hindlimbs. Horse, cow, dog, etc. use all the four limbs to move. They have hard-hoofed feet. Such feet help them to move swiftly on grass despite having huge bodies.

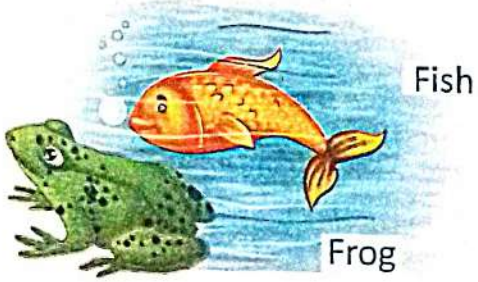
Camel is another big animal that moves reasonably well, especially in desert regions. Camel is called the 'Ship of the Desert.' It has padded feet that do not sink in the sand. It can walk or run on sand with ease.

The tiger is the fastest moving animal. It moves at an astonishing speed of around 80 km per hour. To catch its prey, tiger has special features that make him run at a great speed.

Unlike animals that use all their four limbs for walking, man uses only one pair of legs or lower limbs. He walks, runs and stands upright with only one pair of limbs called legs. They stand erect with the hindlimbs on the ground.



**PUT ON YOUR THINKING CAP**  
Find out what kind of latest species of frog are found where and why?



### Aquatic Animals

Aquatic animals also have special features that help them to swim. Fish have fins and a specially-designed shaped tail, which help to change direction. Frogs use webbed feet to swim. Their strong hind legs help them to jump on land. Turtles use their four paddle-like flippers to swim. Penguins are birds that cannot fly but they use their wings to swim very fast.

### Reptiles

Crocodile, snake and lizard are reptiles. They have short limbs. These limbs help them to crawl. Snakes are legless reptiles. They have scales or plates on the underside of their bodies to crawl. The backbone of a snake is quite flexible. These two features enable the snake to move on land.



## Insects

Insects have six legs. Most insects use their legs to move around. They have no feathers, bones or strong muscles. Their wings are thin, delicate and are made up of tiny scales. Water insects like water boatman use their legs as oars to swim. Butterflies, bees and houseflies fly with the help of wings. Butterflies have two pairs of wings but houseflies have only one pair.



Mosquito



Butterfly



Flying birds



Flightless birds

## Birds

Birds have wings. In fact, forelimbs of birds are modified into wings. They use them to fly. They use their hindlimbs to walk, run, hop on land or perch on trees. Some birds cannot fly. Kiwi, ostrich, emu, rhea etc. are

such birds. They have long and powerful legs that make them run very fast.

### QUICK TEST

Answer these questions.

1. What do you mean by habitat?
2. Name the different types of habitats.
3. Why do animals need to take in oxygen?

### Word Bank



**Oar** : A long shaft of wood with a broad blade used for rowing boats



### Knowledge ZONE

- Ostrich is the fastest runner on two legs. It can run at a speed of 70 km per hour.
- Bodies of monkeys are suited for living on trees. They have long arms and gripping hands that are helpful in grasping the branches of trees.

## Migration

Migration is also a kind of movement. It means moving from one place to another. Migration is the movement of animals over large distances in search of food and suitable weather or to breed. Among all the animals, birds are known to be great migratory animals.

The Siberian crane visits India every year in winter. It goes back to Siberia during summer. The Monarch butterfly flies from Canada to Mexico during the winter season.

The Arctic tern is the champion in migration. It breeds in the Arctic in summer. It travels a distance of 17,000 km to the Antarctica during the winter and again goes back covering the same distance.

Some fish also migrate from one place to another. Eel lives in lakes, ponds and rivers. After living there for about 7 to 12 years, it migrates to sea to lay its eggs. The babies take birth in seas but move to rivers and ponds to spend their life.



Siberian crane



Arctic tern migratory birds

**QUICK TEST**

Fill in the blanks with the correct words.

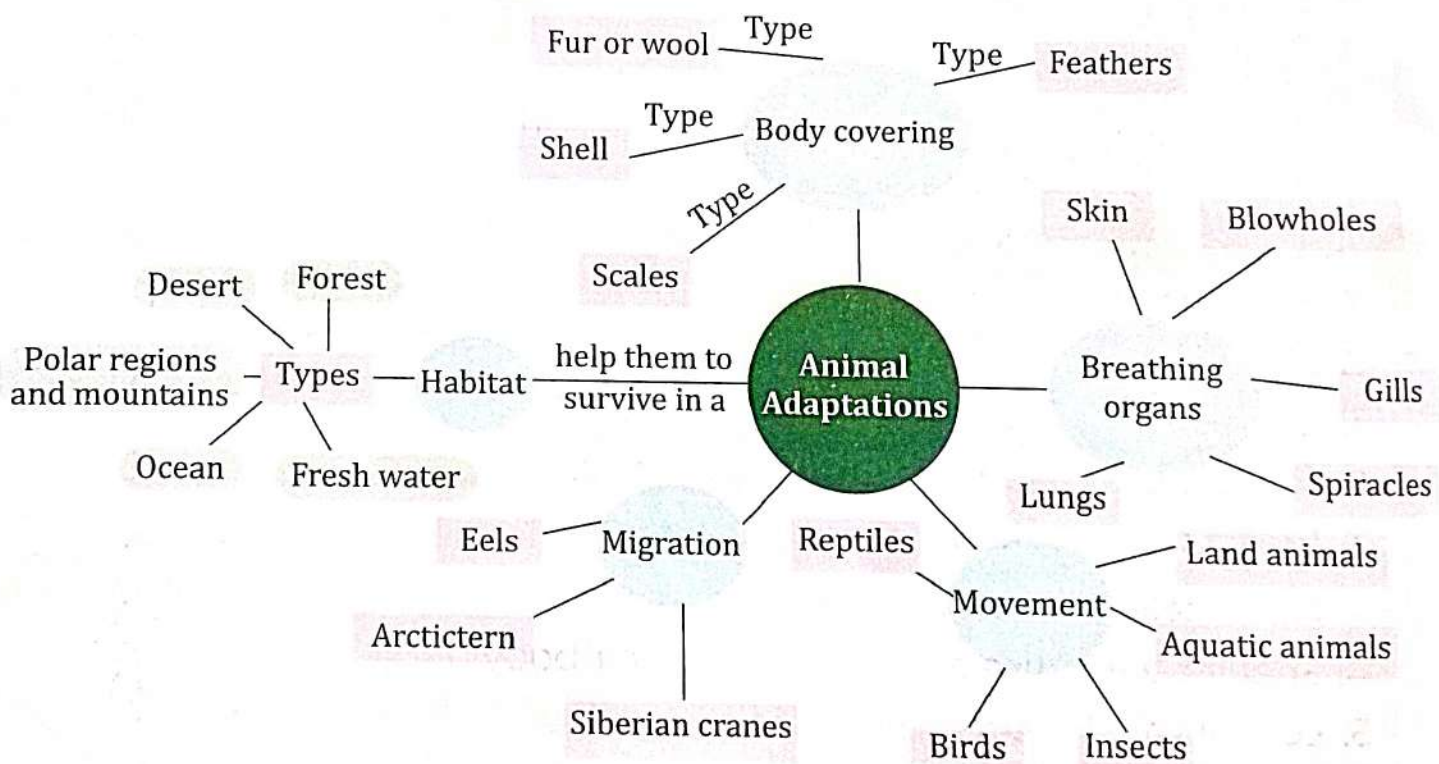
1. The ..... visits India every year in winter.
2. The ..... is the champion in migration.
3. .... lives in lakes, ponds and rivers.

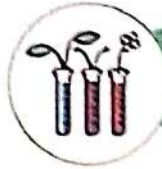


**Knowledge ZONE**

Locusts are insects that migrate in summer. Locusts damage standing crops in the field.

**MIND MAP**





# EXERCISES

## I. Objective Type Questions



### A. Tick (✓) the correct option.

- The place where an animal lives is called its :  
(a) forest  (b) home  (c) habitat
- Bodies of birds are covered with :  
(a) scales  (b) skin  (c) feathers
- The outercase of snail is called :  
(a) cell  (b) shell  (c) cover
- Mammals breathe with the help of :  
(a) gills  (b) lungs  (c) skin
- Which of the following is an aquatic animal?  
(a) Fish  (b) Camel  (c) Locust

### B. Fill in the blanks with the correct words.

- The surroundings where an organism lives naturally and reproduces is called a .....
- Polar region and mountains are covered with .....
- The features and habits of organisms that help them to survive in their habitats are called .....
- Underwater animals like fish have ..... for breathing.
- Aquatic animals have special features that help them to .....

### C. State whether the following statement are True or False.

- Scales are present on the inner body of many animals.
- The tiger is the fastest moving animal.
- Insects like cockroach and grasshopper breathe through tiny holes called spiracles.
- Snail and tortoise have shells on their body
- Locusts are insects that migrate in winter.

**D. Match the following.**

- |            |              |
|------------|--------------|
| 1. Snake   | (a) Feathers |
| 2. Turtle  | (b) Hair     |
| 3. Bird    | (c) Fur      |
| 4. Sheep   | (d) Scales   |
| 5. Mammals | (e) Shell    |

**II. Very Short Answer Type Questions** ?

**E. Write two examples for each of the following.**

1. Animal that live in oceans .....
2. Animals that live in forests .....
3. Animals with scales .....
4. Animals that live in polar regions .....

**F. Define the following.**

1. Habitat
2. Adaptation
3. Migration

**III. Short Answer Type Questions** ?

**G. Answer the following questions briefly.**

1. What are the different types of habitats found on the earth?
2. What is blubber? What is the function?
3. What is the function of scales on the body of a reptile?

**IV. Long Answer Type Questions** ?

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

1. How can a camel walk easily on the sand?
2. Different animals have different body covers. Explain this by giving examples.
3. Which gases are exchanged while breathing? Which organ helps the birds in breathing?
4. Why do animals migrate long distances? Name some migratory birds.
5. Write about the migration of an eel.

## CREATIVE CORNER

### HOTS Question ?

21<sup>st</sup> CS

Critical Thinking



How do the animals know the direction where to move?

### Picture-based Activity

21<sup>st</sup> CS

Art Integration

Look at the pictures given below and write the name of the animals and their habitats.



.....  
.....



.....  
.....



.....  
.....

### Project WORK

EL

Experiential Learning

Visit a zoo. Make a list of animals that you see there. Try to know whether they are wild animals or domestic animals. Write their shelter names also.

### Think Smart

HD

Curiosity

Some animals use sea and air current to guide them. Birds follow the coastline to find their direction while flying. Reindeers use the sun's rays to find their direction.

Try to know how a bat, which has a very poor vision, comes to know the right direction for its flight.



# Skeletal System and Nervous System

### What We Have Learnt?

- ✦ The digestive system
- ✦ Circulatory system
- ✦ Excretory system

### What We Will Learn?

- ✦ Skeletal system
- ✦ Nervous system
- ✦ Sense organs

### Get Set GO!

Look at the pictures given below and write their name.



1. ....



2. ....



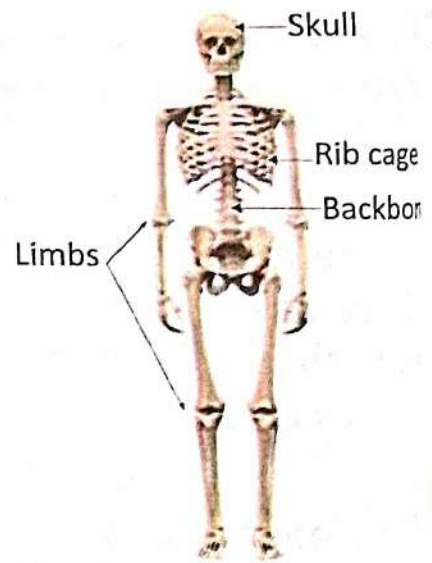
3. ....

Our body's bones are all part of our skeletal system. We use our brain to write, read, think, etc. The brain is a component of the nervous system. Let us learn more about the skeletal system and the nervous system.

### SKELETAL SYSTEM

The human skeletal system is a frame-work of bones. This framework gives support, strength and shape to the body. There are 206 bones in an adult human skeleton. It also protects the internal organs.

The main parts of skeletal system are skull, backbone or spine, rib cage and limbs.



The human skeletal system



The skull

## The Skull

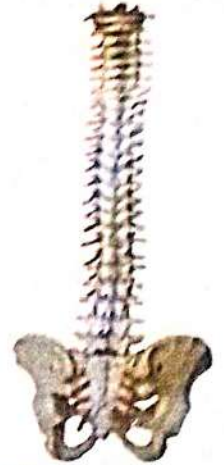
The skull is the framework of the head. It encloses and protects the vital parts of our body and our brain. Skull has 22 bones. The part of the skeleton under the face is made up of fourteen bones.

The only movable bone in the skull is the lower jaw bone. This

enables us to eat, sing and talk.

## The Backbone Or Spine

The backbone or spine is the most important skeletal organ of our body. It extends from the base of the skull down to the hips. It is not a single bone but a column of drum-shaped bones called vertebrae. There are 33 vertebrae altogether. All the vertebrae are interlinked. They form the main axis of the body. It makes the body to stand erect. It is flexible and protects the spinal cord, nerves and important blood vessels that run down from the brain.



The backbone



The rib cage

## The Ribcage

The ribs are thin flat bones that curve around the chest. It is formed of 12 pairs of ribs. They form a protective cage around the heart and lungs called the rib cage.

The last two pairs of ribs are called floating ribs because they are joined only to the backbone.

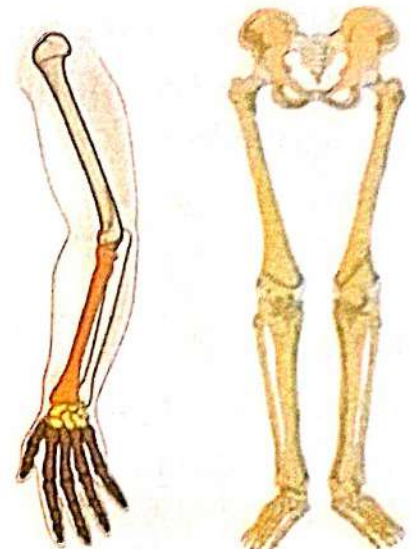
## The Limbs

Limbs are movable organs. There are two pairs of limbs.

The forelimbs or the arms are used for different tasks such as writing, lifting and pulling the objects.

In the upper arm there is only one bone. The long bone in the arm is called the humerus. In the lower arm there are two bones. They join with each other near our elbow. Many small bones make up the wrist, palm and fingers.

Hindlimbs or feet are used for walking and running. The longest and powerful thigh bone called femur, bears the weight of the whole body.



Forelimbs

Hindlimbs



The skull

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Forelimbs



Hindlimbs

## QUICK TEST

Answer these questions.

1. Name the main parts of skeletal system.
2. How many vertebrae are there altogether in our skeletal system?

## Functions Of The Skeleton

- The bones of the skeleton give shape, strength and support to our body.
- The skull covers the delicate brain. The eyeballs rest inside the bony eye sockets.
- The backbone protects the spinal cord and the rib cage protects the lung and the heart.
- The urinary bladder lies inside the hip girdles.
- Muscles are attached to the bones and make movement possible.
- White blood cells and red blood cells are produced by the bone marrow in hollow bones. White blood cells fight foreign organisms that invade our body.



### Knowledge ZONE

The smallest bone present in our ear is stapes.

### PUT ON YOUR THINKING CAP

There is a very small bone breathing in our tongue. Find out its name.

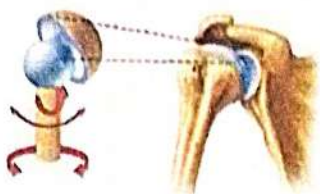
## Joints

The place where two bones meet is called a joint. Bones are held together by tough tissues called ligaments at joints. Joints can be of different kinds:

- **Hinge joints** work like the hinges in a door. Bones connected in this way can move only in one direction. The elbow, knee, toe and finger joints are hinge joints.



Hinge joint



Ball and socket joints

- **Ball and socket joints** have one bone which has a socket into which the ball of another bone fits. This helps the connected bones to move in many directions. The hip and shoulder joints are examples of this type.



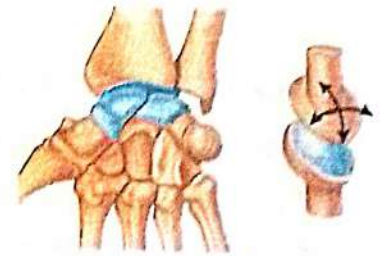
Pivot joint

### Word Bank

**Ligaments** : Tissues holding bones together

vertebra in the neck is called atlas. This joint allows the head to move sideways, upwards and downwards.

- **Gliding joints** allow movement between the connecting bones. These are found between the vertebrae and in the wrist and ankle. It allows our back to bend, twist and turn at each joint.



Gliding joints

## Cartilage

Cartilage hold the bones together at the joints. It also protects the bones. Without cartilage, the bones would rub against each other and wear out. Some organs, such as the nose and ears, have cartilage too.

### QUICK TEST

Fill in the blanks with the correct words.

1. Skull has ..... bones.
2. Our face is made up of ..... bones.
3. .... muscles starts working seven months before birth and stops working at death.

## Muscles

Muscles make our body flexible. They are responsible for all the body movements. There are about 650 muscles in the body. They are attached to the bones. Most muscles work in pairs. That is, for any kind of movement, two

muscles are required. They perform contraction and relaxation. When we flex a muscle, it contracts or gets shorter. On relaxing, it goes back to its original shape. 35% to 40 % weight of our body is made up of muscles.

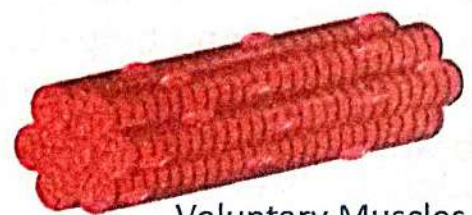
Muscles are made up of fibres having tendons at their end. Tendons are tough tissues which join bones and muscles. There are three types of muscles on the basis of controlled actions:

- **Skeletal or Voluntary muscles** : Skeletal muscles are voluntary, which means we can control their movements. When we lift a weight or move our arm, we are using voluntary



### Knowledge ZONE

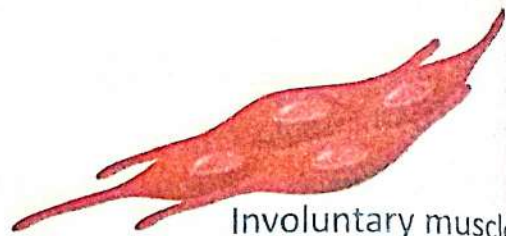
When you smile, you use 17 small muscles. So, keep exercising those muscles.



Voluntary Muscles

muscles. All these muscles are in our control. The biceps and triceps in our arms are examples of voluntary muscles.

- **Smooth or Involuntary muscles :** Smooth muscles are usually found in the walls of the stomach and intestines, in the blood vessels and around the eyes. These muscles work by themselves. They are not in our control. So, they are called involuntary muscles. They work automatically. These muscles help our lungs expand and contract and our food to be digested.

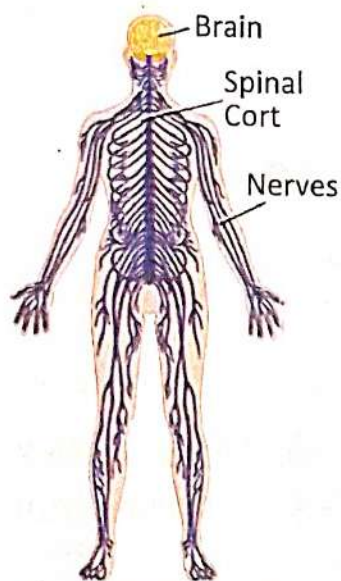


Involuntary muscle

- **Cardiac muscles :** An important involuntary muscle is the cardiac muscle which is found in the heart. It begins working seven months before birth and stops working at death. It makes the heart pump blood to the different parts of the body continuously.



Cardiac muscles



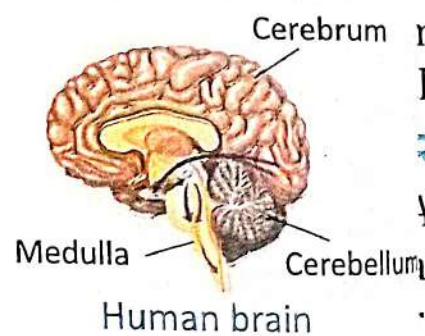
The nervous system

## NERVOUS SYSTEM

The nervous system controls all the actions of our body. It consists of the brain, the spinal cord and the nerves. The brain and the spinal cord together form the Central Nervous System which is the main centre of control in our body and co-ordinates all our movements. The nerves form the Peripheral Nervous System that connects every part of the body to the spinal cord and brain.

### Brain

The brain is the master of our body. It receives information from the sensory organs and responds to them by sending instructions through nerves to the muscles and glands to function. It also stores information and helps us to take intelligent and most suitable decisions based on past experiences. The brain can be divided into three parts : the cerebrum, the cerebellum and the medulla.



Human brain



- The brain resembles a walnut in outer appearance and weighs around 1.5 kg.
- Our brain needs a continuous supply of oxygen to function. If this is cut off for even few seconds we become unconscious.

**The cerebrum** is the largest part of the brain. It has two parts, the right and the left part are known as the right and the left cerebral hemispheres.

They are joined by a tissue called corpus callosum. The right cerebral hemisphere controls the left side of our body and the left one controls the right side of our body.

Our sense organs are in direct control of cerebrum. So, we see, hear, speak, think and do all intelligent activities with the help of our cerebrum. Our emotions too are controlled by cerebrum.

**The cerebellum** maintains a balance in our body movements and a correct posture while sitting, standing and walking. All our voluntary body movements are co-ordinated by the cerebellum as our voluntary muscles are under its control.

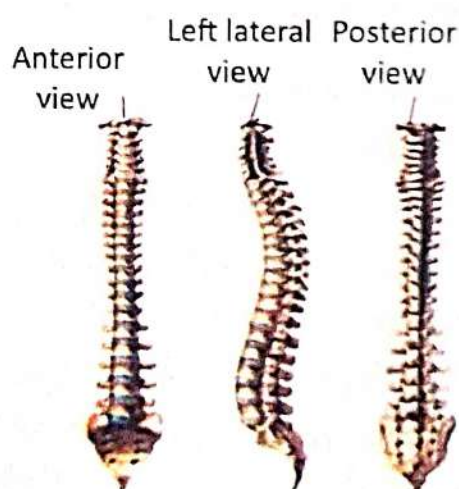
**Medulla** is also known as the brain stem. It connects the brain to the spinal cord. It controls our involuntary actions and movements like breathing, our heart-beat, the movement of food in digestive tract.

### Spinal Cord

The **spinal cord** is a thick cord of nerve tissue that extends down from the brain system. It is surrounded and protected by the backbone. Its main function is to pass on information between the brain and the other body parts.

### Reflex Actions

A **reflex action** is an involuntary or automatic action of our body in response to something. Most reflex actions take place when the messages are sent to and from the spinal cord, without involving the brain. For example, if you touch a hot object by mistake, a reflex causes you to remove your hand immediately.

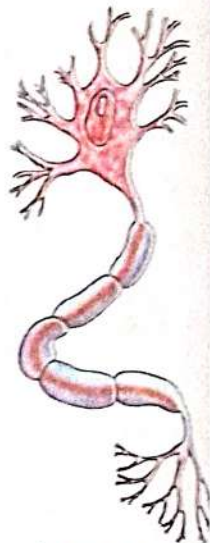


Human spinal cord

## Nerves

Nerves are thin, long, wire-like structures. Like the wires of a computer or a telephone, they link every part of the body to the brain. Nerves are made up of neurons. There are three types of nerves—sensory nerves, motor nerves and mixed nerves.

Sensory nerves carry messages from the sense organs to the brain or to the spinal cord. Motor nerves carry messages from the brain or the spinal cord to our muscles or organs and make them move. Mixed nerves do both the functions i.e., they carry messages to the brain as well as carry orders from the brain to other parts of the body.



