# Science

4

## What does "Progressive Science" series consist of?

**Each lesson is supported by :**

- Beautiful illustrations
- Learning objectives
- Fact to know
- Let's Recall
- Word power
- Train your Brain
- Cross Curriculum Connect
- Exercises with Revision and Model tasks
- Activity time
- HOTS
- Project time

**Tasks for RTP and MTP include :**

- Answer the questions in short
- Fill in the blanks
- Answer the questions
- True/False
- Multiple choice questions
- Answer in one word
- Match the columns

Published by :

# Preface

The "**Science**" series, which is intended for students in grades 1 through 8, is precisely developed in accordance with the requirements and recommendations set forth in the Most Recent National Curriculum Framework appropriate for CBSE and other state board schools.

Children are inherently curious, and they begin to engage in scientific inquiry at an early age. The series emphasises learning with understanding by keeping this in mind.

A fascinating voyage into cause and effect, as well as the inspiration for all life and the universe we inhabit, is offered by science. It is a topic that has a predetermined impact on our line. Therefore, it is crucial to instil a scientific mindset in kids as early as feasible.

The book includes Model Test Paper and Revision Test Paper in accordance with the new plan.

Important details regarding the series:

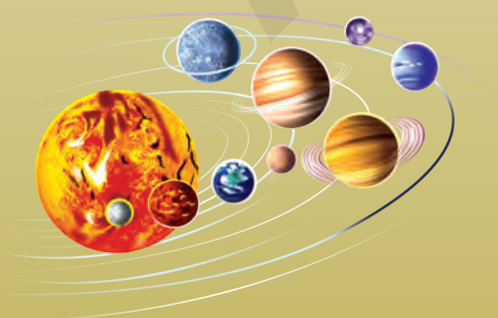
- Learning objectives : which provides quick points about what students going to learn in the chapter.
- Fact to know : which provides interesting facts to extend learning beyond the curriculum.
- Let Recall : which is provided to summarise the key lessons learned.
- Word Power : In this section, difficult words' definitions are provided.
- Train your Brain : This part aims to help pupils improve their critical and creative thinking abilities.
- Cross Curricular Connect : To assess and evaluate the students on a regular basis throughout each chapter in the form of MCQs, one-word questions, columns to match, activity time, and project time in accordance with CBSE rules on the CCE pattern.
- Revision Test Paper : To test and evaluate the students on a regular basis in each chapter using MCQs, one-word questions, column-matching activities, and project time in accordance with CBSE standards on the CCE pattern.

Model evaluations gauge the depth of a student's learning. It is presented in the form of questions and answers and fill-in-the-blanks in each chapter. High order thinking skills (HOTS): Difficult opportunities provided to enhance analytical abilities.

To Offer Continuous and Comprehensive Evaluation of Knowledge, Understanding, and Application of Concepts Learned.

A lot of work has gone into making the series successful. We appreciate any advice you may have to make the series better.

- High order thinking Skills (HOTS) : Difficult opportunities are provided to enhance analytical abilities.



**– Publishers**

# Contents

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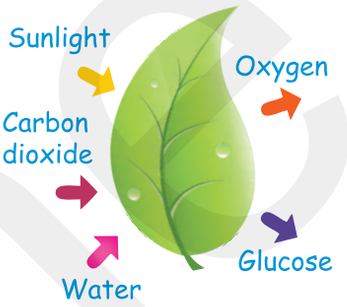
# Food Making in Plants

## Learning Objectives

1. The structure of a leaf
2. Food preparation by the leaf
3. The use of food by plants
4. Relationship between plants and animals
5. Features of some unusual plants

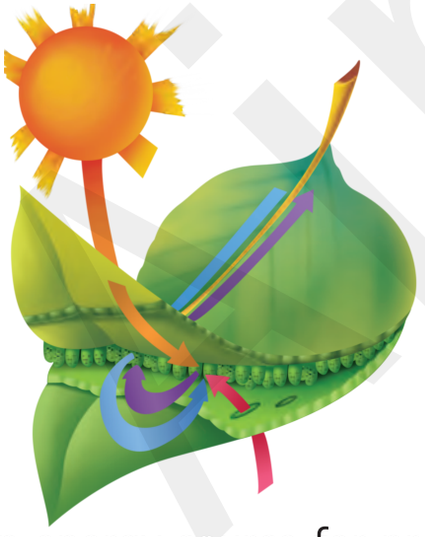
## Let Me Answer

- How do plants make food?
- Where do plants store their food?




## 'FOOD MAKING' : REQUIREMENTS

- Sunlight (Sun)
- Respiration (Stomata)
- Water (Soil)
- Minerals (Soil)
- Carbon-dioxide (Atmosphere)

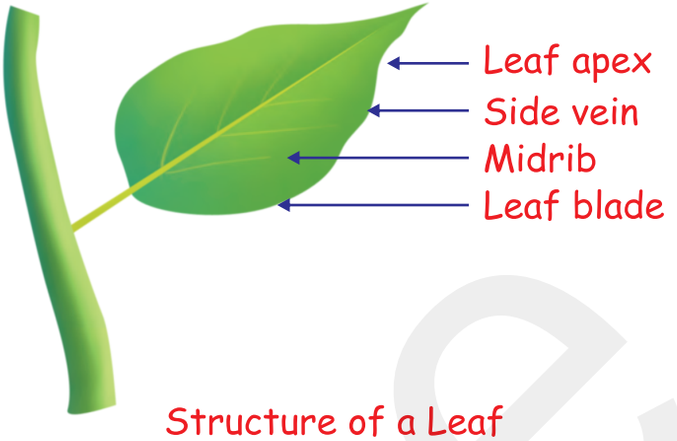


The life on the earth depends upon the presence of plants. We need plants for food and oxygen. The food we consume, the juices we drink, even the clothes we wearing – all come from plants. Trees provide us wood for fuel, furniture and tools. Plants range from very small green planktons in the sea to huge coniferous trees, so tall that you cannot see their tops. But what they all have in common is their capability of capturing and using sunlight as an energy source for producing their own food. This process is known as photosynthesis. It provides life and growth to plants.

# LEAF

## Structure of a leaf

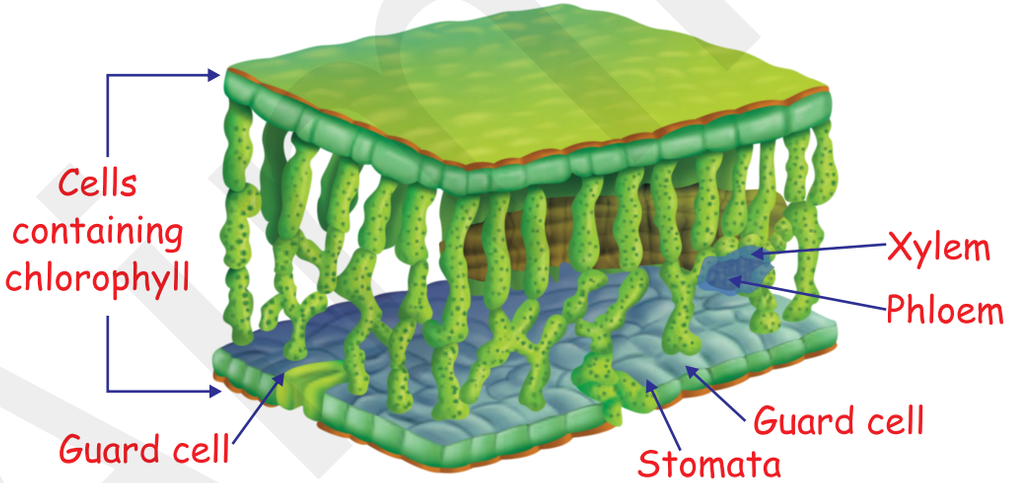
Take the leaf of a plant. The part which is flat and green is called leaf blade. The tip of the leaf is called leaf apex. A mid vein or midrib is seen running through the middle of the leaf. There are a number of side veins emerging from the midrib. The midrib and side veins have small tubes inside them. These tubes are of two types :



Structure of a Leaf

- The tubes that carry water from the roots to the leaves.
- The tubes that help carry the food made in the leaves to all the other parts of the plant.

The inside of a leaf shows many layers of cells. You can see these layers by viewing a section of a leaf under a microscope. These cells contain chlorophyll, which is a green pigment. Chlorophyll makes the leaves look green. The lowest layer of cells has many minute openings, called stomata. The stomata are guarded by the guard cells. They help in the exchange of gases and water vapours between the leaf and the surrounding air.

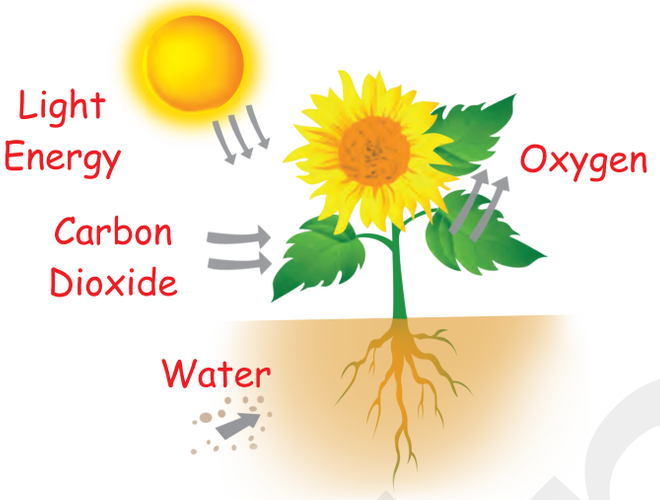


A section of leaf as seen under a microscope

## How do leaves prepare food for a plant ?

For making its food, a plant gets water from the soil and absorbs carbon dioxide from the air. It takes the energy needed to produce food from the sun. Water and carbon dioxide are changed into food or sugar with the help of chlorophyll in the presence of sunlight.

The process by which plants prepare their food from water and carbon dioxide in the presence of sunlight is called photosynthesis. (photo means light and synthesis means putting together)




Leaves prepare food

## How do plants use the food made by them?

Plants use the food made by them for various purposes, such as :

- their growth,
- building new cells and
- repairing worn out cells.

Extra food is stored in various plants parts, like the leaves, stems and roots. This stored food is called the starch.

Plants and animals are interdependent on each other

## Relationship between plants and animals

Plants and animals live together in a relationship where one depends upon the other.

Animals get their food from plants. Do you know that the oxygen that animals breathe in, also comes from plants. Oxygen is released by the plants during the process of photosynthesis. We human beings also depend on plants for our food. Animals breathe out carbon dioxide. This carbon dioxide is used by the plants to make their food. This is why, we need to take good care of plants and we should not cut down plants and trees.

## Features of some unusual plants

Plants like mushrooms, moulds and fungi are non-green plants. They do not possess chlorophyll. So, they are unable to prepare their own food. They get their food from the decaying matter.

Mushrooms

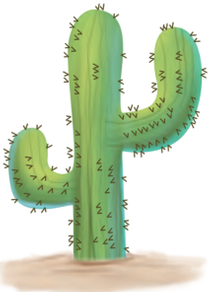
Some plants like croton has colourful leaves (mostly red). These plants do have green colour but that is hidden by the other colour. So, these plants are able to prepare their own food in the presence of sunlight.

Croton Plant

Plants like dodder (amarbel), cannot make their own food. They depend on other green plants. They use the food prepared by other green plants.

Dodder Plant

In plants like cactus, leaves are reduced into spiny thorns. So, the process of photosynthesis and storage of food takes place in stems only. Cactus is generally found in the desert area, where very less amount of water is found. Cactus uses the food stored in fleshy stems for its growth and survival in the absence of water.



Cactus

## Facts to know

- Starch is the stored form of sugar.
- Vanamahotsava programme helps to promote the planting of trees.
- 5 june is the World Environment Day, celebrated throughout the world by planting more and more plants.

## LET'S RECALL

1. Plants and animals depend on each other.
2. Green plants make their own food by a process called photosynthesis.
3. Water, carbon dioxide, sunlight and chlorophyll are necessary for the process of photosynthesis.
4. A kind of sugar called glucose is made during photosynthesis.
5. Stomata help in the exchange of carbon dioxide and oxygen. They also give out water vapours.
6. Veins help to distribute water and food within the leaf.
7. Plants use the food which they make for many purposes.
8. There are some unusual plants such as mushroom and cactus.

## Word Power

| | |
|---|---|
| chlorophyll | : a green pigment present in leaves |
| heterotroph | : an organism that obtains its food from other organisms |
| leaf blade | : flat part of the leaf |
| main vein | : double pipe line of cells that runs in the centre of the leaf |
| photosynthesis | : the process of making food in plants |
| side vein | : parallel veins attached to main vein |
| stalk | : attached part of the stem |
| starch | : food stored in plants |
| stomata | : small openings present on the lower surface of a leaf |

# Train Your Brain

## Cross Curriculum Connect

**1. Answer the following questions in short.**

a. Where do plants store their extra food ? ..... .

b. Through which process do plants make their food. ..... .

c. Name one unusual plant. ..... .

**2. Answer the following questions.**

a. What is photosythesis ? Draw its picture.

b. Name the materials used by a leaf to make food ?

c. How is food used by plants ?

d. How do the following plants get their food ?

(i) mushrooms

(ii) dodder

(iii) cactus

e. Define the following.

(i) Leaf blade

(ii) Chlorophyll

(iii) Leaf apex

(iv) Stomata

f. Give the functions of the following.

(i) Midrib (ii) Roots

(iii) Stomata (iv) Chlorophyll

## 3. Tick (✓) the right and cross (×) the wrong statements.

a. Plants produce their own food in their roots. ☐

b. Photo means 'light'. ☐

c. Non-green leaves cannot prepare their own food. ☐

d. Oxygen is given out during photosynthesis. ☐

## 4. Multiple Choice Questions (MCQs)

### Tick (✓) the correct option.

a. Leaves release ..... into atmosphere during photosynthesis.

(i) carbon dioxide ☐ (ii) oxygen ☐

(iii) hydrogen ☐ (iv) water ☐

b. The tiny pores on the surface of a leaf are known as ..... .

(i) pistil ☐ (ii) chlorophyll ☐

(iii) stomata ☐ (iv) stamen ☐

c. The green colour of leaves is due to pigment called ..... .

(i) stamen ☐ (ii) chlorophyll ☐

(iii) pistil ☐ (iv) stomata ☐

## 5. Give one word for each one of the following.

a. Extra food stored in plants .....

b. The green and flat part of a leaf .....

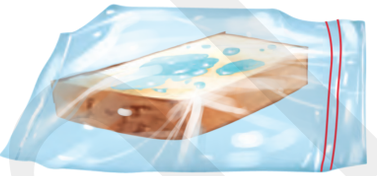
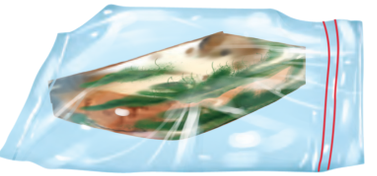
c. The sugar made in the leaf .....

**HOTS**

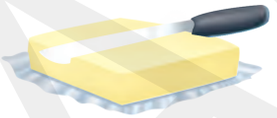
1. A plant kept in dark turns pale. Why ?
2. Do you know about a kitchen garden ? What kind of vegetables are grown in a kitchen garden ?

## project Time

1. Collect pictures of various parts of plant that you eat. Paste on the chart paper under different headings.
2. Test the presence of fungus.
   - Take a slice of bread.
   - Sprinkle drops of water on it.
   - Put it in a plastic bag and close its mouth.
   - Keep it in a dark and warm place for 4 to 5 days.
   - You will notice the growth of grey and hairy substance on it.
   - This is fungus (non-green plant) that grows indise the bag when it gets water, warmth and darkness.

3. Add a drop of iodine solution to each one of the following to check the presence of starch.


Butter


Cooked rice


Chapatis


Bread

2

# Reproduction in Animals

**Learning Objectives**

1. Need of reproduction among animals
2. Ways of reproduction
3. Parental care
4. Life cycle of frog

**Let Me Answer**

- What are three adaptations of plants?
- What is the main function of reproduction?

**REPRODUCTION IN ANIMALS**

- By lying eggs
- By giving birth

## INTRODUCTION

On this earth, every creature or living being has to live for a very short time. For survival on the earth, the each living being has to leave behind one of its own kind otherwise the kind of race would die out. The process by which the living beings produce young ones of their own kind is known as reproduction.

## REPRODUCTION IN ANIMALS

Puppy with its parent dog

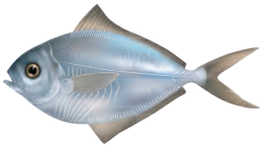
Have you seen a kitten or a puppy following its parents ? Have you seen cute little chicks following the mother hen ?

