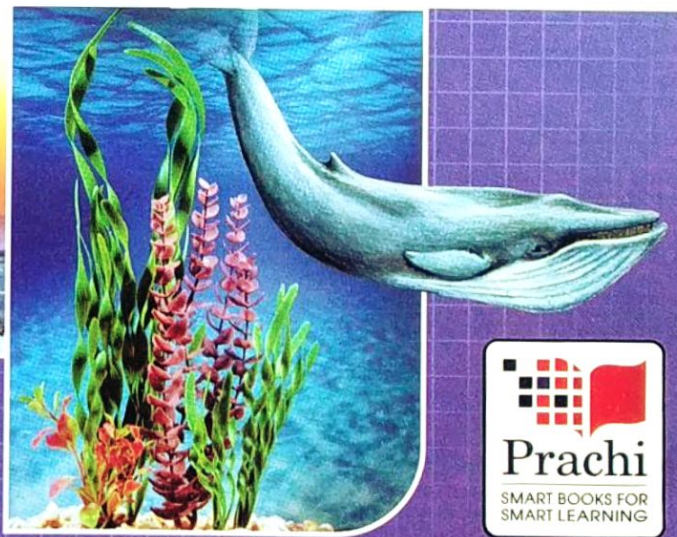
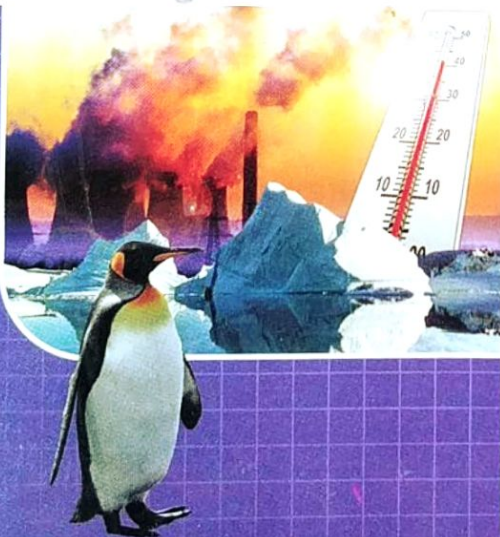
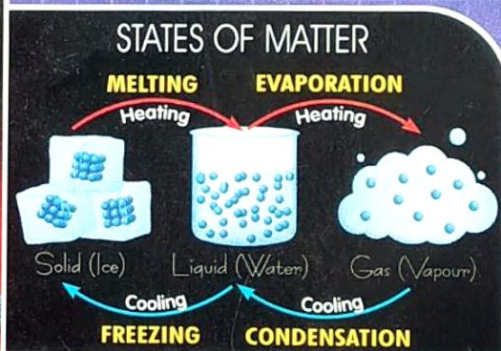


PRACHI

Based on the Latest Syllabus

Science in Life Today

5



PRACHI

Science *in* **LIFE TODAY**

5



Dr. J.P. Sharma
M.Sc., Ph.D

Neetu Tewari
M.Sc.(Physics), B.Ed



Prachi [India] Pvt. Ltd.
SMART BOOKS FOR SMART LEARNING

Contents



Unit I : Plants' Life

- | | |
|-------------------|---------|
| 1. Growing Plants | 5 - 13 |
| Info Hub | 14 - 15 |



Unit II : Animals' Life

- | | |
|-----------------|---------|
| 2. Animal World | 16 - 25 |
| Info Hub | 26 - 27 |



Unit III : Human Body and Its Needs

- | | |
|--|---------|
| 3. Bones and Muscles | 28 - 36 |
| Model Test Paper-I (Based on Chapters 1-3) | 37 - 38 |
| 4. Nervous System | 39 - 46 |
| 5. Food, Health and Hygiene | 47 - 57 |
| 6. Safety and First Aid | 58 - 67 |
| Info Hub | 68 - 69 |



Unit IV : Matter and Materials

- | | |
|---|---------|
| 7. Simple Machines | 70 - 77 |
| Model Test Paper-II (Based on Chapters 4-7) | 78 - 79 |
| Sample Paper-I (Based on Chapters 1-7) | 80 - 81 |
| Info Hub | 82 - 83 |



Unit V : Space and Environment

- | | |
|---|-----------|
| 8. Air and Water | 84 - 95 |
| 9. Volcanoes, Earthquakes and Tsunamis | 96 - 103 |
| 10. The Moon and Eclipses | 104 - 111 |
| Model Test Paper-III (Based on Chapters 8-10) | 112 - 113 |
| Info Hub | 114 - 115 |



Unit VI : Natural Resources

- | | |
|---|-----------|
| 11. Rocks and Minerals | 116 - 124 |
| 12. Soil Erosion and Conservation | 125 - 132 |
| 13. Our Environment and Human Activities | 133 - 139 |
| Model Test Paper-IV (Based on Chapters 11-13) | 140 - 141 |
| Sample Paper-II (Based on Chapters 8-13) | 142 - 143 |
| Info Hub | 144 |

Growing Plants



Plants are the most important living organisms on the earth. They give life to all. They grow everywhere. We use plants in many ways. Large number of plants are eaten or destroyed by us every day, still there is plenty of plants because plants continue to grow.

LESSON OBJECTIVE

You will know

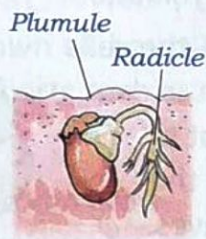
- New plants from seeds
- Other ways of growing plants
- Growth and development in plants

NEW PLANTS FROM SEEDS

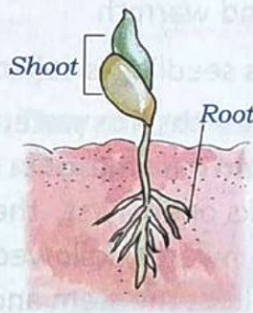
Most plants grow from the seeds. If you sow a seed in the soil, the seed germinates in few days. Within a few days a tiny plant appears that gradually develops into a big plant. This is just like a baby grows into an adult over a certain period of time. But have you ever thought how does a tiny seed convert into a big tree? To know this let us first understand about the parts of a seed.



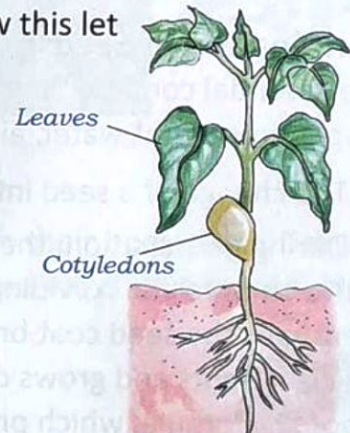
Seed is sown in the soil, where it gets air, water and warmth of the sun



The seed sprouts and a seedling appears after sometime



The seedling develops roots and a shoot



The baby plant grows and leaves appear

Journey from a seed to plant

Parts of a Seed

Take a seed and observe it carefully.

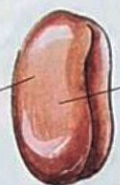
The outer hard covering of the seed is called seed coat.

The seed coat protects the internal delicate parts of the tiny plant called embryo.

You can observe the seed parts by soaking seeds in water for overnight. The swollen seed shows its different parts more clearly.

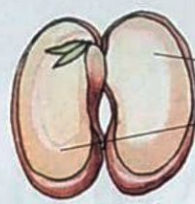
It contains fleshy seed leaves or cotyledons and the baby plant, inside the seed coat.

An outer covering called seed coat protects the baby plant inside the seed.



Outside

The seed coat has a tiny hole through which the seed gets water.



Inside

Seed leaves or cotyledons store food for the baby plant.

Structure of a seed

Some plants have one cotyledon and some have two.

Plants with one cotyledon are called monocot plants while plants with two cotyledons are called dicot plants.



Monocot plants



Dicot plants

Maize, wheat, rice, lily and onion are monocot plants.

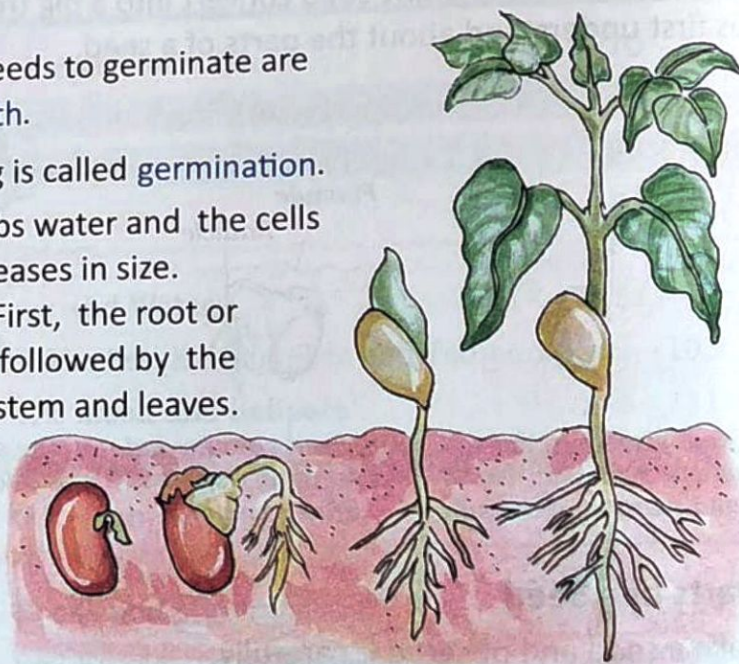
Gram, pea and beans are dicot plants. (Mono-means one and Di-means two).

Germination of Seeds

The essential conditions required for seeds to germinate are proper amount of water, air and warmth.

The change of a seed into a seedling is called germination.

During germination, the seed absorbs water and the cells of the embryo start dividing and it increases in size. Eventually the seed coat breaks open. First, the root or radicle sprouts and grows downwards, followed by the shoot or plumule, which produces the stem and leaves. The seedling grows green leaves and the cotyledons dry up. It soon grows into an adult plant.



Stages of germination

Dispersal of Seeds

The process of scattering seeds away from the mother plant is called dispersal.

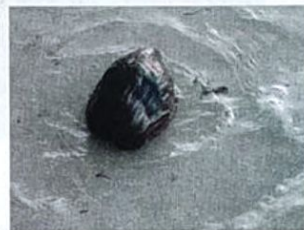
Dispersal is necessary for the better growth of a plant. If all the seeds fall near to the mother plant and start germinating there they would not get enough light, water and space to grow.

The process of dispersal is carried out by animals, birds, water and wind.

- (a) **By wind** : Light, hairy or winged seeds are dispersed by wind.
Seeds of plants like cotton, madar and hiptage disperse through wind.
- (b) **By water** : Plants that grow along river or seashores disperse their seeds through water-currents.
Such seeds have fibrous or spongy parts that float in water. Coconut has fibrous covering while seeds of lotus are spongy.
- (c) **By men, animals and birds** : Men also eat fruits and throw seeds at distant places. Some seeds are not digested by the animals or birds. The undigested seeds are thrown away in animals' or birds' waste.
- (d) **By explosion** : Some fruits on drying break open. Thus, the seeds pop out and get scattered. This is commonly seen in pea, beans and balsam.



Seeds dispersed by wind



Seeds dispersed by water



Seeds dispersed by men, animal and birds

OTHER WAYS OF GROWING PLANTS

Some plants can be grown without seeds. They can grow from their body parts. Growing plants from their body parts such as root, stem or leaf is called **vegetative reproduction**.

From Roots

Carrot and sweet potato can grow into new plants from their roots.



Sweet potato



Carrot



Rose cutting

From Stem

Many plants like rose, money plant, sugarcane can be grown from stem cuttings.

From Underground Stem

Potato, an underground stem has buds called **eyes** which gives rise to new plants.



Potato with eyes



Bryophyllum leaf

From Leaves

Some leaves like bryophyllum grow new plants on its edges. These plantlets fall off and grow into new plants.

From Spores

Some plants such as fern and fungi do not have flowers. They produce their spores, each of which grows into a new plant.



Spores in fungi



spores in fern

GROWTH AND DEVELOPMENT IN PLANTS

Growth and development of plants depend on different kinds of soils, climates and seasons.

Soil

Soil is one of the important factors for growing plants. Some plants grow well in one kind of soil but poorly in another. Different plants require different kinds of soil.

For example, rice and jute need soil that can hold enough water like loamy and clayey soil.

Wheat, jowar, bajra are grown in sandy and irrigated soil of Punjab, Uttar Pradesh and Rajasthan.

Cotton plants grow best in the black soil.

Tea plants are grown in moist soil of hilly areas of Assam, Nilgiri and Darjeeling, whereas maize plants grow well in dry soil.

Coconut trees grow only in coastal areas of salty soil.

Climate

Different plants are adapted to different climates too.

The aquatic plants grow in water while the desert plants like cactus grow best in desert areas.

Some plants need heavy rainfalls like rubber, others like conifers are adapted to grow in hilly area where snowfall is a common phenomena.

Coconut trees are adapted to damp and moist climate.



Rubber tree



Coconut tree



Pine tree



Cactus

Plants of different climates

Seasons

Seasons also affect the growth of plants.

Crops that grow in winter are called rabi crops. Wheat and gram are the examples of rabi crops.

Crops that grow in summer are called kharif crops. Rice, jowar and bajra are examples of kharif crops.



Rice



Bajra



Jowar

Kharif crops



Wheat



Gram

Rabi crops

Getting Good Yield from Crops

Besides favourable climatic conditions, plants also require nutrients in the form of manure and chemical fertilizers to improve the growth and crop-yield. The proper development of plants is necessary for better quality and production of cereals, fruits and vegetables.

Dead and decaying plants, animals' wastes and cow dung are common manures. Urea, ammonium sulphates, nitrates and super phosphates are some common chemical fertilizers.

Insecticides and pesticides are the chemicals that are sprayed on the plants to protect them from various insects and pests. D.D.T. and gammaxene are some common insecticides.



Proper care of plants gives good yield

Certain tips for a good and healthy crop yield are as follows :

- ▼ Use healthy and better quality of seeds for sowing.
- ▼ Prepare the land well before sowing.
- ▼ Add manures and fertilizers to the soil.
- ▼ Irrigate the plants properly.
- ▼ Remove weeds from the fields for the proper growth of plants.
- ▼ Use insecticides or pesticides, to keep the plants pest free.

Proper care of plants not only enhances the growth of the plants but also adds health and wealth to the nation. Think how ?



Words to Remember

- | | |
|---------------------|--|
| Seed coat | : the thick outer covering of the seed, which protects the baby plant |
| Cotyledon | : fleshy part of the seed that contains food for the baby plant |
| Insecticides | : chemicals used for killing insects |
| Pesticides | : substances used to kill insects or other organisms harmful to cultivated plants or animals |



Quick Recall

- Plants are very useful to us.
- New plants can be grown from seeds. A seed has a seed coat, seed leaves or cotyledons and a small baby plant inside it.

- Germination is the process of conversion of a seed into a seedling.
- The process of scattering seeds away from the mother plant is called dispersal.
- Plants can also be grown by stem, root, leaves and spores.
- Crops that grow in winter are called rabi crops and crops that grow in summer are called kharif crops.
- Fertilizers and manures enhance the growth of plants.