A nerve cell



### Knowledge ZONE

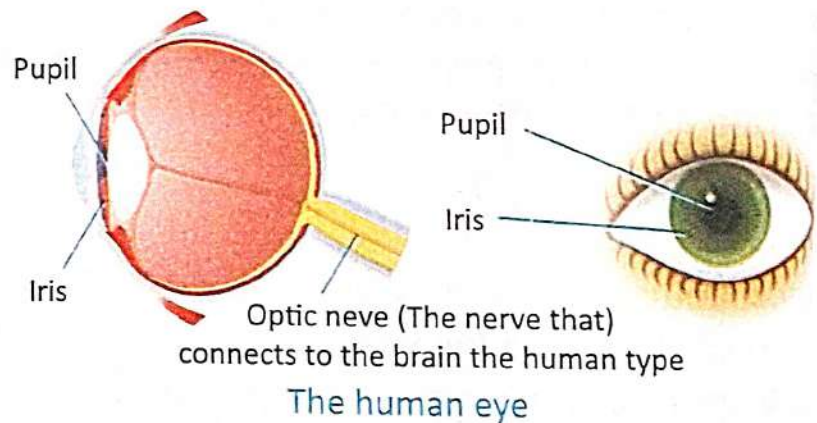
Nerve cells or neurons have a long life but if they are damaged accidentally, they are never replaced by new ones. This is why our brain and spinal cord are so well protected.

## SENSE ORGANS

We have five sense organs which connect us to our surroundings. These allow us to see, smell, hear, taste and feel. Eyes, nose, ears, tongue and skin are the five sense organs.

### Eyes

The coloured part of the eye is the **iris**. When you look at an object, light passes through the black spot in the centre of the iris which is called the **pupil**. Behind the pupil is the lens which forms an image of the object on the retina. The **retina** has special cells that are sensitive to light and color.



### QUICK TEST

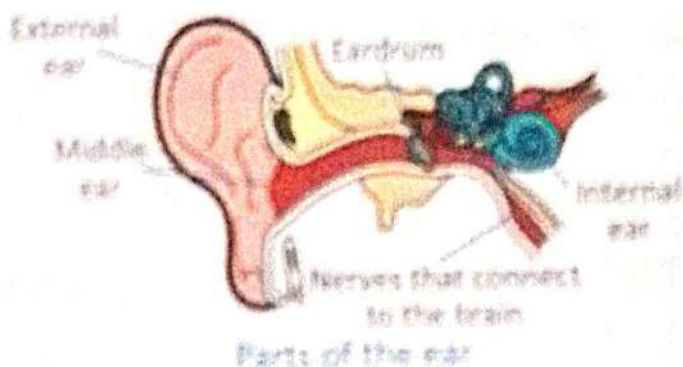
Answer these questions.

1. What is the location of the brain?
2. How does the cerebrum work?
3. What is reflex action?

They convert this image into a message and send it to the brain through the optic nerve. When the message reaches the brain, it is recognised by the brain. This is how we see things.

## Ears

The ear help us to hear sounds. The ear can be divided into external ear, middle ear and the internal or inner ear. The part of the ear that is seen outside is the external ear. The middle ear is a narrow canal. At the end of the narrow canal is the eardrum, which is made up of a thin membrane. When



the sound enters the external ear and then enter the middle ear, it vibrates the eardrum. These vibrations then pass into the inner ear, where these vibrations are converted into messages. The nerves present in the inner ear carry these messages to the brain. The brain then enables you to recognise the sound.

## Nose

The nose helps us to smell and breathe. When you breathe in, tiny hair in the nose called cilia, act like a broom and filter out dust and other particles. The air then enters the nasal cavity where smells are recognised by the receptors. These receptors then send messages to the brain. The brain then tells you about the smell.

## Tongue

You can taste sweet, salty, bitter and sour food with the help of your tongue. It also helps you to speak. The tongue has many tiny bumps called the taste buds. These taste buds are of four types which sense sweet, salty, bitter and sour tastes. The taste buds are connected to the nerves. When you eat something, the taste buds become active.

## Skin

Your skin is also a sense organ which enables you to feel things and sense pain, temperature and pressure. It protects the inside of your body from germs, dirt and from getting hurt. The skin is richly supplied with nerves.

## FUN Activity



Take a cube of ice. Hold it with a piece of cloth leaving the lower end open. Touch it on by one for 5 seconds at the various points of your body. Can you classify the points as 'very sensitive' and 'not so sensitive' to cold?

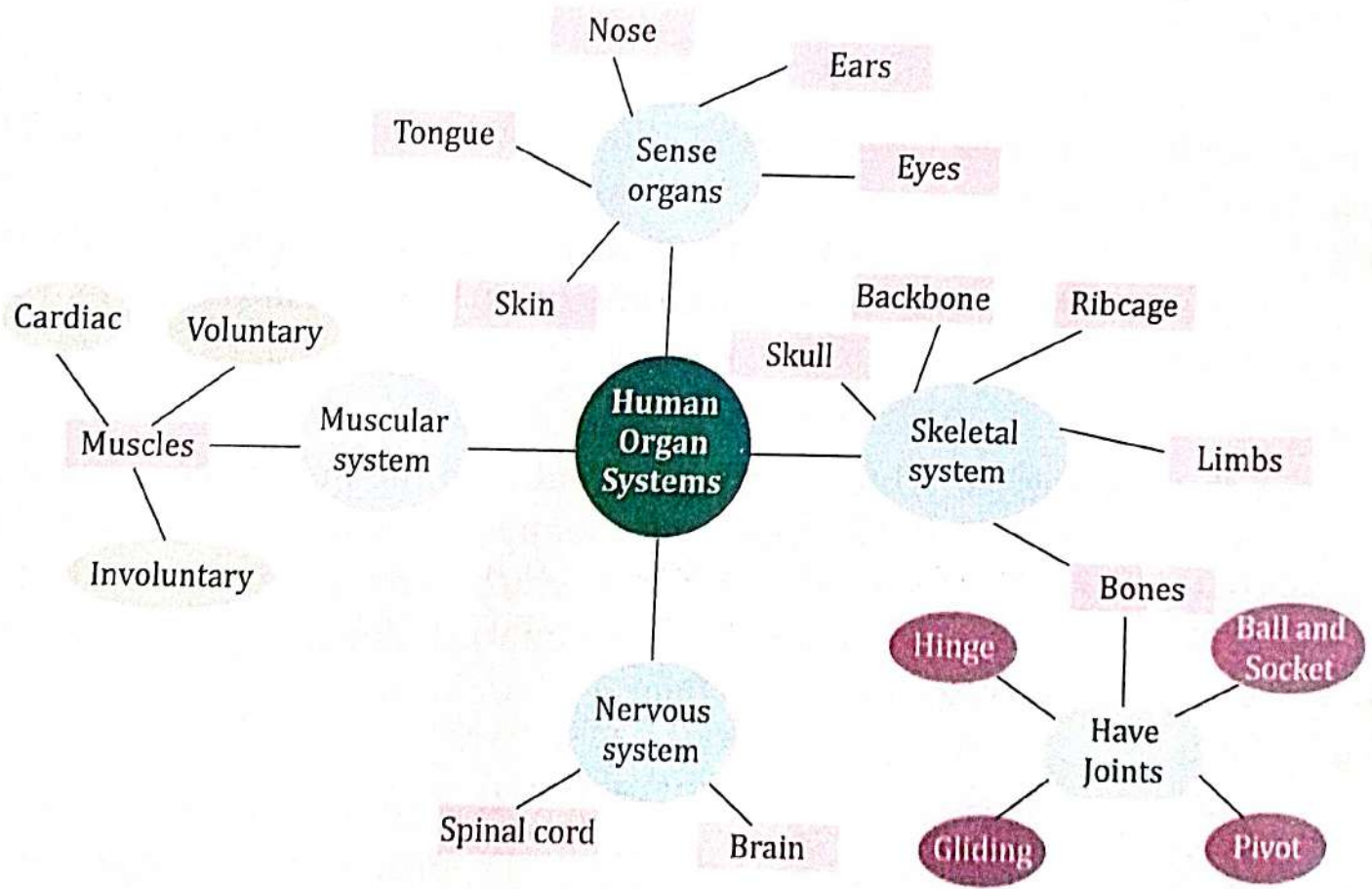
You can use a pencil tip which is not sharpened very much to test for sensitivity to pressure. you can even use a pin to test for sensitivity to pain.

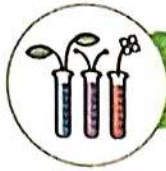
### QUICK TEST E

Fill in the blanks with the correct words.

1. We have ..... sense organs.
2. The colour part of the eye is the .....
3. At the end of narrow canal is the ....., which is made up of a thin membrane.

## MIND MAP





# EXERCISES

## I. Objective Type Questions

### A. Tick (✓) the correct option.

- Muscles are made up of :  
(a) bones  (b) fibres  (c) blood
- The human skeletal system is a framework of:  
(a) hairs  (b) nails  (c) bones
- The bones of the body are filled with a substance called :  
(a) bone marrow  (b) muscle  (c) tissue
- The nervous system consists of brain, nerves and .....  
(a) stomach  (b) lungs  (c) spinal cord
- This is the largest part of the brain :  
(a) Cerebrum  (b) Cerebellum  (c) Medulla

### B. Fill in the blanks with the correct words.

- Tendons are tough tissues which join ..... and muscles.
- The place where two bones meet is called .....
- The rib cage protects the lungs and .....
- The coloured part of the eye is the .....
- ..... are thin, long, wire-like structures.

### C. State whether the following statements are True or False.

- Bones give help to the external organs and help us move.
- The skeletal system is made up of muscles.
- Skull has 22 bones.
- There are 38 vertebrae altogether.
- The spinal cord is protected by the rib cage.
- Cerebrum joins the brain to the spinal cord.

### D. Match the following.

- |                    |                           |
|--------------------|---------------------------|
| 1. Femur           | (a) backbone              |
| 2. Vertebrae       | (b) tendons               |
| 3. Skeleton        | (c) thigh bone            |
| 4. Ligaments       | (d) involuntary           |
| 5. Cardiac muscles | (e) framework of the body |

## II. Very Short Answer Type Questions ?

### E. Write one word for the following.

1. Bone that forms the framework of face
2. Tissue that attaches two bones together
3. The master of our body
4. It helps you to speak

### F. Name the types of joint present in the following parts.

1. Knee .....
2. Hip and shoulder .....
3. Neck .....
4. Ankle .....

## III. Short Answer Type Questions ?

### G. Answer the following questions briefly.

1. How many pairs of ribs are there in a human body?
2. What are joints? Name the different types of joints in the human body.
3. What is a nervous system?
4. What is reflex actions?

## IV. Long Answer Type Questions ?

### H. Answer the following questions in detail.

1. List any three important functions of the skeletal system.
2. Write the difference between voluntary and involuntary muscles. Also, give examples for each type of muscles.
3. What are nerves? Give functions of its each type.
4. How does the ear help us to recognise the sound?

## CREATIVE CORNER

### HOTS Question ?



### Critical Thinking

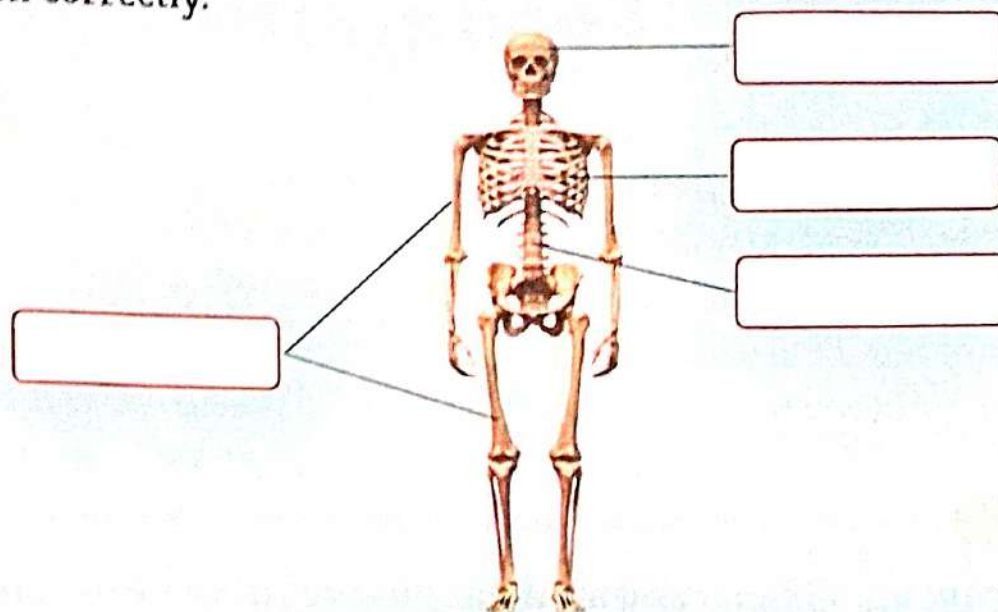
Just as exercise is to skeletal system, sleep is to nervous system. A sound sleep for minimum 6-8 hours is a must for healthy nervous system. But there is a part of brain that never sleeps. Can you tell why and what will happen if it sleeps?

## Picture-based Activity

HD

Observation

Given below is the picture of human skeletal system. Label the different parts of the skeleton correctly.



## Project WORK

AI

Art Integration

Make a chart about the different types of joints present in our body and display it in your class.

## Think Smart

21<sup>st</sup> CS

Health and Well Being



You must have seen people doing exercise in gymnasium. Exercise makes bones and muscles strong.

Visit a gymnasium and ask them which type of exercise they do to make their bones and muscles strong.



## Subject Link (English)

CC

Cross Curricular

Read the given poem and write it in the form of a paragraph :

There are bones in my fingers,  
There are bones in my toes.  
When I feel my face,  
I feel bones in my nose.  
Fish have bones,  
So do pelicans.  
And when we put our bones together,  
They make skeletons!

# Food and Health

## What We Have Learnt?

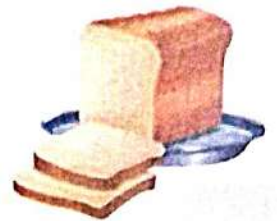
- ✦ Components of food
- ✦ Balanced diet
- ✦ Preservation of food
- ✦ Need for exercise and games

## What We Will Learn?

- ✦ Components of food
- ✦ Balance diet
- ✦ Diseases

## Get Set GO!

We get food from both plants and animals. Pictures of some food items are given below. Name the sources from which these food items are obtained.



.....

.....

.....

.....

We need food to get energy to play and work, to grow and to make our body strong and healthy. We eat different kinds of food. Let us learn more about food and health.

## COMPONENTS OF FOOD

Food has substances called **nutrients**. Different nutrients are found in different foods. Some nutrients provide our body with energy, some help it to grow while some help our body fight against diseases. We must eat varieties of food everyday to get all the nutrients. There are five main nutrients: carbohydrates, proteins, fats, vitamins and minerals. Food also contains water and roughage.

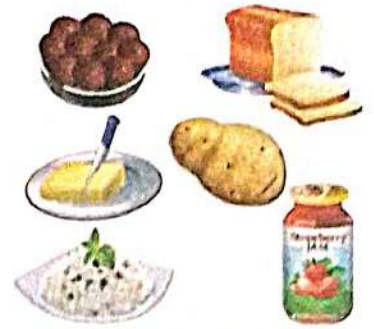
### Word Bank



**Nutrients** : Materials in food help us to remain healthy.

## Carbohydrates

Carbohydrates give us a lot of energy to work and play. Energy-giving food items are rich in carbohydrates. These are rich in sugar and starch. Sugar, potatoes, cereals like rice, wheat, etc. are rich sources of carbohydrates.



Energy-giving food



Fats rich food

## Fats

Like carbohydrates, fats also provide energy to our body. Fats also give structure to the cells. Fats can be stored in the body for further use. Intake of high fat results in a person becoming obese. Obsessed persons are prone to diseases. Rich sources of fats are cooking oils, butter, ghee, nuts, egg yolk, etc.

## Proteins

Proteins are called body building food. Proteins help the body to grow. They make new cells in our body. They also repair our worn out cells. Pulses, milk, meat, chicken, fish, eggs, etc. are rich sources of protein. Soyabean has the highest protein content.



Body building food



Vitamins rich food

## Vitamins

Vitamins are called protective food as they protect our body from diseases. Vitamins are essential for performing main functions in the body. Our body



### Knowledge ZONE

needs only small amount of vitamins. Green leafy vegetables and fresh fruits are rich sources of vitamins. Lack of vitamin A causes night blindness.



Minerals rich food

## Minerals

Like vitamins, minerals are also essential for our body. They are required in very small quantities. Minerals help to strengthen bones. They are needed by our body for proper growth. The rich sources

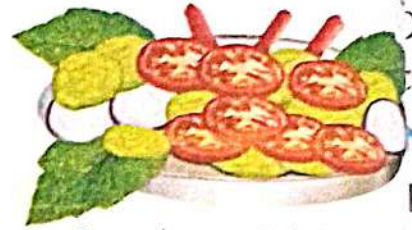
of minerals are fruits, green leafy vegetables, whole grains, cereals, jaggery and milk.

## Water

Water is a very important component of our food. It is not a nutrient but we cannot survive without it. Water is needed by our body for healthy growth. About 70% of our body is composed of water. Water also regulates the body temperature.

## Roughage

Roughage is present in fruits, vegetables and in the upper cover of the grains. Roughages are the fibrous food. They are an important part of the food. It helps us to get rid of the undigested food easily and retain water in our body. Dal (broken wheat) and salads are the best sources for roughage.



Roughage rich food

## BALANCED DIET

A balanced diet is a diet that contains sufficient amount of different components of food like carbohydrates, fats, proteins, vitamins, minerals, roughage and water needed for the healthy functioning of our body.

A balanced diet always maintains balance in our body. A balanced body gives high output for any work. Different age groups need different types of food. For example, Growing children need more of body building food like vitamins and minerals. Old people should eat light food. Men or women doing heavy work need more energy-giving foods.

## FUN Activity

Why does a rumbling sound appear when we deep fry something?

HD

Curiosity

## QUICK TEST

Answer these questions.

1. What do you mean by nutrients?
2. Which type of food items are rich in carbohydrates?

## DISEASES

A disease is an abnormal condition in which the body is not able to function properly. Diseases can occur due to many reasons. This may be due to some infections or malfunctioning in the body. Lack of particular minerals or vitamins in the body also causes diseases.

Diseases can broadly be classified into two types : non-communicable and communicable.

### Non-Communicable Diseases

These diseases that cannot be passed on from one person to another. These are caused due to lack of nutrients in the diet and are also called **deficiency** diseases. Marasmus, kwashiorkor, night blindness, rickets, beri-beri and anaemia are deficiency diseases.

The causes of some diseases are as following :

- Marasmus and kwashiorkor are caused due to lack of proteins and carbohydrates in diet.
- Night blindness is caused due to the deficiency of vitamin A.
- Beri-beri is a disease caused by the deficiency of vitamin B.
- Scurvy is caused due to the lack of vitamin C.
- Rickets is caused due to deficiency of vitamin D.
- Goitre is caused due to the lack of iodine.
- Anaemia is caused due to deficiency of iron in food. In anaemia, the haemoglobin in the blood becomes less.



Marasmus



Kwashiorkor



Scurvy



Rickets



Goitre

Non-communicable diseases

## Communicable Diseases

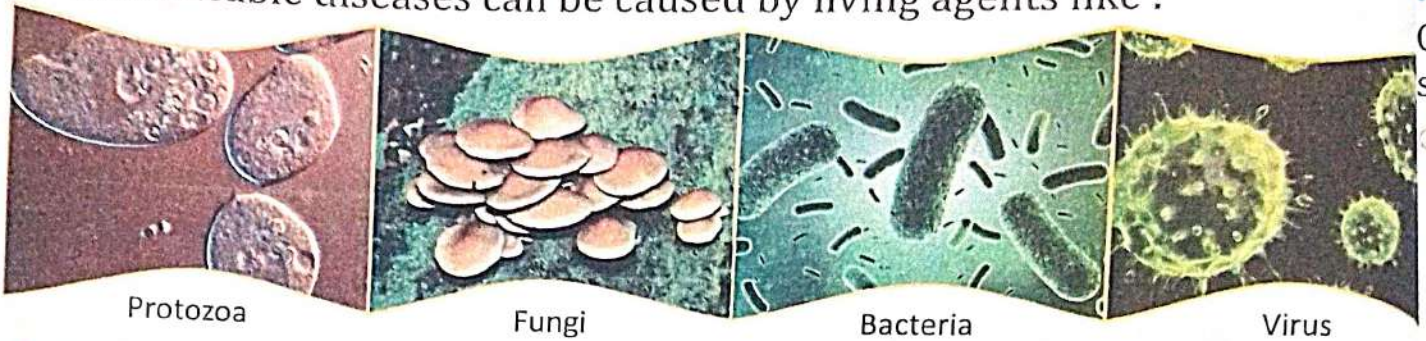
Communicable diseases are caused by very small organisms called germs. These diseases can be transmitted from one person to another. They transfer through living or non-living agents.



### Knowledge ZONE

Malaria is caused by a protozoa which is carried by the female anopheles mosquito.

Communicable diseases can be caused by living agents like :



- **Protozoa** cause diseases like malaria and amoebic dysentery.
- **Bacteria** cause diseases like plague, typhoid and tuberculosis.
- **Viruses** cause diseases like common cold, chicken pox, polio and measles.
- **Fungi** mostly cause infections of skin, eyes and hair.

## How Do Communicable Diseases Spread?

Communicable diseases pass from one person to another through different modes. These are:

- **Air** : When a sick person coughs or sneezes, germs are released into the air. If a healthy person inhales this air, it will result in germs entering the body and causing diseases. Hence, it is necessary to cover our mouth and nose while coughing or sneezing.
- **Infected food and water** : Sometimes food and water may be infected by germs. Flies carry germs. When they sit on our food, they pass on these germs to our food. When we eat this infected food, we fall sick. Impure water contains germs. Drinking this water can make us sick. Diseases such as cholera, typhoid, jaundice and diarrhoea are spread by infected food and water.
- **Insects** : Insects sit on dirty things and germs get attached to their bodies. Disease causing germs are then injected into our body, when an insect bites a healthy person. Mosquitoes are a common carrier of germs. Diseases such as malaria, dengue etc., are caused by mosquitoes.

- **Direct contact** : The clothing and other articles used by a sick person are infected. When a healthy person comes in contact with these, some germs enter his body. These germs then cause diseases. Chickenpox, measles and common cold are spread through direct contact.