Animals are able to produce more of their own kind by a process known as reproduction. Reproduction is important for life to be continued on the Earth.

## Animals reproduce in two ways.

- Some animals give birth to the young ones.
- While some others lay eggs from which the young ones hatch out.

Frog



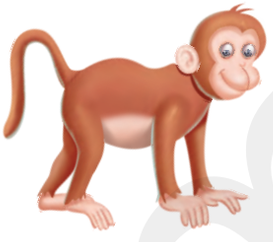
Fish

Pigeon

Horse

Butterfly

Goat



Monkey

Snake

Look at the animals in the above picture. Encircle the animals with blue colour that lay eggs and encircle the ones with green colour that give birth to their young ones.

### Animals that give birth to their young ones

There are animals which do not lay eggs.

They give birth to their young ones.

Animals that give birth to their young ones and produce milk to feed them are called mammals.

These animals are the most highly developed among all animals. Their body is covered with hair.

These animals carry the young ones within their bodies till they are fully developed to be born.

Mammals take good care of their young ones. They feed them, clean them and keep them safe until they have learn to look after themselves.

Tigers, elephants, horses, dogs and cats are mammals.

The bat is the only mammal that can fly. It also gives birth to young ones. It does not make a nest and lives in old buildings or caves. The mother bat feeds and takes care of the baby bats.

### Animals that lay eggs

Some animals that lay eggs are fishes, insects and birds. The young ones that hatch from these eggs resemble their parent animals. Some animal may look very different at birth, but as they grow, they gradually start resemble their parents.

A woman bathing her baby

A bitch feeding its puppies

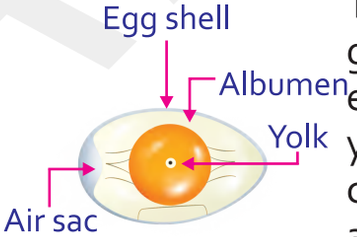
A bat feeding its young one

A mare feeding its colt

## Birds

Birds build nests only when they want to lay eggs. A nest keeps the eggs and the baby birds safe.

A bird in the nest




Structure of a bird's egg

A bird's egg has a hard, outer shell to protect the chick growing inside. The mother keeps the egg warm by sitting on it. This is called incubation. The embryo or the growing chick lies in the yellow part of the egg called yolk. The embryo feeds on the yolk as it grows. The watery white part is called albumen. It protects the embryo. The air sac contains air which the developing chick breathes in while it is inside the egg.

## Fishes

Fishes lay eggs in water. The mass of eggs produced is called spawn. Fish eggs do not have shells. They are covered with a kind of jellds that protects them from water. Out of thousand of eggs, only few hundred develop into young fishes. Bigger fish eat up many eggs and the young fishes. Only a few of them grow to become adult fishes.

A fish laying eggs

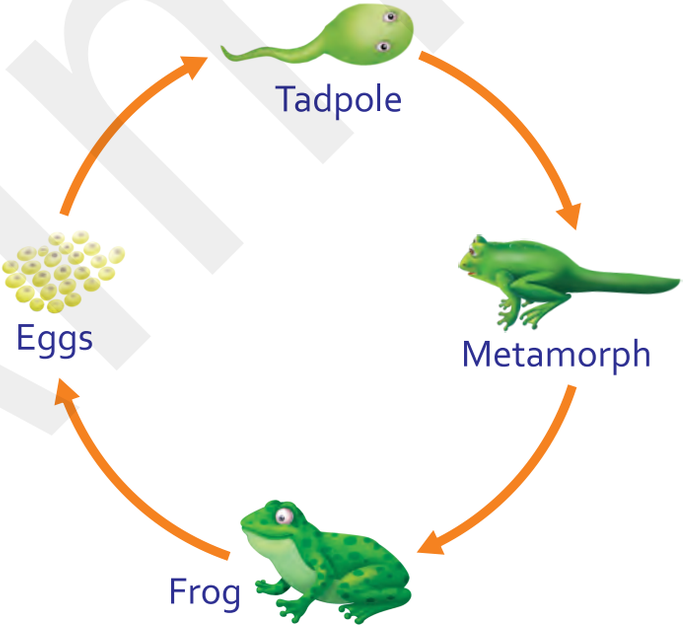
## Reptiles

Reptiles like snakes, crocodiles, lizards and turtles lay eggs on the ground. Their eggs are protected by shells which are like thick leather. As a result, these eggs do not break when laid on the ground. The eggs are warmed by the heat of the sun. Most reptiles do not care for their eggs or babies. Many eggs and young ones are eaten up by other animals.

Baby snake coming out of egg

## Frogs

Frogs also lay eggs. They lay eggs in water in safe places. Their eggs are covered with jelly. The life cycle of a frog has four stages. The eggs hatch into tadpoles. Tadpoles look like little fishes. After a few days, they start growing legs. A tadpole grows into a young frog which looks more like its parent. The adult frog does not have a tail. It lives on land and reproduces in water.




Life-cycle of a frog

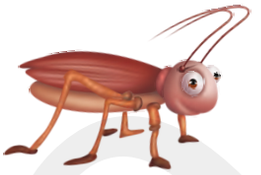
## Insects

All insects develop from eggs. Some insects like grasshoppers and cockroaches pass through three stages in their life cycle. Other insects like houseflies and butterflies pass through four stages in their life cycle.

Housefly

Butterfly

Grasshopper



Cockroach

### Facts to know

- A frog can live on land but its babies cannot.
- The smallest living mammal is a shrew with a body about 2 inches long.

### LET'S RECALL

1. All animals produce young ones of their own kind.
2. Some animals give birth to young ones and others lay eggs.
3. Life cycle of animals that lay eggs have different stages.
4. Some animals take care of their young ones while others do not.
5. Animals need care and protection.

### Word Power

| | |
|---|---|
| embryo | : a young organism in the first stage of development |
| hatching | : to lay eggs and keep them warm |
| maggot | : the larva of a housely |
| metamorphosis | : the rapid transformation from larva to adult form |
| nymph | : when an insect comes out from an egg |
| tadpole | : larva of a frog |

# Train Your Brain

## Cross Curriculum Connect

**1. Answer the following questions in short.**

a. What is albumen?

b. What is incubation?

c. What do you mean by 'yolk'?

**2. Fill in the blanks.**

molting  embryo  maggot  caterpillar  tadpoles

a. An egg contains a tiny growing baby is called ..... .

b. The larva of a butterfly is called ..... .

c. The larva of a housefly is called ..... .

d. The young one of a frog is called ..... .

e. The process of shedding of old skin and growing a new one by a nymph, is called ..... .

**3. Answer the following questions.**

a. What do you understand by 'reproduction'?

b. Why do animals reproduce?

c. What are the different ways by which animals reproduce?

d. Describe the structure of an egg with the help of a diagram.

e. Describe the life cycle of a butterfly.

f. How do mammals take care of their young ones?

## Formative Assessment

**4. Tick (✓) the right and cross (×) the wrong statements.**

a. Reproduction is the process through which new living beings resembling the parents, are produced.

b. Animals lay eggs.

c. Birds give birth to young ones.

d. Animals need care and protection.

e. Animals do not save themselves from danger.

## 5. Multiple choice questions

a. Which statement is wrong about mammals?

(i) Animals give birth to their young ones.

(ii) Animals produce milk to feed their young ones.

(iii) Animals lay eggs and do not give milk.

b. Which statement is wrong about birds?

(i) Birds build nests.

(ii) Birds lay eggs and hatch them.

(iii) Birds give birth to young ones.

c. Which statement is not correct ?

(i) The larva of a butterfly is called the caterpillar.

(ii) The larva feeds on leaves.

(iii) The larva does not become a worm.

## 6. Give one word for each one of the following.

a. How many stages are there in the life cycle of a cockroach ?

b. Write the name of the young one of an insect that resembles the parent-nymph.

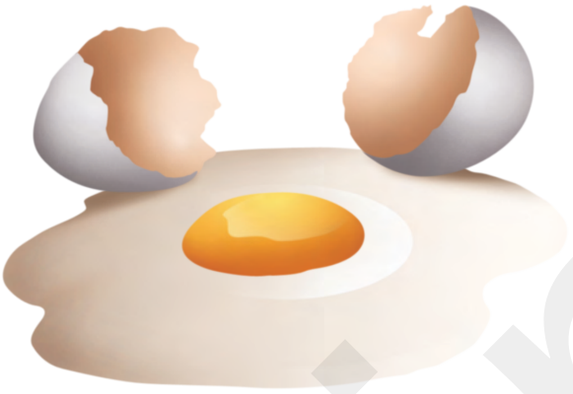
c. What are those animals called that give birth to their young ones and nourish them with their milk ?

## 7. Match the columns.

| | Column A | | Column B |
|---|---|---|---|
| a. | Nymph | (i) | albumen |
| b. | Eggs | (ii) | grasshopper |
| c. | Pupa | (iii) | first stage |
| d. | Larva | (iv) | third stage |

## Activity Time

Take an egg and a bowl. With the help of a knife or the handle of a spoon, gently crack the egg shell. Pour the contents carefully into the bowl. You will be able to see the yolk and albumen. Now try to know which is yolk and which is albumen.

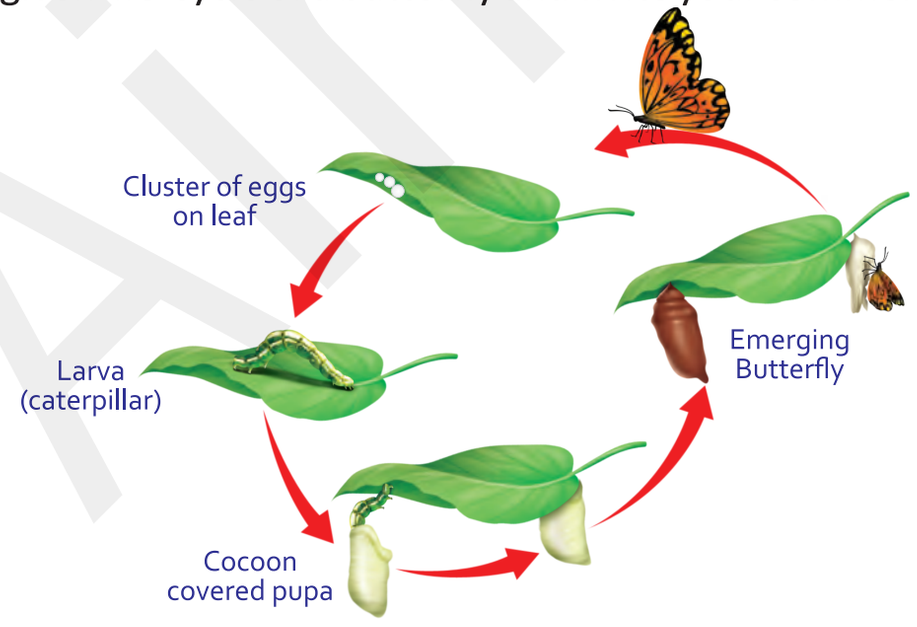


## HOTS

1. Why do you think, cute little chicks follow their mother hen?
2. Most of the reptiles do not care for their eggs or babies. Why?

## project Time

Study the given life-cycle of a butterfly and write your comments.



3

# Adaptation of Animals

**Learning Objectives**

1. Terrestrial or land animals
2. Aquatic animals
3. Animals that live both on land and in water
4. Aerial animals
5. Arboreal animals
6. Adaptations for survival

**Let Me Answer**

- Adaptation is something that helps animals find food, water, mates, and shelter. Which animal finds food easily in their environment?

## ADAPTATIONS IN VARIOUS ANIMALS

- **Land animals**
  - Distinct features
  - Hibernate
- **Aquatic animals**
  - Webbed feet
  - Fins
  - Gills
- **Amphibians**
  - Get food in water
  - Lay eggs on land
- **Aerial animals**
  - boat shaped body
  - Hollow bones
  - Migrate
- **Arboreal animals**
  - Live on tree
  - Strong claws
  - Camouflaging

## ADAPTATION OF ANIMALS

As different kind of plants grow in different environment, so do animals. Human beings also adapt to the environment they live in or get used to living in that environment. This process of living in a particular environment in order to get the demands of food, living places and protection is called adaptation.

An animal should be able to protect itself and find food in order to live in its environment. When an animal is able to do so successfully, we say it has adapted to its environment.

All animals are adapted to live in a certain place. Adapted means to fit into its habitat, where its needs are met. The place where an animal lives is called its habitat. A habitat can be on land, in water, in air or on trees. All animals can be classified on the basis of their habitat.

## Terrestrial or land animals

Animals that live on land are called terrestrial animals. These animals have certain distinct features such as legs or limbs to move, lungs to breathe, hairy or thick skin to bear heat and cold, well developed nervous system and sense organs.

Terrestrial animals can be categorized into Polar animals, Desert animals, Grassland animals and Forest animals.

### 1. Polar animals

The north and south poles of the earth are very cold regions. These places are known as polar areas.

Snow and ice cover the polar areas most of the year. Animals living in these places look different in each season.

Polar animals grow heavy fur in winters. They shed much of their fur in summers.

These animals have also heavy fat deposits under their skin which protect them from cold climate.

Polar bear, musk ox, seal, walrus and penguin are adapted to live in these areas.

Polar Bear

Seal

Penguin

## 2. Desert animals

Desert areas receive scanty rainfall.

These areas are hot and dry.

Animals living in deserts are adapted to survive with little water.

They get water from their food. Animals like camel drink a lot of water at a time.

They can live without food and water for many days.

Desert animals are mostly small in size.

Animals, like camel, has padded feet to move swiftly on hot sand. They have humps on their back which store fat. Fat gives them energy when they do not get food or water for many days.

## 3. Grassland animals

Grassland habitats are the plain areas where plenty of grass grows.

Most of the animals found in these lands depend on grass or other grass-eating animals.

Giraffe, zebra, sheep, horse, kangaroo, rhinoceros etc. are some animals that are adapted to live in grassland habitat.

## 4. Forest animals

Some forests have all the four seasons while some get heavy rainfall throughout the year.

Different type of animals live in forests.

Forest animals are adapted with the change of season. For most of the year, they get enough food to survive.

In winters or extreme summers, they do not get enough supply of food and water.



Some of them may shift to other forests while some undergo a winter sleep.

Animals living in rain forests, are adapted to move through the trees and plants of the forest. Monkey have long tail and arms. Tree frogs have feet like suction cups which help them to move on wet plants.

## Aquatic animals

Aquatic habitat is any place filled with water in which plants or animals live. It can be in fresh water or in salty seawater.

Aquatic animals have certain distinct features which help them to live in water, like :

1. Most of the aquatic animals have gills to breathe. A few may have lungs.
2. They have fins and tails which help them in swimming with water currents.
3. They have slender-shaped bodies which help them to live under deep water.
4. Some water birds have webbed feet or paddle-like flippers as in turtles.



Whale, shark, water-snake, snail, octopus, starfish etc. all are aquatic animals Blue whale is the largest water animal.

## Amphibians

Amphibians are those that live partly in water and partly on land. They get their food in water and come on land to lay eggs.

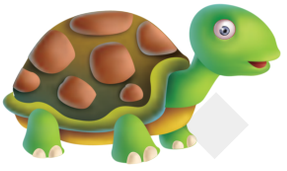
These animals have distinct features which suit both land and water.

They have limbs to move and swim.

They have gills and lungs to respire in water and on the land respectively. They have moist skin to breathe in water.

Amphibians are generally cold-blooded animals. They cannot bear extreme cold weather. So, they undergo a sleeping period in winters, called hibernation.

Frog



Tortoise

Crocodile

Frog, toad, tortoise, crocodile, alligator, salamander etc. live both on land and in water.

## Aerial animals

Aerial animals are those that spend most of their time in air.

Such animals have hollow bones and wings to fly. They have boat-shaped bodies which help them in flying.

They spend most of the time in air in search of food.

Some of the birds fly long distances. Some birds come to the land or trees only to lay their eggs. Some birds migrate from one place to another with the change in weather. These birds are known as migratory birds.

What do you think is an ostrich and an emu—a terrestrial or an aerial animal ?

Bat

Eagle

Ostrich

## Arboreal animals

Animals that spend most of their time on trees are called arboreal animals.
Perching birds, monkey, ape, koala and squirrel are arboreal animals.
Perching birds have different types of claws to hold the branches of trees.
Monkeys have long arms and tail for climbing and hanging on trees.

# ADAPTION FOR SURVIVAL

Anything that helps an animal to live in its environment is called adaptation. Adaptation includes body coverings and other special parts. Body covering helps in protecting body organs. Some body parts are used for getting food and protection. Skin, scales, feathers, fur, feet, wings etc. are adapted for the specific environment.