EXERCISES

A. Choose the correct answer.

1. The outer hard covering of a seed is called
(a) cotyledon (b) seed coat (c) plumule (d) radicle
2. The process of scattering of seeds away from the mother plant is called
(a) germination (b) pollination (c) dispersal (d) reproduction
3. Carrot and sweet potato can grow new plants from their
(a) leaves (b) stems (c) roots (d) seeds
4. Cotton plant grows well in
(a) sandy soil (b) loamy soil
(c) black soil (d) clayey soil
5. The most common plants of deserts are
(a) cactus and prickly pear (b) coconut and rubber
(c) pine and fir (d) neem and banyan
6. Urea, ammonium sulphate, superphosphates are some common
(a) manures (b) fertilizers
(c) organic substances (d) insecticides
7. Wheat and gram are the examples of
(a) rabi crops (b) kharif crops
(c) zaid crops (d) none of these

B. Give short answers.

1. Define germination.
2. What are the necessary conditions for seeds to germinate ?
3. What is the role of cotyledons in the growth of a seedling ?
4. What is vegetative reproduction ?
5. How does soil affect the growth of plants ?

C. Answer the following questions.

1. Name different parts of a seed. Support your answer with a diagram.
2. Explain the three main ways by which new plants can be grown.
3. Which factors affect the growth and development of plants ? Explain briefly.
4. Give five tips for a better crop yield.

D. Give two examples of each.

1. Monocot plants
2. Dicot plants
3. Seeds dispersed by wind
4. Seeds dispersed by water
5. Plants grown from stem cuttings

Higher Order Thinking Skills (HOTS)

1. Sumit brought a coconut plant from Kerala and planted it in his courtyard. The plant was withered after few days. Why ?

[Hint : What kind of climate does a coconut plant need to grow ?]

2. How does proper care of plants add health and wealth to the nation?

[Hint : Proper care of plants will result in good crop yield.]



A. Write T for true or F for false against the given statements.

1. Embryo is the tiny plant inside a seed.
2. Cotyledons contain stored food for new plant.
3. Black soil is good for the growth of cotton and tea plant.
4. Rice, jowar, bajra are the kharif crops that grow in summer.

☐
☐
☐
☐

B. Match the following column A with column B.

Column A

1. Rose
2. Bryophyllum
3. Pea
4. Carrots and beets
5. Potato

Column B

- (a) new plants arise along the edges of the leaf
- (b) grow from root
- (c) grows from buds (eye)
- (d) stem cutting
- (e) explosion

C. Give one word for the following.

1. Baby plant inside the seed
2. Chemicals that enhance the growth of plants
3. Plants that have two cotyledons
4. Crops that grow in winter season



Activity

Project at Home

Collect, mount and label as many kinds of seeds as you can. Soak them overnight and classify them as monocot and dicot.

To observe the necessary conditions for germination.

Take 4 jars. Mark them as A, B, C, D.

Place cotton in jar A and place 3-4 bean seeds on it.

In jar B, place moist cotton and place 3-4 bean seeds on it.

In jar C, place moist cotton and bean seeds and put the jar in a dark room.

In jar D, put moist cotton and 3-4 bean seeds and place it in a refrigerator.

Observe the jars for a few days. In which of the jars will the seeds germinate and why?



ONLY FOR READING

info
hub

Plants' Life

Curiosity Corner

- Plants vary in size from microscopic algae, to huge sequoia trees more than 8 m (26 ft) across their trunk.
- Some parts of a plant are swollen with reserves of starches or sugars. This stored food is used in the next growing season by sprouting shoots.
- Acacias grow on the hot African savannah where there are few other trees. When an animal starts to eat the leaves of an acacia tree, the tree releases unpleasant chemicals. It also gives off a substance called ethylene.

Fun with Science

MAKING CHLOROPHYLL

Take a large leafed plant and fix a piece of paper on one of its leaves. Remove the piece of paper after a few days. You will see a pale patch on the leaf. This is because the paper prevents sunlight from reaching the cells on the leaf, that produce chlorophyll, the substance which makes plants green. Since the cells do not get sunlight, they do not produce chlorophyll and become discoloured.



PHOTO SPEAKS



Cypripedium calceolus

Rarest wild orchid with a lady's slipper-like structure



Coco-de-mer palm seed

The largest seed on the earth weighs upto 20 kg

Amazing SCIENCE FACT

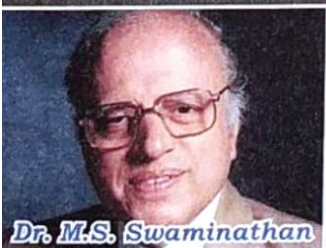
MOST DANGEROUS TREE

The manchineel tree is considered as the world's most dangerous tree. Its bark is covered in sap that causes skin to blister and can blind a person. Even standing under the tree in the rain can cause blisters because the sap will drip on to skin.



NATURAL PEST CONTROL

The nature has its own pest control system. Look for a small tree branch or shrub infested with small green insects. Pluck it and place in a container. Locate a lady bird and place it in the same container. You will see that the lady bird attacks the green flies and eats them.



Dr. M.S. Swaminathan

The man behind 'Green Revolution' in India



Water wheel plant

An insectivorous aquatic plant with traps

Green Gallery

- Excessive use of fertilizers, insecticides and pesticides pollute the soil making it unfit for next crops.
- Personal compost comprises kitchen scraps and yard wastes. It is extremely beneficial for plants and does not pollute the soil.
- Grinded neem seeds soaked in water make an effective eco-friendly insecticide. On mixing with water this can be used for potted plants.
- Spiders are a form of natural pest control as they eat other bugs.



- Agricultural crops like corn, sugar beets, sugarcane, corn stalks and switch grass are grown specifically to produce a chemical liquid named ethanol used as a fuel.

Animal World



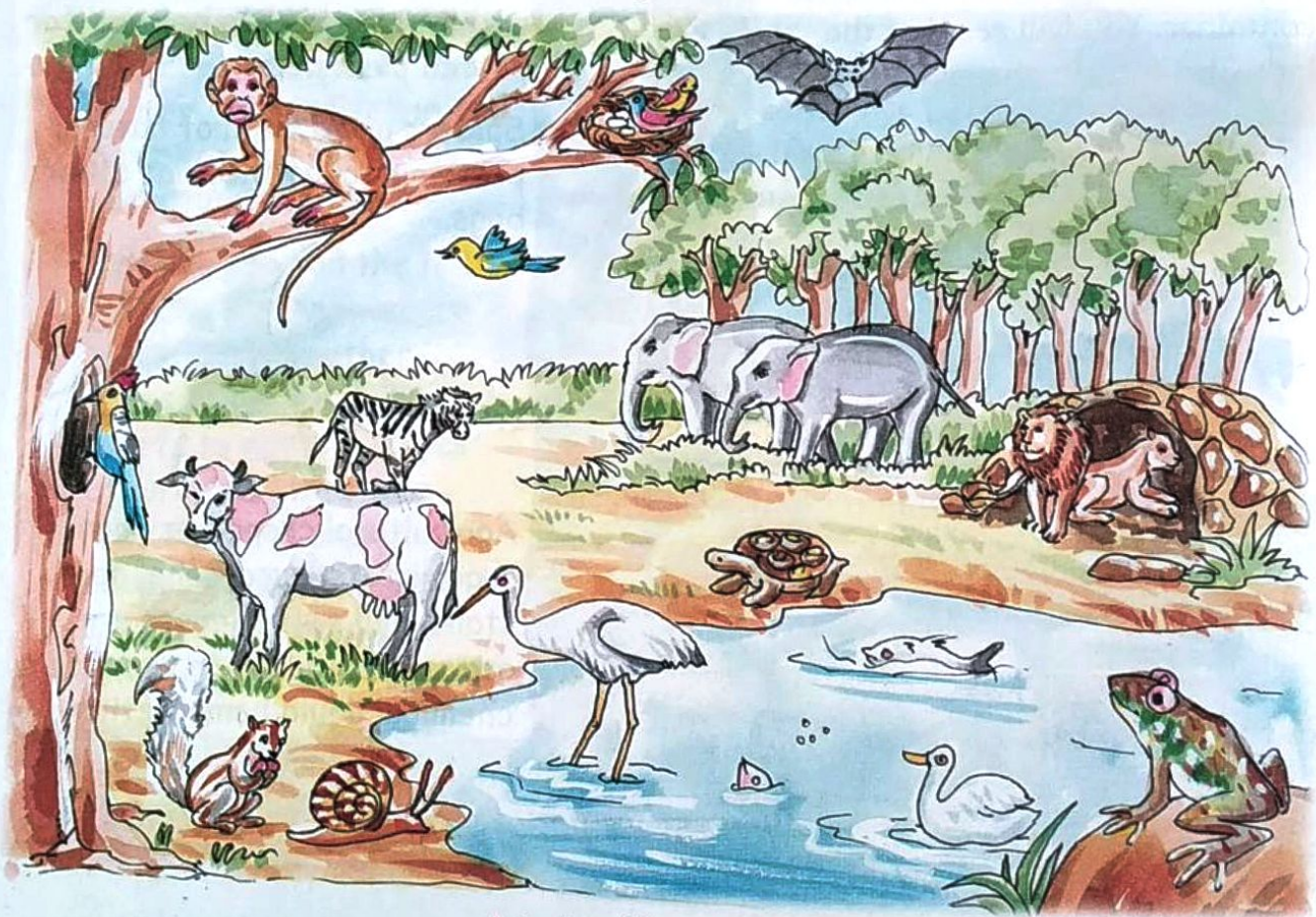
Animals are found in nearly all parts of the earth including land, water, air and trees.

The surroundings in which the animals grow is called their environment. Different animals live in different types of environment. Their food habits, behaviour and body features help them to live in a particular environment. An area where a particular animal naturally lives is called its habitat. Let us know about different features of animals according to their habitats.

LESSON OBJECTIVE

You will know

- Body covering of animals
- Breathing in animals
- Feeding habits
- Movement in animals
- Migration



Animals in different habitats

BODY COVERING OF ANIMALS

Different animals found on the earth have different body coverings. The body covering helps animals to live in a particular habitat.

Let us know about different types of body coverings of some common animals.



Fish Scales

Fish : The body of fish is covered with layers of flexible, overlapping scales. Reptiles like snake, crocodile and lizard also have bodies covered with scales.

Tortoise, Snail and Turtle : These animals are protected by a hard shell. Shell protects them from external danger.



Tortoise



Shell



Bird



Feathers

Birds : Body of birds is covered with feathers. Feathers protect them from cold, rain and help them to fly.

Sheep and Bear : Sheep and bear possess special body covering (called fur and wool respectively) that protect them from extreme cold and rain.



Sheep



Wool

BREATHING IN ANIMALS

All animals need oxygen to breathe in. Oxygen burns the food within the animal's body and releases energy, which an animal uses for various purposes. Animals get oxygen from the air or water that surrounds them. When oxygen combines with food, it releases carbon dioxide and energy. This process is called respiration.

Organs of Breathing

Different animals breathe through different organs.

Tiny organisms like amoeba and paramecium live in water and breathe through their body surface.

Insects breathe through special air holes called spiracles. These are found along the side of the body of the insects.



Air holes in an insect

Aquatic animals like fish, prawns, crabs breathe through gills. Gills have a rich supply of blood vessels. Oxygen from water absorbed by the gills and carbon dioxide is passed out.



Gills of a fish

Amphibians like frogs, salamanders and toads can breathe through their lungs, as well as gills and body surface. A frog breathes through its moist skin, when in water and with its lungs when on land.



Frog

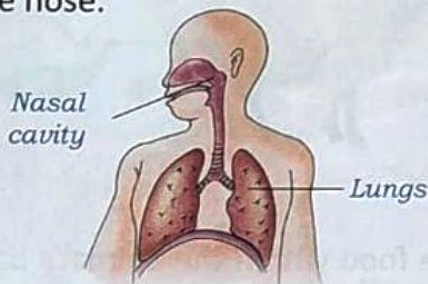


Toad



Salamander

Birds, reptiles and mammals breathe through lungs. The human beings take in air through the nose. The air goes into the lungs through the wind pipe. Lungs are spongy, elastic bags, richly supplied with blood vessels, situated on each side of the heart. At lungs, oxygen from the air passes into the blood and carbon dioxide comes out through the nose.



Human lungs



Lizard and sparrow also breathe through lungs

FEEDING HABITS

All animals require food to grow, to get energy and to stay healthy. The mouth parts of animals are suited to the type of food they eat.

Herbivores or plant eating animals like cow, buffalo, goat and deer have sharp front teeth (incisors) for cutting and biting grass or leaves. They have strong, broad teeth in the back (molars) for grinding food.



Cow, goat, deer are herbivores

Carnivores or flesh eating animals like lion, tiger and wolf have sharp, pointed front teeth to tear flesh. Animals like snake and frog swallow their food.



Lion



Wolf



Snake



Frog

Omnivores are those that eat both plants and flesh of other animals. Examples of omnivores are dog, cat, bear, crow and humans.



Human beings are omnivores



Bear



Crow

Rodents are animals like rabbits, rats and squirrels that gnaw the seeds and fruits with their sharp front teeth.



Rabbit

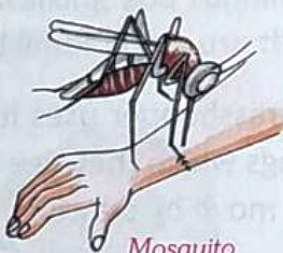


Rat



Squirrel

Insects like mosquitoes and bugs have sharp needle like mouth parts for sucking blood. Butterflies and bees have long slender sucking tubes called proboscis to suck nectar from flowers.



Mosquito



Butterfly



Bee

Frogs and lizards have a long sticky tongue to catch their prey like insects and worms.



Frog



Lizard

Birds have beaks and claws which are modified to the kind of food they eat. Flesh eating birds like eagles, kites have sharp-hooked beak and sharp claws to tear flesh.



Eagle



Vulture

MOVEMENT IN ANIMALS

Animals need to move from place-to-place in search of food, to protect themselves from enemies and to build resting and breeding places.

Organs of Movement

Different animals have different organs for movement.

Aquatic animals have special organs which help them to swim. Fish have fins which are used to move forward. The tail and fins help to change the direction.

Turtles and tortoises have paddle-like limbs which push water and help in swimming.

Frogs have webbed feet to swim. On land they use their long hind legs to jump.



Frog has webbed feet



Tortoise has paddle-like leg



Penguin

Penguins use their two forelimbs as flippers to push water and swim. On land, they use their feet for walking.

Insects have six legs which are used for movement. A grasshopper uses its long hind legs for hopping. Many insects have one or two pairs of wings which they use to fly in the air. Insects like lice, bugs, termites do not have wings. They move by crawling.



Ant



Mosquito



Cockroach



Beetle



Grasshopper

Birds have wings which help them to fly. The wings are attached to the large breast muscles. To make flying easier, a bird has light, hollow bones. Birds use their hind legs for walking, hopping and perching. Birds like emu, ostrich and kiwi have wings but they cannot fly due to their large size and are called flightless birds.