## Prevention of Communicable Diseases

Communicable diseases are contagious but can be prevented if we follow some basic guidelines:

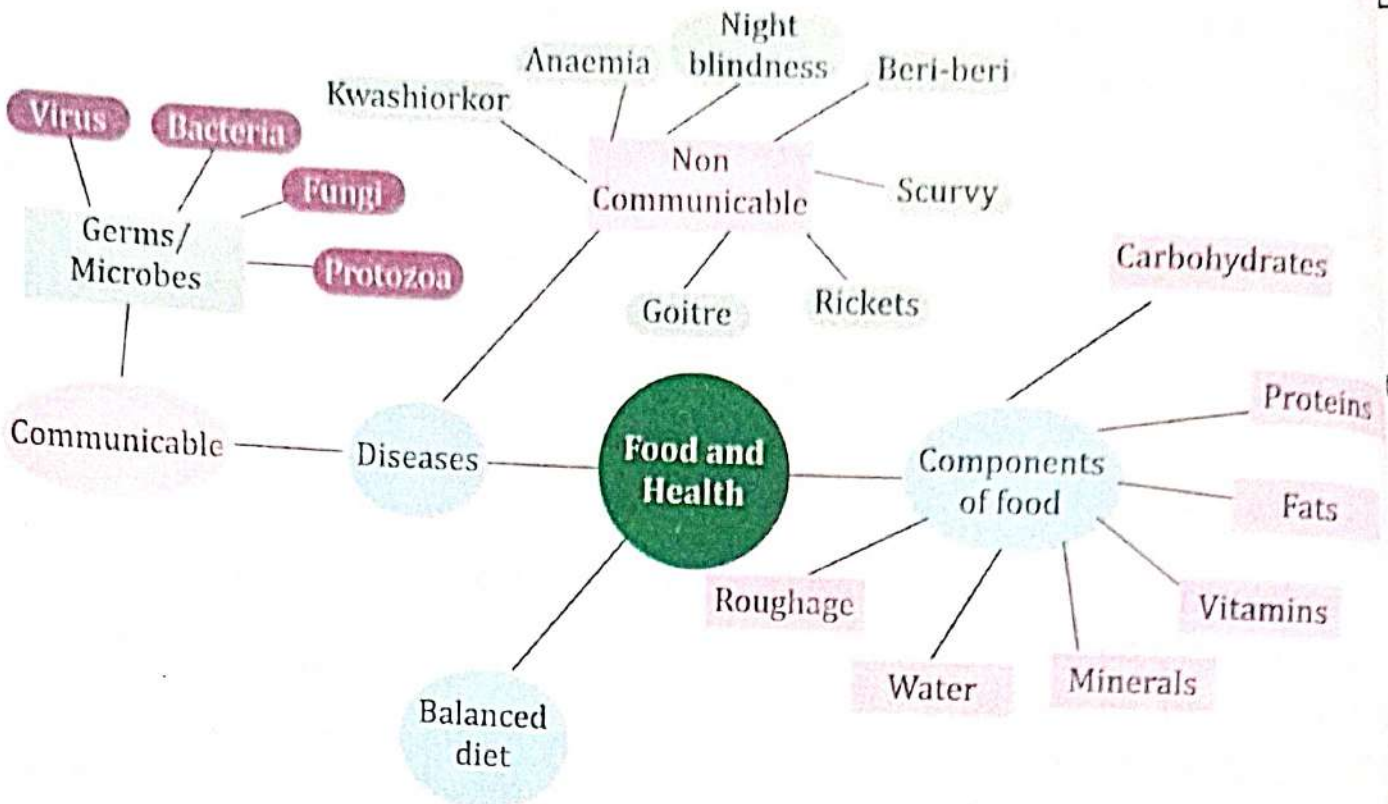
- Keep yourself and your surroundings clean. Wash your hands before eating anything. Cut your nails regularly. Keep the garbage in covered containers. The practice of keeping yourself and your surroundings clean in order to prevent illness or spread of diseases is called hygiene. Use disinfectants in the house to kill germs.
- We should also keep the windows open to allow fresh air and sunlight into the house. The sun's heat kills germs.
- We should make sure that the water does not collect in one place. Mosquitoes breed in stagnant water. By avoiding accumulation of water, we can prevent the breeding of mosquitoes. We should also use mosquito repellents and nets, to keep the flies away.
- We should avoid consuming outside food or water, as it could be contaminated. Since the food is kept open, there are chances of flies and mosquitoes sitting on it. Hence, eating covered food and drinking boiled or filtered water keeps us healthy.
- **Vaccination** is an effective way of preventing communicable diseases. There are different vaccines for different diseases. When the vaccine of a particular disease enters our body, our body becomes capable of killing the germs of that diseases. So, we develop resistance to that disease. Vaccines are available for many diseases such as polio, measles, chickenpox and whooping cough.

### QUICK TEST

Fill in the blanks with the correct words.

1. .... can occur due to many reasons.
2. Beri-beri is a disease by the deficiency of .....
3. Goitre is caused due to the lack of .....
4. There are different ..... for different diseases.

# MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

- Energy-giving food items are rich in :  
 (a) proteins  (b) minerals  (c) carbohydrates
- Which of the following is not an example of fats?  
 (a) Butter  (b) Ghee  (c) Soyabean
- Which of the following is a source of Vitamin C?  
 (a) Ghee  (b) Pulses  (c) Amla
- Which living agent can cause communicable disease?  
 (a) Virus  (b) Fungi  (c) Both (a) and (b)
- Which cause deficiency diseases?  
 (a) Proper nutrients  (b) Improper nutrients   
 (c) Consumption of a lot of water

**B. Fill in the blanks with the correct words.**

1. .... give us a lot of energy to work and play.
2. .... are essential for performing main functions in the body.
3. .... are called body-building food.
4. A ..... always maintains balance in our body.
5. .... diseases that cannot be passed on from one person to another.

**C. Match the following.**

- |                    |               |
|--------------------|---------------|
| 1. Anaemia         | (a) Vitamin B |
| 2. Night blindness | (b) Iron      |
| 3. Scurvy          | (c) Vitamin A |
| 4. Rickets         | (d) Iodine    |
| 5. Goitre          | (e) Vitamin D |
| 6. Beri beri       | (f) Vitamin C |

**II. Very Short Answer Type Questions** ?

**D. Write two examples for each of the following.**

1. Foods rich in roughage ..... ..
2. Foods rich in vitamin A ..... ..
3. Communicable diseases ..... ..
4. Deficiency diseases ..... ..

**E. Give at least one rich source of food for each of the following.**

1. Carbohydrates ..... ..
2. Proteins ..... ..
3. Vitamin B ..... ..
4. Vitamin D ..... ..

**III. Short Answer Type Questions** ?

**F. Answer the following questions briefly.**

1. What is roughage?
2. Which disease is caused due to deficiency of iron in food?
3. What do you understand by communicable diseases?

#### IV. Long Answer Type Questions ?

G. Answer the following questions in detail.

1. What is the importance of roughage in our diet?
2. What is the difference between communicable and non-communicable diseases?
3. Why water is necessary for us?
4. Describe any four deficiency diseases, and their cause?

#### CREATIVE CORNER

#### HOTS Question ?



#### Critical Thinking



Yesterday, you had severe cold and cough. You were sneezing regularly. Your parents did not allow you to go to the school. Why? Try to find out the reason.

#### Project WORK



#### Experiential Learning

1. For each day of the week, prepare a table for all that you eat for breakfast, lunch and dinner. Also, classify the nutrients you are getting from these food items. Are you getting a balanced diet? Or is your diet deficient in a particular nutrient?
2. Make a poster on balanced diet.

#### Think Smart



#### Creativity

Make a food diary. List all the five nutrients in your diet that you will eat one particular day. Jot down the portions of each food item you would eaten for that day and display it into your class.

# Safety and First Aid



## What We Have Learnt?

- + Safety at different places
- + First aid

## What We Will Learn?

- + Safety from fire
- + First aid

## Get Set GO!

Let us make a quick revision of safety rules through the pictures given below.



Use zebra crossing while crossing the road.



Do not get in or out of a moving bus.



Do not touch electric wires.



Avoid using blades to sharpen pencils.

Accidents may occur anytime, anywhere without giving any warning. Most of the accidents occur due to our carelessness. Children often get hurt at home, in school, playground or on the road.

We have learnt safety rules to be followed at home, in school and in playground. Let us now learn how to be safe from fire and the first aid to be given for fracture, burns, cut and animal bites.

## SAFETY FROM FIRE

Fire spreads very fast and causes loss of life and property. To keep ourselves safe, we should know about the causes and prevention of fire accidents.

### Causes

- Electrical faults.

- Unsafe use of things like match sticks, petromax, candles, kerosene, fire crackers.
- Gas leakage in kitchen while cooking.

## Prevention

Following are some safety rules to avoid fire break out :

- Handle the matchsticks, candles and crackers carefully.
- Keep petrol and kerosene oil in air-tight container and away from fire.
- Avoid wearing synthetic clothes while working in the kitchen.
- Never forget to switch off the gas cylinder after use.
- In case of a gas leak, open all doors and windows immediately.
- Electrical wiring should also be checked regularly.



Switch off gas cylinder

## Putting Out Fire

Fire can be put out in the following ways :

- Fire extinguishers are devices to put out fires. They contain carbon dioxide ( $\text{CO}_2$ ) gas or foam. The gas or foam surrounds the fire and puts it off by cutting off the air supply.
- Fire which is caused by petrol can be extinguished by throwing sand or mud over it.
- For electric fire, switch off the mains immediately. Throw sand on the fire. Don't throw water over a fire caused by electricity. Water is good conductor of electricity and you may get an electric shock.
- In case of big fire, call the fire brigade by dialing '101' or '112'.



Fire extinguisher

## QUICK TEST

Answer the questions.

1. Why do accidents occur?
2. What should be done in case of a gas leak?

## FIRST AID

An injured person has to be given an immediate medical aid before he is shifted to the hospital for accurate diagnosis and treatment. This is known as first aid. Timely help can save the life of the injured person. But it is notable that first aid is given for minor wounds, nose bleeding, fatigue, giddiness after playing a game, running in school premises and minor burns. It is not an alternative of complete medical treatment.

Following is a list of first aid given in different kinds of injuries :

### Sprain

Sprain is the twisting and swelling up of joints, such as the ankle gets twisted and swells up due to a bad fall. The tissues around the twisted joints are damaged. This causes pain. The sprained part should not be moved before it is healed.



First aid for sprain

- For first aid, a cold ice-pack should be used on the affected area.
- Apply the ointment on the sprained joint two or three times a day.
- Wrap the crepe bandage around the sprained joint after applying the ointment.

### Fracture

A crack or break in bone is called fracture. The fractured bone causes a lot of pain. The affected area may swell up. You will not be able to move.

Following are first aid steps in case of fracture :

- Do not allow the person to move.
- Make the patient calm and comfortable.
- Tie a splint to give support to the broken bone.
- The fractured arm can be supported by a sling. It gives support to the arm and prevents its movement.
- The injured person should be taken to the hospital immediately.



Splint

Sling



### Knowledge ZONE

Sling is a piece of cloth tied around the neck to support the broken arm.

## Burns

One can get burnt when he or she comes in contact with hot objects, steam, fire crackers, electric shock, etc. Sometimes chemical substances such as acids cause burn. In case of minor burns, the affected skin develops a reddish colour.

In case burns, the following first aid should be given :

- Wash the affected area with cold water.
- After that, apply burnol and place a clean cloth over it to prevent any infection.
- In case of severe burns, **blisters** are formed. The blisters must never be pricked with a pin or any other sharp object. It may lead to infection.
- Instead, a wet compress of a cloth dipped in a solution of baking soda can be applied on the burnt area.
- Take the **victim** to the doctor immediately after the first aid is administered.



Cooling the burnt hand under cold running water

## Cuts And Wounds

In case of minor cut, the wound should be cleaned with soap and water and then with small pads of cotton soaked in dettol or savlon. If there is bleeding from the wound, ice will stop or minimize the flow of blood. One must go to a doctor in case of deep cuts.



First aid for cuts and wounds



### Knowledge ZONE

- Tetanus is a disease caused when the skin is cut by a dirty or rusted object.
- Anti-tetanus injection given within 24 hours of the accident prevents the infection from spreading.



### Word Bank

**Blister** : As form a burn or other injury

**Victim** : A person who has been attacked or injured.

### PUT ON YOUR THINKING CAP

Why sodium is stored in kerosine oil?

## Nose Bleeding

Children face nose bleeding problem during summer.

Following steps should be taken to give first aid in case of nose bleeding :

- Make the patient sit on a chair comfortably. The nose should be wiped with a clean handkerchief. Tilt his head back and ask him to keep his arms folded above his head.
- Prepare an ice pack and keep on the patient's nose. It will reduce bleeding.
- Ask the patient to breathe through his mouth. Do not allow him to blow his nose.
- If there is heavy bleeding, take the victim to the hospital immediately.



First aid for more bleeding

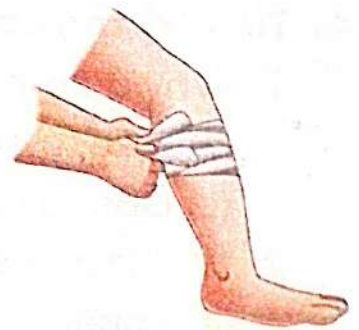
## Animal Bites

Animal bite can be very dangerous. The saliva of dogs, cats, monkeys, wolves and jackals enter the victim's body when these animals bite someone. They cause rabies to the victim. So, it is very important to treat animal bites immediately.

- Wash the wound with soap and water to wash away germs.
- To prevent infection, apply an antiseptic cream on the wound. Bandage the wound with a sterile gauze.
- Take the victim to the doctor immediately. The doctor may give anti-rabies injections.

In case of snake bite, follow the given steps :

- To stop the flow of blood to the heart and brain, apply a tight bandage just above the bite.
- Keep the victim unmoved. Any kind of movement will cause the poison to spread faster in the victim's body.
- The victim should be immediately taken to the doctor.



First aid for snake bite

## QUICK TEST

Fill in the blanks with the correct words.

1. Fire extinguishers are used to put out .....
2. Children face nose bleeding problem during .....
3. Animal bite can be very .....

## MIND MAP



## EXERCISES

### I. Objective Type Questions



#### A. Tick (✓) the correct option.

- Why do most of the accidents occur ?
 

(a) Due to our carelessness	<input type="checkbox"/>	(b) Due to our care	<input type="checkbox"/>
(c) Due to our vision	<input type="checkbox"/>		
- Which is the common problem among children during summer?
 

(a) Sprain	<input type="checkbox"/>	(b) Wound	<input type="checkbox"/>	(c) Nose bleeding
------------	--------------------------	-----------	--------------------------	-------------------
- How can you put off fire caused due to electrical fault?
 

(a) By fire extinguisher	<input type="checkbox"/>	(b) By water	<input type="checkbox"/>
(c) By sand or mud	<input type="checkbox"/>		
- Which is the good conductor of electricity?
 

(a) Mud	<input type="checkbox"/>	(b) Sand	<input type="checkbox"/>	(c) Salt water
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# MIND MAP



## EXERCISES

### I. Objective Type Questions



#### A. Tick (✓) the correct option.

- Why do most of the accidents occur?  
(a) Due to our carelessness  (b) Due to our care   
(c) Due to our vision
- Which is the common problem among children during summer?  
(a) Sprain  (b) Wound  (c) Nose bleeding
- How can you put off fire caused due to electrical fault?  
(a) By fire extinguisher  (b) By water   
(c) By sand or mud
- Which is the good conductor of electricity?  
(a) Mud  (b) Sand  (c) Salt water

**B. Fill in the blanks with the correct words.**

1. .... may occur anytime, anywhere without giving any warning.
2. Fire extinguishers contain ..... gas or foam.
3. A crack or break in bone is called .....
4. In case of minor burns, the affected skin develops a ..... colour.
5. In case of big fire, call the fire brigade by dialing .....

**C. State whether the following statements are True or False.**

1. We should wash our hands before giving first aid to an injured person.
2. If the bleeding of nose stops, use a bandage called tourniquet.
3. In case of a fracture, it must be ensured that the fractured part is not moved.
4. The saliva of animals such as dogs and cats cause a dangerous disease called rabies.
5. The fractured bone causes a lot of pain.

**D. Match the following.**

- |                        |                                  |
|------------------------|----------------------------------|
| 1. Ice cubes           | (a) Burn                         |
| 2. Splint              | (b) Before going to the hospital |
| 3. Blisters            | (c) For fracture                 |
| 4. First aid treatment | (d) For cuts                     |
| 5. Band-aid            | (e) Cool the burning area        |

**II. Very Short Answer Type Questions** ?

**E. Write two examples for each of the following.**

1. Things used to give first aid in case of burns .....
2. Things that cause fire if carelessly handled .....
3. Two animals who bite can cause rabies .....

**F. Write one word for the following.**

1. A person who has been injured .....
2. Instrument used by fire fighters to put out fire .....
3. A cloth that is tied around the neck to support a broken arm .....
4. A disease that can be caused by an animals bite .....

### III. Short Answer Type Questions ?

G. Answer the following questions briefly.

1. Write any three causes of fire.
2. What should be done if a snake bites a person?
3. What is a sprain? What first aid should be given for a sprain?

### IV. Long Answer Type Questions ?

H. Answer the following questions in details.

1. What is first aid?
2. How would you help if a person gets a minor cut?
3. How would you help someone who has nose bleeding?
4. What is fracture? What first aid should you give to an injured person?

### CREATIVE CORNER

#### HOTS Question ?

#### 21<sup>st</sup> CS Critical Thinking

Komal is a four years old girl. She is very naughty. She wants to help her mother in the kitchen. But her mother does not allow her to come in to the kitchen. Why?

#### Project WORK

#### AI Art Integration

Accident can happen anytime. It can happen anywhere. It can happen at school, home, park, on road, etc. The main reason of accident is carelessness. Use your imagination and make a poster which shows that a little carefulness can avoid an accident.



#### Think Smart

#### HD Observation

Tick (3) the correct option.

1. You have a first aid box in your house.
2. Your uncle always gets off from the moving bus.
3. Some expiry medicines are kept in your house.
4. Your mother always switches off the gas cylinder after cooking.
5. You play with matchsticks wearing synthetic clothes.

[Note : All questions are compulsory.]

**A. Tick (✓) the correct option.**

1. Which of the following reproduces through spores?  
 (a) Mushroom  (b) Wheat  (c) Banana
2. The outer case of snail is called:  
 (a) cell  (b) shell  (c) cover
3. The human skeleton system is a framework of:  
 (a) hair  (b) nails  (c) bones
4. Which living agent can cause communicable disease?  
 (a) Virus  (b) Fungi  (c) Both (a) and (b)

**B. Fill in the blanks with the correct words.**

1. The coloured part of the eye is the .....
2. Under water animals like fish have ..... for breathing.
3. .... are called body-building food.
4. The ribcage protects the lungs and .....

**C. State whether the following statements are True or False.**

1. Cerebrum joins the brain to the spinal cord.
2. Seeds are formed inside the fruits.
3. Skull has 22 bones.

**D. Write two examples for each of the following.**

1. Animals that live in oceans .....  
 .....  
 .....
2. Rabi crops .....  
 .....
3. Deficiency diseases .....  
 .....

**E. Answer the following questions briefly.**

1. What is germination?
2. What are skeleton muscles?
3. What is first aid?

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

1. What is the importance of roughage in our diet?
2. Write about the migration of an eel.

## Air and Water

## What We Have Learnt?

- ✦ Air
- ✦ More about water
- ✦ Water cycle
- ✦ Purification of water

## What We Will Learn?

- ✦ Layers of atmosphere
- ✦ Composition of air
- ✦ Properties of air
- ✦ Water
- ✦ Purification of drinking water

## Get Set GO!

Look at the pictures given below and answer the questions given below each picture.



What is the boy blowing into the balloon?

.....



What is helping the kite fly in the sky?

.....

We cannot live without air and water. In this chapter, we will learn about the composition of air, properties of air and the ways to purify water.

**LAYERS OF ATMOSPHERE**

Our earth is surrounded by a blanket of air called atmosphere. It extends up several hundreds of kilometres, above the earth.

The atmosphere of our earth can be divided into five layers :

○ **Troposphere** : It is the first layer above the earth's surface. This layer extends up to a height of 12 km. Most of the gases are present in this region. Weather changes occur within this layer.



○ **Stratosphere** : This layer starts from where the troposphere ends and extends to about 50 km. This layer of the atmosphere is less dense as compared to the troposphere. The ozone layer, which absorbs the sun's ultraviolet rays is located in this layer. Jet planes usually fly in this layer.

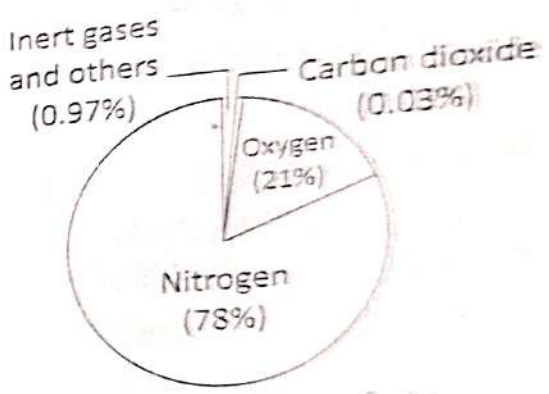
○ **Mesosphere** : It extends from 50 km to 80 km above the earth. There is a decrease in temperature in this area. That is why, it is known as the cold layer. Meteors or rock fragments burn up in the mesosphere.

○ **Thermosphere** : This area has high temperature and hence called the hot layer. Space shuttles orbit in this layer.

○ **Exosphere** : This is the outermost layer and the air is very thin in this layer. Beyond this region, there is no air.

### COMPOSITION OF AIR

Air is a mixture of many gases. It contains about 78% Nitrogen, 21% Oxygen and 1% other gases. There is a variation in the percentage of dust, smoke, water vapour and air pollutants from place to place.



○ **Nitrogen** is the most abundant gas in the atmosphere. Living things require nitrogen, but it cannot be taken directly from the air. Plants gets nitrogen with the help of bacteria present in the soil. Animals and human beings get nitrogen from both animal sources of food and plants.

○ **Oxygen** is the most important gas in air. All living beings require oxygen to breathe. It burns the food we eat to give us energy. Oxygen is also essential for combustion, so it is needed for the burning of any fuel.

○ **Carbon dioxide** is essential for the plants for photosynthesis. Plants make their food through photosynthesis.

○ **All other gases** like helium, neon, hydrogen, argon, krypton and ozone are also present in the air.

Neon and Argon are used in bulbs. Absence of air or any other matter in a particular place is known as vacuum.

○ **Water vapour, dust and smoke** : Air also contains a small amount of water vapour, dust and smoke. Heat from the sun causes water to evaporate from the surface of the oceans, seas, lakes, etc. The amount of water present in the air is called humidity. It plays an important role in determining weather conditions.

## PROPERTIES OF AIR

○ **Air occupies space** : Air takes up space because when you put air in a bicycle's tyre or balloon it becomes bigger. This process of filling air in any expandable substance is called inflation.

○ **Air has weight** : Let us compare two footballs. One of them is inflated and the other is deflated. When you will hold them in your hands, you can easily feel the difference between their weights i.e., the inflated football is heavier than the deflated one.

○ **Air exerts pressure** : We have learnt that air occupies space and has mass. Anything that has mass exerts pressure. So, air also exerts pressure. The pressure exerted by air upon the earth is known as atmospheric pressure. Air exerts pressure in all directions. Air exerts pressure on our body also. We do not feel this pressure because it acts on our body equally in all directions. Air pressure is very helpful to us. Doctors make use of this to fill up their syringes. We can drink liquids with a straw because of air pressure. Cycle, car and bus tyres are filled with air for smooth driving. It also helps in drawing water using water pumps.



### Knowledge ZONE

○ A siphon is a bent tube through which we draw liquids from containers.

○ Barometer is a scientific instrument measuring air pressure.



Filling up injection syringes



Drinking through a straw

## Activity

**Aim :** To show that air exerts pressure.

**Materials required :** Plastic cup and index card (cardboard)

**[Note :** It might be a good idea to try this over a sink.]

**Procedure :**

1. First, fill the plastic cup with water. Place the index card on top of the cup.
2. Hold the index card tightly against the mouth of the plastic cup and turn the cup upside down.
3. Carefully remove your hand, holding the index card in place.

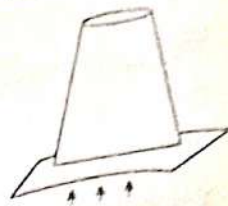
**Observation :** The index card does not fall.

**Reason :** The pressure of air outside the plastic cup is pushing the card up.

**Conclusion :** This shows that air exerts pressure on objects.

EL

Experiential Learning



## WATER

After air, water is also essential for our life. We cannot live without water. It is possible to live without food for some days, but it is very difficult to survive without water even for a day. About 70% of the human body is made up of water. Several life processes in living organisms take place in water.

Water is made up of two atoms of hydrogen and one atom of oxygen ( $H_2O$ ).

### Properties Of Water

- Water is a colourless, tasteless and odourless liquid.
- It freezes at  $0^\circ C$  and boils at  $100^\circ C$ .
- It can dissolve a large number of substances. So, it is known as a universal solvent.