Grasshopper

Garden lizard

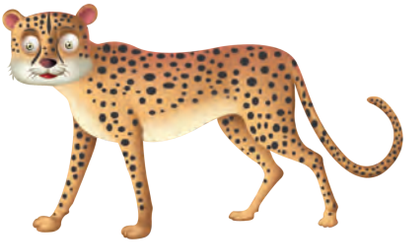
Snake

Some animals like grasshopper, garden lizard, snake etc. develop special adaptations called camouflage. Camouflage helps the animals to hide from its predators and prey. These animals change their skin colour to blend with their surroundings.

Some animals like leopard, tiger, zebra, giraffe, snake etc. have spots and stripes on their body which help them to merge with their surroundings. This protects them from their predators and preys.

Tiger

Snake



Leopard

Some animals have protective resemblance. These animals look almost identical to their surroundings. For example : a walking stick looks like a twig on trees or shrubs. When it is resting, it has the same colour, shape and position as a twig.

Some animals move fast enough to escape from their enemies. Examples : deer, ostrich, emu, snake etc. run very fast.

Walking stick

Ostrich

Deer

Emu

Animals like crabs, tortoise and snails have shells, porcupines have spines to protect themselves from their enemies. The wood louse or bill bug has the ability to roll itself so tightly to take the shape of a ball.

Some poisonous animals like snake, lizard, scorpion etc. have poisonous venom to kill their enemies.

Snail

Scorpion

Lizard

Snake

## Facts to know

- This is a mind-boggling fact – for each of the 600 million people there is about 200 million insects!
- The world has approximately one billion cattle of which about 200 million live in India.

## LET'S RECALL

1. Animals can adapt themselves to their habitat, to the food they eat and for their safety.
2. Animals can be grouped as terrestrial, aquatic, amphibian, arboreal and aerial according to their habitat.
3. Animals also migrate or hibernate to survive in cold weather condition.
4. Animals can survive in different conditions by adapting themselves to camouflage.


migrate : to change one's place for some reasons
nervous system : brain and all nerves in the body
scant : a very small quantity
sense organ : a specialized organ which functions as a receptor


### Cross Curriculum Connect

**1. Answer the following questions in short.**

a. Name two arboreal animals.
b. How do frogs breathe?
c. Name three polar animals.
d. What is winter sleep.

**2. Fill in the blanks.**

gills;lungs  water;land  sleep  shells  fat;fur

a. Animals of polar regions protect themselves from cold climate through ..... and ..... deposition.
b. Aquatic animals have ..... and ..... .

c. Amphibians are ..... and ..... animals.

d. In hibernation, animals ..... for a season.

e. Snails have ..... to protect themselves.

## 3. Answer the following questions.

a. Why is adaptation necessary?

b. What is a habitat? Name some habitats of different animals.

c. How do animals protect themselves?

d. Why do amphibians and reptiles hibernate?

e. How is frog adapted to live both on land and in water?

f. How do camel's adaptations help its survival in desert?

## Formative Assessment

## 4. Tick (✓) the right and cross (×) the wrong statements.

a. The place where animal lives, is its adaptation. ☐

b. Terrestrial animals have limbs to move. ☐

c. The fat deposition under the skin protects animals from cold climate. ☐

d. Camel stores water in its hump. ☐

e. Blue whale is the largest land mammal. ☐

f. All aquatic animals breathe through gills only. ☐

## 5. Multiple choice questions

a. Which animals can live without food and water for many days?

(i) Camel ☐ (ii) Cow ☐

(iii) Dog ☐ (iv) Lion ☐

b. Which is the largest aquatic animal ?

(i) Fish ☐ (ii) Frog ☐

(iii) Blue whale ☐ (iv) Dolphin ☐

c. What is wrong about terrestrial animal ?

(i) They live on land. ☐ (ii) They have legs and lungs. ☐

(iii) They live in water. ☐ (iv) They fly in air. ☐

## 6. Give one word for each one of the following.

a. This animal eats nuts ..... .

b. This long-legged animal have fast lungs ..... .

c. Those animals have suction caps ..... .

d. This animal will salve in desert without taking food and water.....

## 7. Match the columns.

| | Column A | | Column B |
|---|---|---|---|
| a. | Terrestrial | (i) | polar bear, seals, penguins |
| b. | Polar | (ii) | lion, elephant, rabbit, ants |
| c. | Aquatic | (iii) | leopard, tiger, chameleon, leaf insect |
| d. | Camouflage | (iv) | fish, whale, dolphin, octopus |


Bring fifteen cut-out pictures of different animals. Make sections in your notebook for different habitats. Sort and paste pictures of animals in the environment/habitat they are found. Colour and draw the environment around the animals.


1. There are no dinosaurs roaming on the earth now. Do you know why ?
2. Arboreal animals usually have long tails. Why ?


1. Collect pictures of some animals. Draw their habitats on a sheet of paper. Paste each animal in its habitat.
2. Draw a colourful butterfly according to the original shape and size. Put this paper-butterfly on a potted plant, or in the garden. Will a garden lizard or chameleon eat it ? Think why ?
3. Name some animals and their habitats. Collect their pictures and paste them in your note book.

4

# Food and Digestion

**Learning Objectives**

1. Components of food
2. Functions of different nutrients
3. Balanced diet
4. Process of digestion
5. Healthy eating habits
6. Need for cooking food
7. Food preservation

**Let Me Answer**

Adaptation is something that helps animals find food, water, mates, and shelter. Which animal finds food easily in their environment?

## COMPONENTS OF FOOD

- Proteins
- Carbohydrates
- Fats
- Vitamins
- Water
- Roughage
- Minerals

## FOOD

All living beings need food to stay alive. Food gives us energy and helps us to grow. Food also repairs the worn out tissues of our body.

We eat different type of foods that give all essential nutrients to the body to work, play and fight against diseases. This is because our body needs different substances for doing different things. These nutrients provide us energy. Some nutrients help us to promote growth and aid in fighting diseases.

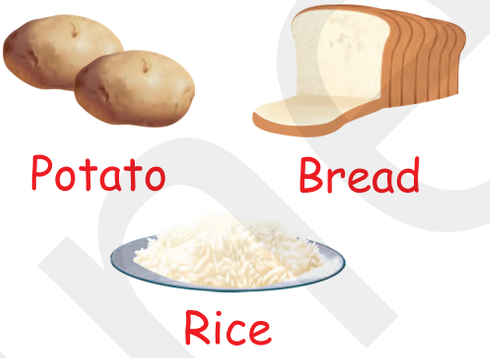
Our body works nonstop, when we run, walk or talk. Some parts of our body keep working even while we are asleep. Examples : like our lungs and heart. Our body requires energy to do all this work.

## Nutrients

Food is made up of useful substances called nutrients. These nutrients are present in different food items in different quantities. It is, therefore, important for us to eat different food items. The five nutrients are carbohydrates, fats, proteins, vitamins and minerals.

### Carbohydrates

They provide us energy for doing work. Sugar and starch are example of carbohydrates. Potato, rice, bread, banana and grapes are rich sources of carbohydrates.




### Fats

They provide us with twice as much energy as carbohydrates. Extra fats can be stored in our body to be used later. Butter, ghee and nuts are rich sources of fats. A person, who does a lot of physical work, needs more carbohydrates and fats.

Fats and carbohydrates are called energy-giving foods.


### Proteins

These are the nutrients that help build the body and make a new cells. They also help in the repair of worn out tissues. Proteins are especially important for growing children. They are called body-building foods. Milk, eggs, cheese, pulses, meat and fish have lots of proteins.

## Vitamins


These are needed in very small quantities by our body. They keep us healthy by helping the body fight diseases. They also help our eyes, nerves, gums, skin etc. work properly. Vitamin A keeps the eyes and skin healthy. Vitamin B is good for muscles and nerves. Vitamin C makes strong gums and heals our wounds fast. Vitamin D makes teeth and bones strong. Fresh fruits, vegetables , fish and milk are rich in vitamins.

## Minerals

Fruits

Vegetables

Protective food

These are also needed in very small quantities to keep us fit and healthy. Calcium, a mineral, is used for building bones and teeth. Calcium is present in milk and green leafy vegetables. Vegetables and fruits like spinach and apples contain iron which help our blood carry oxygen.

Vitamins and minerals are called protective foods.

## WATER

Almost two-third of our body is made up of water. We lose a lot of water in the form of sweat or through urine from our body. If the amount of water in our body becomes less, we feel thirsty. Water helps our body to work well and maintains our body temperature. We must drink at least 8-10 glasses of water everyday.

## ROUGHAGE OF FIBRE

- Roughage is the fibre present in the food we eat.
- It helps our body to get rid of wastes.
- Fruits, e.g. apple, guava, pear etc. contain a lot of fibre.


Apple


Guava

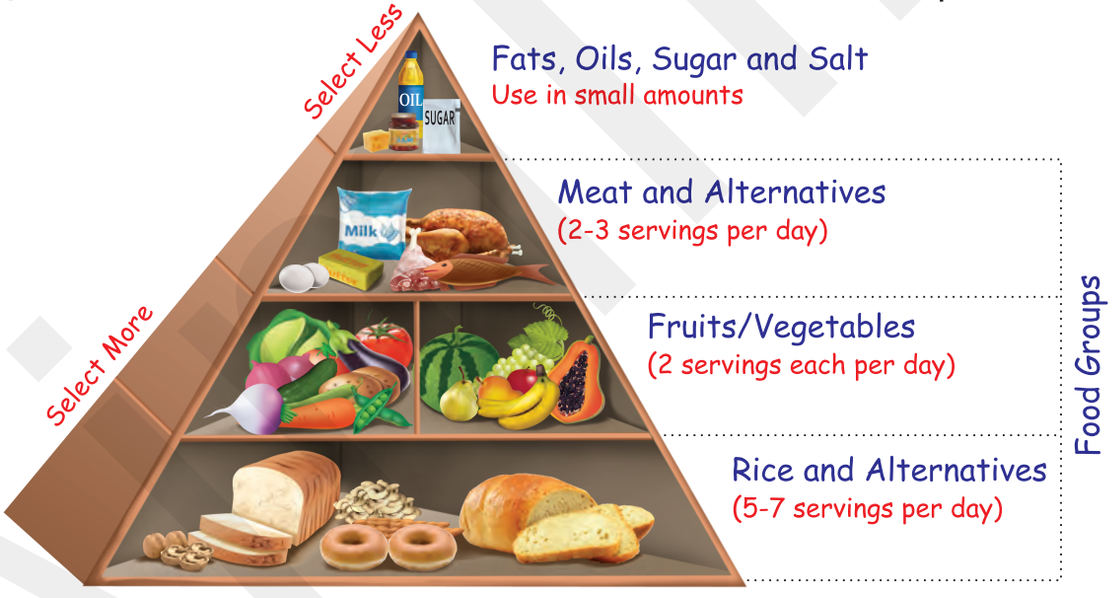

Pear


Carrot


Cabbage

## BALANCED DIET

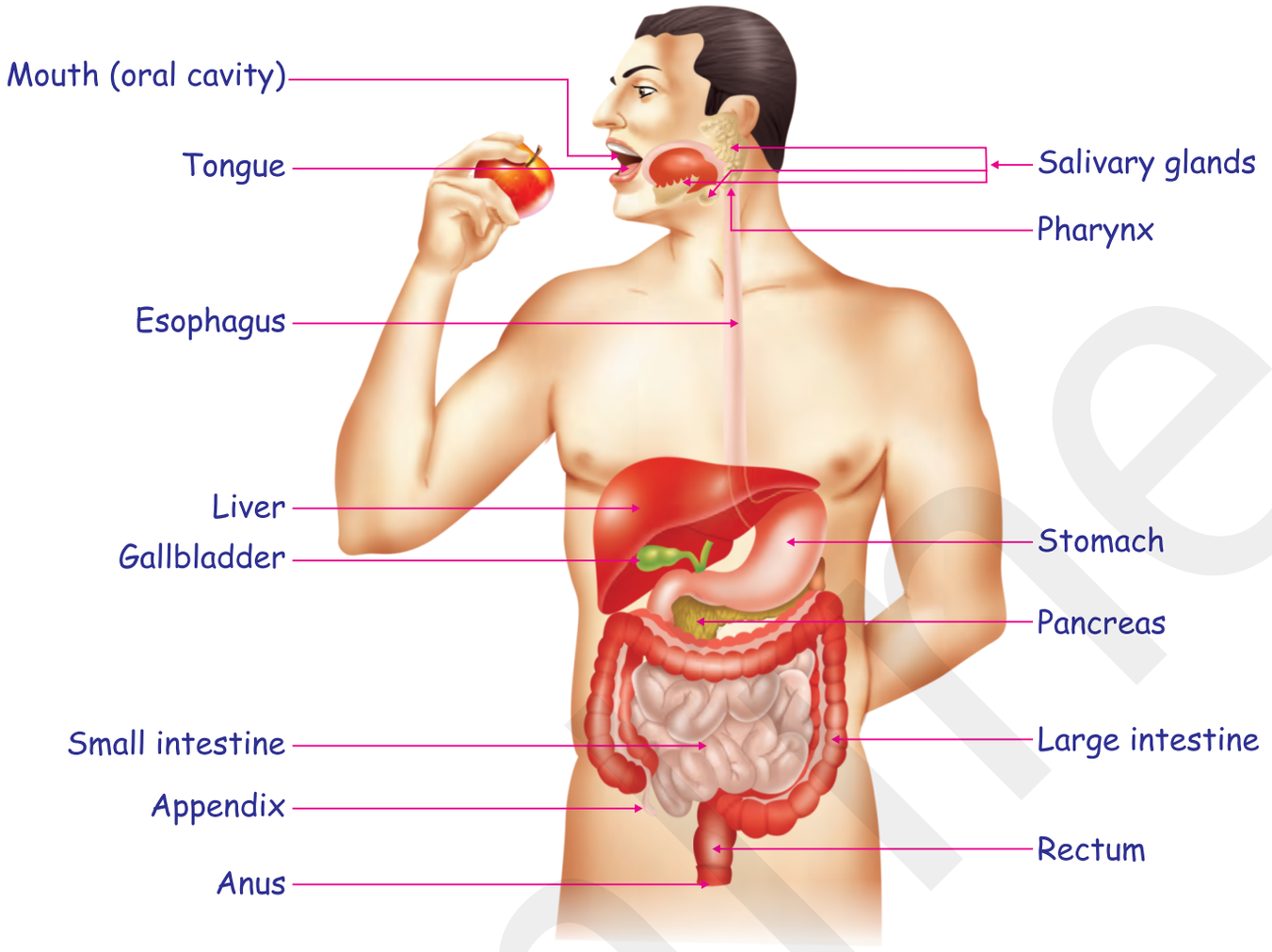
A diet that contains the right amounts of carbohydrates, proteins, fats, mineral salts,vitamins, roughage and water is called a balanced diet. To stay healthy and to grow well, it is essential to have a balanced diet. Milk is a complete balanced diet.




## DIGESTION

All living beings need energy. Food is the main source of energy. Food may not be in a form that the body can use directly. It has to be changed into a simple and usable form. Digestion is the process of breaking down food into simple forms so that it can be used by the body.

The digestive system helps the body to digest the eaten food.




Human Digestive System

## Process of Digestion

Digestion begins in the mouth itself. When we start eating, our teeth break up the food into smaller pieces.

The liquid in our mouth called saliva. It helps us to digest the food. Saliva softens the food and changes it into pulp.

The tongue then pushes bits of this mashed food into the throat where it is swallowed.

The food now moves down a tube, called food pipe. Then, it goes into the stomach.

The stomach plays an important role in digestion. It is a hollow, muscular bag. The strong muscles of the stomach use digestive juices to digest the food. It changes the mashed food into a semi-solid form.

Food remains in the stomach from one to four hours.

This is why we feel full in the evening after a very heavy afternoon meal.

When the stomach has finished its work, muscles at the lower end of the stomach open. The liquid food now moves to the small intestine.

Digestion is completed in the small intestine. The liver, gall bladder and the pancreas help the small intestine complete the digestion of food. The liver secretes bile which helps to digest fats. The food is now in a simple form. It passes through the walls of the small intestines into the blood. The blood carries it to all parts of the body.

The undigested food and water in the small intestine pass into the large intestine. The large intestine allows water and leftover useful substances to pass back into the blood. The undigested food remains inside.

The undigested food then moves from the large intestines into the rectum. It is finally flushed out through the anus when we go to the toilet and defecate in the morning.