Kiwi

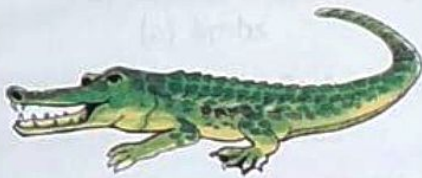


Emu



Ostrich

Reptiles have scales on their bodies and they move by crawling on the ground. Reptiles like crocodiles, chameleons and lizards have limbs and they move with their help. Reptiles like snake do not have limbs. They have scales or plates on the underside of the body that are attached to the ribs. The strong and flexible muscles of the snake contract and expand and thus help it to move forward.



Crocodile



Chameleon



Lizard



Snake

Mammals have four well developed limbs. Cows, camels and dogs use all their four limbs for walking and running. Human beings use only two limbs for walking, they are called hind limbs. They use their hands or forelimbs for holding or catching things.



Camel



Dog



Cat



Child

Mammals move with the help of their limbs

MIGRATION

Migration is the mass movement of animals in response to climatic change. Every year some animals and birds move from one place to another place in search of food or to avoid harsh weather conditions or for breeding purposes.

The bird — Arctic tern makes the longest migration from the Arctic circle to the Antarctic circle and back to the Arctic circle.

Siberian Cranes come India every winter to breed.

Fish like salmon spends most of its life in the sea. It travels long distances to reach the river to lay eggs. When the eggs hatch, the young salmon travels back to the sea.



Siberian cranes



Monarch butterflies

Insects like locusts and monarch butterflies also migrate large distances. Locusts travel in a huge swarm and destroy standing crops. Monarch butterflies migrate from Canada and North America to Mexico.



Words to Remember

Habitat	: the natural surrounding in which an animal lives
Reptiles	: animals that have scales on their bodies
Lungs	: spongy, elastic bags, situated on each side of the heart
Rodents	: animals that gnaw or nibble at their food
Migration	: mass movement of animals every year to avoid harsh weather conditions



Quick Recall

- The place where an animal lives naturally is called its habitat.
- Animals living in different environment have different features.
- Different animals have different organs of breathing, like body surface, spiracles, gills and lungs.

- Animals have different feeding organs like teeth, beak, proboscis and sticky tongue.
- Animals have different organs for movement like limbs, fins and flippers.
- A seasonal mass movement of animals every year is called migration.

EXERCISES

A. Choose the correct answer.

1. The body covering of an animal helps it to
 - (a) prepare its food
 - (b) move
 - (c) live in a particular habitat
 - (d) hibernate
2. The breathing organs of amphibians are
 - (a) lungs
 - (b) gills
 - (c) body surface
 - (d) all of these
3. Frogs and lizards catch their preys by using their
 - (a) forelimbs
 - (b) sucking tubes
 - (c) sharp teeth
 - (d) sticky tongues
4. Insects like lice, bugs, termites move by
 - (a) hopping
 - (b) walking
 - (c) crawling
 - (d) flying
5. Snakes move through
 - (a) limbs
 - (b) scales or plates
 - (c) fins
 - (d) claws
6. Plant and flesh eating animals are called
 - (a) herbivores
 - (b) omnivores
 - (c) carnivores
 - (d) scavengers
7. An animal or bird that does not migrate, is
 - (a) Polar bear
 - (b) Siberian crane
 - (c) salmon
 - (d) locusts

B. Give short answers.

1. What is the natural place of living of an animal called ?
2. What are the breathing organs of a fish or prawn ?
3. How do the teeth of herbivores help them in eating ?
4. What are the functions of feathers ?

C. Answer the following questions.

1. How is a frog adapted to live both in water and on land ?
2. What features of a bird's body help it to fly ?
3. How is a fish adapted to live in water ?
4. Why do animals migrate ? Give two examples of migratory animals.
5. Describe movement in mammals.

D. Tick the odd-one-out giving reason.

1. Lion, Snake, Deer, Wolf
2. Cow, Rabbit, Rat, Squirrel
3. Kiwi, Crow, Ostrich, Emu
4. Cow, Dog, Lizard, Camel

E. Give two examples of each.

1. Rodents 2. Migratory birds 3. Insects with wings

Higher Order Thinking Skills (HOTS)

1. What is the similarity among birds, reptiles and human beings ?
[Hint : How do they all breathe?]
2. An eagle and an ostrich both have beaks, claws and feathers. Then what is the difference between them ?
[Hint : How do they move ?]



QUICK ASSIGNMENT

A. Rewrite the following statements correctly.

1. A whale is a fish and it breathes through gills.
2. Crow and pigeon are flightless birds.
3. Carnivores have well developed incisors.
4. Birds have teeth to eat their food.
5. Snakes have legs to move.

B. Unscramble the organs of breathing of the following animals.

- | | |
|------------|-------------|
| 1. Fish | LSILG |
| 2. Amoeba | OBYDFRECUSA |
| 3. Man | NSUGL |
| 4. Insects | ISRAPSCEL |

A grid of 100 squares arranged in 10 rows and 10 columns, used for a 100th day activity.

C. Fill in the blanks.

1. The process of burning of food with the help of oxygen inside the body is called _____.
2. Butterflies and bees suck nectar from flowers with the help of _____.
3. Turtles and tortoise use their _____ limbs to push water.
4. The _____ is a migratory bird that makes longest migration.

D. Match the following column A with column B.

Column A

1. Snail and Turtle
2. Birds
3. Cow and deer
4. Emu and ostrich
5. Reptiles

Column B

- (a) flightless birds
- (b) scales on the body
- (c) protection by shells
- (d) breathing through lungs
- (e) herbivores



Activity

Field Project

1. Visit a zoo and observe carefully the feeding habits of different animals.
2. Visit a nearby pond and observe how water animals move and feed there.

Project at Home

Collect feathers of different birds and paste them on your scrapbook. Write the name of the bird under each feather.



ONLY FOR READING

info
hub

Animals' Life

Curiosity Corner

- Certain types of grasshoppers have their ears on their front legs.
- The male Goliath beetle of Africa is the heaviest insect of the world.
- The biggest freshwater fish is the giant cat fish at 5 m long.
- Snakes can swallow objects larger than their heads. The egg eating snake swallows the egg and then crushes the shell.
- Eider ducks are one of the fastest flying birds of the world. They are valued for the soft down feathers on their breasts used in bedding.

PHOTO SPEAKS

Fun with Science

To observe the simple way of living of an organism in a particular habitat take an old fish tank. Fill it with some insects and small animals, from your lawn or from a pond. Also collect some grass or weeds and put into the tank. Cover the top of the tank with a fine net. Watch the insects over the next few days.



Firefly

It is neither a fly
nor a bug, but beetle



Poison arrow frog

Has enough poison to
kill about 2200 people

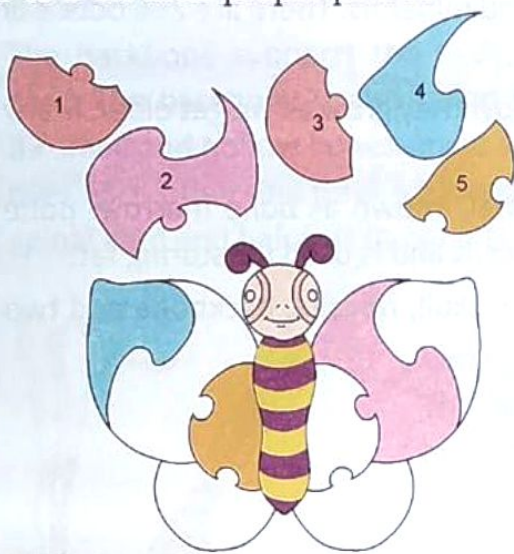
Amazing SCIENCE FACT

MUDSKIPPER

These remarkable fish have adapted their gills to hold water when out of the sea and are known for their ability to climb, walk and skip about out of water. They are able to dig underground burrows, where they lay their eggs.



In the following picture, the butterfly forgets to colour some part of its beautiful wings. Help the butterfly by pasting the coloured parts given below from 1 to 5 on their proper places.



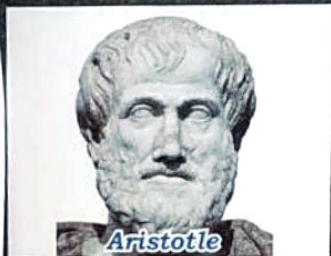
Green Gallery

The bear-like mammal— the giant panda is found in the bamboo forests of China. This endangered mammal feeds only on bamboo leaves.



National parks, wildlife sanctuaries and bird sanctuaries are established to protect the endangered animals. Wild animals live in their natural habitats without the fear of being hunted.

The giant armadillo once found in large numbers, now can only be seen in Argentina. It is usually feeds on termites and ants. Some small mammals such as rat and mice are also its prey.



Aristotle

Great philosopher considered as the first zoologist



One-horned rhino

Its horn is made of compacted hair

Bones and Muscles



The combination of bones and muscles makes human body to work incredibly. Bones form the body's hard, strong skeletal framework, while muscles carry out different activities.

LESSON OBJECTIVE

You will know

- Skeleton
- Joints
- Muscles

SKELETON

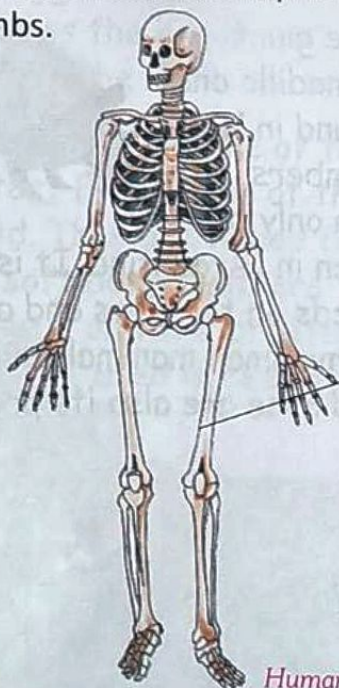
The framework of bones that gives shape and support to the body is called the skeleton. It protects the delicate internal organs.

Bones are the hard structures made of living cells and minerals. There are 206 bones of different shapes and sizes in an adult human skeleton.

Bones have their blood supply and nerves. That is how they grow as we get older. Many bones in our body are hollow.

Long bones of the body contain a jelly-like material, known as bone marrow. Bone marrow is the body's factory for producing red blood cells and is used for storing fat.

The main bones that comprise the skeleton are the skull, ribcage, backbone and two pairs of limbs.



Human skeleton



Marrow

Bone marrow

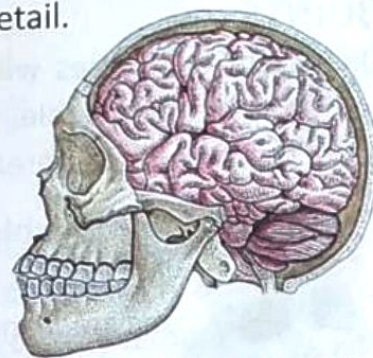


Red blood cell

Now, let us know about these different parts of skeleton in detail.

Skull

Skull is the hardest part of the body that protects the brain. The bones in the skull are fixed, except the lower jaw. The movable lower jaw enables us to talk and eat. The upper and lower jaw contain teeth that help us cutting and chewing the food.



Brain is protected inside the skull



Ribcage

Ribcage

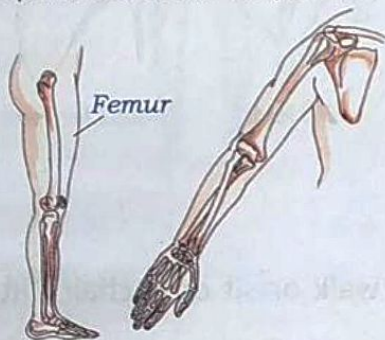
The ribcage consists of twelve pairs of ribs that curve around from the back of our body towards the front. The rib cage protects the lungs and heart. All the rib bones are connected to the upper part of the backbone. In front, ribs are connected to the breastbone called sternum. The lowest two pairs are not connected to the breastbone and are thus called floating ribs.

Backbone

The backbone supports the body and gives protection to the spinal cord. The backbone is also called the vertebral column. It is made of 33 small and hollow bones called vertebrae. These bones are arranged over each other and form a tube-like structure. It protects the delicate spinal cord and helps us to bend and turn.



Backbone



Bones of limbs

Limbs

The two pairs of limbs have the forelimbs (or arms) and the hind limbs (or legs). The arms are connected to the backbone with the help of shoulder girdle.

The thigh bone or femur is the longest bone in our body. It bears the weight of the body.

Functions of Skeleton

The skeleton provides shape and support to our body. Without the skeleton, our body system would not be able to stand.

It provides protection to our soft and delicate organs. For example, skull protects the brain, ribcage protects the heart and lungs and the backbone protects the spinal cord.

Bones along with muscles allow the movement of different body parts. Bones contain bone marrow, where our blood cells are prepared.

JOINTS

Joints are the places where two bones are joined together in our body. Joints can be movable or immovable. Most joints are movable. Each movable joint moves in certain direction and in a different way.



Skull

Immovable Joint

Our skull is the best example of immovable joint. Feel your head. Your skull may feel and look like one big bone. But it has several bones joined together to give it a fixed shape. A fixed joint, as the name indicates, moves little.

Fixed joints have only small space between them. This space provides cushion between the bones to tolerate certain blows to the head.

Movable Joints

These joints provide free movement to the body. These joints are covered with a strong tissue called cartilage which prevents the bones rubbing against each other.

The main types of movable joints in our body are

- | | |
|---------------------------|--------------------|
| (i) Ball and socket joint | (ii) Hinge joint |
| (iii) Pivot joint | (iv) Gliding joint |

Ball-and-Socket Joint

A ball-and-socket joint allows the bones to move easily in a large circle. This joint is formed by the round end of a long bone fitting into a hole or socket of another bone. Our shoulder is an example of ball-and-socket joint.

The upper end of the arm bone has round end fitted in the socket of shoulder bone. The hip joint also has ball-and-socket joint.

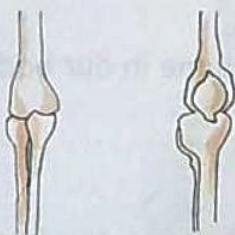


Hip joint



Shoulder joint

Ball-and-socket joint



Elbow joint Knee joint

Hinge joints

Hinge Joint

Feel your knee. How it moves while you walk or sit on a chair? It moves differently.

A hinge joint allows movement only in back and forth direction. It acts just like a hinge of a door. The elbow also has a hinge joint.

Pivot Joint

It is found in the neck. It lets you turn your head.

You can move your head in semi-circle.

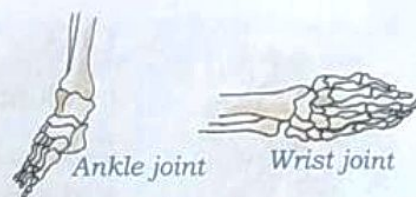
You can also move your head in up and down movement.



Pivot joint

Gliding joint

It allows movement between the connecting bones like wrist, ankle or the vertebrae of the spine.