### Impurities In Water

Rain is the purest form of water but when rain falls to the ground, it gets mixed with many impurities which pollute the water. The impure water is harmful for animals, plants and environment. These impurities can be of two types :

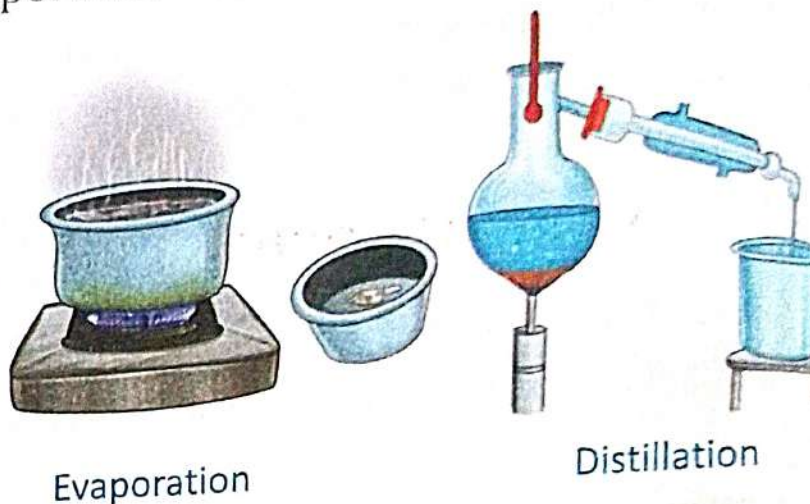
- **Soluble impurities** are salts and minerals. They dissolve in water.
- **Insoluble impurities** are small stones, sand, mud, etc. They do not dissolve in water.

## Removal Of Soluble Impurities

There are two methods of separating soluble impurities :

○ **Evaporation** : It is a process to remove soluble impurities from water. In this, we heat the water solution containing soluble impurities like salt. After some time, water gets evaporated and the impurities are left behind.

○ **Distillation** : In this process, contaminated water is heated in the flask. After some time, water changes into steam and impurities are left behind in the flask. This steam passes through a condenser. Here, it cools down and converts into water. This water is pure which is collected in a separate flask.



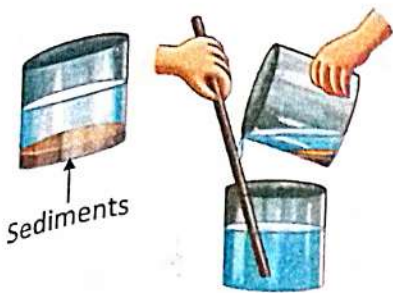
This water can be used in medicines, car batteries and science labs as it is pure, without any germs and impurities. Distillation is the best method of getting pure water.

## Removal Of Insoluble Impurities

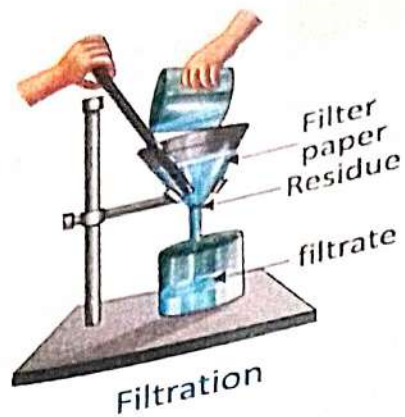
There are two methods to separate insoluble impurities :

○ **Sedimentation and Decantation** : Water with insoluble impurities is kept undisturbed for some time. Impurities settle down and the clear water comes up. This can be separated slowly by pouring out the clear water into another vessel as shown in the figure below. The impurities are left behind.

○ **Filtration** : Separation of insoluble impurities with the help of filter paper or filtering medium is known as filtration. For filtration, filter paper should be arranged in a cone shape. Fit this cone in a glass funnel. To fix the filter paper properly in the glass funnel, sprinkle some water over it. Now, pour the mixture into the funnel. The sand does not pass through the filter paper and remains behind on the filter paper. This is called residue.



Sedimentation and decantation



## PURIFICATION OF DRINKING WATER

Water Purification is the process of removing undesirable chemicals, germs and other harmful substances from water to make fit for consumption. Water which is fit for drinking is known as potable water. Following are some methods of purifying water :

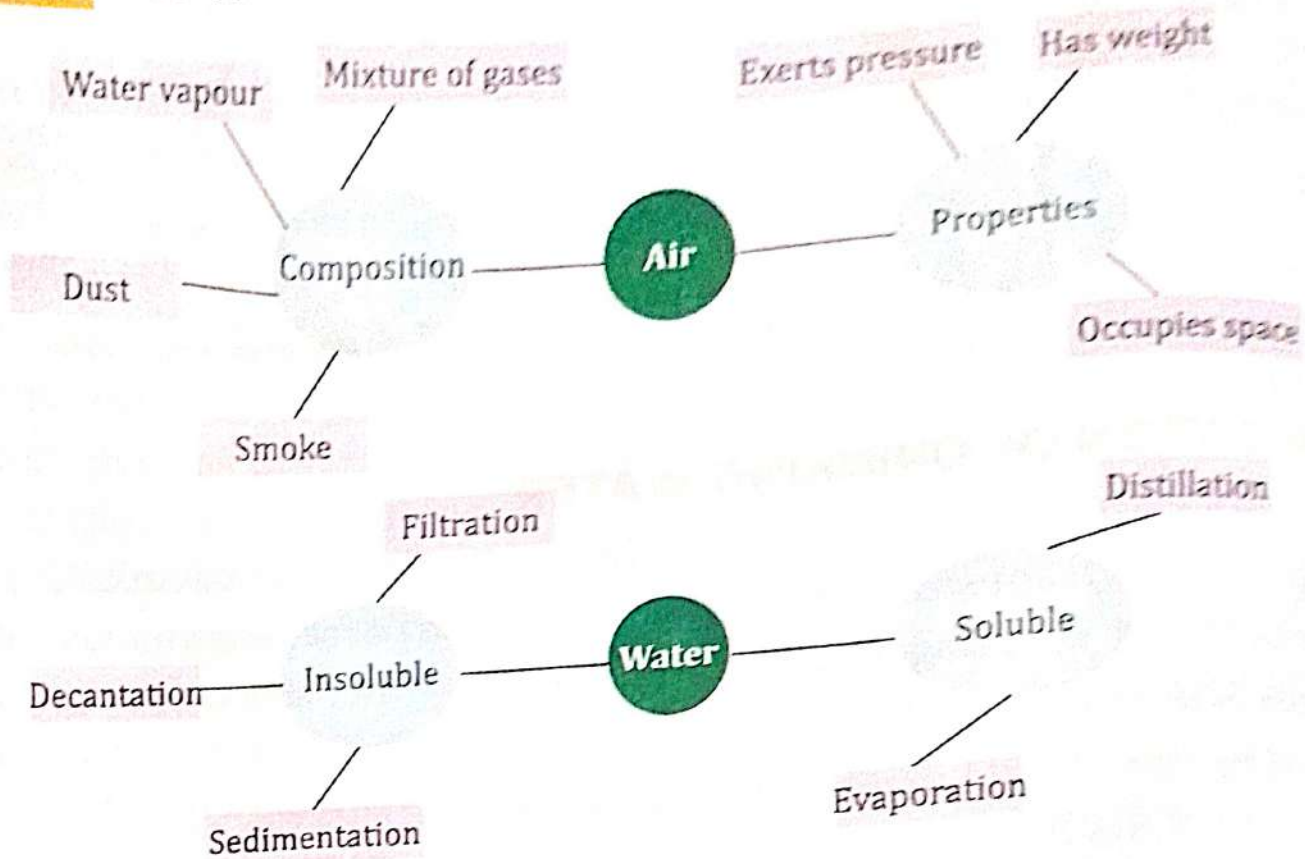
- **Boiling** : We should drink boiled water. Boiling kills the germs present in water. It is the simplest way to purify water.
- **Chlorination** : We can use chlorine tablets in water to kill germs. It should be added in small quantities.
- **Water purifier** : Water purifier filters water and has ultra violet rays tubes inside it. UV rays kill the germs. This is an effective method.

### QUICK TEST :

Fill in the blanks with the correct words.

1. .... % of oxygen contents are in air.
2. .... is the best method of getting pure water.
3. We can use ..... tablets in water to kill germs.

# MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

- Air is a mixture of :
 

(a) oxygen and nitrogen	<input type="checkbox"/>
(b) many gases	<input type="checkbox"/>
(c) both (a) and (b)	<input type="checkbox"/>
- Which gas humans breathe in?
 

(a) Carbon dioxide	<input type="checkbox"/>	(b) Oxygen	<input type="checkbox"/>	(c) Nitrogen	<input type="checkbox"/>
--------------------	--------------------------	------------	--------------------------	--------------	--------------------------
- How can we remove soluble impurities?
 

(a) By evaporation	<input type="checkbox"/>	(b) By distillation	<input type="checkbox"/>	(c) Both (a) and (b)	<input type="checkbox"/>
--------------------	--------------------------	---------------------	--------------------------	----------------------	--------------------------
- The process of removing impurities from water by using filter paper is called:
 

(a) distillation	<input type="checkbox"/>	(b) filtration	<input type="checkbox"/>	(c) boiling	<input type="checkbox"/>
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**B. Fill in the blanks with the correct words.**

1. Our Earth is surrounded by a blanket of air called .....
2. .... is the most abundant gas in the atmosphere.
3. Addition of undesired and harmful substances in air is called .....
4. About ..... of the human body is made up of water.
5. .... is a process to remove soluble impurities from water.

**C. State whether the following statements are True or False.**

1. The main component of air is oxygen.
2. We should wash fruits and vegetables in plenty of water.
3. River water is potable water.
4. The purest form of water is distilled water.
5. Germs in the water are useful.


**II. Very Short Answer Type Questions**

**D. Write two examples for each of the following.**

1. Soluble impurities in water
2. Insoluble impurities in water
3. Properties of air
4. Gases present in the air

.....

.....

.....

.....

**E. Write one word for the following.**

1. It is a mixture of many gases.
2. Addition of undesired and harmful substances in air.
3. The simplest way to purify drinking water.

.....

.....

.....

**III. Short Answer Type Questions**

**F. Answer the following questions briefly.**

1. Name the different layers of the atmosphere?
2. Define sedimentation and decantation.
3. Why should we drink purified water?

**IV. Long Answer Type Questions**

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

1. What is air composed of?
2. Describe the different ways by which soluble impurities can be removed from water.

- Describe the different ways by which insoluble impurities can be removed from water.
- Describe the different ways by which drinking water can be purified.

### CREATIVE CORNER

#### HOTS Question

21  
CS

Critical Thinking

Empty bottles of mineral water or some other plastic bottles should be crushed before throwing them into dustbin. Why?

EL

Experiential Learning

#### Project WORK

#### Make your own 'Water Filter'

**Materials required :** A clean plastic bottle, a glass, pebbles, gravel and sand.

**Method :** Cut off the bottom of a clear plastic bottle. Stuff the neck of the bottle with clean cotton wool.

Turn the bottle upside down and place it on a clean glass. Over the cotton wool, spread a layer of small pebbles, then gravel and above that a layer of sand. All pebbles and gravel must be washed before putting in the bottle.

Pour dirty water over these layers of filter.

Watch the water drops trickling down through the cotton wool. It is clean water. This way dirty water is being filtered and all the insoluble impurities are removed from the water. Remember, this water is still not fit for drinking. Do you know why?



#### Think Smart



HD

Learning from Information

A helicopter is an aircraft which has revolving wings. These wings are called rotors. The rotors rotate at a fast speed to reduce the air pressure above them and the craft is lifted upwards. Helicopters can rise and land vertically and can also hover in the air.

# Earth, Sun and Moon



## What We Have Learnt?

- + Solar system
- + Moon and satellites
- + Movement of the earth
- + Stars

## What We Will Learn?

- + The solar system
- + Sun
- + Earth
- + Moon
- + Eclipses

## Get Set GO!

Look at the pictures given below and write their names.



Objects that we see in the sky are called **heavenly objects**. The sun and the heavenly objects that revolve around it form the solar system. Let us learn more about the solar system, the sun, the Earth and the moon.

## THE SOLAR SYSTEM

The sun and the celestial bodies that revolve around it form the solar system. Other than the planets, **satellites** of various planets, comets, asteroids, etc., are also part of the solar system.

### Word Bank

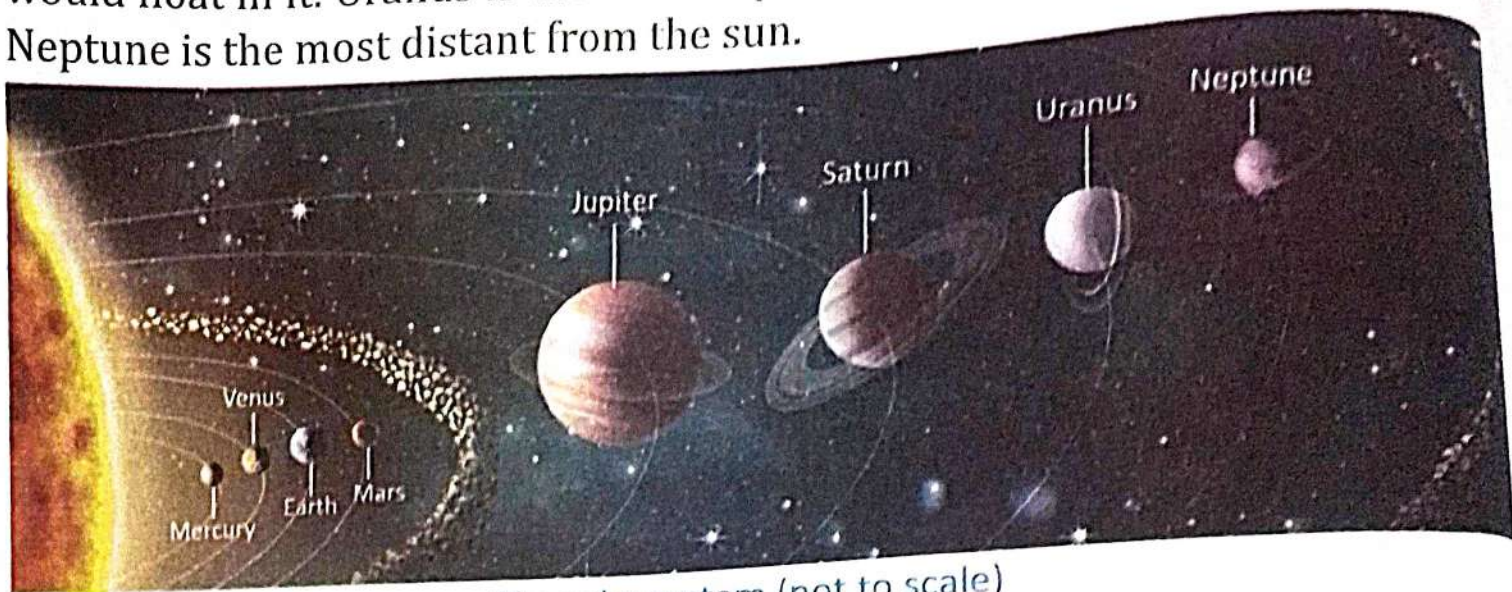
**Satellite** : An object revolving around a planet



### Knowledge ZONE

Heavenly objects are also called celestial objects.

The sun is at the centre of the solar system. There are eight planets revolving around the sun. These planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. They revolve around the sun in fixed paths called orbits. Mercury is the smallest and the closest planet to the sun. Venus is the hottest and brightest planet. The Earth is also called the blue planet. It is the only planet where life is known to exist. Mars is also called the red planet. Jupiter is the largest planet of the solar system. Saturn is the second largest planet after Jupiter. It has rings around it. Hence, it is also called the ringed planet. Saturn is so light that if there was a tub of water big enough to hold it, it would float in it. Uranus is the coldest planet of the solar system. The planet Neptune is the most distant from the sun.



The solar system (not to scale)

## SUN

The sun is a star at the centre of our solar system. It is a huge ball of hot gases that continuously gives out heat and light. Its size is about 109 times that of the Earth. Its mass is about 3,30,000 times that of the Earth. It is almost 99.86% of the total mass of the solar system.

Hydrogen and helium gases are the major constituents of the sun. The sun has a thin outer layer called **corona** and a central part called the **core**.

Helium is continuously converted from hydrogen gas at the core of the sun. Very large amount of heat and light energy are released during this process.



## Knowledge ZONE

Pluto, which was earlier considered as the ninth planet, is now known as a 'dwarf planet'.

Energy released by the sun is called solar energy. The temperature on the surface of the sun is about  $6000^{\circ}\text{C}$ . The existence of all living things on Earth is ultimately dependent on solar energy.

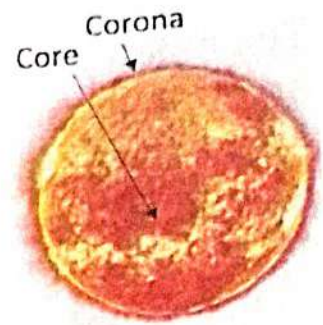
## EARTH

We live on third planet from the sun, the Earth. It has an air envelope around it known as the atmosphere. The atmosphere of the Earth protects us from the harmful radiations of the sun. The interior part of the Earth is divided into three major layers: crust, mantle and core.

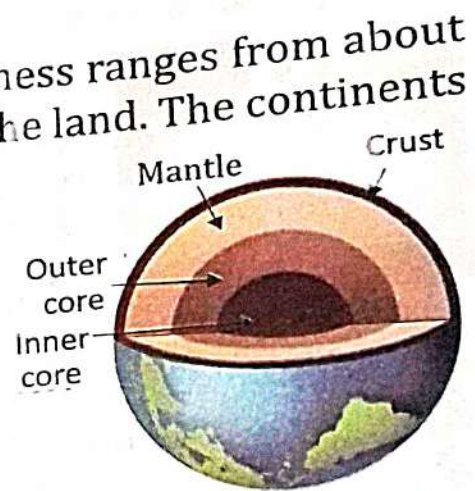
- **Crust** is the outermost layer of the Earth. Its thickness ranges from about 5 km below the ocean floor to about 70 km below the land. The continents and the oceans are on this layer. A crust is composed of rocks and contains all the essential elements for life.

- **Mantle** is the middle layer of the Earth lying between the crust and the core. The thickness of the mantle extends up to 2,890 km. The outer region of the mantle consists of solid rocks. The inner regions of the mantle consist of molten rocks. During volcanic eruptions, molten magma comes out from this layer to the surface of the Earth.

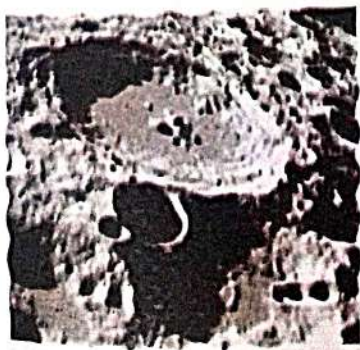
- **Core** is the innermost layer of the Earth. It is mainly composed of iron and nickel. The outer core is in a molten liquid state. It extends to about 3,400 km. A solid sphere of mostly iron lies within the inner core about 1,220 km away from the outer core.



Sun



Internal structure of the Earth



Surface of the moon

## MOON

An object that moves around a planet in an orbit is called moon or satellites. Satellites are of two types : natural satellites and artificial satellites. Naturally existing objects revolving around a planet are called natural satellites. Some satellites of the Earth are man-made satellites. They are called artificial satellites.

The moon is the natural satellite of the Earth. It revolves around the Earth in an orbit at a distance of about 3,84,400 km from the Earth. The moon has no light of its own.

In the sky, the moon appears bright because of the sunlight it reflects. The moon is almost spherical in shape. It has no atmosphere due to which it is very hot during the day and very cold at night.

The surface of the moon has a lot of craters. These are formed when huge rocks called meteorites hit its surface. There are lots of mountains on the surface of the moon.



Footprint on the moon

### Landing On The Moon

On 20th July 1969, Neil Armstrong became the first person to land on the moon, followed by Edwin Aldrin and Michael Collins. They were the astronauts of the American space mission Apollo 11. The rocks from the surface of the moon that they brought helped the scientists obtain a lot of information about the moon.



Astronaut on the moon

There were some unmanned missions to the moon which obtained a lot of information about the surface of the moon through photographs. Chandrayaan-1 was India's first unmanned mission to the moon.

### Phases Of The Moon

It looks like the moon changes shape every night when we look at it. Sometimes it is a round ball, sometimes C-shaped and sometimes it disappears completely. This happens because we see only that part of the moon that reflects the sun's light to us as it moves around the Earth in its orbit. These varied shapes of the moon are called the phases of the moon.

### FUN Activity

Suppose your weight is 48 kg. What will you weigh on moon?

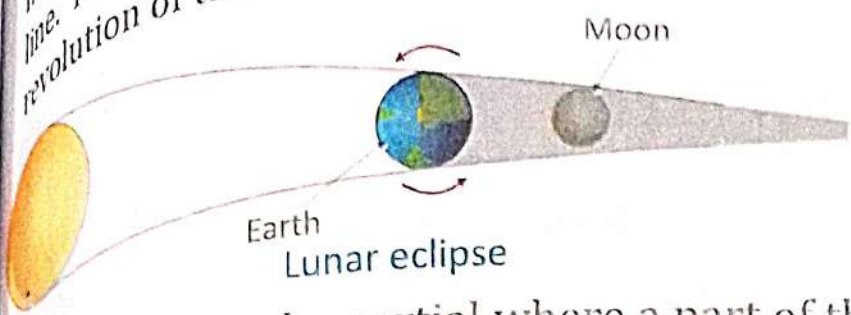


Curiosity

### ECLIPSES

Eclipse is a natural phenomenon in which one heavenly object (or a portion of it) becomes temporarily invisible as it is hidden by the shadow of another

heavenly object. It happens when three heavenly objects are in a straight line. The revolution of the Earth around the sun, Earth's rotation, and the revolution of the moon around the Earth cause lunar and solar eclipses.



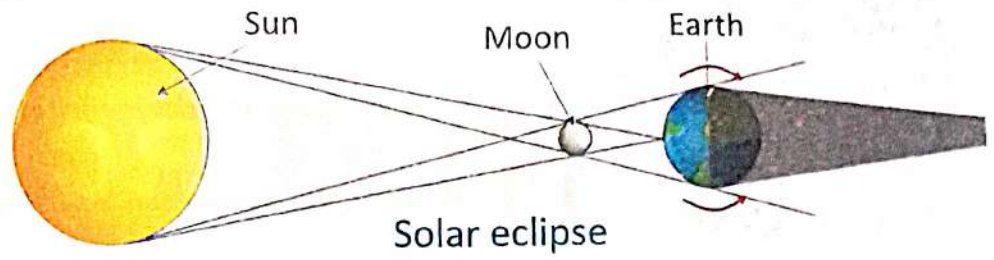
### Lunar Eclipse

Earth's shadow falls on the moon when it lies between the sun and the moon. This causes the lunar eclipse.

Lunar eclipse can be partial where a part of the moon may be visible or total where the moon is not visible at all. The type and duration of a lunar eclipse depends on the position of the moon in the orbit.

### Solar Eclipse

In a solar eclipse, the moon comes between the sun and Earth and its shadow falls upon it.



If we observe from an area on the Earth where the dark inner shadow of the moon falls, we can see a total solar eclipse. If we observe from an area on the Earth where the faint outer shadow of the moon falls, we can see a partial solar eclipse. If only a bright ring is seen around a central eclipsed area then we see a ring-shaped eclipse or annular eclipse.

### PUT ON YOUR THINKING CAP

Find out which fuel is used to launch a space shuttle? Also find its combustion.