## HEALTHY EATING HABITS

1. Always wash your hands before and after your meal.

2. Wash your mouth after eating.

3. Do not eat uncovered and stale food.

4. Always eat a balanced diet.

5. While eating, you should not talk to anyone.

6. Avoid over eating.

# COOKING FOOD

Some foodstuff can be eaten raw while some others need to be cooked. Cooking kills germs. It also makes the food soft, tasty and easier to digest. While cooking the food, we must keep in mind the following things :

- Wash all raw food stuffs well before cooking to remove dust and germs.
- Do not discard the water in which pulses or legumes are soaked as it contains vitamins. Use this water while cooking.
- Wash fruits and vegetables before they are cut. They lose their nutrients if washed after cutting.
- When boiling, use just enough water to ensure the nutrients of sorbed by the food are not wasted.
- Do not overcook or re-heat food. It destroys all the nutrients.
- Food can be cooked in different ways :steaming - idlis; frying- puris; roasting- meat; boiling- eggs and baking- cakes.

# FOOD PRESERVATION

The process of treating food in a way that preserves it for a long time is called food preservation.

The food can be preserved by boiling the milk, freezing the meat, dehydrating the peas, salting the pickles, sweetening the jams, canning the fruits and juices etc.

Food is very valuable, so we should not waste it.

Milk can be saved by pasteurization.

Sun drying method can also preserve food. E.g. : mint, coriander etc. are dried for storage.

Food can be freezed to a lower temperature for preservation. E.g. : meat, milk, eggs etc. are kept in refrigerators.

Boiling the milk

Dehydrating the vegetables

Salting the pickles


Canning the food

## Facts to know

- If we uncoil our intestines, it would be nearly 33 feet long.
- Milk is a complete food. It contains, carbohydrates, minerals and even fats.

## LET'S RECALL

1. Food helps us to grow, provides us energy and keeps us healthy.
2. Proteins help in body building, carbohydrates and fats provide energy and vitamins and minerals protect us from diseases.
3. Roughage is the fibre present in our food.
4. Food is an energy source but has to be changed to a usable form.
5. Digestion is the process in which food is broken down into a usable form.
6. The digestive system consists of the mouth, food pipe, stomach, small and large intestines, rectum and anus.
7. Proper food habits make us healthy and fit.
8. Cooking makes the food, soft, tasty and easy to digest.
9. Food can be preserved to last longer.

## Word Power

| | | |
|---|---|---|
| defecate | : | to get rid of the waste from the body |
| energy | : | the ability to be very active |
| flushed | : | the word used for cleaning a toilet seat with water |
| left over | : | the remainder |
| mashed | : | to mix or crush until it is soft |
| pasteurization | : | to make free from bacteria by heating and cooling |
| worn out | : | damaged by long or hard use |

## Train Your Brain

### Cross Curriculum Connect

**1. Answer the following questions in short.**

a. What is lacking in milk?

b. Why should we wash vegetables before eating them?

c. In which part of our body is digestion completed?

## 2. Fill in the blanks.

| | | | | |
|---|---|---|---|---|
| saliva | food pipe | anus | mouth | small |
| bile; fats | rectum | liver; gall bladder; pancreas | | |

a. Digestion is completed in the ..... intestine.

b. The three glands that help to complete the digestion are ....., ..... and ..... .

c. Solids move from the large intestine into the ..... .

d. The liver secretes ..... which digests ..... .

e. Digestion begins in the ..... .

f. Undigested solid waste is thrown out from the ..... .

g. ..... in the digestive system connects the mouth to the stomach.

h. ..... softens food in our mouth.

## 3. Answer the following questions.

a. What is digestion ? Why do we need to digest food ?

b. What is the role of water in our body ?

c. What happens to the food in the stomach ?

d. Define :

(i) Nutrients

(ii) Balanced diet

(iii) Roughage

(iv) Food preservation.

e. What happens to the food in the small intestine ?

f. What happens to the undigested food ?

## Formative Assessment

## 4. Tick (✓) the right and cross (×) the wrong statements.

a. Digestion starts in the stomach. ☐

b. Food moves down the food pipe into the small intestine. ☐

c. Food passes from the small intestine to the large intestine. ☐

d. Undigested solid wastes are present in the rectum.

e. Food should be overcooked.

f. It is enough if we drink a glass of water everyday.

g. Vitamins are needed in large amounts by our body.

h. Preservatives help germs to grow well.

i. Cheese and milk have lots of proteins.

j. Vitamins and minerals are called protective foods.

## 5. Multiple choice questions

a. A balanced diet contains the right amount of ..... .

(i) carbohydrates and proteins.

(ii) fats and minerals salts.

(iii) vitamins, fibre and water.

(iv) none of these.

b. Anaemia is caused by ..... .

(i) lack of iron.

(ii) lack of vitamins.

(iii) lack of proteins.

(iv) none of these.

c. Green leafy vegetables are rich in ..... .

(i) proteins.

(ii) fats.

(iii) vitamins and minerals.

(iv) none of these.

d. Which method is preferable for ideal cooking ?

(i) Roasting

(ii) Steaming

(iii) Frying

(iv) none of these.

## 6. Give one word for each one of the following.

a. Write one energy giving food.

b. Write one body building food.

c. What is that called when a food is kept for a long time?

d. What does a balanced diet give us?and water.

## 7. Match the columns.

| | Column A | | Column B |
|---|---|---|---|
| a. | Body-building food | (i) | Saliva |
| b. | Energy-giving food | (ii) | Proteins |
| c. | Making food to last longer | (iii) | Carbohydrates |
| d. | The digestive liquid in the mouth | (iv) | Preservation |

### Activity Time

Take a piece of apple and chew it for some time till it becomes tasteless. What is left in your mouth is roughage or fibre.

### HOTS

1. It is winter season. Your father brings mangoes from the fruit market. What is strange and how it is possible ?
2. A child needs more proteins than an old person. Why ?

### project Time

Yummy Salad!

Sprouted green grams, add chopped cucumber, boiled potatoes, paneer cubes, a little salt and few drops of lemon. Your salad is ready!

5

# Safety and First-aid

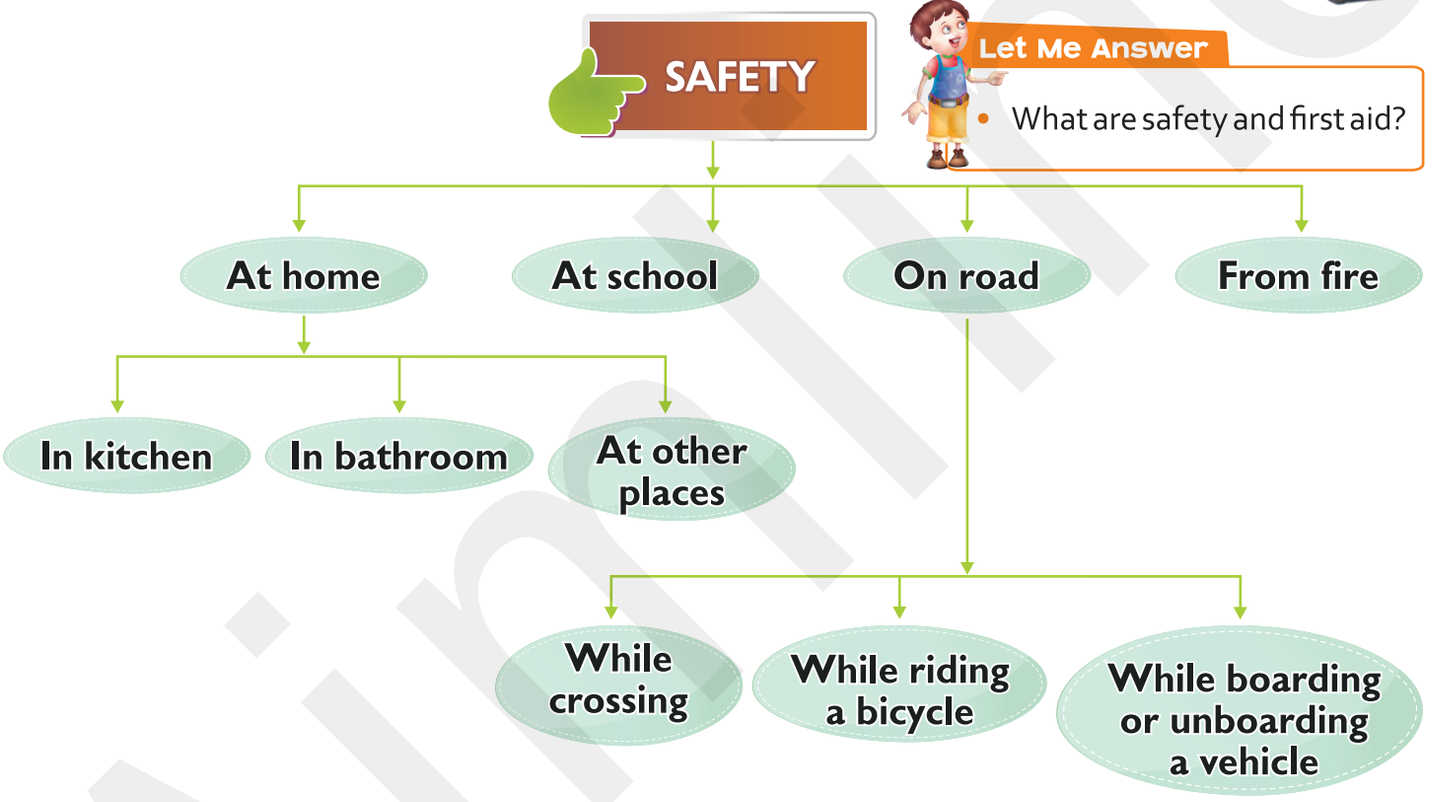
**Learning Objectives**

1. Accidents and their causes
2. Safety • at home • at school • on road • from fire
3. First-aid



**Let Me Answer**

- What are safety and first aid?




## SAFETY RULES

Accidents can occur anywhere, any time and to anyone when the person is not careful about what he/she does. Almost all accidents take place when we are careless, like when we carelessly cut our fingers instead of the vegetables with the choppers, cross the road without looking, drive rash, lean too far out of the window and so on. So, safety is as important for life as eating right and keeping fit. We can stay safe and avoid accidents by being aware of our surroundings and following some simple rules. Remember : "Prevention is better than cure."

## Safety at Home

We all feel safe at home. By being careful about a few small things, we can avoid all types of accidents at home. We should always be observant and alert about anything thats wrong. A slight smell of leaking gas or something burning or a little water spilled on the floor can cause accidents. Here are some simple rules to be followed :

### Safety in the kitchen

- Do not play with matchboxes, knives and other sharp objects.
- Do not go near gas stove wearing synthetic clothes. They might catch fire.
- Use kitchen towel to handle hot objects.
- Check whether the oven, toaster and other cooking appliances are turned off before you leave the kitchen.
- Keep electrical appliances away from water to avoid shocks.
- Do not touch electrical sockets with wet hands.
- Avoid spilling on the floor or wipe up spills right away so no one slips.
- Switch off the gas stove when not in use. Check the gas pipes regularly to avoid leakage.

### Safety in the bathroom

- Do not leave the soap bar on the floor. You may slip and get hurt. Keep it in the soap case.
- Do not spill detergents or shampoos on the floor. The floor gets slippery or you may fall down.
- Do not play with sharp objects like scissors, blades, razor etc.
- Do not touch electrical equipments with wet hands.
- Do not open the hot water tap yourself. It may burn your hand.
- After using the bathroom clean it and wipe the floor.

## Safety at other places

- Wipe the spills on the floor immediately to avoid slipping.
- Do not run, jump and skip over stairs.
- Do not leave the toys on the floor after playing. You may trip or fall down.
- Do not play in the rooms or jump over the furniture.
- Do not touch electrical switches or equipments with wet hands.
- Do not go too close to heater or hot iron.
- Do not take a medicine without asking an adult.
- Do not play with things made of glass. It may break and cut your skin.

## Safety at School

In school, we should follow some safety rules to avoid accidents.

- Do not run up and down the stairs or slide over the hand rail.
- Do not push anybody while moving in queue or on stairs.
- Do not play in the classroom and jump over desks.
- Do not throw paper balls, chalks, pencils and other objects at each other.
- Handle the objects carefully in the lab.
- Do not fight with anybody.

## Safety on Road

### Safety while crossing

- Do not run or play on the road.
- Do not walk on the wrong side or centre of the road. Always use pavement for walking.
- Cross the road only at the Zebra crossing or use subway or over bridge. If there is no Zebra crossing, find the safest place to cross the road. Look at your right, then left and then again right, then cross the road.
- Always cross the road when traffic light is red. Keep watching the coming traffic while crossing the road. Never cross the road while talking to people, listening to music or talking on phones.

## Safety while riding a bicycle

- Always wear well fitted helmet to protect your head.
- Do not wear loose or flared clothes. Make sure your shoe laces are tied properly.
- Before riding, check your bicycle gears, brakes, seat, handles and tyres properly.
- Use hand signals while crossing or turning to left or right.
- Do not use earphones while riding.
- Follow the traffic signs or traffic lights.

## Safety while boarding or unboarding a vehicle

- Make a queue while getting in and down the bus.
- Do not push anybody while getting in or out the bus or also in the moving bus.
- Do not disturb the driver of bus or car.
- Always fasten your seat belt while travelling in a car.
- Do not keep any part of your body out of the window of moving vehicle.
- Always get down on safe side of the bus or car.

## From Fire

Fire is our friend only when it cooks our food, keeps us warm during the winter and lights up our way in the dark. However, it becomes our enemy when it goes out of control. Then, it can kill or harm us. It can destroy our homes. It can reduce an entire forest to an empty land and burn everything to ashes.

## Prevention

Fire does not give us any warning before it starts. It may start from something as small as a lighted matchstick that is carelessly thrown away. It can start from a candle burning near a curtain. Carelessness while cooking can be the cause of a big fire. Here are some measures you can follow to avoid it :

- Wear cotton clothes while standing near the cooking stove. Synthetic clothes catch fire easily.
- Work in a kitchen only if an elder is with you.
- Do not play with lighters and matchsticks. Extinguish a used matchstick before throwing it away.

- Store petrol and kerosene safely, away from any source of heat, as they catch fire easily.
- Turn - off the gas stove and regulator when not in use.

**If a fire starts in the place around you :**

- Cover your nose and mouth with a wet cloth. Smoke kills more people than actual fire.
- Get to the floor and crawl out of the room.
- If the fire has started due to electrical gadgets or oil, never use water to extinguish it out. Use sand instead. For all other fires, use a fire extinguisher and water.
- If a door is closed, first put your hand against it. If the door feels hot, it means there is a fire on the other side. Do not open the door. Try to find another way to get out.
- If alone, shout and bang on doors and walls to let your family know about the danger.

**If your clothes catch fire :**

- Never run if your clothes catch fire, as this will fan the fire and spread it.
- **STOP** where you are and cover your face with your hands.
- **DROP** to the ground.
- **ROLL** on the floor.
- This will cut off the air supply and stop the fire.
- It will also reduce the burns you get.

**In case someone else is on fire :**

Roll him in a blanket till the flames are put out.

Do not pour water on a person with sever burns as the person may go into a state of shock.

## FIRST-AID

If an accident takes place, call for a doctor. Before the doctor arrives, a proper care of the victim should be taken. This is known as first-aid. It is the immediate and correct medical help given before the doctor arrives. Often, it can save a life and reduces injury. While giving first- aid, it is important to stay clam and act fast.

## Cuts and Wounds

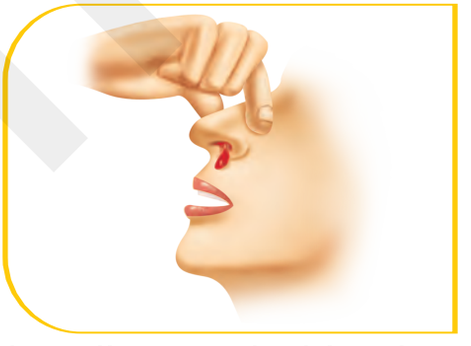
- Wash cuts with water.
- Then clean them with cotton soaked in an antiseptic solution like dettol or savlon.
- You could even cover cuts with clean bandages or gauze.

## Burns

We get burns when we touch any hot object. To soothe the pain :

- Remove the source of heat.
- Put out flames or remove clothing.
- For minor burns, dip the part in cold water or hold the burnt part under running water for some time. Do this at once. This cools the wound and avoids a severe burn.
- Minor burns heal on their own.
- In case of more serious burns, consult a burn specialist, if necessary.

## Nose Bleed



- In case your nose bleeds, stay calm and do not panic. Sit upright and press the nose tightly with your fingers.
- Keep it closed like this for 5-10 minutes. This stops the blood from flowing.
- Breathe through your mouth. Bend forward to avoid swallowing the blood.

## In case a Person Faints

- If a person faints, make him lie down for a while.
- Keep the head low for the extra blood to reach the brain.