Gliding joints

Ligament

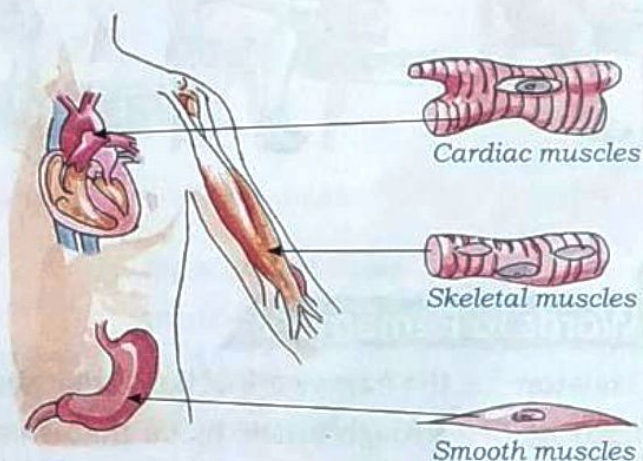
All joints have ligaments. Ligaments are the strong and tough fibers which hold the bones together at the joints. A ligament looks like a stretchable cord that connects one bone to another across a joint. Ligaments also protect joints by checking the movement of bones.

MUSCLES

Our bones cannot move on their own. They need muscles to move them. Muscles are made up of tough elastic tissues which are connected to the bones by strong fibres called tendons. There are about 650 muscles in our body. Muscles can only pull at the bones, they cannot push. So to move the bones in one direction, at least two muscles are required. Thus muscles work in pairs. They contract and relax to produce movement in the body.



Muscular system



Cardiac, skeletal and smooth muscle cells in human body

Types of muscles

1. Skeletal Muscles

The skeletal muscles lie between the skin and the bones. The skeletal muscles have voluntary movement, i.e., skeletal muscles can move at our will.

Skeletal muscles are used in running, walking, laughing and eating.



Skeletal muscles of leg

2. Smooth Muscles

Muscles of some body organs, such as walls of stomach and intestine have smooth muscles. These muscles work on their own. So these are called involuntary muscles.



Our stomach has smooth muscles



Cardiac muscles of heart

3. Cardiac Muscles

Involuntary muscles of our heart are cardiac muscles. Cardiac muscles work continuously since our birth. The contraction and expansion of cardiac muscles counts one heart beat.

How do Muscles Work ?

Muscles work in pairs by contraction and expansion. A contracted muscle becomes tighter and shorter. When an expanded muscle is relaxed it goes back to its original shape. The biceps and triceps in our body arms are voluntary muscles that work together. To maintain the muscles in good shape, one must follow the proper posture while sit or stand or walk.



Proper postures of sitting, standing and walking



Words to Remember

- Skeleton** : the framework of bones that supports the body
- Cartilage** : a tough elastic tissue that is important in support and especially in joints to prevent the bones rubbing against each other
- Ligaments** : strong tissues that hold the bones together at joints
- Tendons** : strong fibres that connect muscles to the bones
- Joint** : a place where two bones meet
- Ribcage** : twelve pairs of curved bones that protect the heart and lungs



Quick Recall

- The skeleton is the framework of bones that supports and protects our body.
- Bones are the hard structures made of living cells and minerals.
- There are 206 bones in an adult's skeleton.

- Skull protects the brain, backbone protects the spinal cord and ribs protect the lungs and heart.
- Cartilage is strong elastic tissue that is important in support. It prevents the bones at joints to rub against each other.
- Our body has four kinds of movable joints :
 - (i) ball-and-socket joint (ii) hinge joint
 - (iii) pivot joint (iv) gliding joint
- Ligaments are the strong and tough fibres which hold the bones together at the joints.
- Muscles that move at our will are called voluntary muscles and muscles that move without our will are called involuntary muscles.
- Muscles are of three types : skeletal muscles, smooth muscles, cardiac muscles.
- Muscles work by contraction and expansion.

EXERCISES

A. Choose the correct answer.

1. Bones are made of

(a) minerals and salts	(b) acids and bases
(c) living cells and minerals	(d) salt and water
2. The jelly-like material inside the long bones is known as

(a) plasma	(b) bone marrow	(c) bone meal	(d) bone sap
------------	-----------------	---------------	--------------
3. Ribcage protects the

(a) lungs and heart	(b) brain	(c) spinal cord	(d) stomach and liver
---------------------	-----------	-----------------	-----------------------
4. The longest bone of the body is

(a) ulna	(b) radius	(c) femur	(d) stirr up
----------	------------	-----------	--------------
5. Our blood cells are prepared in the

(a) bone marrow	(b) heart	(c) intestine	(d) liver
-----------------	-----------	---------------	-----------
6. The joints of skull are

(a) fixed	(b) movable	(c) gliding	(d) hinge
-----------	-------------	-------------	-----------
7. The tissue that prevents the bones rubbing against each other is

(a) cartilage	(b) ligament	(c) tendon	(d) none of these
---------------	--------------	------------	-------------------

8. The joint found in the neck is
(a) gliding (b) hinge (c) pivotal (d) ball-and-socket
9. Walls of stomach, intestine and alimentary canal have
(a) smooth muscles (b) skeletal muscles (c) cardiac muscles (d) all of these
10. Muscles work in pairs by
(a) contraction only (b) contraction and expansion
(c) expansion only (d) neither contraction nor expansion

B. Give short answers.

1. What provides shape and support to the body ?
2. Which organ is protected by the backbone ?
3. Name the longest bone of the body.
4. Which joint allows movement in back and forth direction ?
5. Which kind of muscles move at our will ?

C. Answer the following questions.

1. Why is skeleton necessary ?
2. What are involuntary muscles ?
3. What is a joint ?
4. Mention four functions of skeleton.

D. Differentiate between

1. Movable and Immovable joints.
2. Cardiac muscles and Skeletal muscles.

Higher Order Thinking Skills (HOTS)

1. What would be the disadvantage of having a fixed lower jaw ?
[Hint : What is the function of lower jaw ?]
2. Why are ligaments necessary ?
[Hint : What is the function of ligaments ?]

QUICK ASSIGNMENT

A. Tick (✓) the correct word.

1. The skull protects eyes / brain.
2. Backbone is made of 33 / 30 small and hollow bones.
3. The twelve / twenty-one pairs of ribs form the rib-cage.
4. The thigh bone is the smallest / longest bone in our body.
5. The bones / bone marrow produce(s) new blood cells.

B. Fill in the blanks.

1. There are _____ bones in our body.
2. The _____ joint helps to move the head.
3. In front, ribs are connected to the _____.
4. _____ is a smooth flexible substance that joins the bones together.
5. The _____ contains immovable joints.

C. Write one word for the following.

1. A hard structure that supports and protects the internal organs _____
2. Twelve pairs of curved bones that protect the heart _____
3. Muscles of the heart _____
4. Muscles that move on their own _____
5. Substance that connects skeletal muscles with the bones _____

D. Unscramble the following words with the help of clues given below.

1. Body's factory for producing red blood cells
O N E B O W R M R A
2. The bone that protects the spinal cord
C N A K B O B E
3. The longest bone of human body
R U F M E
4. The joint in the knee
G N I E H
5. The joint in the neck
I O P T V

E. Match the following column A with column B.

- Column A**
1. Skull
 2. Backbone
 3. Rib cage
 4. Bone marrow
 5. Shoulder bones

- Column B**
- (a) protects lungs and heart
 - (b) produces new blood cells
 - (c) ball-and-socket joint
 - (d) protects brain
 - (e) protects spinal cord



Activity

Classroom Project

To know how do skeletal muscles move.

What is needed : You and your friend, pencil and rubber.

What to do : Place your right hand on your left upper arm. Raise your left lower arm slowly, facing inwards. Your left arm should bend at the elbow. Ask your friend to measure the length and breadth of your left upper arm. Do it four times. Now, ask your friend to hit (not very hard) on your contracted muscles. See what happens ?

Write the observations on the following table :

	Full arm measure		Folded arm measure	
	Length	Breadth	Length	Breadth
1.				
2.				
3.				
4.				

Group Discussion

With the help of your teacher discuss in the class how Yoga is helpful in keeping muscles healthy.

MODEL TEST PAPER-I

(Based on Chapters 1 to 3)

MM 20

Instructions

- Read the question paper carefully.
- Do not over write. Write neatly.

I. State True or False.

[4]

1. Dicot plants have two cotyledons.
2. Lion, frog and wolf are omnivores.
3. All animals move with the help of their legs.
4. The place where two bones meet is called a joint.
5. Muscles work by contraction and expansion

☐
☐
☐
☐
☐

II. Give one word for the following.

[4]

1. The part of the seed that produces the stem and leaves.
2. Breathing organ of mammals.
3. The special changes in an animal's behaviour to suit its habitat.
4. The longest bone of the human body.
5. The joint that allows the bones to move easily in a large circle.

III. Match the following columns.

[5]

- | | |
|--|---------------------|
| 1. Chemicals used to kill harmful insects | (a) bone marrow |
| 2. Frogs and lizards | (b) ligaments |
| 3. Fish, prawns and crabs | (c) insecticides |
| 4. Production of red blood cells | (d) aquatic animals |
| 5. Strong and tough fibres holding the bones at the joints | (e) sticky tongue |

IV. Draw a picture to show the stages of germination.

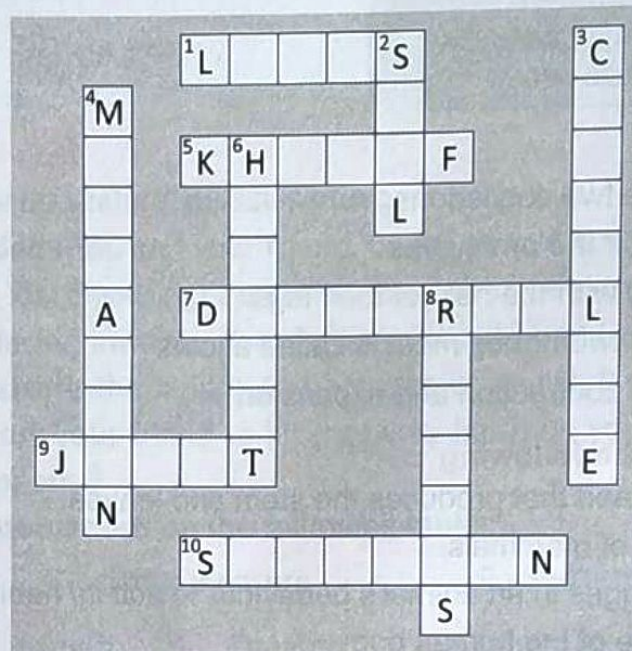
[2]

V. Solve the given crossword on the basis of clues given below.

[5]

Across

1. Spongy, elastic bag- like organs through which mammals breathe
5. Crops grown from June to October
7. The scattering of seeds away from the parent plant
9. The place where two bones meet
10. Framework of bones that supports the body.



Down

2. The medium on which plants grow.
3. The tough elastic tissue by which our ears are made.
4. Mass movement of animals to avoid harsh weather conditions.
6. The natural surrounding where an animal lives.
8. Animals that gnaw the seeds or nuts with their sharp front teeth.

4

Nervous System



The nervous system is the body's internal communication network. This system carries and brings messages to and from the brain.

With these messages, we sense and respond to our environment.

This system controls different functions of our body.

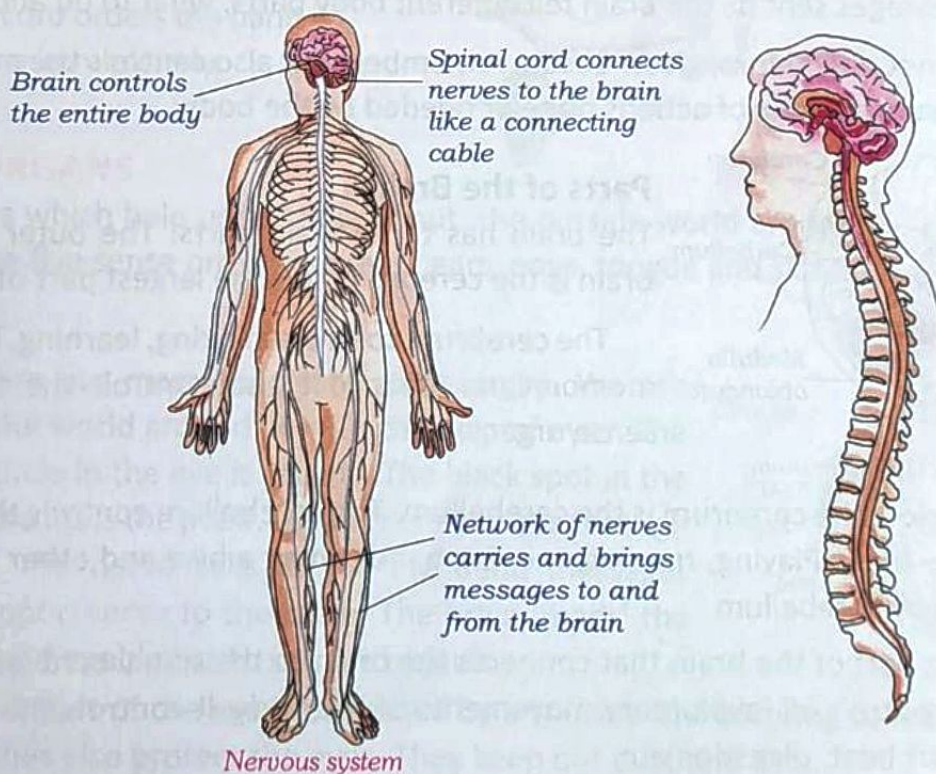
LESSON OBJECTIVE

You will know

- Nervous system
- Nerves
- Brain
- Spinal cord
- Sense organs

NERVOUS SYSTEM

The nervous system comprises the nerves, brain and spinal cord. They receive and integrate the signals relayed from sense organs (such as the eyes, nose, and ears). Nerves have an important role in receiving and integrating the signals. This system also controls unconscious functions such as heartbeat and breathing.



NERVES

Nerves are thread-like structures spread throughout the body. They carry and bring messages to and from the brain. Nerves carry messages from the body parts through the spinal cord to the brain. They also bring messages from the brain through the spinal cord to the body parts. Nerves act like telephone wires which communicate the message to the brain. Messages are sent and received through nerve cells.

Nerves are of different kinds.

Sensory nerves carry a message from a body part to the brain. These nerves allow sensing.

Motor nerves bring messages from the brain to the muscles. These cause the muscles to contract. These are responsible for the actions taken by the body.

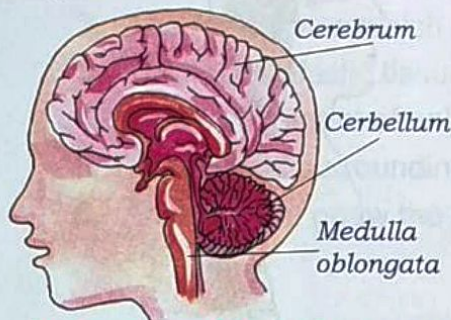
Suppose you want to walk. A message is sent from the brain through the motor nerve. The motor nerve in your leg carry the message to the muscles. Your muscles receive the message and you lift your leg to walk.

Mixed nerves pass signals between the sensory nerves and motor nerves.

BRAIN

Brain is the most important and delicate organ in the body. It is protected by the skull. It is the main control centre of the body. The brain controls the body by receiving and giving messages. Messages coming from different body parts tell the brain, what is needed by the body. Messages sent by the brain tell different body parts, what to do and how to do.

The brain not only thinks, gives reason, remembers but also controls the movement of body. It observes all sorts of actions done or needed by the body.



Different parts of human brain

Parts of the Brain

The brain has three main parts. The outer part of the brain is the cerebrum. It is the largest part of the brain.