### Importance Of The Solar Eclipse

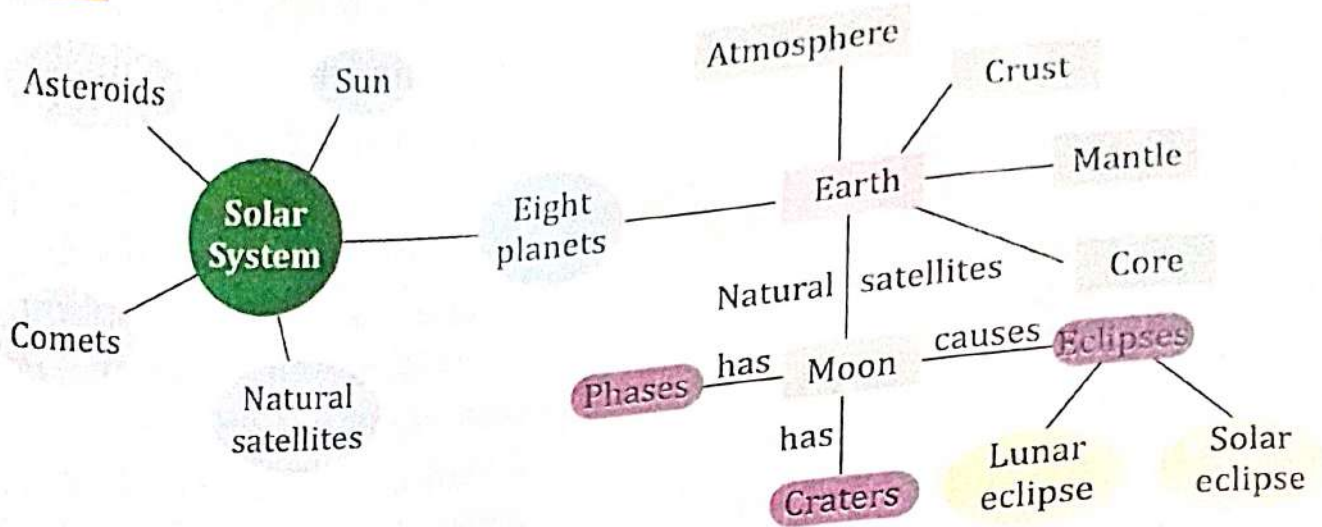
Solar eclipse enables us to study the outer layer of the sun called the corona, which is otherwise very difficult to observe due to the bright rays of the sun. We must always remember to wear ultraviolet (UV) rays-protected dark glasses while observing the solar eclipse as the bright light of the sun might harm our eyes.

### QUICK TEST

Fill in the blanks with the correct words.

1. Satellites are of ..... types.
2. .... is the middle layer of the Earth.
3. .... is the innermost layer of the Earth.

# MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

- The major element in the inner core of the earth is :  
 (a) iron  (b) nickel  (c) both (a) and (b)
- Major constituents of the sun are :  
 (a) hydrogen and helium   
 (b) helium and oxygen   
 (c) hydrogen and oxygen
- The thin outer layer of the sun is called the :  
 (a) mantle  (b) corona  (c) crater
- Solar eclipse occurs when :  
 (a) the moon comes between the Earth and the sun   
 (b) the Earth comes between the sun and the moon   
 (c) the sun comes between the moon and the Earth
- Lunar eclipse occurs when :  
 (a) the moon comes between the Earth and the sun   
 (b) the Earth comes between the sun and the moon   
 (c) the sun comes between the moon and the Earth

**B. Fill in the blanks with the correct words.**

1. The outermost layer of the Earth is called the .....
2. During volcanic eruptions, the magma comes out from the ..... of the earth.
3. The moon is the ..... satellite of the Earth.
4. The major portion of the sun's core is made up of .....
5. Lunar eclipse occurs only on ..... day.

**C. state whether the following statements are True or False.**

1. The inner core of the Earth is a solid sphere.
2. At the core of the sun, hydrogen changes into helium.
3. The moon produces its own light.
4. The moon has a lot of craters on its surface.
5. Total solar eclipse is visible from all parts of the earth.


**D. Match the following.**

- |                   |  |
|-------------------|--|
| 1. Moon           | (a) First man to land on the moon                      |
| 2. Neil Armstrong | (b) Shadow of the earth falls on the moon              |
| 3. Chandrayaan    | (c) The sun, moon and the earth are in a straight line |
| 4. Lunar eclipse  | (d) India's unmanned mission to the moon               |
| 5. Spring tide    | (e) Natural satellite of the earth                     |

**II. Very Short Answer Type Questions**

**E. Write two examples for each of the following.**

1. Astronauts who landed on the moon .....
2. Types of eclipses .....

**F. Write one word for the following.**

1. It is situated at the centre of our solar system .....
2. The third planet from the sun .....
3. The natural satellites of the Earth .....

**II. Short Answer Type Questions**

**G. Answer the following questions briefly.**

1. What is the solar system?
2. What are artificial satellites?
3. What is an eclipse? Mention the two eclipses that are visible to us.

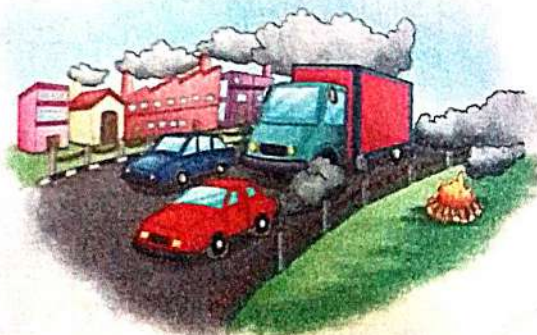
## POLLUTION

The presence of substances which has harmful poisonous effects in environment is called **pollution**.

The substances that cause pollution are called **pollutants**. Pollution has harmful effects on plants, animals and human beings. There are mainly three types of pollution : air pollution, water pollution, land pollution and noise pollution.

### Air Pollution

Contamination of the air due to impurities is known as **air pollution**. Smoke from the industries and vehicles are the main sources of air pollution. In villages, many houses still use firewood and coal for cooking. This gives smoke causing air pollution in the rural areas. Smoke from firecrackers also contributes to air pollution. People who breathe in polluted air suffer from respiratory diseases like asthma, breathing problems and lung cancer.



Smoke from factories and vehicles causes air pollution



Burning of wood causes air pollution



Bursting of firecrackers causes air pollution

Air pollution also cause the following :

**Acid rain** : When harmful gases like sulphur dioxide and nitrogen oxide are released by factories, combine with water droplets in the atmosphere, acids are formed. When this falls down as rain, it is called **acid rain**. It affects the growth of crops and destroy many historical monuments, harms human skin, etc.

**Depletion of the ozone layer** : Harmful gases released into the air have affected the ozone layer, creating holes in it. The ultraviolet rays from the sun enter through these holes into the earth and cause various diseases, one of them being cancer.

**Global warming** : Carbon dioxide does not let heat escape from the earth, which has led to an increase in temperatures and melting of the ice caps. This is known as the greenhouse effect. It causes global warming, which if continued, may lead to floods caused by the melting ice caps.

## Water Pollution

Water pollution is mainly caused by industrial wastes and sewage pipelines from homes and other buildings. In the villages, the lakes or rivers are polluted due to the various activities that are done in or near the water source. Villagers depend on the lake or river for washing clothes, washing cattle, and bathing. The dirt and soap from all this washing goes into the water and causes pollution. The solid wastes dumped in the water also causes water pollution.



Sewage left into the water source

Pollution of water makes it unfit for human use. Sewage contains harmful germs which cause diseases like cholera, diarrhoea and typhoid. If these germs are present in drinking water, they can cause diseases.

## FUN Activity

El Nino Oscillation means the cycle of warm and cold temperatures measured on the different sea waters. Explore internet to know a little more.



Digital Resources



## Land Pollution

Dumping wastes like glass, plastic bags, and metal containers causes land pollution. Overuse of chemicals like fertilizers, insecticides and pesticides also causes land pollution.



Garbage dump in the soil causing land pollution Soil erosion

Soil is held together by the roots of trees. Deforestation or cutting of trees loosens the soil. This loose soil is carried away easily by the blowing wind. The rainwater also washes away the loose soil. The process of removal of the top layer of soil by wind and rainwater is called soil erosion.

## Noise Pollution

Noise pollution is caused by the loud sounds that disturb the normal activities of human beings and animals. Honking vehicles, sound from the loud speakers, television, etc. cause noise pollution. Noise from firecrackers and construction of buildings and roads also cause noise pollution. Noise pollution has many health effects causing hypertension, hearing impairment, heart disease and sleep disturbance.



Noise pollution in a city

## SAVING THE ENVIRONMENT

We should try to minimize pollution to save our environment. Some ways of reducing pollution are given below :

- The smoke and gases in the factories should be processed and made safe before letting out through chimneys.
- Reducing air pollution by using vehicles only when needed, and walking or cycling to short distances.
- Treatment of waste from factories and sewage from homes before being let into the water bodies.
- Planting more trees to reduce air pollution, to get pure air to breathe and to prevent soil erosion.
- Using cloth bags instead of polythene bags and minimizing the use of plastics.
- Using environment-friendly manures and natural fertilizers in fields.
- Use of solar energy should be encouraged as it does not cause pollution.
- Construction of factories far away from the main city.

### PUT ON YOUR THINKING CAP

PM 1.5 means pollutant particles of micrometres suspended in air. They penetrate into lungs causing cancer. Now, know about PM 10.



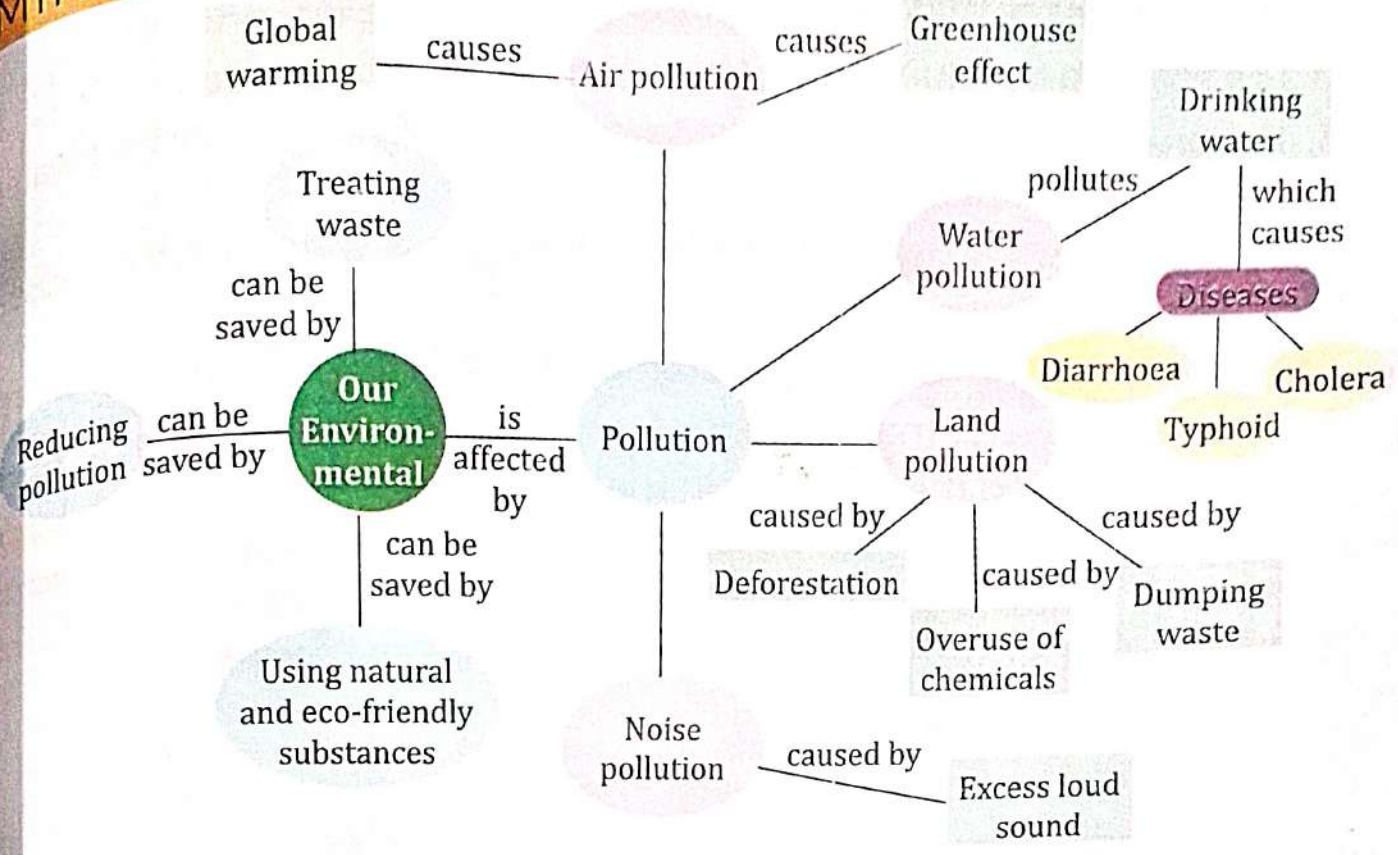
Planting trees

### QUICK TEST

Fill in the blanks with the correct words.

1. Everything the surround us forms our .....
2. .... or cutting of trees loosens the soil.
3. The ..... also washes away the loose soil.

# MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

- Which of the following is a cause of air pollution?
 

(a) Trees	<input type="checkbox"/>	(b) Smoke	<input type="checkbox"/>	(c) House	<input type="checkbox"/>
-----------	--------------------------	-----------	--------------------------	-----------	--------------------------
- Which of the following is not a cause of soil erosion?
 

(a) Wind	<input type="checkbox"/>	(b) Rain	<input type="checkbox"/>	(c) Tree	<input type="checkbox"/>
----------	--------------------------	----------	--------------------------	----------	--------------------------
- Air pollution can cause :
 

(a) asthma	<input type="checkbox"/>	(b) obesity	<input type="checkbox"/>	(c) cholera	<input type="checkbox"/>
------------	--------------------------	-------------	--------------------------	-------------	--------------------------
- Which of these causes land pollution?
 

(a) Loud speakers	<input type="checkbox"/>	(b) Polythene bags	<input type="checkbox"/>	(c) Smoke	<input type="checkbox"/>
-------------------	--------------------------	--------------------	--------------------------	-----------	--------------------------
- Honking of vehicles and loud noise from television cause pollution of:
 

(a) land	<input type="checkbox"/>	(b) water	<input type="checkbox"/>	(c) noise	<input type="checkbox"/>
----------	--------------------------	-----------	--------------------------	-----------	--------------------------

**B. Fill in the blanks with the correct words.**

1. The substances that cause pollution are called .....
2. The solid wastes dumped in the water cause .....
3. The process of removal of the top layer of the soil by wind and rain is called .....
4. Washing clothes and bathing animals near a water source cause .....

**C. State whether the following statements are True or False.**

1. Pollution of water makes it unfit for human use.
2. Global warming melts the ice in the polar regions.
3. Burning firecrackers causes air pollution.
4. Sewage contains germs cause cholera, diarrhoea, etc.
5. Pollution of air, water, noise and land is beneficial for us.

**D. Match the following.**

- |                    |                        |
|--------------------|------------------------|
| 1. Air pollution   | (a) Plastic bags       |
| 2. Water pollution | (b) Honking vehicles   |
| 3. Land pollution  | (c) Harmful substances |
| 4. Noise pollution | (d) Smoke              |
| 5. Pollutants      | (e) Sewage             |

**II. Very Short Answer Type Questions** ?

**E. Write two examples for each of the following.**

1. Types of pollution .....
2. Causes of soil erosion .....
3. Sources of air pollution .....
4. Sources of noise pollution .....

**III. Short Answer Type Questions** ?

**F. Answer the following questions briefly.**

1. What is pollution?
2. Write the harmful effects of air pollution?
3. What is soil erosion?
4. What are pollutants?

## IV. Long Answer Type Questions ?

G. Answer the following questions in detail.

1. What are the causes of water pollution in cities and villages?
2. Describe the sources of noise pollution.
3. Write any five ways to save our environment.

### CREATIVE CORNER

## HOTS Questions ?

21<sup>st</sup>  
CS

Critical Thinking



1. Soil pollution makes the soil infertile and increases the number of barren lands. How?
2. If firecrackers are burst, they cause two types of pollution. Name them.

## Project WORK



21<sup>st</sup>  
CS

Creativity



Make posters on the four types of pollution you have studied in this chapter and ways to prevent them. Write catchy slogans to create awareness.

## Think Smart



21<sup>st</sup>  
CS

Life Skills

3 GOOD HEALTH AND WELL BEING



Tick (✓) the statements, that you and your family do to be eco-friendly.

1. Do you and your family sometimes use public transport?
2. Do you use natural colours for Holi?
3. Do you tell your parents not to use plastic bags?
4. Do you throw garbage at the proper dumping place.

# CHAPTER 9

## Natural Disasters

### What We Will Learn?

- ✦ Earthquake
- ✦ Volcanoes
- ✦ Tidal waves and Tsunamis
- ✦ Floods
- ✦ Drought

### Get Set GO!

Look at the pictures given below and identify the natural phenomenon. Choose the words from the help box.

Earthquake    Drought    Flood    Volcanic eruption

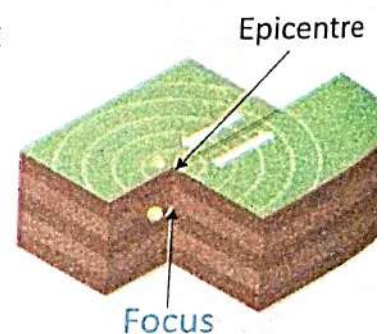


When living things on earth become victims of nature's fury we say that a natural disaster has happened.

Let us learn more about the natural disasters.

### EARTHQUAKE

A sudden violent shaking of the ground as a result of movements within the earth's crust or volcanic action causing great destruction is called an earthquake. These movements are caused by shifting of layers of rocks deep under the Earth's crust. The actual point deep inside the Earth where an earthquake begins is called the **focus** and the point on the Earth's surface directly above the focus



is called the **epicentre**. The maximum effect of the earthquake is felt at the epicentre and the effect reduces as we move away from the epicentre.

After-effects of Earthquakes:

- Destruction of buildings, trees, roads and vehicles
- Huge loss of life (humans and animals)
- Spread of diseases



Destruction caused by earthquakes

## Measuring Earthquakes And Their Effects

The effects of earthquakes depend on the force with which they occur. Some earthquakes are so weak that they just shake materials kept on a shelf while some are so strong that buildings fall down and leads to death of numerous people.

The intensity of an earthquake can be measured using an instrument called the seismograph. Richter scale is a standard scale that is used to find out the intensity of earthquakes on a scale of 1 to 10. Earthquakes measuring 1 to 2 on the scale will hardly be felt. Earthquakes measuring 3, 4 and 5 on the scale can cause damage to property. Earthquakes measuring 6 and above on the scale can result in widespread damage to property and can also cause death.

## Safety Measures During An Earthquake

Here are some steps in which you can be safe during an earthquake:

- If you are inside a room, take shelter under a table or a bed.
- Do not run around in panic.
- Do not stand under or near objects that can fall and hit you.
- If you are outdoors, stand in an open area away from any building and trees.



### Knowledge ZONE

Zhang Heng of China's Han dynasty was the first person to build an instrument to detect earthquakes.

## VOLCANOES

A vent in the crust of the earth which allows hot magma from below the surface to come out is called a volcano.

A vent is the region where the Earth's crust is weak and develops a crack. Once hot magma comes out of the Earth's surface, it is called lava. After a volcanic eruption occurs, a crater is formed at the region of vent.



A volcano

Volcanoes are of three types, namely active, dormant and extinct.

- **Active volcanoes** : These volcanoes keep erupting often and are always active. Barren island in the Andaman and Nicobar Island group has an active volcano.
- **Dormant volcanoes** : A volcano which has not erupted in a long time but has a possibility of erupting in the future, is called a dormant volcano. Mount Mauna Kea in Hawaii Islands in USA, is a dormant volcano.
- **Extinct volcanoes** : The volcano which has erupted thousands of years ago and has no possibility of erupting again, is called an extinct volcano. Mt. Ashitaka in Japan, is an extinct volcano.

### After-Effects of Volcanic Eruptions

- Destruction of farmlands and roads, damage to property and loss of life.
- Volcanic dust blocks sunlight for a long period which leads to change in the weather pattern.
- Spread of diseases.

### Advantages of Volcanic Eruptions

- Soil after volcanic eruption becomes very fertile and good for farming.
- Some of the volcanic locations can be used to generate **geothermal energy**.



Tides

### TIDAL WAVES AND TSUNAMIS

Tides are the occurrences of rise and fall of sea level. Sometimes the waves on the sea are high and sometime they are low. The rise and fall of the waves is due to the gravitational force of the sun and the moon acting on the oceans of the Earth. Tides reach maximum height when the sun, moon and the Earth are in a straight line.

Rise of large amounts of water in the form of huge waves from oceans due to underwater earthquakes, volcanic eruptions, etc. is called Tsunami. When there

is a disturbance between the layers of rocks in the Earth's crust which



Tsunami waves



### Knowledge ZONE

A region in the Pacific Ocean which consists of 452 volcanoes is called the ring of fire.

### Word Bank

**Geothermal energy** : Energy obtained from the Earth

lies under water bodies, a large amount of energy is released which leads to formation of huge waves. Large tsunami waves lead to loss of life and property. It is advisable to stay at high altitude regions during tsunami threat. On 26th December 2004, a tsunami occurred due to an earthquake in the Indian Ocean. It affected many South Asian countries like Indonesia, India etc.

### QUICK TEST

Fill in the blanks with the correct words.

1. Once hot magma comes out of the Earth's surface, it is called .....
2. .... Volcanoes keep erupting often and are always active.
3. Some of the volcanic locations can be used to generate .....

## FLOODS

An overflow of a large amount of water beyond its normal limits over land is called flood. Approximately 75% of the Earth's surface is covered by water. When the water bodies like oceans, rivers, lakes and ponds have excess water, they overflow leading to floods. Floods occur due to natural factors like:

- heavy rainfall,
- low-pressure region formed in the ocean,
- excess melting of snow in the mountains and glaciers.

Floods can be prevented if there are:

- proper streams or channels for the excess water to flow through,
- proper embankments that control the level of water flowing in to the rivers.
- enough trees to slow down the force with which water flows.
- enough mud to absorb excess water.

### After-Effects of Floods

- Spread of waterborne diseases
- Damage to property
- Loss of life

In June 2013, the Indian state of Uttarakhand and nearby places received heavy rainfall leading to devastating floods and landslides. More than 5700 people were believed to be dead.



Flood

## Safety Measures During Floods

Here are some of the ways in which you can be safe during a flood.

- Leave your area where the flood water is bound to flow.
- Do not panic. Always listen to flood warnings given on radios and TV channels.
- Keep medicines, food supplies and clean drinking water in plenty.
- Shift to higher locations where the flood water cannot reach.

## DROUGHT

Sometimes, the land becomes dry without any moisture, due to lack of rains. This condition is called a drought. Some droughts are of shorter duration whereas some continue for years.

Droughts occur due to lack of or insufficient rainfall along with excessive usage of existing water resources.

### Effects of Drought

- malnutrition and death of humans and animals.
- destruction of crops.
- mass movement of people from one place to another.



### Knowledge ZONE

Drip irrigation is a modern irrigation technique which saves water. It is done using narrow tubes which allow very small quantity of water to drip into the roots of plants.



Drought

### PUT ON YOUR THINKING CAP

What are called cloud bursts?  
Why do they blast?

The effects of drought can be controlled by

- making **judicious** usage of available water resources.
- adapting to rainwater harvesting.
- recycling of water.
- cultivating crops which require less water.