## Insect Bite

It is important to remember that bees, wasps and other insects sting only when we disturb them. If an insect stings you, try to remove the sting with a sharp object. Never pinch it as more of the poison may enter your body.

You may :

- Wash the area thoroughly with water.
- Put some soothing cream.
- A soft pad soaked in ammonia water also gives relief.
- Apply calamine lotion if there is itching.

## Poisoning

We have invented many things like certain sprays, nail paints, wall paints and detergents that have harmful chemicals. These can prove poisonous if we smell or swallow them. All such things must be kept away in a safe place. It is also important to wash our hands after using any of these things. In case of poisoning, read and follow the instructions on the container. Rush the person to a doctor. Also, carry the source that caused the poisoning with you. This will help the doctor to take the right action.

### Fact-o-scope

- Nose bleeding mostly occurs in summer when the atmosphere pressure falls down.
- Never use a soda-acid extinguisher on an electric fire as this may give you an electric shock.

### LET US RECAPITULATE

1. By taking care, most accidents can be avoided.
2. Prevention is better than cure.
3. Accidents can be avoided on roads by following the traffic rules.
4. First-aid is the quick and correct help given before a doctor arrives when someone is sick or hurt.

### Word Power

| | | |
|---|---|---|
| accident | : | a miss happening by chance |
| careful | : | alert |
| cure | : | treatment |
| electric spark | : | shock of current |
| electric stove | : | an electric apparatus used for cooking |
| immersion | : | the state of being dipped in a liquid |
| instructions | : | rules to follow |
| prevention | : | to avoid something |
| scouts | : | members of NCC |
| synthetic | : | made by chemical process |
| Zebra crossing | : | a part of the road with white stripes where pedestrians cross the road |

# Train Your Brain

## Tasks for Summative and Formative Assessments

**1. Answer the following questions in short.**

a. How can poisoning take place?

b. What should you do if your clothes catch fire?

c. How can accidents be avoided in the kitchen?

**2. Fill up the blanks with suitable words.**

footpath  Prevention  minor  Do not  tetanus

a. ..... play with lighters and matchsticks.

b. If a wound is due to a dirty or rusted object, we may need a ..... injection.

c. Always walk on the ..... .

d. ..... is better than cure.

e. In case of ..... burns, hold the part under running water.

**3. Answer the following questions.**

a. Name four safety rules that you must follow at home.

b. How can a fire start?

c. What precautions should you take while crossing a road?

d. What is first-aid? What first-aid should be given for burns?

e. What should you do in case of an insect bite?

f. What first-aid will you give in case of the following?

(i) Nose bleed  (ii) In case a person faints

**4. Tick (✓) the right and cross (×) the wrong statements.**

a. We can touch electrical appliances with wet hands. ☐

b. Water should be thrown on fire caused due to a live wire. ☐

c. If clothes catch fire, we should stop, drop and roll. ☐

d. Cuts and wounds should be washed properly with water. ☐

e. All medicines should be kept within easy reach of children. ☐

## 5. Multiple Choice Questions (MCQs)

### Tick (✓) the correct option.

a. Which statement is not correct?

(i) Prevention is better than cure. ☐

(ii) Do not put fingers into electrical sockets. ☐

(iii) In case of electric shock, pull the person. ☐

(iv) Cut off the electric supply, in case of electric shock to a person. ☐

b. Which statement is not correct in case you catch fire?

(i) Run as fast as you can. ☐

(ii) Stop and cover your face with your hands. ☐

(iii) Drop to the ground. ☐

(iv) Roll on the floor. ☐

c. Which statements is not correct, in case someone else catches fire?

(i) Roll him/her in a blanket till the flames are put out. ☐

(ii) Do not pour water. ☐

(iii) Pour water on the person. ☐

d. Which statement is not correct while using footpath?

(i) Always walk on the footpath. ☐

(ii) Cross the road only at Zebra crossing when the 'walk' signal is green. ☐

(iii) Cross the road without seeing left and right sides. ☐

## 6. Give one word for each one of the following.

a. If we get minor burn on our hands, we shall pour this on our hands.

.....

b. You would roll on the floor if you catch it. .....

c. You can cross a road only from this point. .....

## 7. Match the columns.

| Column A | | Column B | |
|---|---|---|---|
| a. | Nose bleeding | (i) | Immediate and correct medical help |
| b. | Prevention | (ii) | On the road |
| c. | First-aid | (iii) | Occurs in summer |
| d. | Never play | (iv) | Is better than cure |


Use an old toffee tin or shoe box to make your own First-aid box. Cover it with a plain paper and make a big red cross (+) on it. Keep the following things handy - dettol, scissors, band-aid, gauze, cotton bandage, antiseptic cream, a bottle of methylated spirit, an adhesive tape etc.


1. You are alone in your house. You get your finger burnt while working in the kitchen. What would you do?
2. Your mother keeps soaps, shampoos, Harpic bottles, Colin etc., separately from grocery items like jam, sauces, drinks etc. Why?


1. Maintain a small diary having important phone numbers, required in case of an emergency (doctor, police station, fire brigade, parents, hospital, neighbours etc.).
2. List some other safety rules that should be followed in the lift, near the gate and in the parking area of the building you live in. Make a chart and take permission to patch it up on the notice board.

6

# Matter and Material

**Learning Objectives**

1. Matter and its properties
2. States of matter
3. Changes from one state of matter to another

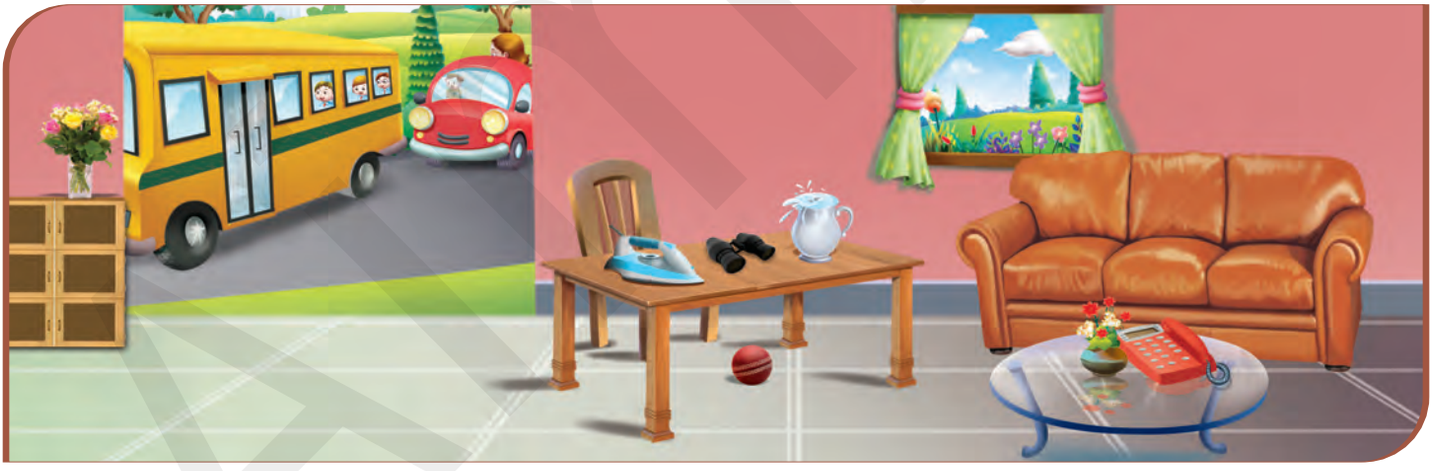
**Let Me Answer**

- What are the types of matter?
- How can you define liquid matter?

**STATES OF MATTER**

- Solid
- Liquid
- Gas

We notice many objects around us. They are different from one another in shape, size, colour and texture.



Every single object has two properties in common.

- All these objects occupy some space. Your computer takes up space on the desk. You take up space on the chair. The amount of space an object occupies is called its volume.
- All the objects have weight.

# MATTER

Objects that occupy space and have weight are called matter. Everything around us is made up of matter. Chocolate and cake are made up of matter. You are also made up of matter.

Matter is made of tiny particles called atoms. Some matters like gold, platinum and carbon, are able to exist alone. This means that they do not combined with any other atom. However, certain atoms are so reactive that they typically combine with other atoms of the same kind to form a molecule. Atoms of hydrogen, oxygen and chlorine combine to form the molecules of hydrogen, oxygen and chlorine respectively.

Some matters are formed of molecules containing different atoms. For example, water is made up of 2 atoms of hydrogen and 1 atom of oxygen.

2 atoms of hydrogen + 1 atom of oxygen → 1 molecule of water

# STATES OF MATTER

There are different forms of matter. Your eraser is very different from the water you drink or the air you breathe. There are three main states of matter, namely, solid, liquid and gas.

## Solids

In a solid state, a matter has a define shape and it takes up a definite amount of space. In this state, matter has molecules that are very close to each other.

Solid

## Liquids

In a liquid state, a matter does not have a define shape but it takes up a definite amount of space. In this state, there is a little space between the molecules. These molecules are able to slide past each other.

Liquid

## Gases

In a gaseous state, a matter does not have a definite shape and it does not take up a definite amount of space.

On squeezing a balloon, you can change the shape of air in it. Gas takes the shape of its container.

In a gas, the molecules are much farther apart than in a solid or liquid and the molecules of a gas can easily spread through out all the space within a container.

Gas

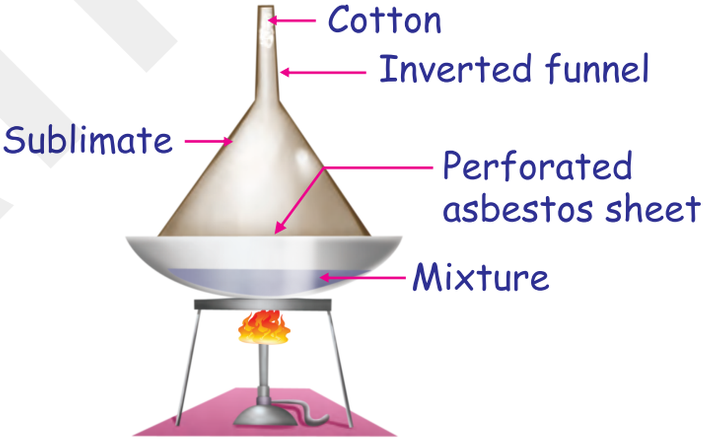
# CHANGE IN THE STATE OF MATTER

Matter can exist in more than one form.

Water exist in all three forms, that is, solid, liquid and gas. When there is a change in temperature, one state of water can be changed into another state. When temperature is as low as 0°C, the liquid water takes the shape of ice which is the solid state of water. This process is called freezing. When ice is heated, it changes into water. This process is called melting. When water is boiled at high temperature, it changes into water vapours. This process is called evaporation. When water vapours change back to water on cooling, it is called condensation.

## Sublimation

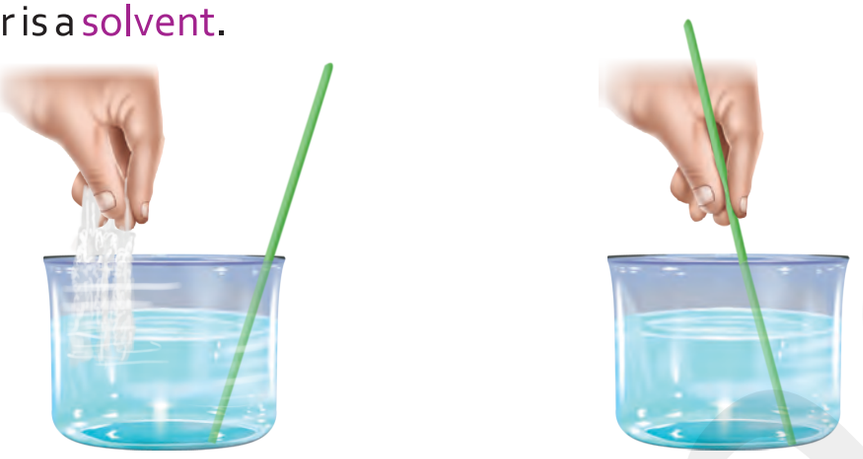
When iodine is heated, the purple coloured fumes of iodine are observed. This means that iodine which is a solid directly turns into the gaseous form on heating. This process is called sublimation.




Sublimation

## Solution

When sugar is stirred in water, it dissolves. Here, sugar is said to be soluble in water. When a sold dissolves in a liquid, it forms a solution. Sugar, in this case is a solute and water is a solvent.



## Solids dissolve in liquids

Sugar is a solid and water is a liquid. When a solid (sugar) dissolves in a liquid (water) to form a solution, such a solution is called a solid in liquid solution. The level of water in the beginning and at the end of the activity remains the same. This is because the sugar molecules do not take up extra space but fit into the space between the water molecules.

An eraser is insoluble in water. It takes up some space. So, there is a rise in the level of water in the measuring jar when an eraser is put in it.

## Liquids dissolve in liquids

When milk is added to water, at first the colour of the milk spreads slowly in the water. After stirring, the colour spreads uniformly. This is because milk is completely soluble in water. Here, both water and milk are liquids. Hence, their solution is called a liquid in liquid solution.

## Gases dissolve in liquids


When we open a soda bottle you will observe bubbles of gas coming out of the soda. These are bubbles of a gas called carbon dioxide. This shows that soda is a liquid with a gas dissolved in it. Hence, it is an example of a gas in liquid solution.

## Facts to know

- The smallest particle of an element has the same properties as the element itself.
- There are about 90 naturally occurring elements and scientist have been able to make about 25 more.

## LET'S RECALL

1. Anything that occupies space and has weight is called matter.
2. Matter is made up of atoms.
3. Atoms combine together to form molecules.
4. Matter exists in three states — solid, liquid and gas.
5. Matter can be change from one form to another by heating or cooling.
6. Some solids can be dissolve in liquids.
7. Some liquids can be dissolved in other liquids.
8. Some gases can be dissolved in liquids.

## Word Power

computer : a programmable machine which carries logical operations
definite : sure
iodine : an element whose solution is used to treat wounds
stirring : to shake vigorously
soda : an aerated water
volume : space occupied by matter

# Train Your Brain

## Cross Curriculum Connect

**1. Answer the following questions in short.**

a. Define the following :

(i) Freezing

(ii) Melting

(iii) Evaporation

(iv) Condensation

(v) Sublimation

**2. Fill in the blanks.**

weight space atoms solid molecule gas liquid

a. All matter take up some ..... and has some ..... .

b. Matter is made up of small particles called ..... .

c. Atoms put together form a ..... .

d. Matter exists as ....., ..... and ..... .

**3. Answer the following questions.**

a. What is matter ?

b. What are the common properties of matter ?

c. How are molecules arranged in a solid ?

d. What are the features of water ?

## Formative Assessment

**4. Tick (✓) the right and cross (×) the wrong statements.**

a. Matter has weight and occupy space. ☐

b. The contaminated water is good for drinking. ☐

c. Water can be purified by boiling. ☐

d. Water has three forms – liquid, gas and solid. ☐

e. Molecules of gas are not scattered. ☐

## 5. Multiple choice questions

a. Which are the main states of matter ?

(i) solid ☐ (ii) liquid ☐

(iii) gas ☐ (iv) all of these ☐

b. What are the forms of water ?

(i) liquid ☐ (ii) gas ☐

(iii) solid ☐ (iv) all of these ☐

c. Select the correct statement .

(i) Molecules are close in gas. ☐

(ii) Molecules in gas are linked to each other. ☐

(iii) Molecules in gas are scattered. ☐

(iv) all of these ☐

d. Which state of matter does not flow freely ?

(i) solid ☐ (ii) liquid ☐

(iii) gas ☐ (iv) liquid and gas ☐

## 6. Give one word for each one of the following.

a. Things that occupy space and have weight : .....

b. Matter having definite shape and taking definite volume : .....

c. On heating, it gives purple fumes : .....

d. An example of gas dissolved in a liquid : .....

e. A solid which can flow like liquids : .....

## 7. Match the columns.

| Column A | | Column B |
|---|---|---|
| a. Water | (i) | Sugar in water |
| b. Condensation | (ii) | boiled to form steam |
| c. Milk plus water | (iii) | Gas in liquid solution |
| d. Solution | (iv) | Liquid in liquid Solution |
| e. Soda water | (v) | Loosely packed molecules |

## Activity Time

Take a pencil and an eraser. Touch and feel each object. What do they feel like?
Put each of the two items in different glasses. Do you see any change in their shape or size ?

## HOTS

1. The fragrance of rose flowers kept in a vase in a room, fills the room. Why?
2. Can you store a gas in a container? If yes, how?

## project Time

Fill the glass half with hot water. Slowly mix as much sugar as possible in it. Keep adding sugar until you have a thick syrup.