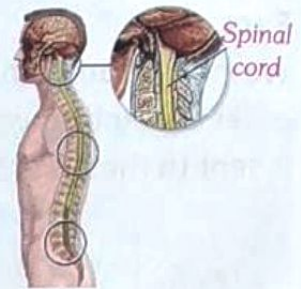
The cerebrum controls thinking, learning, intelligence, memory and talking. It also controls the functions of sense organs.

The part below the cerebrum is the cerebellum. The cerebellum controls the voluntary muscles of the body. Playing, running, moving hand, riding a bike and other movements are controlled by cerebellum.

The bottom part of the brain that connects the brain to the spinal cord is the medulla oblongata. It controls all involuntary movements of the body. It controls the muscles for breathing, heart beat, digestion etc.

SPINAL CORD

Spinal cord is formed by a large group of nerves. It is thick, cord-like bundle of nerve cells. Messages travel along the spinal cord, to and from the brain. The spinal cord is like a connecting cable. It connects the nerves to the brain. It is well protected in the flexible but tough bony spine.



Reflex Action

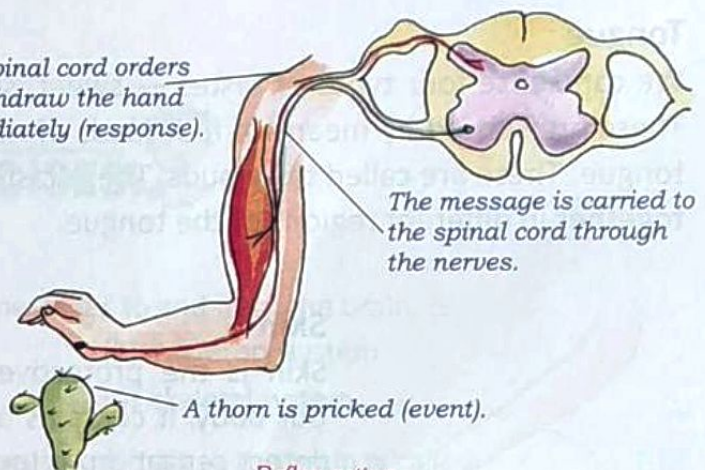
Some body movements are done automatically without thinking about them. This automatic response of body to an event is called reflex action. The reflex action involves only the nerves and spinal cord.

For example, your mouth gets watered at the sight of ice-creams and chocolates.

Similarly, the action, such as moving your hand away from a thorn or needle takes place without the message going to the brain.

The reflex action allows fast reaction. In reflex action, on touching the thorn or needle, the sensory nerves send a message to the spinal cord and the spinal cord orders the hand to withdraw immediately.

The spinal cord orders to withdraw the hand immediately (response).



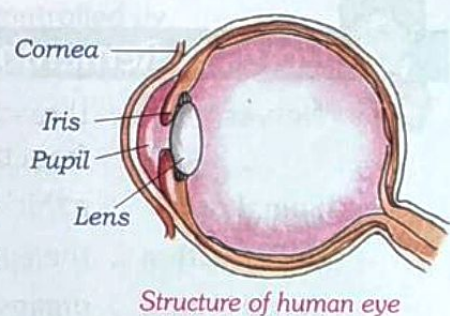
SENSE ORGANS

The organs which help us to know about the outside world around us are called sense organs. The five sense organs are eyes, ears, nose, tongue and skin.

Eyes

The eyes are our most important sense organ. We see the beautiful world around us with the help of eyes. The coloured circle in the eye is the iris. The black spot in the centre of the iris is the pupil. Light enters the eye through the pupil. The nerve cells in the eye send messages along the optic nerve to the brain. The brain 'reads' the messages and enables us to see the objects.

The front part of the eye is protected by a transparent covering called cornea. Eyelids and eyelashes also protect the eyes. They keep out dust and dirt.

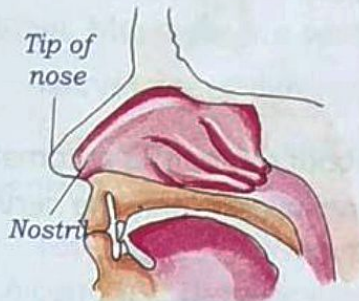


Ears

We hear sounds through our ears. The sound of an object enters the outer ear and travels through the middle and inner ear. From there, it is sent to the brain by the nerves. Ears also help us to keep our balance.



External ear



Internal structure of the nose

Nose

Nose helps us to smell different objects. In the upper part of our nose there are endings of nerves which are sensitive to smell. They send the message to the brain and the brain tells us what the smell is.

When we have a blocked nose, no air can reach the nerve endings and we cannot smell. The senses of smell and taste are linked. Our food does not taste good if we cannot smell it because of a blocked nose.

Tongue

We can sense four types of tastes — sweet, sour, salt and bitter. These are sensed by means of four kinds of nerve endings in our tongue. These are called taste buds. These taste buds are grouped together in different regions of the tongue.



Tongue showing taste buds



Skin

Skin

Skin is the protective outer covering of our body. It contains nerve endings which detect sensation of touch, pain, heat or cold. Some parts of our skin such as finger tips, have more nerve endings than other parts of the body so these are more sensitive.



Words to Remember

- Nerves** : thread - like structures that carry and bring information to and from the brain and spinal cord
- Spinal cord** : a thick cord of nerve tissues that extends down from the brain
- Reflex action** : the automatic response of the body to an event
- Sense organs** : organs that help us to know about the outside world



Quick Recall

- The nervous system is like the communication system of our body.
- Our nervous system comprises brain, spinal cord and nerves.
- Brain is the main control centre of the body and the nervous system.
- Brain has three main parts : cerebrum, cerebellum and medulla.
- Spinal cord is formed by a large group of nerves that connect all parts of the body to the brain.
- There are three types of nerves : (i) sensory nerves (ii) motor nerves (iii) mixed nerves.
- Reflex action involves only the nerves and spinal cord.
- We get information about the environment through the sense organs.

EXERCISES

A. Choose the correct answer.

1. The system that carries and brings messages to and from the brain, is
(a) muscular system (b) excretory system
(c) nervous system (d) skeletal system
2. The nerve that carries a message from a body part to the brain is called
(a) motor nerve (b) sensory nerve (c) mixed nerve (d) optic nerve
3. The largest part of the brain is the
(a) cerebrum (b) cerebellum (c) medulla (d) skull
4. Activities like running, playing, moving hand etc. are controlled by
(a) cerebrum (b) cerebellum (c) medulla (d) all of these
5. Reflex actions are controlled by
(a) medulla (b) spinal cord (c) backbone (d) hand
6. The eye is protected by a transparent covering called
(a) iris (b) retina (c) pupil (d) cornea
7. The largest external organ that is also a sense organ, is
(a) skin (b) ear (c) nose (d) eye

B. Give short answers.

1. Name the system that works as the internal communication network of the body.
2. Which nerves carry messages from the body to the brain ?
3. Which part of the brain controls thinking, learning and talking ?
4. Name the action controlled by the spinal cord.
5. Which sense organ helps us to keep our balance ?

C. Answer the following questions

1. Why does food not taste good when we have a cold ?
2. How do eyelids and eyelashes help the eye ?
3. What is reflex action ? How is it different from other actions ?
4. How does brain convey message to different body parts ?
5. What are sense organs ? Give one function of each.

D. Differentiate between :

1. Sensory nerves and Motor nerves
2. Cerebrum and Cerebellum

E. Tick the odd-one-out giving reason.

1. Nerves, Veins, Brain, Spinal cord
2. Sensory nerves, Motor nerves, Reflex actions, Mixed nerves
3. Cerebrum, Spinal cord, Cerebellum, Medulla
4. Face, Eyes, Nose, Ears

Higher Order Thinking Skills (HOTS)

1. Which two senses are linked and how ?
[Hint : Does the food taste good when you have a cold ?]
2. Why do we not feel pain when we cut our nails or hair ?
[Hint: Nails and hair do not contain nerves.]



QUICK ASSIGNMENT

A. Write T for true or F for false against the following statements.

1. The nervous system is the communication system of our body.
2. Our nervous system is a network of nerves only.
3. Medulla is the largest part of the brain.
4. Cerebellum lies in the back part of the cerebrum.
5. Nerves connect the spinal cord with the brain.

☐
☐
☐
☐
☐

B. Fill in the blanks.

1. _____ and nerve cells work together to carry messages.
2. The largest part of the brain is the _____.
3. Playing, running and riding are controlled by _____.
4. The _____ is the outer protective covering of the body.
5. Moving hand away from the hot pan is a _____.

C. Name the following :

1. The organ which is the main control centre of the body : _____
2. The part of brain which controls thinking, learning and talking : _____
3. The part of brain which controls the voluntary muscles : _____
4. The nerves which carry message from a body part to the brain : _____
5. The nerves which carry messages from the brain to the muscles : _____

D Match the following column A with column B.

Column A

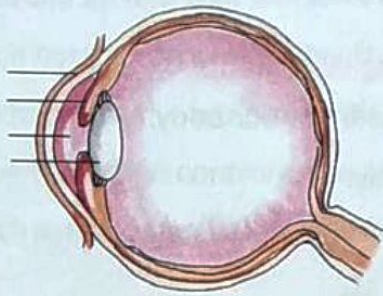
1. Brain
2. Nerve cells
3. Spinal cord
4. Skull
5. Reflex action

Column B

- (a) thread like structures
- (b) protected by the backbone
- (c) involves only nerves and spinal cord
- (d) centre of the nervous system
- (e) protects the brain

Label the Diagram

Label the following diagram. Take help from the words given in the box.



Lens

Iris

Cornea

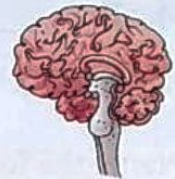
Pupil

Wordsearch

In the following wordsearch, ten names of parts of the nervous system and sense organs are hidden. Find them vertically and horizontally and encircle them. One has been done for you.



N	A	I	R	B	E	Y	E	S	L
I	D	T	X	Y	X	Z	S	O	S
H	N	N	V	X	Y	U	H	M	O
S	E	A	R	L	E	N	S	E	S
K	L	B	R	A	I	N	D	D	P
U	U	V	F	T	W	D	N	U	I
L	I	S	Z	T	M	Z	O	L	N
L	L	K	Y	P	X	Q	S	L	E
S	S	K	I	N	F	S	E	A	Y
I	R	I	S	V	E	D	O	Z	L



Activity

Classroom Project

To observe the reflex action.

What is needed : your hand, a partner, pencil and paper.

What to do : Ask your partner to look straight ahead.

Quickly wave your hands in front of him. Keep a distance of about 10 cm between his eyes and your hand. Observe your partner's eyes.

1. What did you observe when you waved your hand ?
2. Ask your partner whether he/she thinks about blinking his/her eyes.

Food, Health and Hygiene



All living beings need food to live and stay healthy. We get our foods from plants and animals. Hygiene is an essential component of healthy living and preventing diseases. Not just selecting the right food choice but also cooking and consuming them in hygienic way is equally important to prevent ourselves from the diseases.

LESSON OBJECTIVE

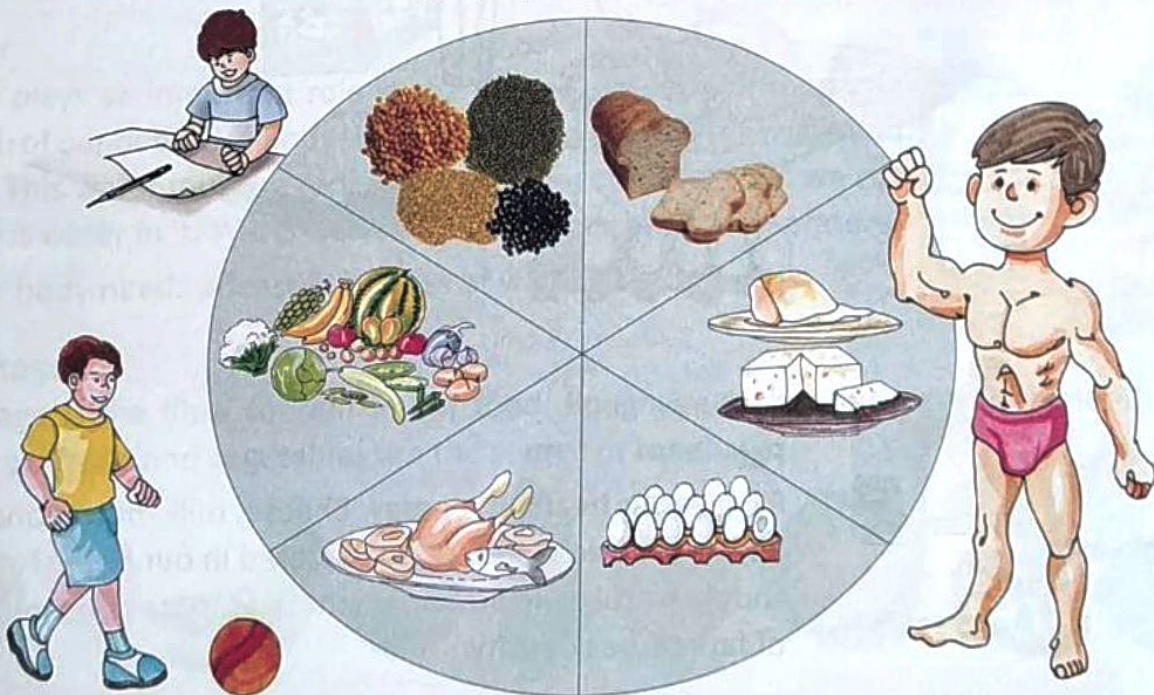
You will know

- Food and health
- Other factors affecting our health
- Diseases
- Hygiene

FOOD AND HEALTH

Food is necessary for all living beings. We need a wholesome and balanced food for proper growth and development.

At the growing stage our body needs nutrients like carbohydrates, proteins, fats, vitamins, minerals and water. All these nutrients are present in different food items like milk and milk products, meat, vegetables, fruits and grain-cereals. The food we eat is called diet. A food with all the essential nutrients in right proportion is called a balanced diet.



The nutrients present in a balanced diet are described below.



Sources of carbohydrate

Carbohydrate

Carbohydrates give us energy to work. Carbohydrates in food are present as sugar and starch. Foods with sugar are generally sweet in taste. Sugar gives quick energy. Food items like bread, potatoes, rice and cereal contains starch.

Carbohydrate can be stored by the body, if eaten in excess. It is stored in the form of fat. Too much carbohydrates in diet may cause obesity.

Protein

Proteins are the body-building nutrients. Our body needs protein for repair of worn-out cells and to build body tissues. Protein is needed for proper growth of bones and muscles. Our muscles, skin, nails and hair are mostly made of proteins.

We should eat protein-rich food everyday as our body cannot store it for later use.

Milk products, peanuts, fish, eggs, meat, pulses contain proteins. Soyabeans contain maximum protein.



Sources of Protein



Sources of fat

Fat

Fat gives us heat and energy. Cheese, milk, butter and nuts are fat rich food. Fats are stored in our body. Fats should be taken in limited quantity as more consumption of fats causes obesity.