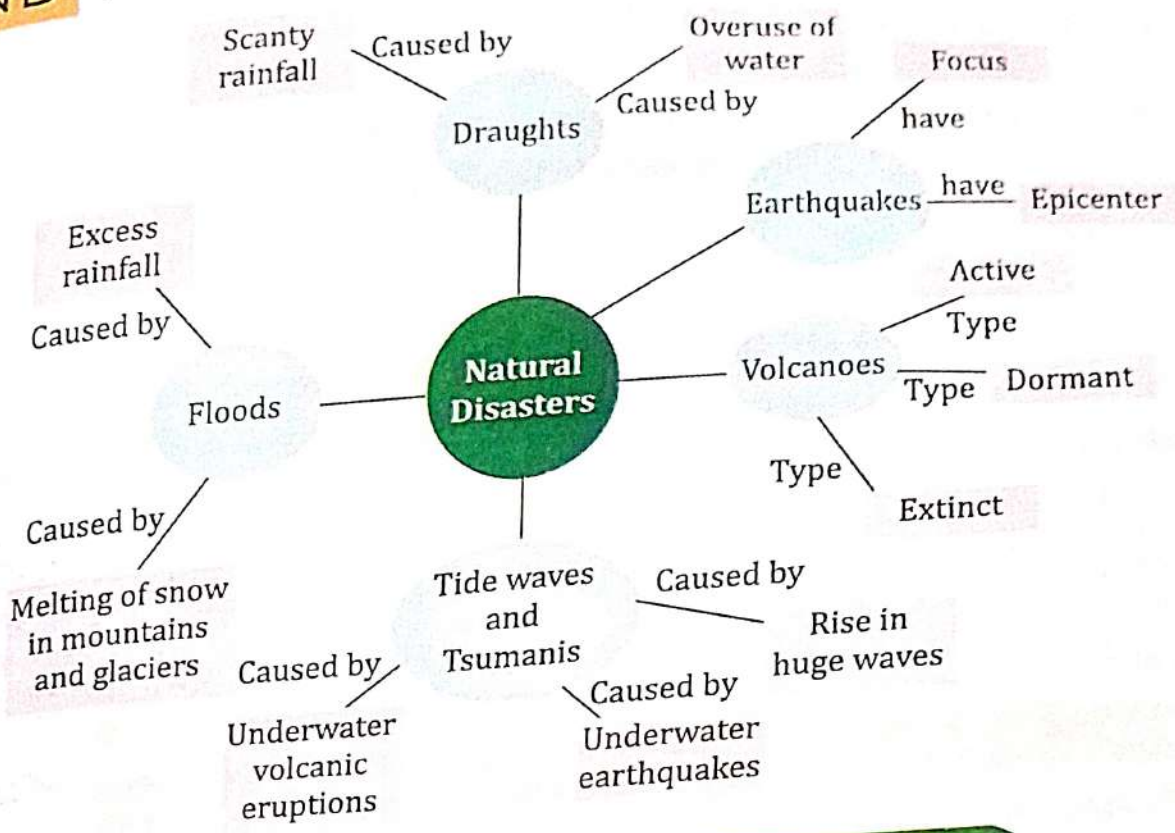
Major drought-prone regions in India are Southern and Eastern Maharashtra, Northern Karnataka, Andhra Pradesh, Odisha, Gujarat and Rajasthan.



### Word Bank

**Judicious** : Careful and sensible

# MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

- The actual point where an earthquake begins is called :  
 (a) Mantle  (b) Core  (c) Focus
- Which of the following natural disasters is caused by shortage of water?  
 (a) Drought  (b) Tsunami  (c) Earthquake
- Heavy rainfall can cause :  
 (a) Earthquake  (b) Drought  (c) Flood

#### B. Fill in the blanks with the correct words.

- The intensity of an earthquake can be measured using an instrument called the .....

2. A vent in the crust of the earth which allows hot magma from below the surface to come out is called a .....
3. Approximately, ..... of the Earth's surface is covered with water.
4. .... is a modern irrigation technique which saves water.

**C. State whether the following statements are True or False.**

1. Drought occurs when all water bodies will have excess water to handle.
2. Effect of earthquake is felt more at the epicentre.
3. Tides and tsunami are one and the same.
4. When magma comes out of the Earth's surface, it is called lava.

**D. Match the following.**

- |                |  |
|----------------|--|
| 1. Earthquake  | (a) device used to measure earthquake      |
| 2. Epicentre   | (b) underwater earthquake                  |
| 3. Seismograph | (c) a sudden violent shaking of the ground |
| 4. Tsunami     | (d) point directly above the focus         |

**II. Very Short Answer Type Questions** ?

**E. Write one word for the following.**

1. The point under the ground where the earthquake begins.
2. The instrument used to measure the intensity of earthquake.
3. The region where the Earth's crust is weak and develops a crack.
4. A natural disaster caused by undersea earthquakes.

**III. Short Answer Type Questions** ?

**F. Answer the following questions briefly.**

1. What is an earthquake?
2. What is an epicentre?
3. Explain dormant volcanoes?
4. How tides occur?

**IV. Long Answer Type Questions** ?

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

1. How do earthquakes happen? What are the effects of an earthquake?

2. What is a volcano? Explain different types of volcanoes with one example each.
3. Write two after-effects and advantages of volcanic eruption.
4. When do floods occur? What are the effects of flood?

### CREATIVE CORNER

#### HOTS Question ?

Amit is on the first floor of a building. If an earthquake occurs suddenly, which method is better for him to come out of the building: using the stairs or the elevator? Why?



Critical Thinking



#### Project WORK



Collect information on safety measures which can be taken during an earthquake. You can take help from your library, newspapers, magazines or the internet and write a report in your notebook.



Digital Resources



#### Think Smart



Make a list of at list five NGOs in your state, which have been active in helping victims of natural disasters, whenever they have occurred in the past.



Observation

#### Subject Link (English)



Cross Curricular

**Read an extract from a real incident which occurred on 26 December 2004 when huge tsunami waves hit India's coast. Circle the adjectives.**

"Run away!" her husband screamed from a rooftop. He had just spotted the colossal tsunami waves rushing towards the shore. The giant waves that would crush or wash away at least 1,23,000 lives on the shores of the Indian Ocean.

Priyanka grabbed her youngest two children and ran. She thought the oldest, nine-year-old Shyam, would be able to outrun the tsunami churning toward their home. Shyam headed for the safest place he knew.

CHAPTER 10

# Solids, Liquids and Gases

### What We Have Learnt?

- ✦ States of matter
- ✦ Change of states
- ✦ Solute, solvent and solution

### What We Will Learn?

- ✦ What is matter made up of?
- ✦ Heating and cooling of liquids, solids and gases
- ✦ Physical and chemical changes

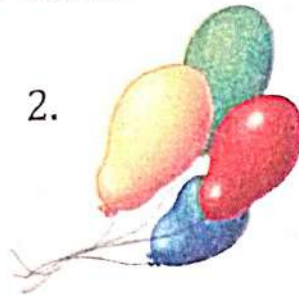
### Get Set GO!

Water exists in three forms or states : solid, liquid, and gas. Draw a line to match the pictures that show the same state of matter.

1.



2.



3.



(a)



(b)



(c)



All things whether living or non-living are made up of matter. Anything that has mass and occupies space is called **matter**. Matter can exist in three states : solid, liquid and gas. It is made up of small particles called atoms and molecules. Let us learn more about them.

### WHAT IS MATTER MADE UP OF?

**Atoms** are the building blocks of all matter. They are extremely small in size and can be seen only using very powerful microscopes. Though you



### Word Bank

**Atoms** : small particles of matter

...and see them with naked eyes, everything around you is made up of atoms.  
 ...water you drink, the air you breathe, the Earth and everything on it are  
 ...up of atoms.

## Molecules

When two or more atoms combine together, they form a particle called a **molecule**. A molecule can be made up of the same or different kind of atoms. For example, an oxygen molecule is made up of two oxygen atoms (also written as  $O_2$ ). A water molecule is made up of two hydrogen atoms and one oxygen atom (also written as  $H_2O$ ).



$O_2$   
Oxygen molecule



$H_2O$   
Water molecule

...and molecules are in  
 ...motion. In solids, the  
 ...are very close to each  
 ...They attract each other  
 ...with great force. So, a solid is  
 ...and has a definite  
 ...and volume.

### Knowledge Zone

Nanotechnology is the branch of science that involves working with atoms and molecules to build devices such as sensors that are extremely small.

...liquids, the molecules are less closely  
 ...packed. The attraction between the molecules  
 ...liquids is less as compared with that in  
 ...solids. Molecules can move around freely. That  
 ...why liquids can flow. A liquid has a definite volume, but no definite shape.

**Word Bank**  
**Molecules** - smallest particles of substance



(a) Arrangement of particles in solid  
 (b) liquid and (c) gas

It takes the shape of its container.

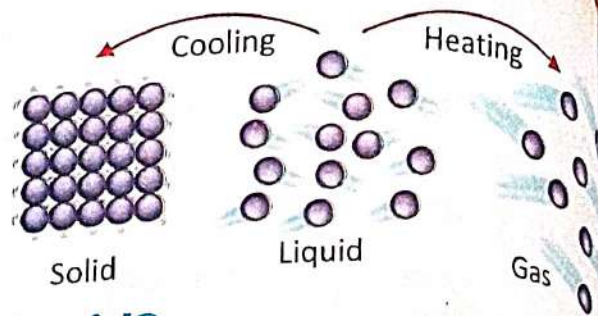
In **gases**, the molecules are separated by large empty spaces. They have a lot of freedom to move about. The molecules in a gas move faster than the molecules in a solid or a liquid. That is why a gas has no definite shape or volume.

## HEATING AND COOLING OF LIQUIDS

### What Happens When We Heat A Liquid?

When a liquid is heated, the molecules acquire energy and move faster. When it is heated continuously, the molecules move so fast that they are no longer

in contact with each other and thus, the liquid changes into gas. This process in which a liquid changes into gas is called evaporation.



### What Happens When We Cool A Liquid?

When a liquid is cooled, the molecules slow down and when the cooling is continued, the molecules come close together and rearrange themselves to become a solid. This process in which a liquid changes into a solid is called freezing.

#### PUT ON YOUR THINKING CAP

Ice cubes do not sink in water, why?

### HEATING AND COOLING OF SOLIDS

When solids are heated, the molecules start to vibrate faster. On further heating, it allows the particles to move around and gradually turn into a liquid. This process in which a solid changes into liquid is called melting. Not all substances undergo melting at normal conditions. Some solid substances may undergo certain changes on heating. For example, paper burns when it is heated. However, all solids expand on heating.

When the ball is heated, the molecules move further apart, causing the size of the ball to increase. This is called expansion.

When the ball is cooled, the movement of molecules slow down and they will come closer to each other. This is called contraction.

Do the following activity to show that matter expands on heating.

### Activity

Take an iron ball and an iron ring as shown in figure. The size of ball should be slightly more than the size of ring so that it cannot pass through the ring.

Heat the ring without the ball for a few minutes.

Now try to pass the ball from the ring. What do you notice?

**Observation:** The ball which was initially tight to pass through the ring now passes easily.

**Conclusion:** Matter expands on heating.



#### Knowledge ZONE

The lightness or heaviness of a substance for a given volume is called density. Which is mass per unit area?



#### Experiential Learning



Iron ball



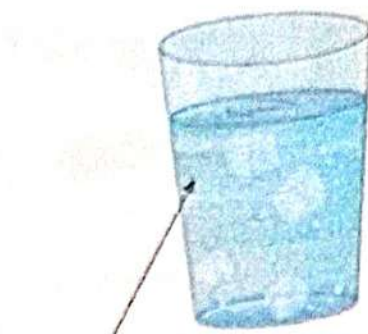
Iron ring



## HEATING AND COOLING OF GASES

When a gas is heated, the molecules move away very fast, thereby causing it to expand. When a gas is cooled for a long time, the molecules slow down and gradually turn into liquid. This process in which a gas changes into a liquid is called condensation.

The formation of water droplets on the outer surface of a cold glass is an example of condensation. When the water vapour present in the air comes in contact with the cold glass, the movement of molecules in water vapour slows down. Hence water vapour (gas) turns into water (liquid).



Water droplets condensing on the surface of the glass

## PHYSICAL AND CHEMICAL CHANGES

A change in which no new substance is formed and there is merely a change of state is called a **physical change**. Melting of ice, freezing of water and boiling of water are examples of physical changes.

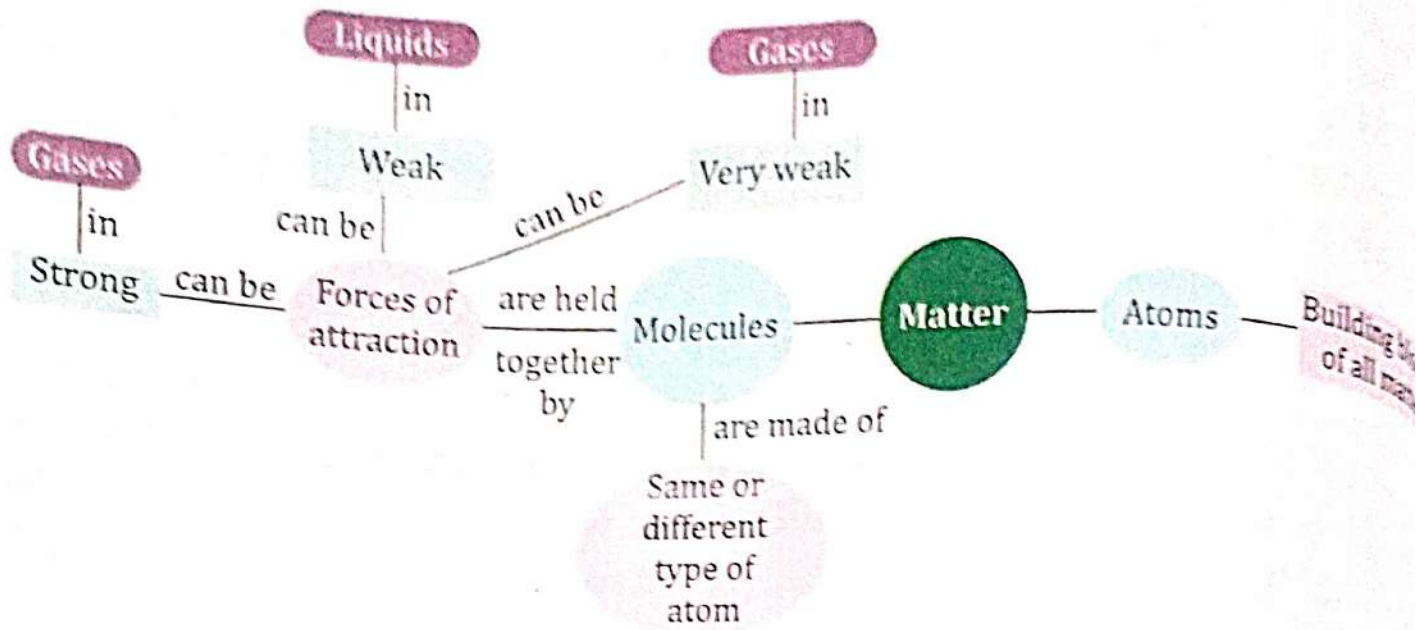
Physical changes are reversible. In other words, the original substance can be obtained after the change takes place. We can convert ice by freezing water. In a **chemical change**, heating or cooling result in a permanent change in the state of matter. A new substance is formed and we cannot get back the old substance. For example, when a piece of paper is burnt it changes into ashes. The molecular of paper are different from the molecules of ashes.

### QUICK TEST E:

Fill in the blanks with the correct words.

1. The three states of matter are ..... , ..... and .....
2. Two or more ..... combine to forms molecule.
3. Molecule is made up of same or ..... kinds of atoms.

# MIND MAP



## EXERCISES

### I. Objective Type Questions



#### A. Tick (✓) the correct option.

- Matter has mass and occupies :  
 (a) weight  (b) space  (c) energy
- Identify the state of matter which has a fixed shape :  
 (a) solid  (b) liquid  (c) gas
- When a solid is heated, it :  
 (a) expands  (b) contracts  (c) freezes
- Formation of mist is an example of :  
 (a) freezing  (b) evaporation  (c) condensation

#### B. Fill in the blanks with the correct words.

- All things whether living or non-living are made up of .....
- ..... are the building blocks of all matter.
- The space between two molecules is called .....
- This process in which a liquid changes into a solid is called .....
- ..... changes are reversible.

**C. State whether the following statements are True or False:**

1. Atoms are the building blocks of matter.
2. Molecules are made up of only same kind of atoms.
3. When heated, atoms move faster.
4. All substances undergo melting in normal conditions.
5. Solids expand on heating.


**D. Match the following.**

- |                 |                                  |
|-----------------|----------------------------------|
| 1. Solid        | (a) liquid to gas                |
| 2. Liquid       | (b) solid to liquid              |
| 3. Evaporation  | (c) gas to liquid                |
| 4. Condensation | (d) flows                        |
| 5. Melting      | (e) particles are tightly packed |

**II. Very Short Answer Type Questions ?**

**E. Define the following.**

1. Melting
2. Expansion
3. Contraction

**F. Write one word for the following.**

1. Any substance that has mass and occupies space
2. The process by which a gas changes into a liquid
3. The process by which a liquid changes to its solid form
4. The process by which a solid changes to a liquid

**III. Short Answer Type Questions ?**

**G. Answer the following questions briefly.**

1. Why is a molecule of oxygen written as  $O_2$ ?
2. What is the difference between melting and freezing?
3. What happens when a solid is heated?

**IV. Long Answer Type Questions ?**

**H. Answer the following questions in detail :**

1. What is the difference between an atom and a molecule?
2. Do solids expand on heating? Justify your statement with the help of an activity.
3. Explain what happens when :  
(a) a liquid is heated  
(b) a liquid is cooled

# Rocks and Minerals



## What We Have Learnt?

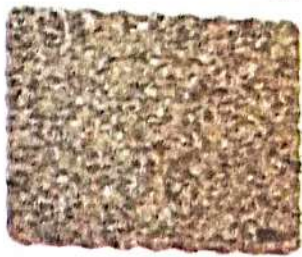
- ✦ Rocks
- ✦ Types of rocks
- ✦ Minerals

## What We Will Learn?

- ✦ Types of rocks
- ✦ Minerals
- ✦ Other materials extracted from rocks

## Get Set GO!

Read the clues and write the names of minerals below each picture.



.....  
1. It is used to make kitchen slab.



.....  
2. It is used to write on blackboards.



.....  
3. It is used in making jewellery.

Our earth is made of many types of rocks and minerals. Rock is a natural material on the earth's **crust**.

Rocks contain one or more minerals. Thus, they become different from each other in their origin, colour, texture and also in the types of metals they have.

## TYPES OF ROCKS

Rocks are divided into three groups depending on their formation.

- Igneous rocks
- Sedimentary rocks
- Metamorphic rocks

Let us know about them in detail.

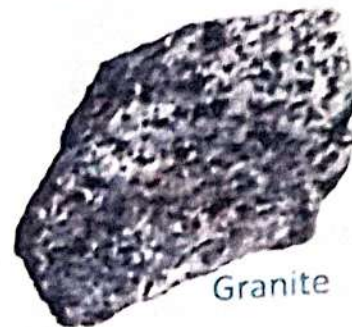
### Word Bank

**Crust** : The outer surface of the Earth on which we live

## Igneous Rocks

This is the oldest type of rock. Igneous rocks are formed by the cooling and hardening of hot liquid rock material, magma, which comes from deep inside the earth. Rocks are melted at a very high temperature inside the earth's crust. This forms magma. Magma reaches the surface of the earth and forms lava. It comes out from the earth through volcanic eruptions. This lava cools down to form igneous rocks. On quick cooling, it forms pumice, obsidian and basalt, but on slow cooling, it forms granite. Granite, basalt, pumice are the examples of igneous rocks.

**Granite** : It is the most common rock. It is very hard. It is used for constructing the floor of houses. It is also used for making statues and paving roads. It can be black, grey, white or pink in colour.



Granite



Basalt

**Basalt** : It forms when volcanic lava cools very fast and hardens quickly above the surface of the earth upon coming in contact with air. It is a dark, shiny and layered rock appearing like glass and having sharp edges. It is used for making tools.



### Knowledge ZONE

- All rocks sink in water except pumice, it floats.
- Basalt is used to test the purity of gold by goldsmiths.

**Pumice** : It is soft, spongy and a light weighted rock. It is formed when lava cools quickly. As the lava cools, the gases in the holes remain trapped inside. This makes it soft, spongy and light in weight. It is used to make stone utensils. Dentists use powdered pumice for polishing teeth. It is also used as a scrubber to remove rough skin from the body.



Pumice

## Sedimentary Rocks

Sedimentary rocks are formed from pebbles, sand, mud or clay that are deposited in oceans. These sediments are brought to the shore by flowing water or floating ice and are piled up in layers. The layers are cemented together by minerals. As more and more layers are formed on the top, lower layers get pushed together.

Following are the examples of sedimentary rocks :

**Sandstone** : It is formed when sand becomes cemented with some minerals. It is a soft rock. It can be yellow, brown, pink or red in colour. Famous Indian monuments are made of sandstone e.g. Red fort and the Qutub Minar.



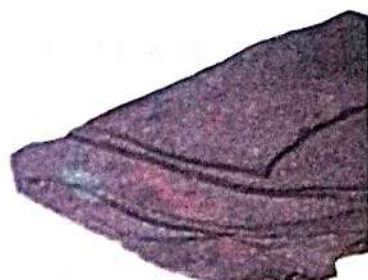
Sandstone



Limestone

**Limestone** : It is mainly made of minerals of calcium (calcium carbonate). Some of them are formed from sea shells, corals and bones of animals. It is used to make bricks and glass. It is also used to make quick lime, chalk and cement.

**Shale** : It is formed from clay and mud deposited in river beds. Shale is grey in colour. It is made of parallel layers which readily split into flat pieces. It is used to make tiles and bricks. It is also mixed with limestone to make cement.



Shale



Conglomerate

**Conglomerate** : A rock consisting of gravel, stones and pebbles solidifies to form an uneven rock is called conglomerate. It is hard and cemented with some minerals. It can be orange or grey in colour. It was once used as millstone for grinding corn.

## Metamorphic Rocks

Metamorphic means 'changed form'. These rocks are formed of igneous and sedimentary rocks. When these rocks undergo some changes due to heat or pressure of the earth, the mineral contents of these rocks are transferred. These changed rocks are known as metamorphic rocks. These are very hard and tough rocks.

Some metamorphic rocks are :

**Marble** : Marble is pure and hardened limestone. It is hard, smooth and crystalline. It is a precious building material which is generally white in colour. It is used for flooring and making statues. The Taj Mahal at Agra is made of white marble.



Marble

**Quartzite** : It is too hard to be used as a building stone. It was once sandstone. It is used in making statues. It is also used in watches.



Slate

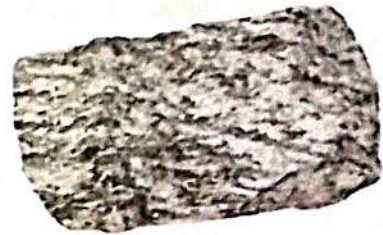
**Slate** : It is hardened shale. It is formed of smooth, black and hard stone in fine layers. It splits easily into thin layers. It is used to make

slates and blackboards.

**Gneiss** : It is a metamorphic rock of granite. It has light and dark bands like streaks. Polished gneiss can be used as tiles for flooring.



Quartzite



Gneiss

### QUICK TEST

Fill in the blanks with the correct words.

1. .... is a natural material on the earth's crust.
2. .... is the oldest type of rock.
3. Three kinds of igneous rocks are ....., ..... and .....

### FUN Activity

Have you ever seen stone used to make heel-scrubber or mortar-pestle. Find out, from which stones they are made of?



Curiosity



### MINERALS

Minerals are the underground natural resources. All rocks are made up of minerals. Metal bearing substances are known as minerals. Some minerals have more of the metallic deposits where the metals can be extracted profitably. Such minerals are known as ores. Hematite, bauxite, pyrite and calamine are mineral ores. We get iron, aluminium, copper and zinc, respectively from these ores.



Copper wires

Aluminium utensils

Gold jewellery

## OTHER MATERIALS EXTRACTED FROM ROCKS

### Coal

Coal is one of the most valuable minerals stored in the earth. It is a fossil fuel. It has been used as fuel for thousands of years.

Coal is used as cooking fuel. It is also used as a fuel in steam engines, factories and furnaces. It is used in power plants to produce electricity and in the extraction of metal. In India, coal mines are situated in Dhanbad, Raniganj, Neyveli, Singaneri and Suhagpur.

Coal is found in four types — peat, lignite, bituminous and anthracite.