Hang a paper clip from a piece of thread and suspend it in the glass. Make sure that the paper clip doesn't touch the bottom. Leave the cup where it won't be disturbed and cover it to keep dust out.

After a few days, crystal will begin to form around the paper clip and thread.

Use a magnifying glass to examine the shapes of crystals.

7

# Our Environment

**Learning Objectives**

1. Pollution and its types
2. Causes of pollution
3. Effects of pollution

**Let Me Answer**

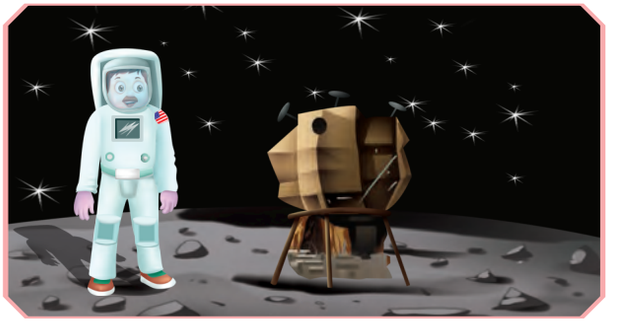
- What do you understand by environment?
- What are the ways to keep your environment safe and clean?

## TYPES OF POLLUTION

- Air Pollution
- Water Pollution
- Soil Pollution

## POLLUTION

Suppose we climb the world's highest peak Mount Everest, to our surprise we find it lined with garbage. Likewise if we visit space, there too we will find garbage left behind by earlier missions. Let us accept the fact that we have polluted every single place we have gone to, right from the moon to the bottom of the oceans.



Pollution is the contamination of the environment with harmful substances. Pollution makes the air, land and water dirty. It is the result of our failure to balance our needs and wants with that of nature. It is a fact that without

transportation, communication, industries and so on, we would have led very difficult lives. But it is equally true that we have not behaved in a responsible manner. We have acted cruelly towards our environment. Today, if we worry about pollution, it is only because it is affecting our own lives. Due to this selfish reason, we are now finding the causes and effects of different types of pollution and trying hard to minimise it.

## Types of pollution

### 1. Air pollution

Air is a mixture of gases and dust particles. It gets polluted when there is a change in its composition. When anything is burnt, it releases carbon dioxide, harmful gases and tiny, solid particles like carbon into the air. All this reduces the oxygen in the air causing breathlessness and affecting our vision. It also affects cloud formation. Forest fires pollute the air in the same way.

### 2. Water pollution

Water bodies such as lakes, rivers and oceans are present everywhere. We have deliberately dumped garbage and liquid wastes into them. Heat also pollutes water. Industries, release warm water into nearby rivers and lakes without minding the harmful effects of it. This increases the temperature of water and makes it unfit for many forms of aquatic life.

### 3. Soil pollution

Soil supports life, for both plants and animals. Chemicals such as dyes and fertilizers often leak into the soil. Garbage in towns and cities is dumped into holes dug up in soil called landfills. All these activities reduce the quality of the soil and make it unfit for growing plants. Soil has thus become poisonous and polluted in many parts of the world. Such a soil may support no form of life.

When people first started to pollute the earth, no one ever thought about its harmful effects on nature. Pollution over the years has led to harmful effects on the earth and the lives of the people. Some of these effects are permanent. They are being seen worldwide. The major changes that have taken place due to pollution are as follows :

## 1. Global warming

Earth is a much warmer place than it should be. This has been due to excessive carbon dioxide in the air because of air pollution. This carbon dioxide gas attracts sun's heat and does not allow it to escape. This trapped heat warms the surface of the earth, resulting in Greenhouse Effect.

The rise in the earth's temperature is causing the melting of ice at the north and south poles. As a result , there is now less snow covering the mountain ranges. Countries like Bangladesh and islands like Tuvalu and Marshall fear floods. All this means that there will be progressively less land available for a growing population to inhabit.

## 2. Climatic changes

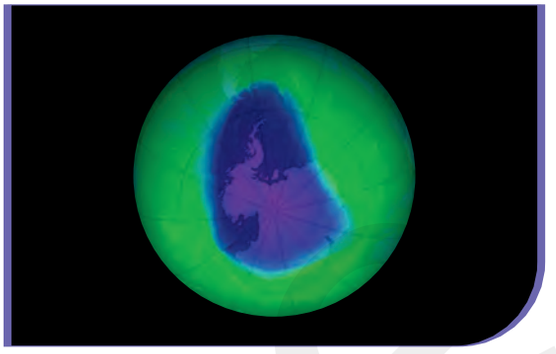
Unexpected weather changes have taken place all over the world. It has snowed for the first time in Saudi Arabia. In cold Siberia, summers have come three months earlier. There have been widespread floods in Europe and very heavy snowfall in Kashmir. Predicting weather conditions has become quite difficult.

## 3. Changing landscape and destruction of habitats

Many areas that were once covered with plants and animals are now barren. Water bodies where fish were in plenty, are lifeless today. Pollution has reduced the population of many living things. Roads and buildings have emerged in areas that were once habitats for certain living beings.

## 4. Ozone hole

There is a thin layer of invisible gas called ozone in the atmosphere. This layer protects us from the harmful ultra violet rays of the sun. Chemicals released into the air have thinned out this layer and in some places like the north pole, there is a hole in it. This means that harmful rays are now entering the atmosphere and affecting plants and animals life on earth. This has resulted in the increase of various types of cancers and damage to eyes.



## 5. Acid rain

Rain that falls down on us also contains harmful gases. These gases remain in the air till the rains bring them back down. Acid rain harms wildlife, building surfaces and soil.

## 6. Reduced vision

Air pollutants reduce vision. Dust or dirt particles remain in the air and stop light from passing through. This can be the cause of accidents and respiratory problems. Many of these effects are now beyond our control. Controlling pollution is not easy. It is important for factories to use filters that will clean the exhausted gases before letting them out into the atmosphere. Cleaner fuels like the CNG should be used in vehicles. Till now,

little efforts have been made to control pollution. For this reason, countries need to increase awareness among its people and take constructive steps to clean the environment.

## Facts to know

- It is a fact that we have polluted every place we have gone to, right from moon to the bottom of the oceans and high peaks too.
- Due to the hole in the ozone layer harmful rays entering atmosphere and effecting plants and animals on earth.

## LET'S RECALL

1. Pollution is caused by the harmful substances not present naturally in the environment.
2. The main types of pollution are air, soil and water.
3. Pollution causes global warming, climatic changes, change in landscapes, destruction of habitats, ozone holes, acid rain and reduced vision.

## Word Power

| | |
|---|---|
| breathlessness | : having difficulty in breathing |
| contamination | : the process of making something dirty |
| garbage | : rubbish |
| greenhouse effect | : warming of earth's atmosphere due to heat being absorbed from the sun and being trapped by gases such as carbon dioxide in the air around the earth |
| harmful | : causing damage |
| landfill | : an area containing buried wastes |
| ozone | : a thin layer present in the atmosphere that protects us from the harmful rays of the sun |

# Train Your Brain

## Cross Curriculum Connect

**1. Answer the following questions in short.**

a. Why has the ozone layer thinned out ?

b. Give two causes for each of the following :

(i) Air pollution

(ii) Water pollution

(iii) Soil pollution

**2. Fill in the blanks.**

| | | | | |
|---|---|---|---|---|
| greenhouse effect | | dies; fertilizers | | harmful gases |
| ozone | air | landfills | gases; dust | vision |

a. When air pollution traps heat, it is called the ..... .

b. ..... and ..... often leak into the soil causing soil pollution.

c. Acid rain contains ..... .

d. ..... layer protects us from harmful rays of the sun.

e. Air pollution reduces ....., leading to accidents.

f. Forest fires are a cause of ..... pollution.

g. Holes dug up in the earth to dump garbage are called ..... .

h. Air is a mixture of ..... and ..... particles.

**3. Answer the following questions.**

a. Define pollution.

b. How have we polluted the air, water and soil of the earth ?

c. What is global warming? Give an example of a place affected by global warming.

d. What climatic changes have taken place in the last few years ?

e. Write two ways to control pollution.

f. What is acid rain ? How is it harmful ?

## 4. Tick (✓) the right and cross (×) the wrong statements.

a. We have always behaved in a responsible manner towards our environment. ☐

b. Increase in the temperature of water makes it unfit for aquatic life-forms. ☐

c. There is no change in the amount of snow covering the mountains. ☐

d. We should use eco-friendly fuels like CNG in vehicles. ☐

e. Rainwater does not contain any pollutants. ☐

## 5. Multiple choice questions

a. What are the types of pollution ?

(i) air pollution ☐ (ii) water pollution ☐

(iii) soil pollution ☐ (iv) all of these ☐

b. What are the effects of pollution ?

(i) global warming ☐ (ii) destruction of habitats ☐

(iii) ozone holes, acid rain etc. ☐ (iv) all of these ☐

c. Which is the incorrect statement ?

(i) pollution is harmful to flora and fauna. ☐

(ii) pollution can be restricted by awareness. ☐

(iii) plants and trees do not help in curbing pollution. ☐

d. The cause of air pollution is ..... .

(i) plants ☐ (ii) trees ☐

(iii) smoke ☐ (iv) all of these ☐

## 6. Give one word for each one of the following.

a. Rise in the temperature of the earth is known by this name.

b. This gas protects from the ultraviolet rays of the sun.

c. This is a desert country but it received snowfall.

## Activity Time

Make a list of household things and activities which cause pollution.

## HOTS

1. According to you, what should be the main five measures to check pollution in your neighbourhood ?
2. The sweeper of your area collects and burns the waste papers, fallen leaves etc. Is it a right step ? Why ?

## project Time

1. Make charts on how various kinds of pollution can be reduced and display them in your school corridors to spread awareness.
2. Name the different kinds of things that end up in your garbage bin. Identify how their life began and at what point they became garbage.

8

# Sun, Planets and Stars

**Learning Objectives**

1. The Universe
2. The Solar system
3. Sun and planets
4. Satellites : Natural and Artificial

**Let Me Answer**

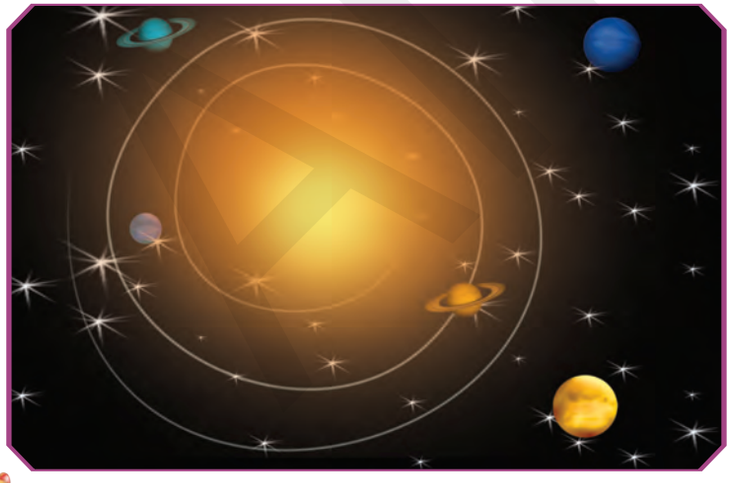
- Why is Sun called a star?
- How many sun do we have in our planetary system?

## HEAVENLY BODIES

- Sun
- Stars
- Moon
- Planets
- Comets
- Meteors
- Constellations

## THE UNIVERSE

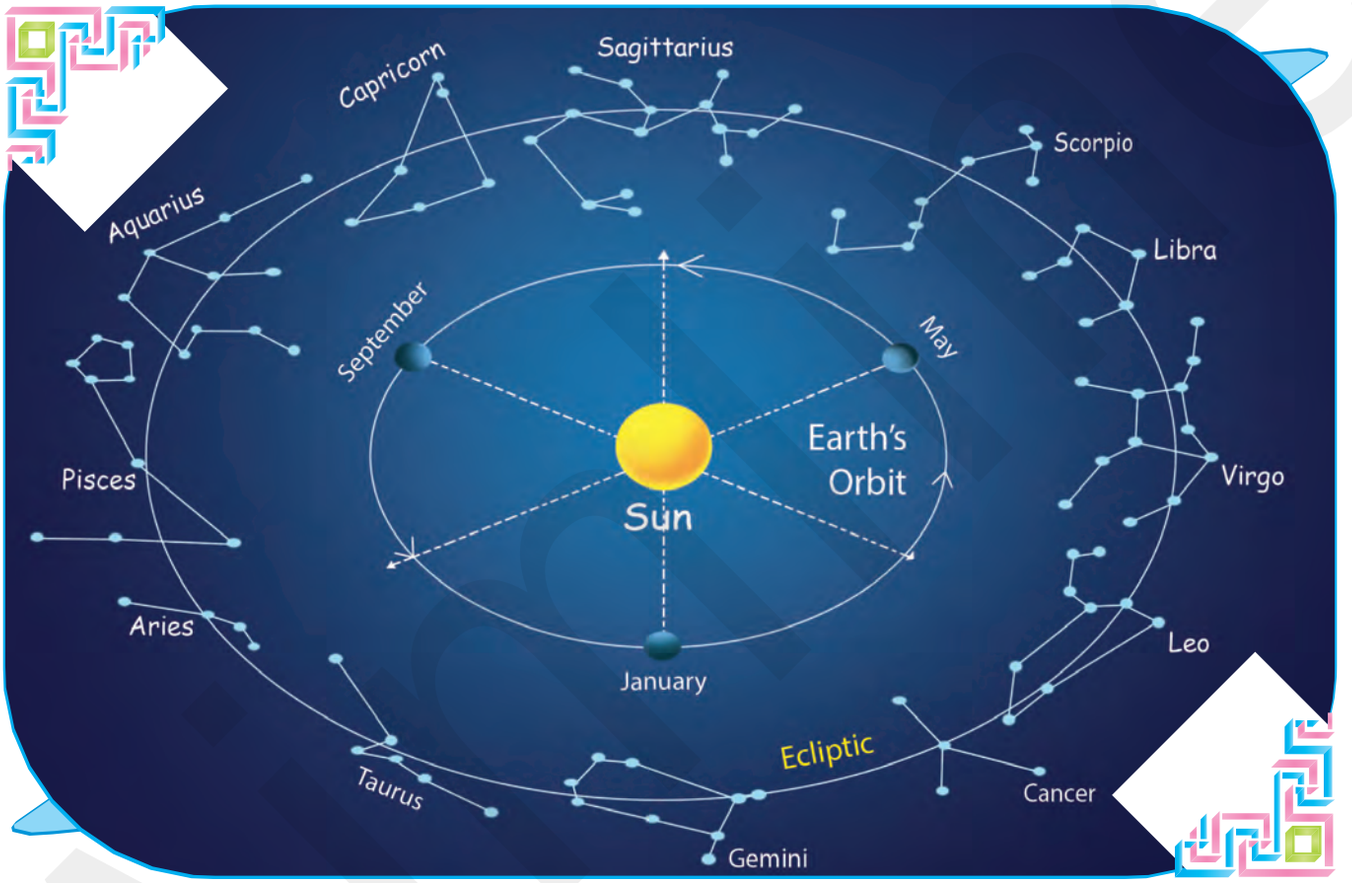
The universe is made up of millions of stars, planets, clouds of dust and gas and vast empty spaces.



Scientists believe that the universe began with a vast explosion called Big Bang about 15 billion years ago. Minutes after the explosion, atomic particles combined together to make the gases helium and hydrogen. Over millions of years, these gases formed the universe and all the stars and galaxies within it. Even parts of the universe are still forming.

## Let us now learn about universe.

Everything that exists is the universe, is what we have learnt. The earth on which we live is also a part of the universe. Similarly the sun, the moon and the stars are also a part of the universe. If we look at the sky in the night, we can see a galaxy of stars twinkling. A star is a hot ball of gases. Stars emit their own heat and light. The sun is also a star. There are some stars which are thousand times bigger than the sun. Stars are grouped by our ancestors under different names. These groups of stars are called Constellations. These groups are named after animals and ancient heroes.