Vitamins and Minerals

Fresh fruits and vegetables are rich sources of vitamins and minerals. These are needed in very small quantities. If the body does not get them in sufficient quantity, it can result in many diseases. Some important vitamins and minerals with their sources, functions and the diseases due to their deficiency are described in the following table.

Vitamin/ Mineral	Sources	Function	Deficiency disease
A		Growth of skin and improves eye-sight	Night blindness
B		Helps in function of heart and nervous system	Beri-Beri
C		For healthy gums and bones	Scurvy
D		For strong teeth and bones	Rickets
IODINE		Proper development of the body	Goitre

Water

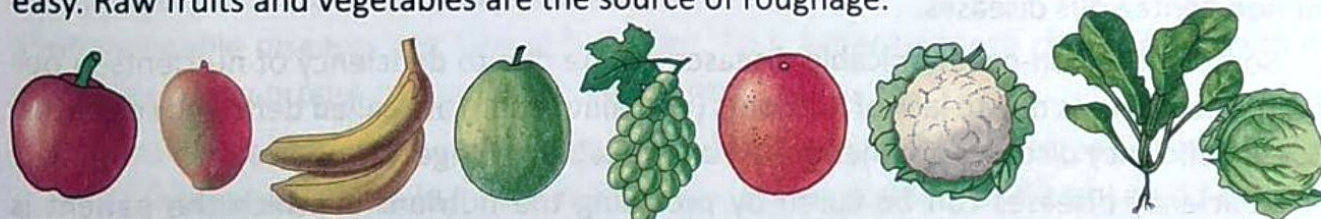
Water plays an important role in the proper digestion of food and growth of our body. Our body releases water in the form of sweat and urine. This water must be replaced by more water. The food we eat contains water in it. Water helps to regulate our body temperature.

Our body needs atleast 8-10 glass of water daily.



Roughage

Roughage is the fibre content in our food. Roughage makes our digestion smooth and easy. Raw fruits and vegetables are the source of roughage.



Sources of roughage

OTHER FACTORS AFFECTING OUR HEALTH

In addition to these nutrients, our body also needs proper exercise, rest and hygiene to be fit and healthy.

Exercise

Exercise is necessary to keep our body in good health and shape. Young children need to exercise more so that their body will grow and develop correctly.

Exercise involves the muscles of the body and makes them strong. It improves breathing, blood circulation, digestion and other physical processes.



Different forms of exercises

Rest

Rest is also as important as the food and exercise. Rest gives us freshness. A sound sleep provides rest to the body. It is important for the brain and nervous system to get rest. It helps in keeping our mind and body healthy and fresh.

Cleanliness

Cleanliness is another way to keep our body healthy. Daily bath removes the dead skin cells, dust, germs, sweat from our body. It keeps us fresh. Brushing of teeth prevents tooth-decay. It makes the food taste well.

DISEASES

The word disease comprises two words dis and ease mean 'not comfortable'. It is a condition in which some body part or the whole body does not work properly. Generally diseases are of two types non-communicable and communicable.

Non-communicable Diseases

Diseases that cannot be passed from one person to another are called non-communicable or non-contagious diseases.

Some of the non-communicable diseases can be due to deficiency of nutrients in our food. The diseases due to lack of nutrients (or malnutrition) are called deficiency diseases. Some deficiency diseases are mentioned on the table on page 52.

Deficiency diseases can be cured by providing the nutrient in which the patient is deficient.

Some non-communicable diseases are caused by harmful substances present in the environment. For example, fumes from cars and factories can cause diseases of the lungs and heart.

Non-communicable diseases can also be caused by bad habits, such as smoking. Smoking is a major cause of heart and blood diseases.



Communicable Diseases

The diseases that can spread from one person to another are called communicable or contagious diseases.

Some micro-organisms, like bacteria, virus and fungi etc. are present in air, water or our food. They cannot be seen with naked eyes. The uncovered food or water may contain them. These disease causing micro-organisms called germs cause communicable diseases. Certain flies and mosquitoes also spread some diseases. The flies sit on dirty places, fly to the uncovered food and bring germs with them.

Some common communicable diseases are mentioned in the following table.

Disease	Disease Caused by	Source
1. Cholera	bacteria	food, water and flies
2. Typhoid	bacteria	food and water
3. Polio	virus	air
4. Malaria	protozoa	mosquito
5. Dysentery	protozoa	food and water
6. Jaundice	bacteria	polluted water
7. Digestive disorders	tape worm/round worm	food, water and soil
8. Dengue fever	virus	air
9. AIDS	virus	infected syringe or blood, from expecting mother to her baby and through physical contacts

Diseases like common cold, chicken-pox, measles, whooping cough, tuberculosis (TB) or skin diseases are caused by the contact with a sick person through sneezing, coughing or by using things of sick people.



A child infected with chicken-pox

Prevention of Communicable Diseases

Communicable diseases are caused by germs. So it is necessary to check the growth of germs by taking proper precautionary measures.

1. The house should be disinfected. It should have good ventilation and open space.
2. Drinking water should be clean and pure. Water purifiers or filters should be used to clean the water.

3. The area around your home should be neat and clean so that neither flies nor mosquitoes can breed there.
4. Water should not be stagnate in puddles around the home. Drains should be kept covered.
5. Children should be vaccinated properly against diseases. There are vaccines available for diseases like TB, diphtheria, hepatitis etc.

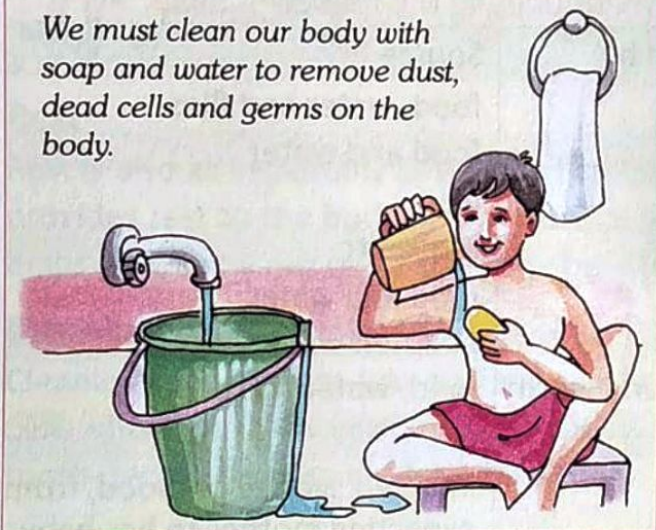
HYGIENE

Health and hygiene are closely associated to each other. The word 'hygiene' includes cleanliness of the body and the surroundings in which one lives. Personal hygiene helps in preventing diseases.

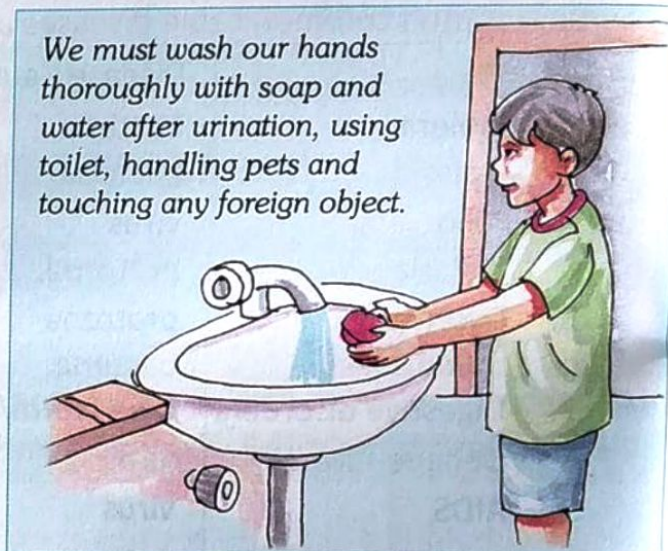
For maintaining personal hygiene and good health one should follow the instructions given below.

Maintaining Good Health and Hygiene

We must clean our body with soap and water to remove dust, dead cells and germs on the body.



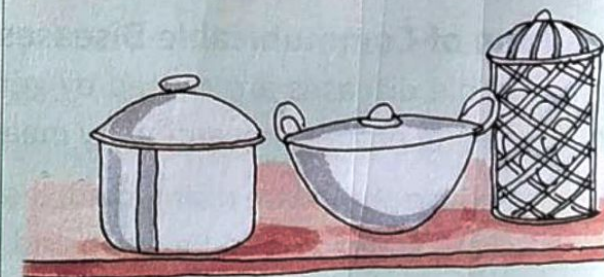
We must wash our hands thoroughly with soap and water after urination, using toilet, handling pets and touching any foreign object.



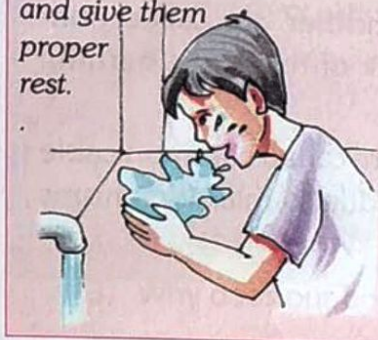
We must brush our teeth at least twice a day. Brushing removes the food particles stuck on the teeth and prevents germs to attack the teeth.



In the kitchen, all food items whether cooked or uncooked should be covered and kept at height. Kitchen should be free from pests, insects or any other infectious creatures.



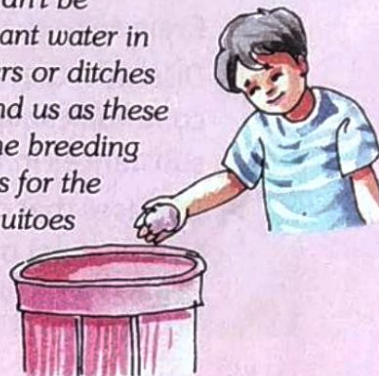
Eyes are very important for us. We should take proper care of them. We must wash our eyes regularly with cold water and give them proper rest.



We must trim our nails regularly as long nails are home to dirt and germs.



Our surrounding should also be cleaned. Garbage should be thrown in covered dustbins. There shouldn't be stagnant water in coolers or ditches around us as these are the breeding places for the mosquitoes and flies.



Words to Remember

- Nutrients** : essential substances present in the food
- Roughage** : the fibre content in food
- Balanced diet** : a diet that contains all the nutrients in the right proportion
- Deficiency diseases** : diseases caused due to the lack of a nutrient in the body
- Non-communicable diseases** : diseases that cannot be spread from a sick to a healthy person
- Communicable diseases** : diseases that can spread from a sick person to a healthy person
- Vaccine** : a substance that is put into the blood and that protects the body from a disease.
- Germs** : disease - causing micro-organisms



Quick Recall

- Food that contains all the nutrients like protein, carbohydrates, fats, vitamins and minerals in adequate proportion is called balanced diet.
- Proteins are the body-building nutrients. These are needed for repairing and building body tissues.
- Carbohydrates are the energy-giving nutrients. They give us energy to work.
- Fats are also energy-giving nutrients. They are stored in our body cells.

- Vitamins and minerals are protective foods that our body needs to remain healthy.
- Roughages are the fibres present in food which makes the digestion easy.
- Exercise uses the muscles of the body and makes them stronger.
- Diseases that cannot spread from one person to another are called non-communicable diseases. These are caused due to lack of nutrients, harmful substances in the environment or bad habits.
- Diseases that can spread from one person to another are called communicable (contagious) or infectious diseases. These are caused due to microorganisms like bacteria, virus or fungi.

EXERCISES

A. Choose the correct answer.

1. The variety of food that contains all the nutrients in right proportion is called
 (a) healthy diet (b) balanced diet (c) fast food (d) qualitative food
2. Carbohydrates are energy-giving food. But excess amount of carbohydrates causes
 (a) perplexity (b) communicable diseases
 (c) obesity (d) healthy body
3. Proteins are
 (a) energy-giving nutrients (b) body-building nutrients
 (c) disease - fighting nutrients (d) digestive nutrients
4. The nutrients that provide heat and energy are
 (a) fats (b) fibres (c) minerals (d) proteins
5. Oranges, grapes and carrots are rich sources of
 (a) proteins (b) fibres (c) vitamins (d) water
6. Scurvy is caused by the deficiency of
 (a) vitamin A (b) vitamin B (c) vitamin C (d) vitamin D
7. Rashi is suffering from goitre. She should be given a diet rich of
 (a) iodine (b) phosphorous (c) iron (d) calcium
8. Jaundice is caused by
 (a) bacteria (b) virus (c) protozoa (d) insects

9. A dreaded disease caused by a virus HIV that attacks the immunity system, is
- | | |
|-------------|---------------------|
| (a) rickets | (b) night blindness |
| (c) AIDS | (d) polio |
10. Deficiency diseases are caused due to
- | | |
|-----------------------|-----------------------------|
| (a) micro-organisms | (b) lack of nutritious food |
| (c) lack of medicines | (d) lack of clean water |

B. Give short answers.

1. Why do we need food ?
2. Which disease is caused due to lack of vitamin A ?
3. Why does our body need protein ?
4. What causes malaria ?
5. Why is water essential for our body ?

C. Answer the following questions.

1. Name two communicable diseases caused by
(a) bacteria (b) virus (c) protozoa
2. How can you prevent diseases from spreading ?
3. Name different nutrients present in food. Describe at least one function of each.
4. Distinguish between communicable and non-communicable diseases ?
5. List four causes of communicable diseases ?

D. Give two examples of each.

1. proteinated food : _____
2. carbohydrate food : _____
3. fatty food : _____
4. communicable diseases : _____
5. non-communicable diseases : _____

E. Tick the odd-one-out giving reason.

1. Rice, Wheat, Orange, Potato
2. Fast food, Carbohydrates, Proteins, Minerals
3. Beri-Beri, Rickets, Tuberculosis, Goitre
4. Rest, Hygiene, Exercise, Late-night sleep
5. Bacteria, Tape worm, Protozoa, Virus

Higher Order Thinking Skills (HOTS)

1. Why are deficiency diseases non-communicable ?
[Hint : Communicable diseases are caused by micro-organisms.]
2. Why do the people consuming sea food do not suffer from goitre ?
[Hint : The sea water contains many salts and minerals including iodine.]



QUICK ASSIGNMENT

A. Mark a tick (✓) against the correct word and cross (X) the wrong one.

1. Proteins are body-building/energy-giving nutrients.
2. Proteins/carbohydrates are energy-giving nutrients.
3. Deficiency of nutritious food/clean water is called malnutrition.
4. Common cold is communicable/non-communicable disease.
5. Polio is a communicable/non-communicable disease.

B. Fill in the blanks.

1. _____ is the necessity of all living beings.
2. Food with all the _____ is called a balanced diet.
3. Fats remain _____ in our body for later use.
4. Vitamins and minerals are needed by our body in _____ quantity.
5. The malnutrition causes _____ diseases.

C. Write one word for the following.

1. Food with all the nutrients _____.
2. Diseases caused by infection _____.
3. Diseases that can pass from one sick person to another healthy person _____.
4. Disease caused by the deficiency of vitamin C _____.
5. Disease caused by the deficiency of iodine _____.

D. Match the following column A with column B.

Column A

1. Soyabean
2. Cereals
3. Sunlight
4. Calcium and phosphorous
5. Malaria

Column B

- (a) carbohydrates
- (b) bones
- (c) communicable disease
- (d) protein
- (e) vitamin D



Activity

Project at Home

To see the growth of micro-organisms.