### Petroleum

It is a mineral oil found in rocks. It is also a fossil fuel like coal. It is formed from the dead animals of ancient land and sea creatures. Many fuels are extracted from petroleum like petrol, kerosene, fuel oil, diesel, etc. by the process called fractional distillation. Paraffin wax and asphalt are also extracted from petroleum. Petroleum is also known as liquid gold.



### Knowledge ZONE

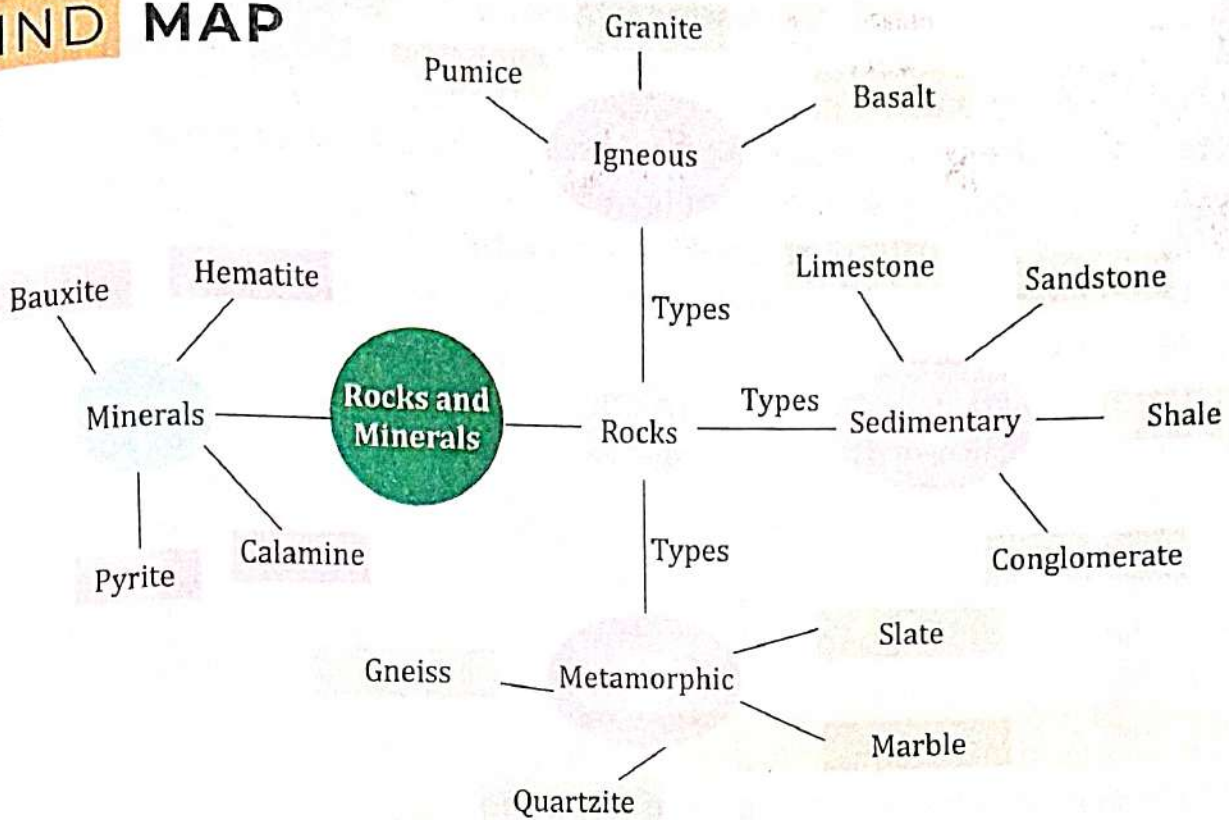
Fractional distillation is a separation technique that is used for liquids that dissolve in each other. Liquids that dissolve in each other are called miscible liquids.

### QUICK TEST

Fill in the blanks with the correct words.

- ..... are the underground natural resources.
- ..... is one of the most valuable minerals stored in the earth.
- ..... is a fossil fuel like coal.

# MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

- Which of the following is an igneous rock?  
 (a) Pumice  (b) Basalt  (c) Both (a) and (b)
- Which rock was used for grinding corn?  
 (a) Limestone  (b) Conglomerate  (c) Shale
- Which of the following is a metamorphic rock of granite?  
 (a) Gneiss  (b) Basalt  (c) Mica
- Which of the following rocks is used as scrubber?  
 (a) Granite  (b) Basalt  (c) Pumice

#### B. Fill in the blanks with the correct words.

- ..... is used for constructing the floor of houses.
- ..... is soft, spongy and a light weighted rock.

3. .... is mainly made of minerals of calcium.
4. .... is formed of smooth, black and hard stone in fine layers.
5. Petroleum is also known as .....

**C. State whether the following statements are True or False.**

1. Marble is an impure form of limestone.
2. Coal can be used to generate electricity.
3. Diesel is obtained from petroleum.
4. All minerals are ores.
5. Paraffin wax is obtained from coal.

**D. Match the following.**

- |              |                                     |
|--------------|-------------------------------------|
| 1. Shale     | (a) Taj Mahal                       |
| 2. Sandstone | (b) Molten rock inside Earth's core |
| 3. Marble    | (c) Light rock with holes           |
| 4. Magma     | (d) used in building Red Fort       |
| 5. Pumice    | (e) formed from clay and mud        |



**II. Very Short Answer Type Questions** ?

**E. Write two examples for each of the following.**

1. Igneous rocks ..... ..
2. Sedimentary rocks ..... ..
3. Metamorphic rocks ..... ..
4. Minerals ..... ..

**F. Write one word for the following.**

1. It is a dark, shiny and layered rock ..... ..
2. It is used to make tiles and bricks ..... ..
3. It is a shiny transparent material found in the layers ..... ..

**III. Short Answer Type Questions** ?

**G. Answer the following questions briefly.**

1. What are minerals? Give two examples.
2. What are metamorphic rocks?
3. What are ores? Give two examples.

**IV. Long Answer Type Questions** ?

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

1. How many kinds of rocks are there?
2. What are sedimentary rocks? Give two examples.

- Which rocks are formed by cooling of lava?
- Name and explain any two metamorphic rocks.

### CREATIVE CORNER

#### HOTS Question



#### Critical Thinking



Which type of rock do we use to make the floor of our houses?

#### Picture-based Activity



#### Curiosity

Name the rocks used to build the following monuments:



.....

.....

#### Project WORK



#### Observation

Have you ever seen any precious stone? Visit a jewellery shop with your mother. See the precious stones displayed there. Try to find out the names of the stones.

#### Think Smart



#### Creativity



We know that petrol and coal takes millions of years to form and they will not last forever. Therefore, we should try to conserve them so that they will remain for long period.

Make a banner for fuel conservation using the following points and put it up on your school board.

- Don't drive! Walk or use bicycle for short distances.
- Switch off the engine at traffic lights.
- Avoid applying brakes frequently. This consumes more fuel.
- Use public transport as much as possible.



# Light and Shadow



## What We Have Learnt?

- ✦ Light
- ✦ Shadow

## What We Will Learn?

- ✦ Transparent, translucent and opaque materials
- ✦ Shadows

## Get Set GO!

Objects which produce light are called luminous objects and those objects which do not produce light are called non-luminous objects.

Look at the picture given alongside and name three luminous and three non-luminous objects.

Luminous objects	Non-luminous of objects
------------------	----------------------------

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



We can divide all objects into two groups luminous and non-luminous. Luminous objects produce light. Bulb, candle and torch are examples of luminous objects.

Non-luminous objects are made from different materials. They can be classified on the basis of the amount of light they allow to pass through them.

## TRANSPARENT, TRANSLUCENT AND OPAQUE MATERIALS

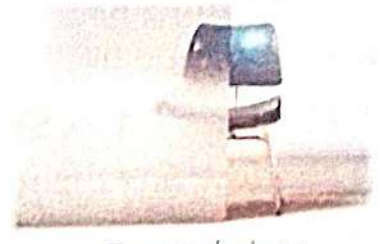
Materials that allow all the light to pass through them are called transparent materials. For example : clear glass, clear water and clear plastic sheet.

Materials that allow light to pass through them partially are called translucent materials. For example : butter paper, frosted glass and coloured glass.

Materials that completely block light are called opaque materials. For example : wood, bag and books.



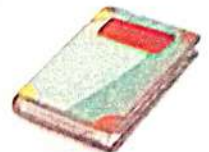
Clear water



Frosted glass



Bag



Book



### Knowledge ZONE

Mirror is not a transparent object because we cannot see objects on the other side, we can only see our own image in the mirror.

## SHADOWS

We know that a shadow is formed when an object is placed in front of a source of light. Let us perform an activity to understand the formation of shadows by transparent, translucent and opaque objects.

### Activity

EL

Experiential Learning

**Aim:** Identify how transparent, translucent and opaque materials produce shadows.

**Materials required:** A translucent tracing sheet (A4 size), a transparent plastic sheet (A4 size), a cardboard sheet (A4 size), a screen and a torch.

#### Procedure

1. Take the plastic sheet, the tracing sheet, the cardboard sheet and the torch.
2. Hold the objects one by one in front of the screen and project the light from the torch onto each object from the opposite side. What do you observe?

#### Observation

1. You will see that the opaque cardboard sheet blocks the light completely and hence forms a clear and dark shadow on the screen.
2. The translucent tracing sheet partially blocks the light and thus forms a lighter shadow on the screen.
3. The transparent glass does not block the light from passing through it and hence does not form any shadow.

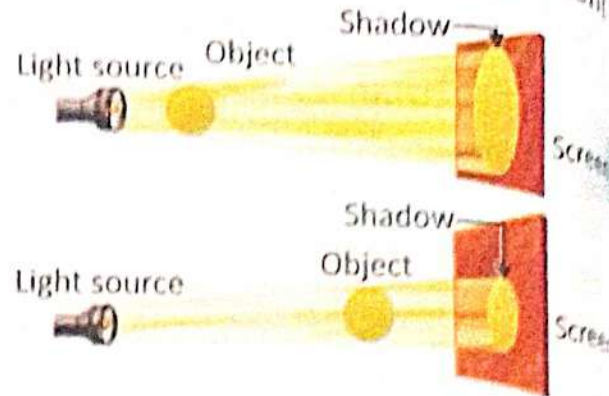
From the above activity, it is clear that opaque and translucent objects form shadows, whereas transparent objects do not form shadows.

Thus, a shadow is a dark region formed by a translucent or an opaque object. Three things are required for a shadow to form: a light source, a translucent or an opaque object and a screen.

### Features Of A Shadow

A shadow has the following features.

- The size of a shadow depends on the distance of the light source from the object, and also on the distance of the screen from the object.
- The colour of a shadow does not depend on the colour of the object. Shadows are always dark.
- A shadow is always formed on the opposite side of the light source.
- A shadow shows only the outline or shape of the object, and not any details.



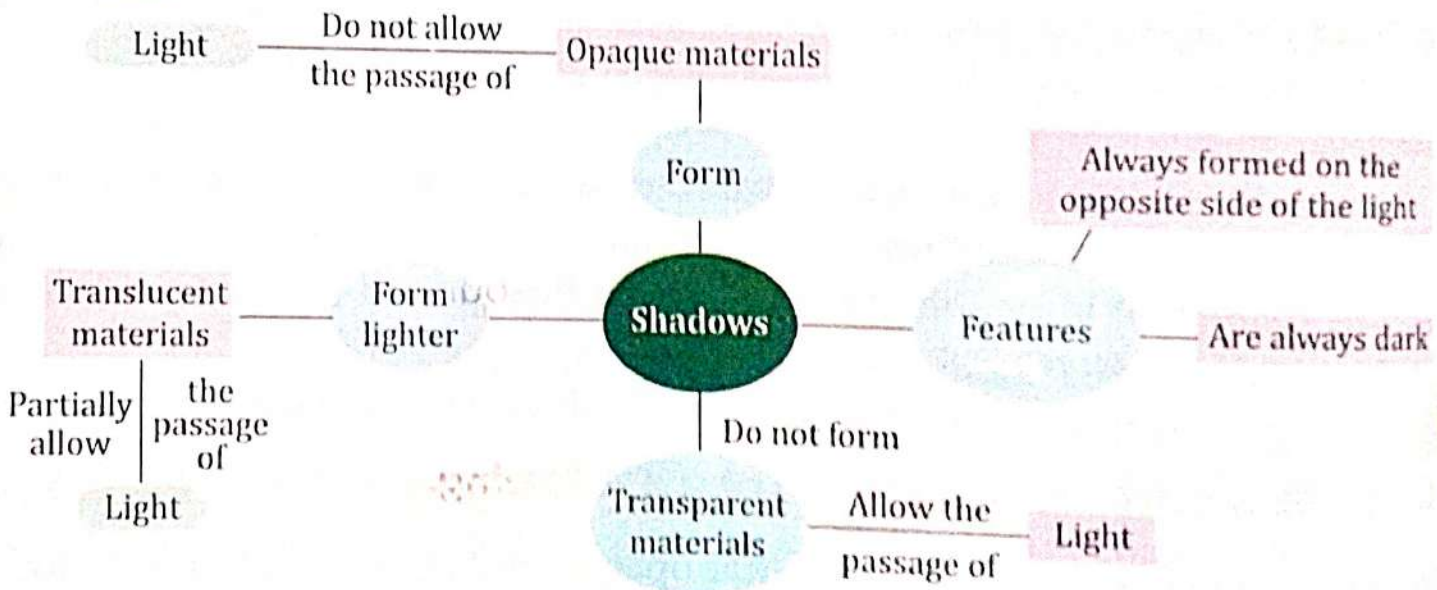
When the light source is close to the object, the shadow formed is bigger than the object. When the light source is away from the object, the shadow formed is smaller than the object.

### QUICK TEST

Fill in the blanks with the correct words.

1. Objects which produce light are called .....
2. Those objects which do not produce light are called .....

### MIND MAP





# EXERCISES

## I. Objective Type Questions



### A. Tick (✓) the correct option.

- Which of the following is a transparent object?  
(a) Clear glass  (b) Wood  (c) Butter paper
- Objects that give out light are called :  
(a) transparent  (b) opaque  (c) luminous
- Materials that do not allow light to pass through them are called :  
(a) transparent  (b) translucent  (c) opaque
- Identify the translucent object from the following :  
(a) frosted glass  (b) cardboard  (c) mirror
- Which of the following objects cannot form a shadow?  
(a) Pencil  (b) Clear glass  (c) Bag

### B. Fill in the blanks with the correct words.

- Materials that allow all the light to pass through them are called .....
- Materials that allow light to pass through them partially are called .....
- Materials that completely block light are called .....
- A ..... is always formed on the opposite side of the light source.

### C. State whether the following statements are True or False.

- Translucent materials allow light to pass through them completely.
- Only transparent materials can form shadows.
- The size of the shadow of an object is always the same.
- Shadows can be formed without a light source.
- Shadows are always dark.

## II. Very Short Answer Type Questions



### D. Write two examples for each of the following.

- Transparent materials .....  
.....
- Translucent materials .....  
.....

3. Opaque materials .....
4. Things required to form a shadow .....

### III. Short Answer Type Questions ?

**E. Answer the following questions briefly.**

1. What are luminous objects?
2. What are non-luminous objects?
3. Why do transparent materials not form shadows?

### IV. Long Answer Type Questions ?

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

1. What is the difference between transparent and translucent materials?
2. State two factors on which the size of a shadow depends.
3. Define transparent, translucent and opaque materials. Give two examples of each.
4. What is a shadow? What are the features of a shadow?

### CREATIVE CORNER

#### HOTS Question ?



#### Critical Thinking



Why do the length and position of shadow change during different times of the day? Give reasons for your answer.

#### Project WORK



#### Experiential Learning

Change a transparent object into translucent and opaque objects. Also, change an opaque object into a translucent object through an activity.

#### Think Smart



#### Creativity



You are given the task of setting up your study room. You need to shop for materials. Classify those materials as transparent, translucent and opaque. Justify their purpose and usage. You need to purchase two materials from each category.





# Force and Energy

### What We Have Learnt?

- ✦ Types of forces
- ✦ Work
- ✦ Simple machines
- ✦ Energy and its sources

### What We Will Learn?

- ✦ Effects of force
- ✦ Types of forces
- ✦ Work
- ✦ Energy and its forms

### Get Set GO!

Force and energy are terms we usually use in our daily lives. Let us do this short exercise. Look at the pictures given below and complete the sentences.



Rohit kicks the ball. Initially the ball goes up but comes down due to .....

(frictional/gravitational force)



The floodlight produce a lot of .....

(light/sound energy)



Deepak rolls a ball over a floor. It gradually slows down and finally stops due to .....

(Magnetic/frictional force)

Most of the actions that we perform in our daily lives involve pushing or pulling something. Such as, we push the paddles of our cycle to enjoy the ride. A horse pulls a cart to move it. We can say that a push or pull on an object is called force.



A boy pushing the paddles of a cycle

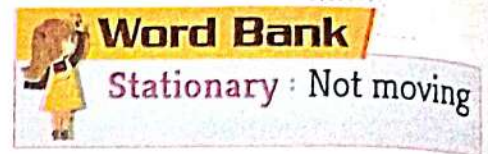


A horse pulling tonga

## EFFECTS OF FORCE

We cannot see a force, but we can see its effects! Let us examine the effects. Let us examine the effects that force can have on objects, that force can have on objects.

- It moves a **stationary** object.
- It stops a moving object.
- It makes a moving object move faster.
- It slows down a moving object.
- It changes the direction of a moving object.
- It changes the shape and size of an object.



Opening a door



Playing football



Pulling a suitcase

## TYPES OF FORCES

There are different types of forces:

### Magnetic Force

When we bring a magnet near an iron object, say iron nails, it attracts the iron nails towards itself. This is because of the fact that magnet has a force. It is called magnetic force.



Electrostatic force

### Electrostatic force

Electrostatic force is a result of slow moving electrical charges. For example, a comb when rubbed with the hair and brought near small pieces of papers, all the pieces are attracted towards it. This happens, because the charged comb induces an opposite charge in the paper pieces and they stuck to the comb.

## Gravitational Force

Everything that we throw up, comes down on the earth. It is because of the force exerted by the earth on the object. This force is called gravitational force. It is the pulling down force on the earth.



### Knowledge ZONE

We stand on the earth because of the gravitational force.

## Frictional Force

When we roll a ball on the ground, it stops after some time due to the force of friction. This force slows down a moving object. We are able to walk because of the frictional force. Vehicles are stopped due to the frictional force. Frictional force is also called force of resistance.

## Buoyant Force

If we push down a mug floating on water, we feel an upward thrust. This upthrust or push is called buoyant force.



### QUICK TEST:

Which force act in the following situations?

1. We rub our palms against each other for a long time.
2. A piece of iron is kept near a magnet.
3. You bring a charged comb near small pieces of paper.
4. You throw a ball high up in the air.

.....  
.....  
.....  
.....

## WORK

When you read a book, you are not doing any work. But when you pull a chair, it is said that work has been done. When we apply force to move any object, we do work. But, when you push an almirah and it does not move, no work is said to be done. So, a work is said to be done only when the applied force causes a change in the position of the object in the direction of the applied force.

## ENERGY AND ITS FORMS

Energy is the ability to do work. We require energy to perform many activities. Playing, running, reading etc., all need energy. Only a body which has energy in it can produce a force to carry out work.



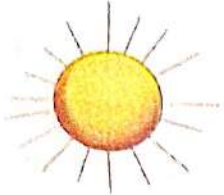
### Knowledge ZONE

A 100 watt bulb consumes only 1 unit of energy to give light for 10 hours.

Following are the different forms of energy :

### Heat Energy

Energy that we get from the sun is called heat energy. Sun is the main source of heat. This energy is also produced when fuels like wood, coal, etc. are burnt. When we cook food, we use heat energy.



### Light Energy

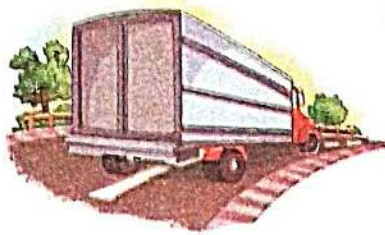
Energy that we get from light is called light energy. Bulb, candle, tube, etc. are sources of light energy. Sun is also a source of light energy.

### Electrical Energy

Energy that is obtained from electric current is called electrical energy. Television, washing machine and other electrical appliances run on electrical energy.



Electrical wires



### Kinetic Energy

The energy of an object due to its movement is called kinetic energy. A moving car, a moving truck, a moving toy, etc. have kinetic energy.



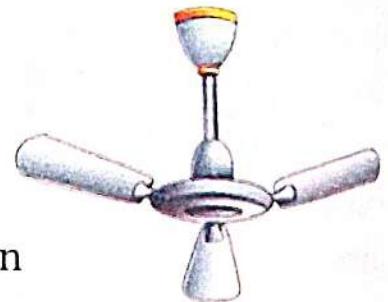
Potential energy

### Potential Energy

Potential energy is the energy which is stored in a body due to its position. Water in a tank has potential energy.

### PUT ON YOUR THINKING CAP

If a 100 watt bulb consumed 1 unit of energy to give light for 10 hours. How much units will consume a geyser of 2000 W in 10 hours?



Mechanical energy

### Mechanical Energy

Mechanical Energy is the energy that is possessed by an object due to its motion or due to its position.



Wind energy

### Wind Energy

Wind has the power to move things. This power is called wind energy. Wind energy is used in wind mills. Wind mills are used to generate power and electricity.

## Solar Energy

Energy of the sun is called solar energy. Solar energy is used to cook food in solar cookers, to heat water in solar heaters, etc. It is also used in solar calculators and solar watches.



Solar energy

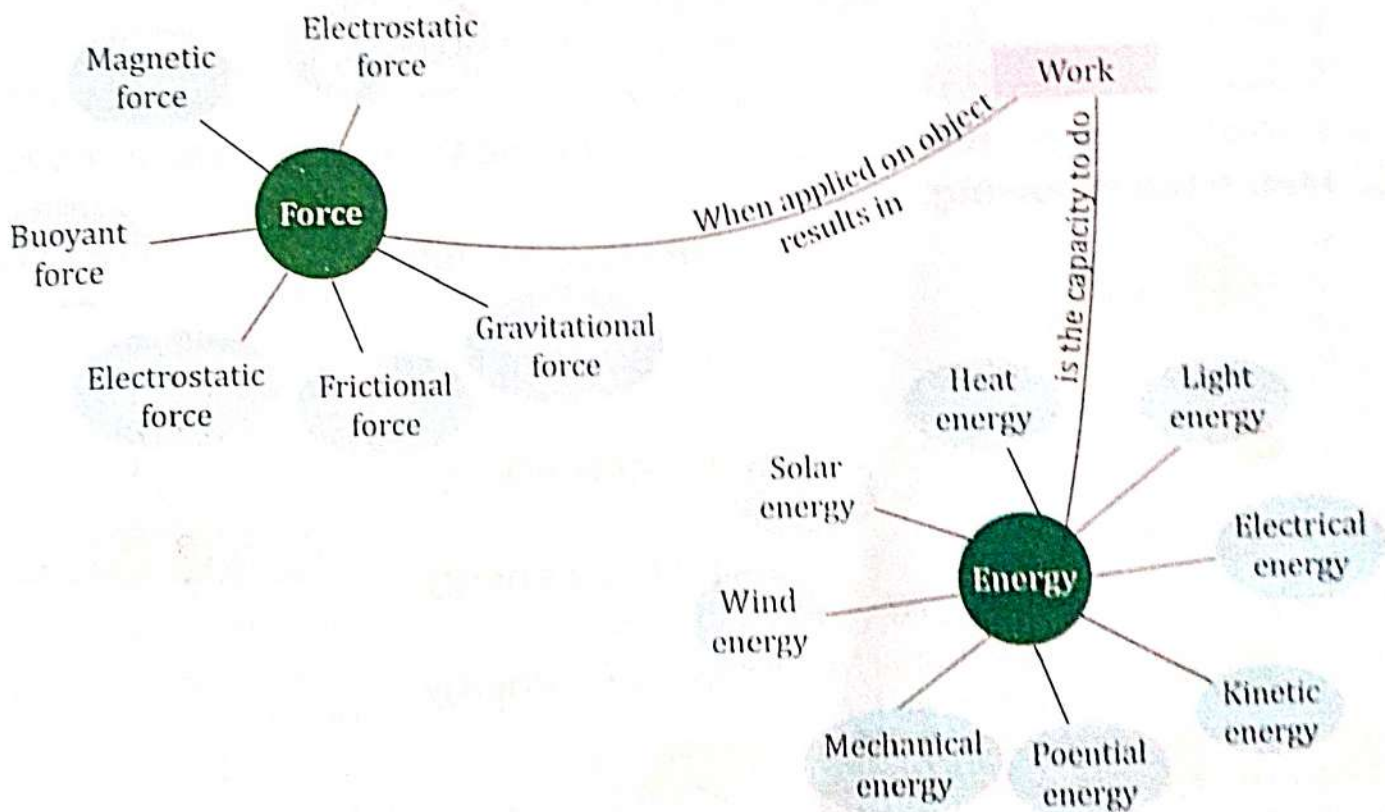
Energy is not produced. It just changes from one form to another. For example, coal contains chemical energy stored in it. When we burn it, we get heat and light energy. The heat is then converted into electrical energy and so on. Thus, energy just changes its forms.