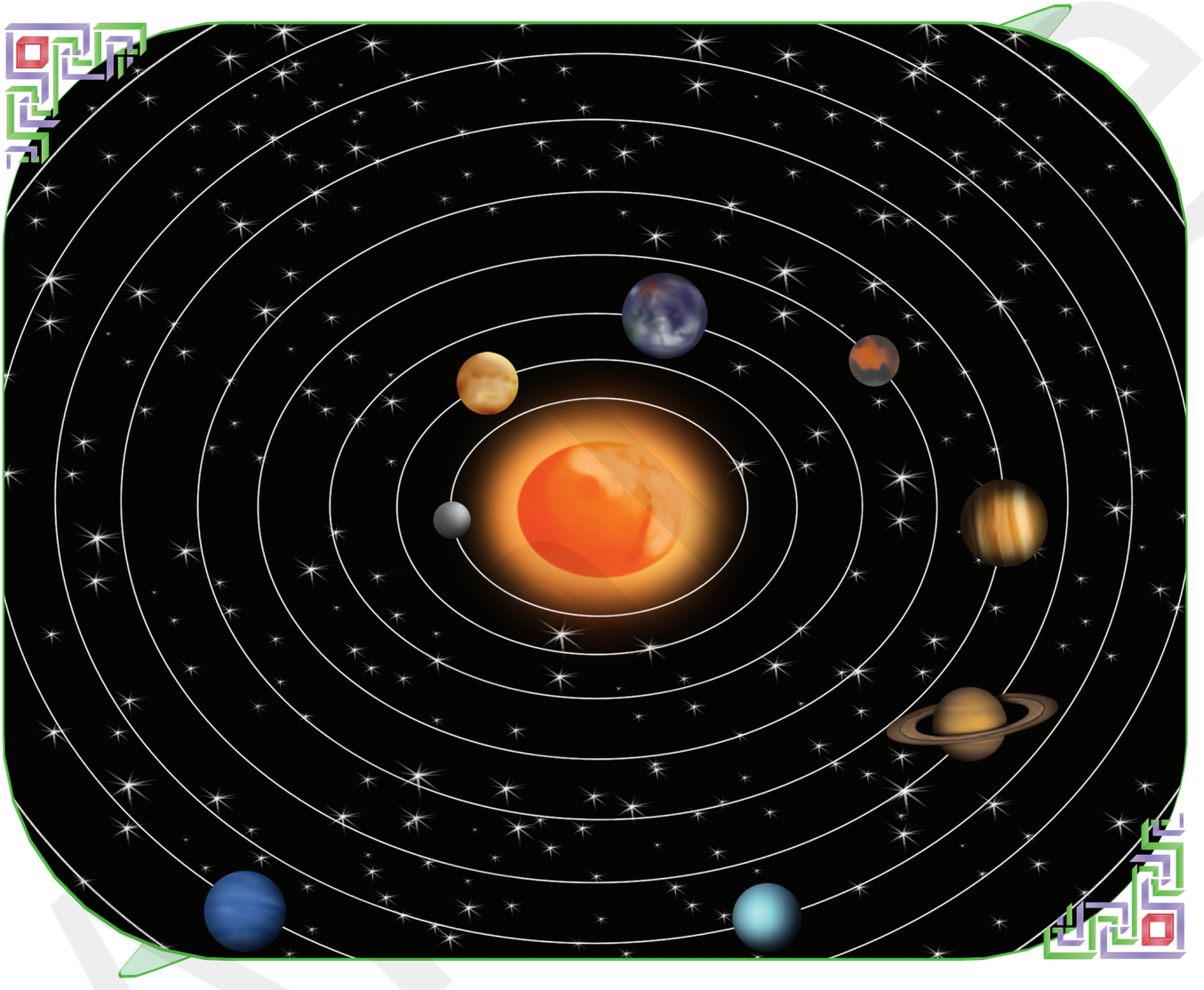

The constellations change their position in the sky. They move from east to west. Ursa Major, Orion, Big Dipper and Cancer are some examples of constellations.

## The Sun

The sun is also a star. It is a giant ball of hot glowing gases. It is the nearest star to the earth, that is why we get enough heat and light from it. The other stars are far away from the earth. So they look very small.

## The Solar System

The sun and the eight planets that revolve around it form the solar system. The word 'planet' means 'wanderer'. Planets do not emit light of their own. They only reflect the sunlight. These planets are made up of rocks, metals and gases. They are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. All the planets in the solar system revolve around the sun in their own orbits but in the same direction.



The path that a planet takes to revolve around the sun is called an orbit. Besides these stars and planets there are many other heavenly bodies called satellites. Satellites move around the planets. They do not possess light of their own. They reflect the light from the sun. The moon is the natural satellite of the earth. The moon takes 27 days to orbit the earth. The satellites of planets are called moons.

## Now let us learn more about the planets.

1. **Mercury** : It is the nearest planet to the sun. It is the hottest planet of all. It takes 88 days to orbit the sun. It has no moons. We can see it with the naked eyes.
2. **Venus** : It takes 225 days to orbit the sun. It is the brightest of all planets. It has no moons. It is also known as the morning star.
3. **Earth** : Earth is the only planet that supports life. It takes 365¼ days to orbit the sun. It has only one satellite, that is the moon.
4. **Mars** : It is red in colour. It takes 687 days to orbit the sun. It has two moons.
5. **Jupiter** : It is the largest planet in the solar system. It takes 12 years to orbit the sun. Jupiter has 16 moons. It can be easily seen with the naked eyes.
6. **Saturn** : It is characterised by rings. It takes 29½ years to orbit the sun. It has more than 18 moons, more than any other planet in the solar system. It can be seen with the naked eyes.
7. **Uranus** : It takes 84 years to orbit the sun. It has 15 moons. It can be seen with the naked eyes.
8. **Neptune** : It takes 165 years to orbit the sun. It has 8 moons.

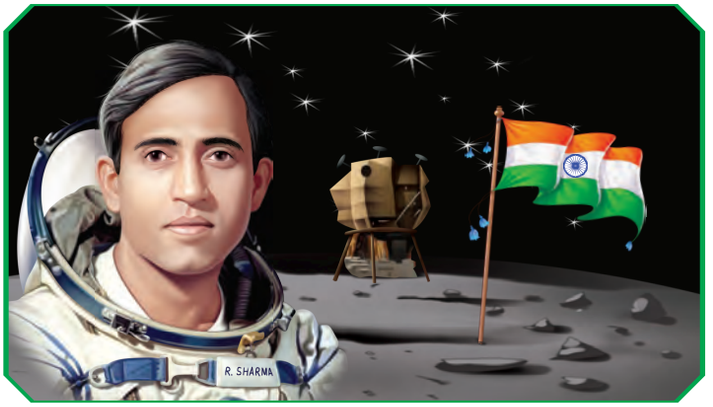
## Artificial satellites

Satellites launched by man, that revolve around the earth and collect data and information about various things, are called artificial satellites. Sputnik–I was the first artificial satellite launched by man. It was launched by Russia on October 4, 1957. Now there are hundreds of artificial satellites in the sky launched by different countries.

These artificial satellites are used for various purposes such as weather forecasting, education, communication and transmission of the television programmes.

India also launched many artificial satellites namely Aryabhatta, Rohini, Insat–IB, Insat–IC, PSLVs (Polar Satellite Launch Vehicles) and GSLVs (Geo–Synchronus Satellite Launch Vehicles).

Rockets are used to carry satellites and other things into space.




The first man who landed on the moon was Neil Armstrong, an American. Rakesh Sharma was the first Indian who went into space.

## Facts to know

- Scientists have given name 'sol' to the sun. That's why, our system of planets is called solar system.
- Milky Way is our galaxy which is spiral in shape.
- The Russian astronaut, Yuri Gagarin, was the first man to orbit the earth in a spacecraft.
- The first woman who went around the earth in a spacecraft was a Russian woman, Valentina Tereshkova.

## LET'S RECALL

1. Universe is the everything that exists.
2. The sun, the earth and the stars, all are the part of universe.
3. Group of stars are called constellations.
4. The sun and the eight planets which revolve round it, together form the solar system.
5. Planets revolve around the sun in their own orbits but in the same direction.
6. Mercury is the nearest and Neptune is the farthest planet from the sun. Earth is the third nearest planet to the sun.
7. Artificial satellites are used for weather forecasting, education, communication, transmission of television programmes and for various other purposes.

**Word Power**

| | | |
|---|---|---|
| explosion | : | a sudden bursting |
| forecasting | : | predicting |
| galaxy | : | the Milky Way in the sky |
| launch | : | to start |
| wanderer | : | who moves without a definite destination (a planet is called a wanderer yet it has a definite path ) |


## Cross Curriculum Connect

**1. Answer the following questions in short.**

a. Name the planets of the solar system.

b. What are artificial satellites ?

c. What is big bang ?

**2. Fill in the blanks.**

morning star  orbit  sun  sputnik-I  constellations

a. ..... was the first artificial satellite launched by man.

b. Groups of stars are called ..... .

c. We get light and heat from the ..... .

d. The path that a planet takes to resolve around the sun is called an ..... .

e. Planet Venus is also known as ..... .

**3. Answer the following questions.**

a. What are the group of stars called?

b. What constitute the solar system?

c. Which is the hottest planet of all?

## 4. Tick (✓) the right and cross (×) the wrong statements.

a. Earth is the only planet that supports life. ☐

b. Jupiter is the smallest planet in the solar system. ☐

c. Neptune takes the longest time to revolve around the sun. ☐

d. Yuri Gagarin was the first man to land on the moon. ☐

e. Earth has only one moon. ☐

## 5. Multiple choice questions

a. This is the nearest star to the earth.

(i) Sun ☐ (ii) Moon ☐

(iii) Saturn ☐

b. The word planet means .....

(i) wanderer ☐ (ii) star ☐

(iii) moon ☐

c. This is the brightest planet in the solar system.

(i) Mercury ☐ (ii) Venus ☐

(iii) Earth ☐

d. The following planet has the highest number of moons.

(i) Jupiter ☐ (ii) Saturn ☐

(iii) Uranus ☐

e. This is the coldest of all planets.

(i) Earth ☐ (ii) Uranus ☐

(iii) Neptune ☐

## 6. Give one word for each one of the following.

a. It is also called morning star. .....

b. It is a hot ball of gases. .....

c. It is natural satellite of the earth. .....

## 7. Match the columns.

| Column A | | Column B |
|---|---|---|
| a. Big Dipper | (i) | the largest planet in the solar system |
| b. Sun | (ii) | characterised by rings |
| c. Mercury | (iii) | nearest to the earth |
| d. Mars | (iv) | a constellation |
| e. Jupiter | (v) | the red planet |
| f. Saturn | (vi) | the hottest planet |

### Activity Time

Make a model of the solar system using a flat cardboard as the universe, ping-pong balls of different sizes as the sun and the planets and wool to make the orbits. Make it colourful and exhibit it in your science laboratory.

### HOTS

A friend of yours lives in America. You called your friend on phone in the afternoon, but he was sleeping there. Can you guess, why ?

### project Time

Take a globe and place it on a table. Place a table lamp in front of it. Rotate the globe slowly. Observe that the part that faces the lamp has day and the part behind it has night. This will help you understand why it is day in India and night in America.

9

# Work, Force and Energy

**Learning Objectives**

1. Force and its types
2. Work and machines
3. Energy and its sources

## VARIOUS TYPES OF MACHINES

- Liver
- Pulley
- Wheel and axle
- Inclined plane
- Screw
- Wedge

## FORCE

In our daily life, we lift, pull or push things.

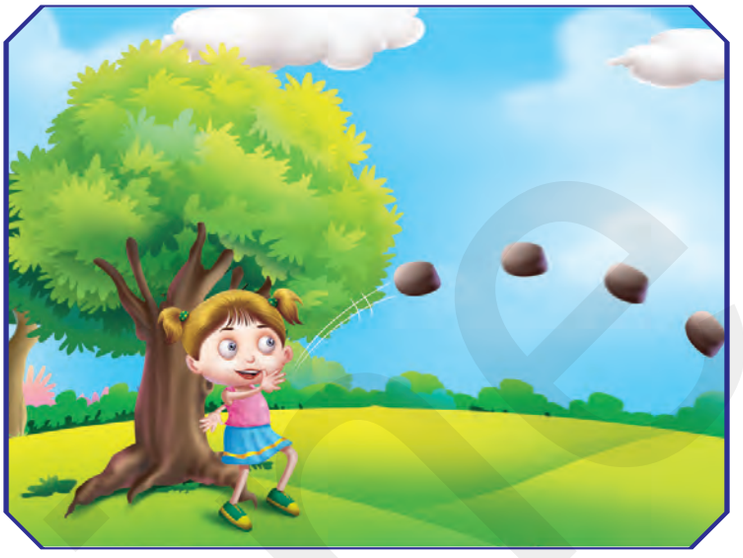
A pull or a push acting on an object is called force.

We can move objects or change their shapes by applying force.

The picture below shows Meena and her friends enjoying their summer holidays. The children are playing foot ball and skipping the rope. Circle the children who are applying a force.

Force may cause an object to stop or start moving, to change its position or direction or to increase or decrease its speed. In nature, there are two types of forces that are acting all the time : gravity and friction.

## Gravity



Everyday, we see several examples of the force of gravity around us. What happens when we throw a stone up into the air? It first rises, stops and then falls back to the ground. Why does it fall back? Why doesn't it keep on going up? This is because of the force of gravity. The force that pulls objects downwards towards the centre of the earth is called gravity.

When you throw the stone up, you throw it with a lot of force—more than the force of gravity. So it rises. As the stone moves up, it loses this force and then gravity pulls it down.

Similarly, you see leaves falling towards the ground and the ripe fruits always fall downwards on their own, unless they are plucked. All of these happen due to the force of gravity.

## Friction

Reena is pushing her ruler on the table. Every time she pushes the ruler, it stops after moving a certain distance. Why does the ruler stop ? It stops because of the friction. When as object moves on a surface, a force, called force of friction, acts between the object and the surface. This force resists the motion of the object and the object either slows down or stops moving.

If there was no friction, anything that started moving would never stop and if there was too much friction, nothing would move.

Generally, smooth materials like glass or ice cause less friction while rough materials like a carpet produce more friction.

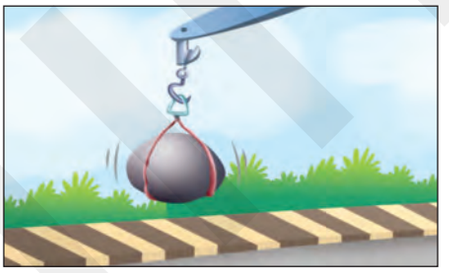
# WORK AND MACHINES

How many times do you use the word 'work'? The 'work' is the most commonly used word in our daily life. However, in science, work has a very precise meaning. Let us look at the following examples.

Rohit and Akhil are using force which is an activity. What do you think will be the result ? Rohit may be able to move the box to a certain distance. However, the wall will not move even though Akhil might apply greater force.

According to science, Rohit is doing work, whereas Akhil is not doing any work. Therefore, we can say work is done only if a force exerted on an object moves it in the direction of the force.

Look at the pictures given below carefully. A man is trying to move the rock off the road. Can he do it with out any help ? No, however a crane can do it easily.

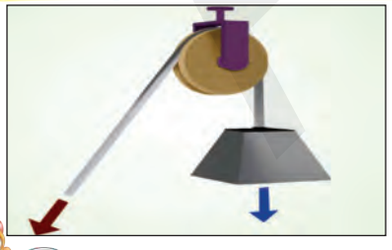


When work is difficult to do with our hands, we may use tools called machines. Machines make our tasks easy. There are some simple machines that we use in our everyday life. Let us learn about these machines.

## Lever

A lever is an ordinary machine which is used to lift or move heavy weights, cut things, or open the lid of a tin. A pair of scissors is an example of a lever. When we use a spoon handle to open the lid of a tin, the spoon acts as a lever.

## Pulley



A pulley is a machine which has a grooved wheel and a rope running between the grooves of the wheel.

## Wheel and Axle

Can you name some things that have wheels ? Almost all vehicles have wheels. The wheels have a rod connected to it. This rod is called the axle. The axle moves the wheel. Moving heavy objects becomes easy with the help of wheel and axle.

## Inclined Plane

An inclined plane is a sloping surface which is used to push or pull heavy objects to a certain height. A strong, smooth board placed at an angle can be used as an inclined plane. You must have seen heavy cartons being loaded onto a truck by pushing the carton up an inclined board.

## Screws

A screw is actually an inclined plane wrapped around a cylinder that has a sharp pointed end. Screws are tightened or loosened with the help of a screwdriver. As they rotate they also move forward. So, they help to attach things to each other.

## Wedge

A wedge has at least one slanting surface ending in a sharp edge. This helps to cut things. A good example is an axe with which we can cut wood.

# ENERGY AND ITS SOURCES

We are able to work only when we have energy. Energy is the ability to do work.

We need energy to do any kind of work right from the basic things like walking, reading and talking, to the difficult tasks like lifting, carrying and climbing.

Energy exists in various forms, such as chemical, mechanical, heat, light, electrical, magnetic and sound energy. Energy can be changed easily from one form to another.

## Sources of energy

### 1. Sun

The main source of all energy on earth is the sun. The energy that we get from the sun is called solar energy.