What is needed : Bread or chapatti, pencil and paper.

What to do : Keep the bread or chapatti in warm and damp place. Observe it for 5-6 days. What changes do you observe each day.

What do you observe :

Days	Change in colour	Change in smell
1		
2		
3		
4		
5		

What do you learn : The colour changes due to the growth of micro-organisms.

Field Project

Visit the dispensary near your home with your mother or father. See the immunisation chart and note the vaccines given for communicable diseases. Ask your parents whether you are vaccinated against these diseases or not.

6

Safety and First Aid



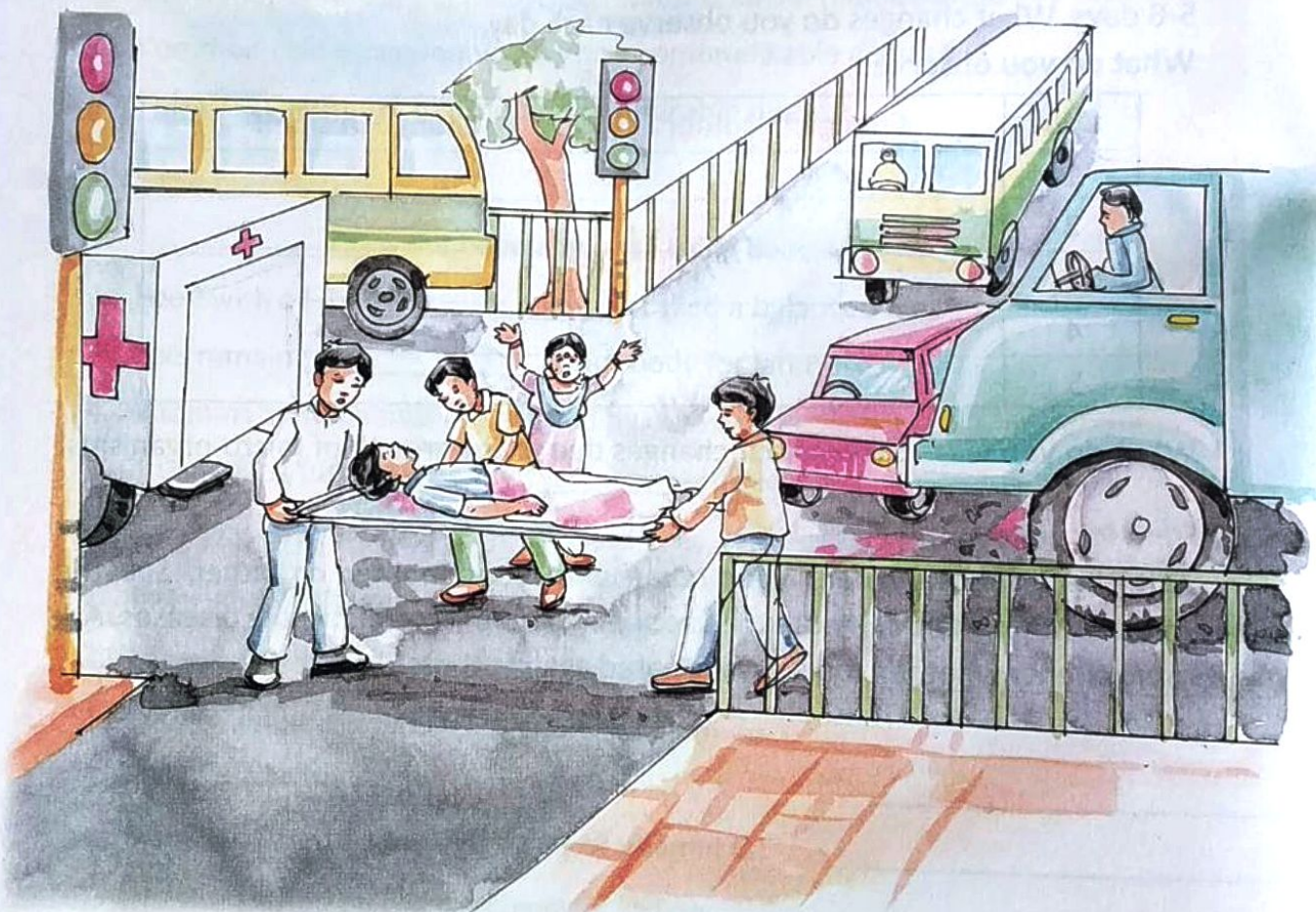
Accidents can happen anywhere, if we are not careful. The injuries may be from road accidents, fire, shock, animal bites and other reasons. Most accidents take place either on roads, at home or from fire. Therefore, one must be very-very careful and should follow the safety rules to avoid these accidents.

LESSON OBJECTIVE

You will know

- Safety on the roads
- Safety at home
- Safety from fire
- First aid

It is also necessary that we should know about the first aid to be provided to the accident victims so that the injured persons' condition can be improved from being worsened.



First aid provided during accident

SAFETY ON THE ROADS

We should observe the following safety rules on the roads.

1. Before crossing the road, check properly that no vehicle is coming from either direction.
2. Cross the road at a zebra crossing. If there is no zebra crossing, then make sure that there is no traffic from either side. If possible, use a subway or pedestrian bridge to cross the road. It is the safest way of crossing the road.
3. Never play on the road.
4. Read the road signs properly and try to understand the information they impart.



Some important road signs with their meanings.

SAFETY AT HOME

Most accidents occur at home due to our negligence. Observe the following safety rules to avoid them.

1. Keep your toys, books or other belongings on their proper place. Do not scatter them on the floor. They can hurt someone.
2. Never play on the stairs, terrace or other elevated places because falling down from there may cause severe injuries.
3. Keep the bathroom clean. Do not leave water with soap or detergent on the floor. Bathroom injuries are very fatal.
4. Never play with sharp objects like knife, blades etc. Playing with these objects can hurt you and cause tetanus.
5. In case of a gas leak, open all the doors and windows of your home. Do not switch on the lights. Inform your elders immediately, call a mechanic to repair the leak.



Avoid playing on the stairs



Injury from sharp objects may cause tetanus



The gas escapes out on opening windows and doors

SAFETY FROM FIRE

Domestic fires and kitchen injuries are the most common examples of accidents due to carelessness.

Most fires occur while working in the kitchen or while using electric gadgets. To prevent this, following instructions should be followed :

1. Use proper clothes / duster to hold hot pots and pans instead of your own clothes.
2. Get all electric gadgets checked from time to time.
3. If a crack is seen in the plastic covering of any wire, get it replaced.
4. Never keep a kerosene stove on the floor. If it gets knocked over, the oil can get spilled, resulting in a fire.
5. If the oil in the pan catches fire, smother the fire by covering the pan. Throw some baking soda on the burning oil. Never throw water, it will splutter the oil and spread the fire.
6. Never wear nylon or other synthetic clothes in the kitchen or while burning crackers during Diwali, because they catch fire very easily. Cotton clothes are safer to wear.



Do not keep kerosene stove on the floor



Cover the pan immediately if the oil in it catch fire



Do not burn crackers wearing synthetic clothes

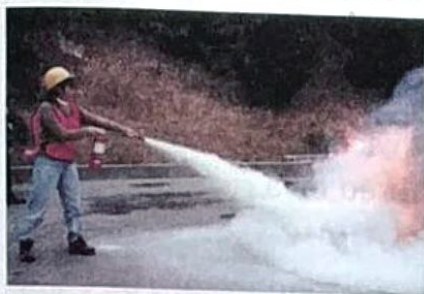
Prevention from Fire

1. To keep burning, fire needs air.
One method of putting out fire is to cut off the air supply. Throwing mud or sand over the fire cuts off air supply by covering the substance on fire.
2. Pouring water over the fire, cools down the burning substance and also cuts off its air supply.
3. Fire caused by electricity can be put off by throwing sand over it. There are special fire extinguishers to put off such fires.

A fire extinguisher is a simple device used to extinguish the fire. It cuts off the supply of air to the fires.

Water should never be thrown over a fire caused by electricity, electricity can flow through water and give an electric shock to the person who touches it.

4. Never throw water over burning kerosene or petrol. These are lighter than water and float over water and will continue burning.



Fire fighting officials



Wrapping a burnt person in a blanket cuts off the air supply

5. In case the fire is severe, call for help. Dial 101 and call for the fire brigade.
6. If clothes catch fire roll on the ground. This cuts-off the air supply to the fire and puts it out. If a blanket or a rug is available, rolling up in it is more effective.

FIRST AID

First aid is the immediate help given to a wounded or injured person before proper medical aid arrives. Proper first aid can prevent the injury from getting worse and can sometimes even save a life.

First Aid for Different Kinds of Injuries

Burns

- ▼ If the burn is minor, put the burnt area immediately under cold water. This will cool the area and prevent blisters from being formed.
- ▼ A severe burn can result in blisters. Never prick the blister. If a blister opens, wash the area with soap and water. Cover it lightly with a clean piece of cloth or bandage. A piece of clear cloth dipped in a solution of baking soda in water can be applied to the burnt area.
- ▼ In case of severe burn, the patient should be taken to a doctor immediately.
- ▼ Burns due to chemicals such as acids, should be washed with plenty of water. Then follow the treatment as in case of burn.



Wounds

Minor wounds : In case of minor cut and scratches, wash the wound with soap and water. Apply an antiseptic like Savlon or Dettol on it. In case there is lots of bleeding apply ice on the wound to stop the bleeding. Cover the wound with a band-aid.

Deep wounds : In case of deep wounds, clean the wound with soap and water, apply an antiseptic and take the person to a doctor. If the wound is caused by a rusted or iron or dirty object, ask the doctor for an anti tetanus injection.

Sometimes a tight band called **tourniquet** is twisted above a wound to stop bleeding. It applies pressure on the wounded area and thus stops bleeding.

Animal Bite

Dog or Cat Bites

The saliva of dogs or cats may carry rabies virus. So wash the wound thoroughly with soap and water and put an antiseptic cream. The patient should be taken to a doctor to give anti-rabies vaccine.



Washing the animal bite

Snake Bite

The poison ejected by the snake travels through the blood and affects the heart and nervous system. A tight bandage should be tied between the wound and the heart to slow down the flow of blood so that the poison cannot circulate with blood. The patient should be rushed to a doctor immediately.



Snake bite

Broken Bones and Sprains

A crack or break in bone is called a fracture. If you think a bone is broken, do not move that part of the body. In case, a bone in the hand is broken, make a sling using a triangular piece of cloth. This will give support to the arm and prevent movement. Take the patient to a doctor.

A **sprain** is a twist in the ankle or the wrist. The joint swells up and is very painful. An elastic bandage can be wrapped around the joint to prevent it from moving. Soak the sprained joint in cold water, the first day. From the second day onwards it can be soaked in



Sling supports the broken bone of the arm



Do not move sprained ankle or wrist



warm water 2 or 3 times a day. This will help it to heat. Some muscle relaxant ointments can be lightly rubbed over the sprained joint.

Remember, it is important to know what to do after an accident but it is more important to avoid an accident. This is what safety is all about.



Words to Remember

Fracture	: a broken bone
Sprain	: a twist in the joints of the ankle or the wrist
Tourniquet	: a tight bandage that helps to apply pressure to stop bleeding
Fire extinguisher	: a simple device to put off a fire
First aid	: the immediate help given to an injured person before the arrival of proper medical aid.
Sling	: a bandage or triangular piece of cloth looped round the neck to support the injured arm.



Quick Recall

- Most accidents can be prevented if we are careful.
- Using a zebra crossing, subway or pedestrian bridge, knowledge of road signs and not playing on the road are some measures to avoid road accidents.
- Keeping things on their proper place, not playing on stairs, terraces, balcony etc. and keeping the bathroom floor clean and dry are some instructions to avoid accidents at home.
- Fire can be put off by cutting off the air supply, throwing sand etc.
- First aid is the immediate help given to a wounded person before proper medical aid arrives.
- Minor burn injuries could be washed with cold water and an antiseptic should be applied.
- A wound should be properly cleaned and an antiseptic should be applied.
- Severe burn, wounds and animal bites require treatment by a doctor.
- In case of a broken bone or a sprain do not move the affected part, go to a doctor.

EXERCISES

A. Choose the correct answer.

1. The safest way of crossing the road is the use of
(a) zebra crossing (b) pedestrian bridge (c) subway (d) all of these
2. To keep on burning, fire needs
(a) air (b) water (c) carbon dioxide (d) sand
3. A subway is meant for
(a) pedestrians (b) car drivers (c) traffic police (d) two wheelers
4. The fire caused by electricity can be put off by throwing
(a) water (b) oil (c) sand (d) blanket
5. Anti-rabies vaccine should be given in case of a
(a) fracture (b) sprain (c) fever (d) dog bite
6. Rolling on the ground or wrapping a burning person in a blanket
(a) cuts off the air supply (b) increases the air supply
(c) supports burning (d) cools down the burnt area
7. A fracture is a
(a) rupture of ligaments (b) pain in the joints
(c) crack in a bone (d) twist in the ankle
8. A fire due to short circuit should be extinguished with the help of
(a) water (b) petrol (c) sand (d) blanket
9. A cut due to sharp objects like knife or blade can cause
(a) malaria (b) cold and flu (c) tetanus (d) dysentery
10. A sling is used to support the injured
(a) foot (b) leg (c) fingers (d) arm

B. Give short answers.

1. What is the tight band used to stop bleeding called ?
2. Which organs are affected by snake bite ?
3. What is looped round the neck to support an injured arm ?
4. What should be done if the oil in the pan catches fire ?
5. Name four things that catch fire easily.

C. Answer the following questions.

1. State three safety rules on the roads ?
2. What precautions should be taken to avoid accidents at home ?
3. How can a fire caused by electricity be put off ?
4. What first aid would you provide in the following cases ?
(i) Fracture (ii) Sprain (iii) Dog bite

D. Give reason for the following.

1. Never throw water to put off an electric fire.
2. Cover a person in a blanket if his/her clothes catch fire.
3. Electric switches should not be operated in case of a gas leak.
4. Damaged electric wires should be replaced.

Higher Order Thinking Skills (HOTS)

1. Why is the knowledge of first aid necessary ?

[Hint : What is the aim of first aid ?]

2. Why is it dangerous to play on the roads ?

[Hint : What moves on the roads ?]



**QUICK
ASSIGNMENT**

A. State T for true or F for false against the given statements.

1. Carelessness prevents accidents.
2. We should wear nylon clothes in the kitchen.
3. We should switch on electric switches in case of a gas leak.
4. A fractured part should not be moved.
5. A burn should be treated with warm water.
6. The cracked plastic cover of a wire needs not to be replaced.

B. Fill in the blanks.

1. _____ leads to accidents.
2. Prevention is always better than _____.
3. Never touch electric gadgets with _____ hands.
4. _____ is lighter than water, and floats on it.
5. Never use _____ to put off an electrical fire.
6. In case of a _____ open the windows and doors immediately.

C. Give one word for the following.

1. The immediate help provided to an injured person before the arrival of the doctor.
2. The rules or instructions to be followed to avoid accidents on the roads, at home etc.
3. Broad white stripes marked on the roads where vehicles must stop for people to cross the road.
4. A path under a road which people can use to cross the other side.
5. A device used to extinguish a fire by cutting off the air supply.
6. A piece of cloth looped around the neck to support injured arm.