### QUICK TEST

Fill in the blanks with the correct words.

1. We are able to walk because of the ..... force.
2. .... is also called the force of resistance.

## MIND MAP





# EXERCISES

## I. Objective Type Questions ?






### A. Tick (✓) the correct option.

- Fuels on burning produce ..... energy.  
(a) mechanical  (b) light  (c) solar
- ..... is the pulling down force on the earth.  
(a) Fractional force  (b) Gravitational force   
(c) Magnetic force
- Where from do we get heat energy?  
(a) Sun  (b) Water  (c) Rain
- Due to ..... force, a mug floats on water.  
(a) elastic  (b) frictional  (c) buoyant

### B. Fill in the blanks with the correct words.

- Push or pull is called .....
- Force can ..... down a moving object.
- ..... is the ability to do work.
- Work is done when ..... is applied to an object and it moves.

### C. Match the following.

-  (a) Magnetic force
-  (b) Buoyant force
-  (c) Solar energy
-  (d) Light energy
-  (e) Wind energy

## II. Very Short Answer Type Questions ?

### D. Write one word for the following.

- When we push, pull or lift anything, we apply .....

2. Energy that we get from the sun
3. Energy that we get from light
4. It shows the combination on both mechanical and potential energy

.....  
 .....  
 .....

### III. Short Answer Type Questions ?

**E. Answer the following questions briefly.**

1. What is force?
2. Explain any four types of forces.
3. What is work?

### IV. Long Answer Type Questions ?

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

1. How is work said to be done? Explain with examples.
2. What is meant by buoyant force?
3. Differentiate between light energy and heat energy.

### CREATIVE CORNER

#### HOTS Question ?

21<sup>st</sup> CS Critical Thinking

You are walking in a garden with your grandfather. Two children are playing on a see-saw. Your grandfather asked you if one child gets up all of a sudden, then what would happen and why?

#### Project WORK

21<sup>st</sup> CS Creativity

Mention in your scrapbook all that you do in a day. Also mention which kind of force you apply to do each activity.

#### Think Smart

HD Curiosity

A 100 watt bulb consumes only 1 unit of energy to give light for 10 hours. Try to find out how much energy is consumed in your house every month. Take help from the monthly electricity bill.

It will help you in knowing whether your family is saving energy or not?



# Measurement



### What We Have Learnt?

- ✦ Measurement of length, weight, volume, temperature and time

### What We Will Learn?

- ✦ History of measurement
- ✦ Measurement of length, capacity, mass, time and temperature

### Get Set GO!

We need to measure many things in our daily life such as length of clothes, weight of vegetables, time and temperature. Look at the pictures given below and complete the sentences.



1. The tailor is measuring the ..... of the man's shoulder. (weight/length)



2. The fruitseller ..... the fruits. (weighing/carrying)



3. The milkman is measuring the ..... of milk. (height/quantity)



4. The doctor is measuring the ..... of the patient. (height/temperature)

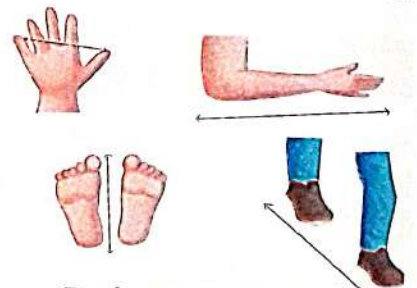
Measurement is defined as the act to measuring the size or quantity of something.

Have you ever wondered how things were measured in the earlier days when there were no measuring devices? What do you think were the methods used by them? Let us look back into the past.

### HISTORY OF MEASUREMENT

In the earlier days, people used to depend on their body parts and other natural objects for measuring length, mass, capacity, time and temperature. These are different quantities of measurement.

Some of the body parts that have been used to measure length or distance are handspan, cubit, foot and thumb.



Body parts used for measurement in earlier days

However, the length of the various body parts differ from person to person. Therefore, people realized the need to have fixed quantities to measure things. A fixed standard used for measurement is called a unit. Now let us learn about some units of measurement.

## MEASUREMENT OF LENGTH

The shopkeeper measures the cloth with a long steel rod. It is a measuring rod that measures length in metres. The standard unit of measurement of length is metre (m). Smaller lengths, like the length of your notebook, are measured in millimetre (mm) and centimetre (cm). Larger lengths, like the distance between two cities, are measured in kilometre (km).

The relationship between different length-measuring units is:

$$10 \text{ millimetres} = 1 \text{ centimetre}$$

$$100 \text{ centimetres} = 1 \text{ metre}$$

$$1000 \text{ metres} = 1 \text{ kilometre}$$

The common devices used to measure small lengths are a measuring tape and a ruler.



A ruler is used to measure small lengths.

## MEASUREMENT OF CAPACITY

The amount of liquid a container can hold is called the capacity of that container. The units for measuring capacity are litre (l), millilitre (ml) for smaller capacities and kilolitre (kl) for larger capacities. For example, a milkman gives milk in litres. At the hospital, a nurse takes blood with a syringe in millilitres.

The relationship between different units of measurement of capacity is:

$$1000 \text{ millilitres} = 1 \text{ litre}$$

$$1000 \text{ litres} = 1 \text{ kilolitre}$$

Devices like beakers and measuring cylinders are used to measure capacity.



A beaker is used to measure the quantity of a liquid.

## FUN Activity

Take 2 containers of 1 litre each. Pour 1 bag of 1 litre milk in each.

Now, you have to pour  $\frac{1}{2}$  litre of milk in *gajar halwa*. How will you measure it?



Problem Solving

## MEASUREMENT OF MASS

Mass tells us how heavy or light an object is. A beam balance is an instrument used to measure mass. The standard unit used to measure mass is kilogram (kg). Milligram and gram are used to measure smaller mass like that of a big bag of potatoes or the mass of a person.

The relationship between different units of measurement of mass is :

$$1000 \text{ milligrams} = 1 \text{ gram}$$

$$1000 \text{ grams} = 1 \text{ kilogram}$$



A beam balance

## MEASUREMENT OF TIME

The period between two events is called time. A day is divided into 24 equal durations and each duration is called an hour (h). Smaller durations are measured in minutes (min) and seconds (s) and larger durations are measured in weeks, months and years. The standard unit of measurement of time is second.

The relationship between different units of measurement of time is:

$$60 \text{ seconds} = 1 \text{ minute}$$

$$60 \text{ minutes} = 1 \text{ hour}$$

The commonly used devices to measure time are watches, wall clocks and stop watches.



A wall clock

## MEASUREMENT OF TEMPERATURE

Temperature is the measure of how hot or cold an object is.

Temperature is commonly represented using the units degree Celsius ( $^{\circ}\text{C}$ ) and degree Fahrenheit ( $^{\circ}\text{F}$ ). The standard unit of measurement of temperature is kelvin (K).

The relationship between different units of measurement of temperature is.

$$^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$$

$$^{\circ}\text{F} = (^{\circ}\text{C} \times 9/5) + 32$$

The commonly used device for measuring temperature is called a thermometer.



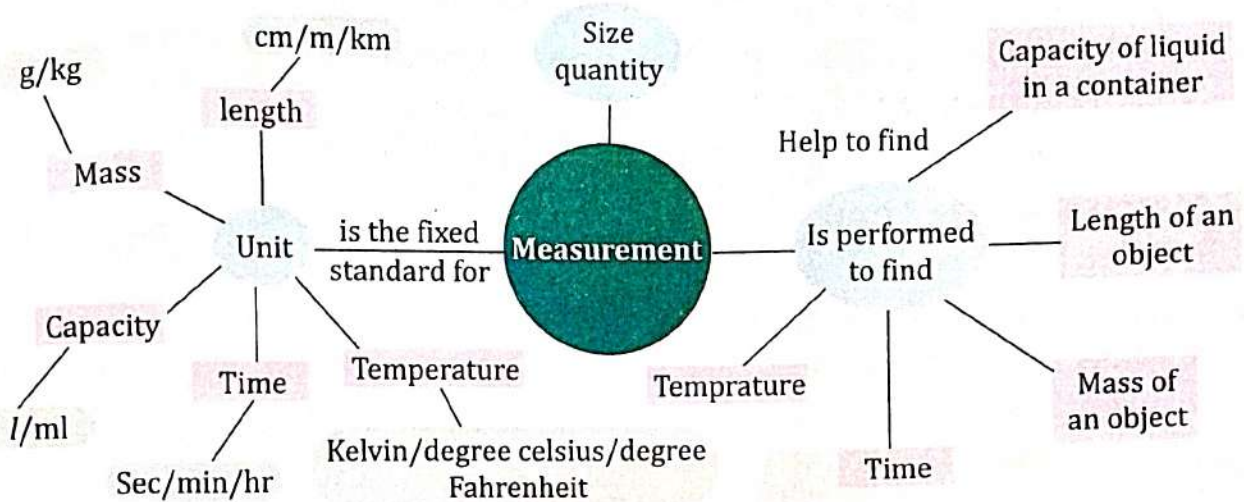
A Clinical Thermometer

## QUICK TEST

Fill in the blanks with the correct words.

1. A milkman gives milk in .....
2. The commonly used device for measuring mass is a .....
3. The period between two events is called .....

## MIND MAP



## EXERCISES

### I. Objective Type Questions

#### A. Tick (✓) the correct option.

1. Which among the following is the biggest unit of length?  
 (a) Metre  (b) Millimetre  (c) Kilometre
2. Which among the following is the smallest unit of time?  
 (a) Second  (b) Hour  (c) Minute
3. Identify the unit of length which is not related to a human body part:  
 (a) cubit  (b) centimetre  (c) foot
4. How many millilitres make one litre?  
 (a) 1000  (b) 100  (c) 10

**B. Fill in the blanks with the correct words.**

1. 1 kilometre is equal to ..... metres.
2. 1 hour is equal to ..... minutes.
3. .... is defined as the act to measuring the size or quantity of something.
4. The amount of matter present in a body or an object is called its .....

**C. State whether the following statement are True or False.**

1. Litre is a unit of mass.
2. One centimetre is longer than one kilometre.
3. Clinical thermometers are used by doctors.
4. A day is divided into 24 equal durations.


**D. Match the following.**

- |             |               |
|-------------|---------------|
| 1. Length   | (a) Kilogram  |
| 2. Capacity | (b) Minute    |
| 3. Mass     | (c) Litre     |
| 4. Time     | (d) Kilometer |

**II. Very Short Answer Type Questions** ?

**E. Write the name for the following :**

1. The standard unit for the measurement of capacity .....
2. The standard unit for the measurement of length .....
3. The standard unit for the measurement of time .....
4. The standard unit for the measurement of mass .....

**III. Short Answer Type Questions** ?

**F. Answer the following questions briefly.**

1. What is measurement?
2. Name the devices used to measure small length.
3. What is capacity?
4. Define time and time period.

**IV. Long Answer Type Questions** ?

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

1. Name three body parts used in earlier days for measuring length. What is the drawback of using these body parts for measuring length?

2. What are the five different quantities of measurement? Also mention their standard units and measuring devices.
3. Define temperature. Name the various units used to measure temperature. Also mention two devices used for measuring temperature.
4. What is the relationship between degree Celsius and degree Fahrenheit.

### CREATIVE CORNER

#### HOTS Question



Critical Thinking



Normal school timing is approximately 7 hours a day. Express it in terms of minutes. Remember 1 hour is equal to 60 minutes.

#### Project WORK



Experiential Learning

Measure the length of the teacher's table in your classroom using your handspan and then using a scale. Record your readings in the table given below.

Quantity Measured	Measurement using handspan	Measurement using scale
Length of teacher's table		

Compare your readings with that of your friend's hand span and find out in which of the cases you got a uniform reading of measurement.

#### Think Smart



Health and Well Being



Rohan has high fever and his mother wanted to check his body temperature before taking him to a hospital. She quickly pulls out a laboratory thermometer from his father's cupboard and tries to measure his temperature. Even after multiple attempts, she was not able to get the correct temperature. Why was Rohan's mother unable to measure his body temperature correctly?



# QuickTEST

Based on Chapters 11 to 14



[Note : All questions are compulsory.]

## A. Tick (✓) the correct option.

- Formation of mist is an example of:  
(a) freezing  (b) evaporation  (c) condensation
- Objects that give out light are called:  
(a) transparent  (b) opaque  (c) luminous
- From where do we get heat energy?  
(a) Sun  (b) Water  (c) Rain

## B. Fill in the blanks with the correct words.

- Molecule is made up of same or ..... kinds of atoms.
- ..... is mainly made of minerals of calcium.
- Simple machines use ..... force.

## C. State whether the following statements are True or false.

- All substances undergo melting in normal conditions.
- Diesel is obtained from petroleum.
- Shadows are always dark.
- Litre is a unit of mass.

## D. Answer the following questions briefly.

- The process by which a gas changes into a liquid. ....
- Energy that we get from light. ....
- It is used to make tiles and bricks. ....

## E. Answer the following questions briefly.

- What are ores? Give two examples.
- What are luminous objects?
- Explain any four types of forces.

## F. Answer the following questions in detail.

- What is the relationship between degree Celsius and degree Fahrenheit?
- What is a shadow? What are the characteristics of a shadow?

**A. Tick (✓) the correct option.**

1. Which of the following is an aquatic animal?  
 (a) Fish  (b) Camel  (c) Locust
2. This is the largest part of the brain.  
 (a) Spinal cord  (b) Cerebellum  (c) Cerebrum
3. The process of removing impurities from water by using filter paper is called:  
 (a) distillation  (b) filtration  (c) boiling
4. The major element in the inner core of the earth is:  
 (a) iron  (b) nickel  (c) both (a) and (b)

**B. Fill in the blanks with the correct words.**

1. .... give us a lot of energy to work and play.
2. A crack or break in bone is called .....
3. Reproduction in plants by seeds is called .....
4. Muscles are made up of .....

**C. State whether the following statements are True or False.**

1. Germs in the water are useful.
2. A fire can cause hazardous destruction.
3. Rat is a rodent.
4. The spinal cord is protected by the rib cage.

**D. Write two examples for each of the following :**

1. Seeds dispersed by water ..... ..
2. Animals with scales ..... ..
3. Gases present in the air ..... ..
4. Food rich in Vitamin A ..... ..

**E. Answer the following questions briefly.**

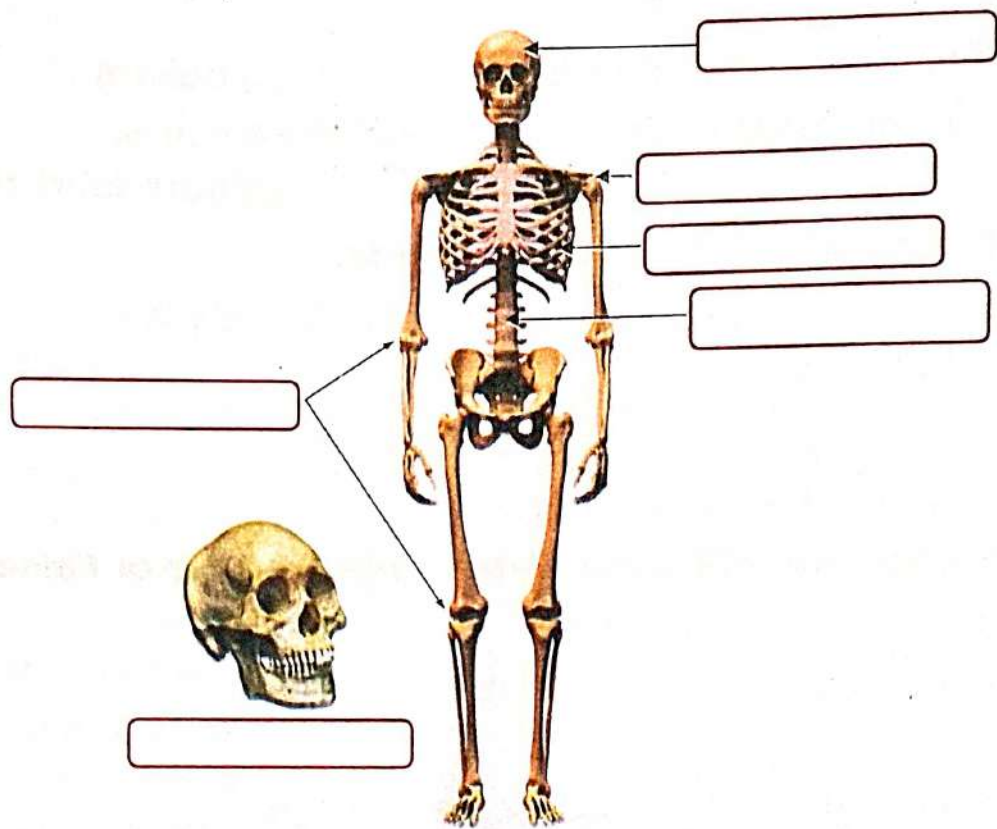
1. What is reflex action?
2. what is a sprain? What first aid should be given for a sprain?

3. What is function of a seed coat?
4. What do you understand by communicable diseases?

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

1. List any three important functions of the skeletal system.
2. Explain the structure of the Earth.
3. Describe the different ways by which soluble impurities can be removed from water.
4. Differentiate between the herbivore, carnivore and omnivore animals.

**G. Label the different parts of the skeletal correctly.**



**A. Tick (✓) the correct option.**

1. Which is the common problem among children during summer?  
(a) Sprain  (b) Wound  (c) Nose bleeding
2. Which of these causes land pollution?  
(a) Loud speakers  (b) polythene bags   
(c) Smoke
3. Identify the state of matter which has a fixed shape:  
(a) Solid  (b) Liquid  (c) Gas
4. Which among the following is the biggest unit of length?  
(a) Metre  (b) Millimetre  (c) Kilometre

**B. Fill in the blanks with the correct words.**

1. Global warming is caused due to increase in .....
2. .... changes are reversible.
3. Material that allow light to pass through them completely are called .....
4. Work is done when ..... is applied to an object and it moves.

**C. State whether the following statements are True or False.**

1. Naphthalene balls are also poisonous.
2. Marble is an impure form of limestone.
3. Sewage contains germs cause cholera, diarrhoea, etc.
4. Effect of earthquake is felt more at the epicentre:

**D. Match the following.**

- |                    |                                  |
|--------------------|----------------------------------|
| 1. Water pollution | (a) Underwater earthquake        |
| 2. Pumice          | (b) Hard, smooth and crystalline |
| 3. Marble          | (c) Sewage                       |
| 4. Tsunami         | (d) Light rock with holes        |

**E. Answer the following questions briefly.**

1. What is blubber? What is the function of it?
2. What are non-luminous objects?
3. What is soil erosion?
4. Why is a molecule of oxygen written as  $O_2$ ?

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

1. Differentiate between light energy and heat energy.
2. Which rocks are formed by cooling of lava?
3. How would you help if a person gets a deep cut?
4. When do floods occur? What are the after-effects of flood?

**G. Identify the following pictures and write their names.**



1. .... 2. .... 3. .... 4. ....

o Tick (✓) the correct option.

1. What will come next in the given series?

KM 5, LK 8, MI 11, NG 14, ?

- (a) PE/15  (b) OD/17  (c) OE/15  (d) OE/17

2. Select the odd one out.

- (a) 

S	2
---	---

 (b) 

A	V
---	---

 (c) 

N	H
---	---

 (d) 

Q	♂
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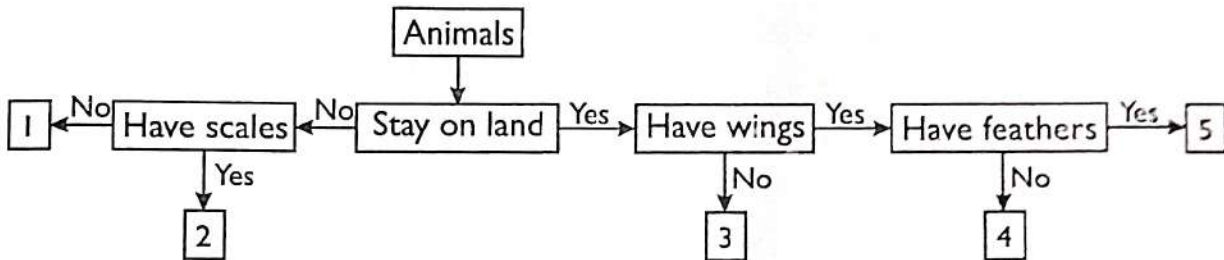
3. Which of the following Venn diagrams best represents the relationship amongst, "Doctors, Teachers and Parents"?

- (a)   (b)   (c)   (d) 

4. Anamika drives 30 km towards South. Then she turns right and drives 60 km. She again turns right and drives 30 km. Finally she drives 10 km after turning to the left. How far is she now from her starting point?

- (a) 20 km  (b) 70 km  (c) 50 km  (d) 60 km

5. Study the given flowchart carefully.



Identify the animals which can be placed at 1, 2, 3, 4 and 5.

1.                      2.                      3.                      4.                      5.

- |               |            |          |          |          |                          |
|---------------|------------|----------|----------|----------|--------------------------|
| (a) Dolphin   | Snake      | Giraffe  | Sparrow  | Mosquito | <input type="checkbox"/> |
| (b) Sea horse | Dolphin    | Lion     | Parrot   | Silkworm | <input type="checkbox"/> |
| (c) Tortoise  | Jelly fish | Frog     | Crow     | Owl      | <input type="checkbox"/> |
| (d) Whale     | Goldfish   | Elephant | Mosquito | Sparrow  | <input type="checkbox"/> |

6. What type of joint is shown in the given figure?

- (a) Hinge joint
- (b) Ball and socket joint
- (c) Pivot joint
- (d) Gliding joint



7. Kishan and his two friends Hari and Mohan are trying to get a good harvest. Which among the three would get a best harvest?

1. Kishan loosened the soil, added manure, and sowed the seeds. He sprayed pesticides to protect the crops.
2. Hari ploughed his fields, added manure, and sowed the seeds. He sprayed pesticides too.
3. Mohan sowed seeds, added water and sprayed pesticides whenever needed.

- (a) Kishan
- (b) Mohan
- (c) Hari
- (d) None of these

8. Fish live longer in an aquarium with water plants in it, than in one without them. Why?

- (a) Because plants release carbon dioxide.
- (b) Because plants release oxygen.
- (c) Because plants prepare food.
- (d) Because plants provide more water.

9. Plants growing in deserts, as shown in the figure have spines instead of leaves. Then, how do these plants make food in the absence of leaves?

- (a) Spines themselves make food.
- (b) Roots make food.
- (c) Green, fleshy stem makes food.
- (d) Flowers make food.



10. Saurabh is looking very weak and pale. He also gets tired easily. What do you think his diet is deficient in?

- (a) Iodine
- (b) Iron
- (c) Vitamin A
- (d) Vitamin C