Plants use solar energy to make food in the green leaves. Food has energy stored in the chemical form.

We get heat and light energy from the sun. Solar energy can also be used to generate electricity.

## 2. Wind

Movement of air around us is called wind. Any object that is moving has energy in it. Energy of the wind can turn windmills, which in turn can move other machines called turbines, which then help to produce electrical energy.

## 3. Water

Moving water too has a lot of energy in it. To use this energy we build dams. Dams allow the water to fall with force, from a height, onto the turbines. Turbines then move and help to produce electrical energy.

### LET'S RECALL

1. A pull or a push acting on an object is called force.
2. There are two main types of forces in nature-gravity and friction.
3. Machines make our work easier.
4. There are different types of simple machines, like the inclined plane, the screw etc.
5. The ability to do work is called energy.
6. Energy exists in various forms : heat, light, sound, electrical, mechanical and chemical.
7. Some sources of energy are the sun, wind and water.

**Word Power**

| | | |
|---|---|---|
| groove | : | a hollow cut of 'V' shape, made on the surface |
| inclined | : | at an angle to the horizontal position |
| tightened | : | to make something fixed firmly |
| loosened | : | not tied up |
| windmill | : | a machine which runs on the energy by air |
| screw driver | : | a special tool to turn a screw |


## Cross Curriculum Connect

**1. Answer the following questions in short.**

a. What is a wedge? Give a simple example.

b. Define energy. Name some forms in which energy exists.

c. How is wind energy useful?

**2. Fill in the blanks.**

machines force more liver wind

a. We can move an object by applying ..... .

b. Friction will be ..... on a rough surface.

c. ..... make our life easy.

d. Scissors are an example of a ..... .

e. Windmills use ..... energy.

**3. Answer the following questions.**

a. What is force? Why is it necessary?

b. What is gravity?

c. What is the force of friction? How is it useful?

d. How is work defined in science?

e. What type of simple machine would you find in a car?

## 4. Tick (✓) the right and cross (×) the wrong statements.

a. Everything that is thrown up need not fall to the ground. ☐
b. Work will be done only if force is applied. ☐
c. All machines are levers. ☐
d. To draw water from the well, a pulley is used. ☐
e. Screw are simple machines. ☐
f. Water energy can be used to produce electrical energy. ☐

## 5. Multiple choice questions

a. What are the forms of energy ?
(i) Chemical, mechanical ☐ (ii) Heat, light ☐
(iii) Electrical, magnetic and sound energy ☐ (iv) all of these ☐

b. What are the sources of energy ?
(i) Sun ☐ (ii) Wind ☐
(iii) Water ☐ (iv) all of these ☐

c. Which is the incorrect statement ?
(i) The main source of energy is sun. ☐
(ii) The earth is the main source of energy. ☐
(iii) The moon is the main source of energy. ☐

d. Which is the incorrect statement ?
(i) Machines make our task easy. ☐
(ii) The force that pulls objects downwards towards the centre of the earth is called gravity. ☐
(iii) Sun is not the source of energy. ☐

## 6. Give one word for each one of the following.

a. The force that pulls objects downwards : .....
b. The force that resists the motion of objects : .....
c. An ordinary machine : .....
d. The main sources of all energy : .....
e. The ability to do work : .....

## Activity Time

To show that a screw is an inclined plane wrapped around a cylinder.

Materials required : paper, pencil, sketch pen and scissors

Method :

1. Cut a square paper in two pieces diagonally.
2. Draw a line along the longest side of one of the triangles with the sketch pen.
3. Now place the triangle such that the shortest side is closest to the side of the pencil.
4. Wrap the triangle around the pencil by rolling the pencil.
5. You will see that you have a screw.

## HOTS

1. You are doing your home work and your brother is playing the cricket. Which action needs more energy ?
2. You can tear paper with your hands as well as using scissors. Which way is advised and why ?

## project Time

1. On a map of India, locate important dams and the names of rivers across which they are built.
2. Find out which country is famous for windmills. Spot the country on a world map.
3. Take a plastic scale and rub it against your hairs. Now bring it close to small bits of paper. You see that the bits of paper are attracted towards scale and stick to it for sometime. Find the reason.

# Revision Test Paper - I

**(Based on Chapters 1 to 3)** Max. Marks : 10

## 1. Multiple Choice Questions (MCQs) 2

**Tick (✓) the correct option.**

a. Trees provide us wood for the ..... .

(i) fuel ☐ (ii) furniture ☐

(iii) tools ☐ (iv) all of these ☐

b. Extra food is stored in various parts of the plant like the ..... .

(i) leaves, stems, root ☐ (ii) flowers ☐

(iii) branches ☐ (iv) all of these ☐

## 2. Give one word for each one of the following. 2

a. Extra food stored in plants. .....

b. The animal which survives in deserts without taking food and water

.....

## 3. Tick (✓) the right and cross (×) the wrong statements. 3

a. Blue whale is the largest land animal. ☐

b. Aquatic plants are plants that live in water. ☐

c. Animals also migrate or hibernate to survive in cold weather conditions. ☐

## 4. Match the columns. 3

| Column A | Column B |
|---|---|
| a. Green plants | (i) Small pores in the leaves |
| b. Stomata | (ii) Lay eggs |
| c. Frog | (iii) Makes their own food |

# Revision Test Paper - II

**(Based on Chapters 4 to 6)** Max. Marks : 10

## 1. Multiple Choice Questions (MCQs) 2

**Tick (✓) the correct option.**

a. Anaemia is caused by ..... .

(i) lack of iron ☐ (ii) lack of vitamins ☐

(iii) lack of proteins ☐ (iv) none of these ☐

b. What are the main states of matter ?

(i) Solid ☐ (ii) Gas ☐

(iii) Liquid ☐ (iv) All of these ☐

## 2. Give one word for each one of the following. 2

a. A part of the road with white stripes where pedestrians cross the road .....

b. A substance essential for a living thing to live and grow .....

## 3. Tick (✓) the right and cross (×) the wrong statements. 3

a. Accidents can be avoided on the roads by following the traffic rules. ☐

b. We can touch electrical appliances with wet hands. ☐

c. The transformation of water vapours into water by heat of the sun is called evaporation. ☐

## 4. Match the columns. 3

| Column A | Column B |
|---|---|
| a. Energy | (i) On the footpath |
| b. Prevention | (ii) The ability to be very active |
| c. Always walk | (iii) Is better than cure |

# Revision Test Paper - III

**(Based on Chapters 7 to 9)** Max. Marks : 10

## 1. Multiple Choice Questions (MCQs) 2

**Tick (✓) the correct option.**

a. The ..... is the coldest of all the planets.

(i) Earth ☐ (ii) Uranus ☐

(iii) Neptune ☐ (iv) Mercury ☐

b. What are the sources of energy?

(i) The Sun ☐ (ii) Wind ☐

(iii) Water ☐ (iv) All of these ☐

## 2. Give one word for each one of the following. 2

a. A gas which protects from the ultra violet rays of the sun. .....

b. The ability to do work .....

## 3. Tick (✓) the right and cross (×) the wrong statements. 3

a. Pollution makes the air, water and land dirty.

b. All machines are levers.

c. Jupiter is the only planet that supports life.

## 4. Match the columns. 3

| Column A | Column B |
|---|---|
| a. Clean fuel | (i) The largest sense organ |
| b. Skin | (ii) Constellations |
| c. Groups of stars | (iii) CNG |

# Model Test Paper - I

**1. Answer the questions given below.**

a. Write a note on the structure of a leaf.

b. Write the different kind of reproduction processes of animals with examples.

c. What are the steps that should be taken to avoid accidents?

**2. Fill in the blanks with suitable words.**

terrestrial chlorophyll frogs

a. The green pigment present in leaves is called ..... .

b. ..... lay eggs.

c. Animals that live on land are called ..... animals.

**3. Tick (✓) the right and cross (×) the wrong statements.**

a. The process of taking sunlight by plants is known as photosynthesis. ☐

b. A bat gives egg on land. ☐

c. We can avoid accidents by following the traffic rules. ☐

**4. Multiple choice questions**

a. Which one of the following makes the leaves to look green?

(i) Starch ☐ (ii) Chlorophyll ☐

(iii) Phloem ☐ (iv) Stalk ☐

b. What do we need to gain energy to work ?

(i) Fats ☐ (ii) Proteins ☐

(iii) Carbohydrates ☐ (iv) None of these ☐

**5. Answer the following questions in one word each.**

a. The process in which plants make their food taking light from sun, water from soil and carbon dioxide from air is called ..... .

b. What do we call the place where animals live? .....

c. What are those animals called that live sometimes in water and sometimes on land? .....

d. Which is the animals that can live without and water for many day? .....

**6. Match the columns.**

| Column A | | Column B |
|---|---|---|
| a. Starch | (i) | plant of the grass family |
| b. Wheat | (ii) | fibre present in the food |
| c. Crocodile | (iii) | food stored in plants |
| d. Roughage | (iv) | amphibian |

# Model Test paper - II

## 1. Answer the questions given below.

a. What does 'Global Warming' means?

b. What do you understand by 'Sublimation'?

c. Why the sun is important in our lives?

d. What are the different types of pollution?

e. What is gravity? Explain.

## 2. Fill in the blanks with suitable words.

ozone  constellations  gravity  sedimentation

a. The way of purifying water is ..... .

b. ..... layers protects us from the harmful ultra violet rays of the Sun.

c. The group of stars are known as ..... .

d. The force that attracts objects downwards towards the centre of the eath is called ..... .

## 3. Tick (✓) the right and cross (×) the wrong statements.

a. There are some stars which are thousand times bigger that the sun. ☐

b. The earth moves around the moon. ☐

c. The excessive carbon dioxide led to global warming. ☐

## 4. Multiple choice questions

a. Sedimentation, decantation and filtration are the process of purifying ..... .

(i) oil ☐  (ii) water ☐

(iii) both (a) and (b) ☐  (iv) neither (a) nor (b) ☐

b. Which of the following is not an example of constellation ?

(i) Ursa major ☐ (ii) Orion ☐

(iii) Cancer ☐ (iv) Jupiter ☐

c. Who was the first Indian who went into space ?

(i) Kalpana Chawla ☐ (ii) Rakesh Sharma ☐

(iii) Neil Armstrong ☐ (iv) None of these ☐

d. All objects fall back on the earth because of ..... .

(i) friction ☐ (ii) gravity ☐

(iii) air ☐ (iv) none of these ☐

## 5. Answer the following questions in one word each.

a. When we mix sugar with water, sugar dissolves in a liquid. In this case which is a solute?

b. The Earth moves on its axis. What is this movement called?

c. When something is burnt it releases carbon dioxide. What does it lead to?

d. Which planet is the nearest to the Sun?

e. What is the main source of energy on the Earth?

## 6. Match the columns.

| Column A | | Column B |
|---|---|---|
| a. Saturation | (i) | the extreme points |
| b. Ozone | (ii) | first satellite launched by man |
| c. Sputnic - I | (iii) | the first man who landed on the moon |
| d. Neil Aronstrong | (iv) | thin layer of invisible gas in the atmosphere |

## ACTIVITY-1

To learn the chief things supplied by fruits, vegetables and cereals.

**Materials required** : one Apple, one orange, 20 grains of wheat, 20 grains of rice, two leaves of spinach, 20 grains of lentil (daal) and one cup of sugarcane juice.

**Procedure** :

1. Show them to your teacher and ask her what they give to you (as a chief product).
2. Now, complete this table.

| S No. | Item | Category | Chief thing we get from it | Next thing we get from it |
|---|---|---|---|---|
| 1. | Orange | fruit | Vitamin C | Sugar |
| 2. | Apple | | | |
| 3. | Wheat | | | |
| 4. | Rice | | | |
| 5. | Spinach | | | |
| 6. | Lentil | | | |
| 7. | Sugarcane | | | |

**Conclusion** : This shoes that different types of food item give us different types of nutrient.

## ACTIVITY-2

To prove that liquid food can be preserved by boiling it.

**Materials required** : Two cups full of milk, one burner (in lab), one pan, one towel, two small plates, one stand

**Procedure** :

1. Pour one cup of milk in the pan.
2. Put the pan on the stand. The burner is below the stand.
3. Let the lab assistant light up the burner. You keep away from it.
4. The lab assistant will boil the milk for you and pour it back into the cup.
5. Keep the other cup as it is and do not boil its milk cover the cup with small plates.
6. Come back to the lab after two days.
7. Which cup's milk turned sour ?


**Conclusion** : We conclude that the boiled liquid food (milk in this case) can survive for a long period in comparison to the unboiled liquid food (milk in this case) that was not boiled.

# Protect Your Environment

Apparently Going Green seems to be related to plants, trees and other flora and fauna but it means different to different people. To some people, it means an environment friendly surrounding while for others, it means living such a life which is not harmful for the health of other creatures. Going Green means using such products that are not an environmental hazard.

1. We should use such green products which are eco-friedly too. Make sure that their packaging must be biodegradable and they should not contain phosphate, chlorine, artificial smell or colour.



2. We can use solar water heater in place of other methods of heating water. For the full benefits of a solar heater, we must have an open area that has a proper exposure to the Sun to collect the Sun rays.

3. Our home should be the safest, cleanest and healthiest place in the whole world.

What is good for our home is always good for the Earth and every one living on it. Some of the good cleaners are as follows :

- Always use nontoxic, natural, biodegradable, hypoallergenic products in your home.
- Open your windows to allow fresh air to come in.
- Use indoor plants. Besides being beautiful they can absorb dirty smells and gases from the air inside.

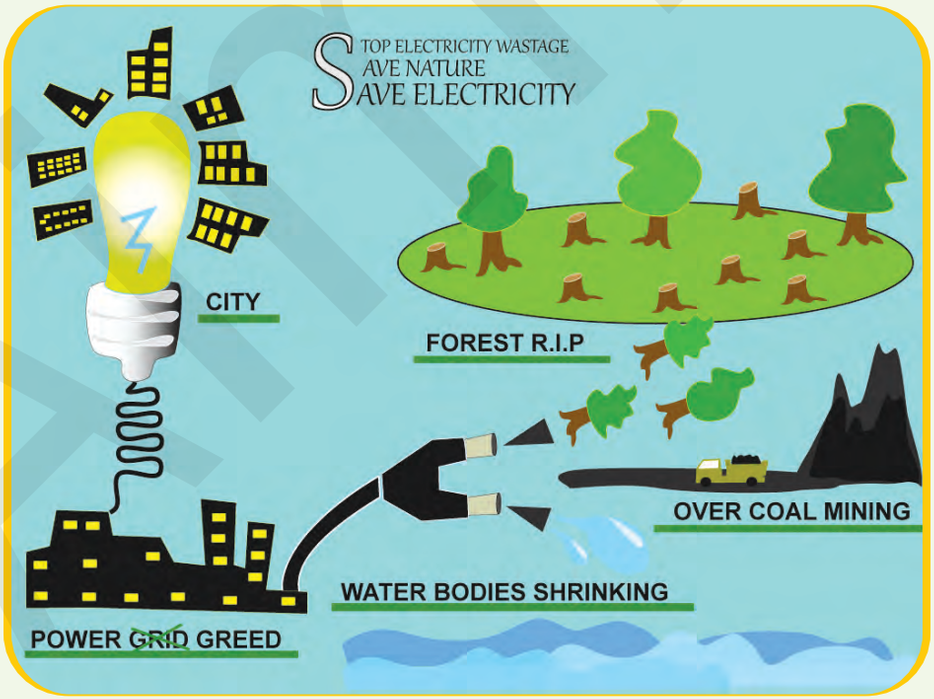
4. Do not use those fruits and vegetables which are grown by using quite a good amount of pesticide. It may cause disabilities among your children.
5. Avoid using such soaps and toothpastes that have a chemical like triclosan. It can harm your body.
6. Use flea pills for your dog and cat, other than flea collars or powders.
7. Use CFL in place of bulbs. Switch of the TV and computer from the plug and keep the computer on sleep mode when not in use.


8. Travel by train rather than by a flight. An average jet plane pumps one ton of carbon-dioxide in the air for every passenger it carries from Kolkata to Mumbai.

9. Avoid products such as paper towels, tissue paper, coffee filters as they are chlorinated. Studies have revealed that these sort of products finally lead to cancer. Recycled tissue papers could be useful in this regard. They can be helpful to curb global warming and can save forests, water and a lot of energy.

10. Reduce, Reuse and Recycle is a good habit. The packaging material can be reused saving more energy than recycling. If you use dishwasher, only run it when it is full. Dispose of the oils, old and dried paints and chemicals to a proper disposal site. Never throw them in the dustbins.


Teach the children and teenagers to care for everything they do, it should be eco-friendly.




Conserve Electricity