D. Match the following column A with column B.

Column A

1. Application of cold water or ice
2. Use of tourniquet
3. Anti-rabies vaccine
4. Using a sling
5. Soaking the joint in warm water

Column B

- (a) sprain
- (b) dog bite
- (c) burn
- (d) bleeding wounds
- (e) fracture

E. Read the following situations carefully and state what first-aid would you provide in each case.

1. You are playing basketball in nearby park with your friend. Suddenly your younger sister who is barefoot, steps on a sharp object. Her foot is cut and is bleeding. What do you do?

2. You are enjoying a family picnic. Suddenly a dog comes and bites your cousin who is playing near a flower bush. What do you do ?

3. Your mother is cooking food in the kitchen. You are playing with your sister. Both of you run into the kitchen and your sister slides on the floor. She puts her hand right on the hot cooker to keep herself from falling. What do you do ?



Activity

Classroom Project

Paste the road signs on a chart paper with the information they impart. Display it in your classroom.

Project at Home

Make a fire extinguisher.

- Take a plastic bottle with a cap. Make a hole in the cap and insert a drinking straw in it, that can bend. Seal the hole by pressing some plastics lightly around the straw.
- Light a candle and put it in a bowl.
- Remove the cap of the bottle. Pour into the bottle, half a cup of vinegar and a table spoon full of sodium bicarbonate (baking soda). Immediately put on the cap and screw it tight.
- Put the straw towards the lighted candle. The candle gets extinguished because when vinegar and baking soda mix, the gas carbon dioxide is produced, which does not support burning.



ONLY FOR READING

info
hub

Human Body and Its Needs

Curiosity Corner

- The stomach of an adult can hold 1.5 litres of material.
- Muscles produce heat when they use energy, this is why people become warm when they exercise.
- Some animals have much better eyesight than humans. Cats have a mirror-like organ in their eyes that reflects light. That's why a cat's eye seems to glow at night.
- There are more nerve cells in the brain than there are stars in the milky way.
- In newborns, the brain is known to grow three times within the span of one year. As we grow older the brain loses a gram every year.

Fun with Science

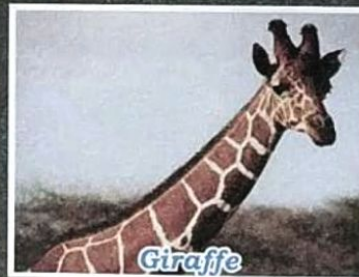
CHECK YOUR TEETH

Borrow two small makeup mirrors from your mother. To look at the upper set of teeth hold one mirror horizontally on the lower lip and



adjust the second mirror, vertically in front of your mouth, to see the reflection of teeth in the second mirror and see the reflection in the second mirror.

PHOTO SPEAKS



Giraffe



Body feature

Has same number of bones in neck as that of humans

The hands have the same number of bones, 27 in all

Amazing SCIENCE FACT

CARTILAGE COVER

The ears and end of the nose do not have bones. Their inner support is cartilage, which is lighter and more flexible than bones. That's why the nose and ears can be bent. After death, cartilage rots faster than bone. This is why the skeleton of skull has no nose or ear.



BALANCED DIET

To find out whether a balanced diet is being eaten, get a diet chart from your doctor. Make a record of everything eaten for 15 days. Compare what you have eaten with what is prescribed in the diet chart. See what you have not eaten, but provides nutrition to your body, include it in your new diet chart. Don't include too many sugary foods on the list.



Green Gallery

A baby is born with pink lungs. As we get older, our lungs darken from breathing in polluted air.

Green leafy vegetables are rich source of vitamins. These must be included in our daily diet.

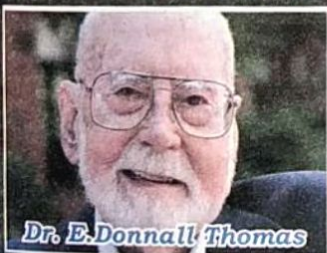


The smoke that is produced by a fire kills more people than a burn does because of carbon monoxide and other dangerous gases.

Ashwagandha, a medicinal plant is used to treat many diseases like nervous disorders, leprosy and intestinal infections. The roots, bark, leaves, fruits and seeds all the parts of this herb are used for medicinal purposes.



The cutting down of forests, and greater industrialization (which has led to chemicals being released into the atmosphere) have upset the balance between the carbon dioxide and oxygen.



Dr. E. Donnall Thomas



Dolphin

Father of Bone Marrow Transplantation

Best hearing sense, 14 times sharper than humans

3. The area around your home should be neat and clean so that neither flies nor mosquitoes can breed there.
4. Water should not be stagnate in puddles around the home. Drains should be kept covered.
5. Children should be vaccinated properly against diseases. There are vaccines available for diseases like TB, diphtheria, hepatitis etc.

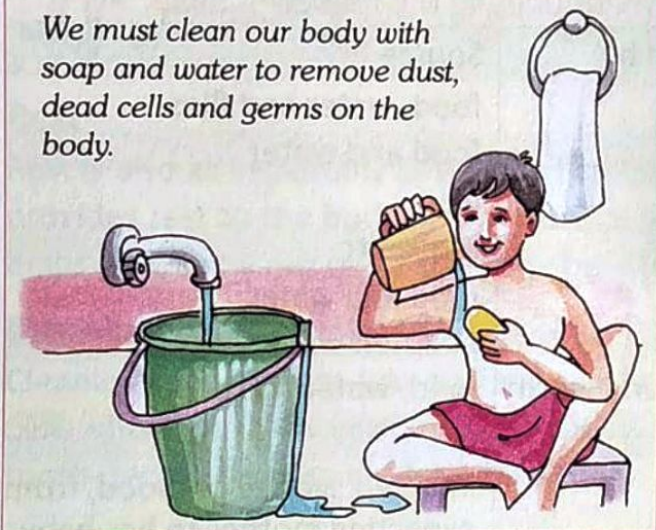
HYGIENE

Health and hygiene are closely associated to each other. The word 'hygiene' includes cleanliness of the body and the surroundings in which one lives. Personal hygiene helps in preventing diseases.

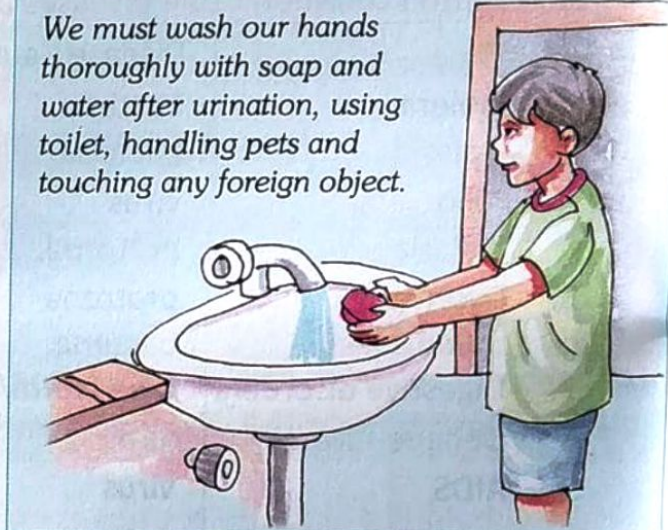
For maintaining personal hygiene and good health one should follow the instructions given below.

Maintaining Good Health and Hygiene

We must clean our body with soap and water to remove dust, dead cells and germs on the body.



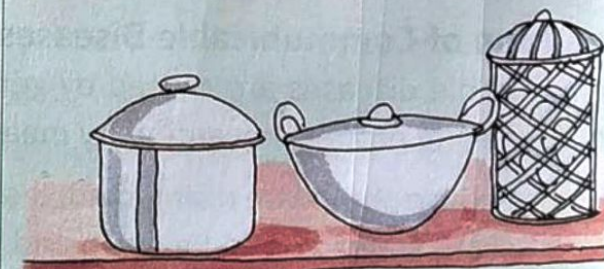
We must wash our hands thoroughly with soap and water after urination, using toilet, handling pets and touching any foreign object.



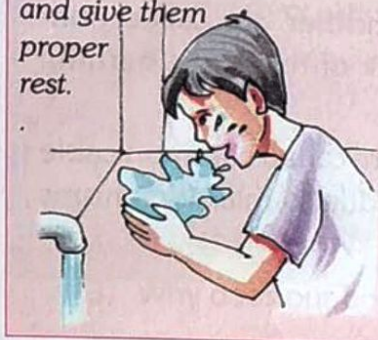
We must brush our teeth at least twice a day. Brushing removes the food particles stuck on the teeth and prevents germs to attack the teeth.



In the kitchen, all food items whether cooked or uncooked should be covered and kept at height. Kitchen should be free from pests, insects or and other infectious creatures.



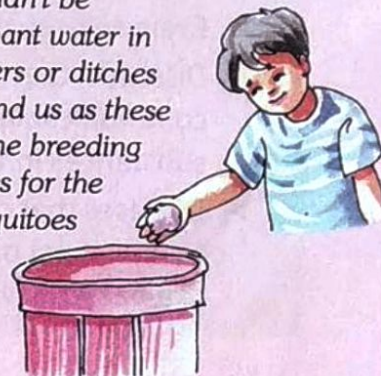
Eyes are very important for us. We should take proper care of them. We must wash our eyes regularly with cold water and give them proper rest.



We must trim our nails regularly as long nails are home to dirt and germs.



Our surrounding should also be cleaned. Garbage should be thrown in covered dustbins. There shouldn't be stagnant water in coolers or ditches around us as these are the breeding places for the mosquitoes and flies.



Words to Remember

- Nutrients** : essential substances present in the food
- Roughage** : the fibre content in food
- Balanced diet** : a diet that contains all the nutrients in the right proportion
- Deficiency diseases** : diseases caused due to the lack of a nutrient in the body
- Non-communicable diseases** : diseases that cannot be spread from a sick to a healthy person
- Communicable diseases** : diseases that can spread from a sick person to a healthy person
- Vaccine** : a substance that is put into the blood and that protects the body from a disease.
- Germs** : disease - causing micro-organisms



Quick Recall

- Food that contains all the nutrients like protein, carbohydrates, fats, vitamins and minerals in adequate proportion is called balanced diet.
- Proteins are the body-building nutrients. These are needed for repairing and building body tissues.
- Carbohydrates are the energy-giving nutrients. They give us energy to work.
- Fats are also energy-giving nutrients. They are stored in our body cells.

- Vitamins and minerals are protective foods that our body needs to remain healthy.
- Roughages are the fibres present in food which makes the digestion easy.
- Exercise uses the muscles of the body and makes them stronger.
- Diseases that cannot spread from one person to another are called non-communicable diseases. These are caused due to lack of nutrients, harmful substances in the environment or bad habits.
- Diseases that can spread from one person to another are called communicable (contagious) or infectious diseases. These are caused due to microorganisms like bacteria, virus or fungi.

EXERCISES

A. Choose the correct answer.

1. The variety of food that contains all the nutrients in right proportion is called
(a) healthy diet (b) balanced diet (c) fast food (d) qualitative food
2. Carbohydrates are energy-giving food. But excess amount of carbohydrates causes
(a) perplexity (b) communicable diseases
(c) obesity (d) healthy body
3. Proteins are
(a) energy-giving nutrients (b) body-building nutrients
(c) disease - fighting nutrients (d) digestive nutrients
4. The nutrients that provide heat and energy are
(a) fats (b) fibres (c) minerals (d) proteins
5. Oranges, grapes and carrots are rich sources of
(a) proteins (b) fibres (c) vitamins (d) water
6. Scurvy is caused by the deficiency of
(a) vitamin A (b) vitamin B (c) vitamin C (d) vitamin D
7. Rashi is suffering from goitre. She should be given a diet rich of
(a) iodine (b) phosphorous (c) iron (d) calcium
8. Jaundice is caused by
(a) bacteria (b) virus (c) protozoa (d) insects

9. A dreaded disease caused by a virus HIV that attacks the immunity system, is
(a) rickets (b) night blindness
(c) AIDS (d) polio
10. Deficiency diseases are caused due to
(a) micro-organisms (b) lack of nutritious food
(c) lack of medicines (d) lack of clean water

B. Give short answers.

1. Why do we need food ?
2. Which disease is caused due to lack of vitamin A ?
3. Why does our body need protein ?
4. What causes malaria ?
5. Why is water essential for our body ?

C. Answer the following questions.

1. Name two communicable diseases caused by
(a) bacteria (b) virus (c) protozoa
2. How can you prevent diseases from spreading ?
3. Name different nutrients present in food. Describe at least one function of each.
4. Distinguish between communicable and non-communicable diseases ?
5. List four causes of communicable diseases ?

D. Give two examples of each.

1. proteinated food : _____
2. carbohydrate food : _____
3. fatty food : _____
4. communicable diseases : _____
5. non-communicable diseases : _____

E. Tick the odd-one-out giving reason.

1. Rice, Wheat, Orange, Potato
2. Fast food, Carbohydrates, Proteins, Minerals
3. Beri-Beri, Rickets, Tuberculosis, Goitre
4. Rest, Hygiene, Exercise, Late-night sleep
5. Bacteria, Tape worm, Protozoa, Virus

Higher Order Thinking Skills (HOTS)

1. Why are deficiency diseases non-communicable ?
[Hint : Communicable diseases are caused by micro-organisms.]
2. Why do the people consuming sea food do not suffer from goitre ?
[Hint : The sea water contains many salts and minerals including iodine.]



QUICK ASSIGNMENT

A. Mark a tick (✓) against the correct word and cross (X) the wrong one.

1. Proteins are body-building/energy-giving nutrients.
2. Proteins/carbohydrates are energy-giving nutrients.
3. Deficiency of nutritious food/clean water is called malnutrition.
4. Common cold is communicable/non-communicable disease.
5. Polio is a communicable/non-communicable disease.

B. Fill in the blanks.

1. _____ is the necessity of all living beings.
2. Food with all the _____ is called a balanced diet.
3. Fats remain _____ in our body for later use.
4. Vitamins and minerals are needed by our body in _____ quantity.
5. The malnutrition causes _____ diseases.

C. Write one word for the following.

1. Food with all the nutrients _____.
2. Diseases caused by infection _____.
3. Diseases that can pass from one sick person to another healthy person _____.
4. Disease caused by the deficiency of vitamin C _____.
5. Disease caused by the deficiency of iodine _____.

D. Match the following column A with column B.

Column A

1. Soyabean
2. Cereals
3. Sunlight
4. Calcium and phosphorous
5. Malaria

Column B

- (a) carbohydrates
- (b) bones
- (c) communicable disease
- (d) protein
- (e) vitamin D



Activity

Project at Home

To see the growth of micro-organisms.

What is needed : Bread or chapatti, pencil and paper.

What to do : Keep the bread or chapatti in warm and damp place. Observe it for 5-6 days. What changes do you observe each day.

What do you observe :

Days	Change in colour	Change in smell
1		
2		
3		
4		
5		

What do you learn : The colour changes due to the growth of micro-organisms.

Field Project

Visit the dispensary near your home with your mother or father. See the immunisation chart and note the vaccines given for communicable diseases. Ask your parents whether you are vaccinated against these diseases or not.

6

Safety and First Aid



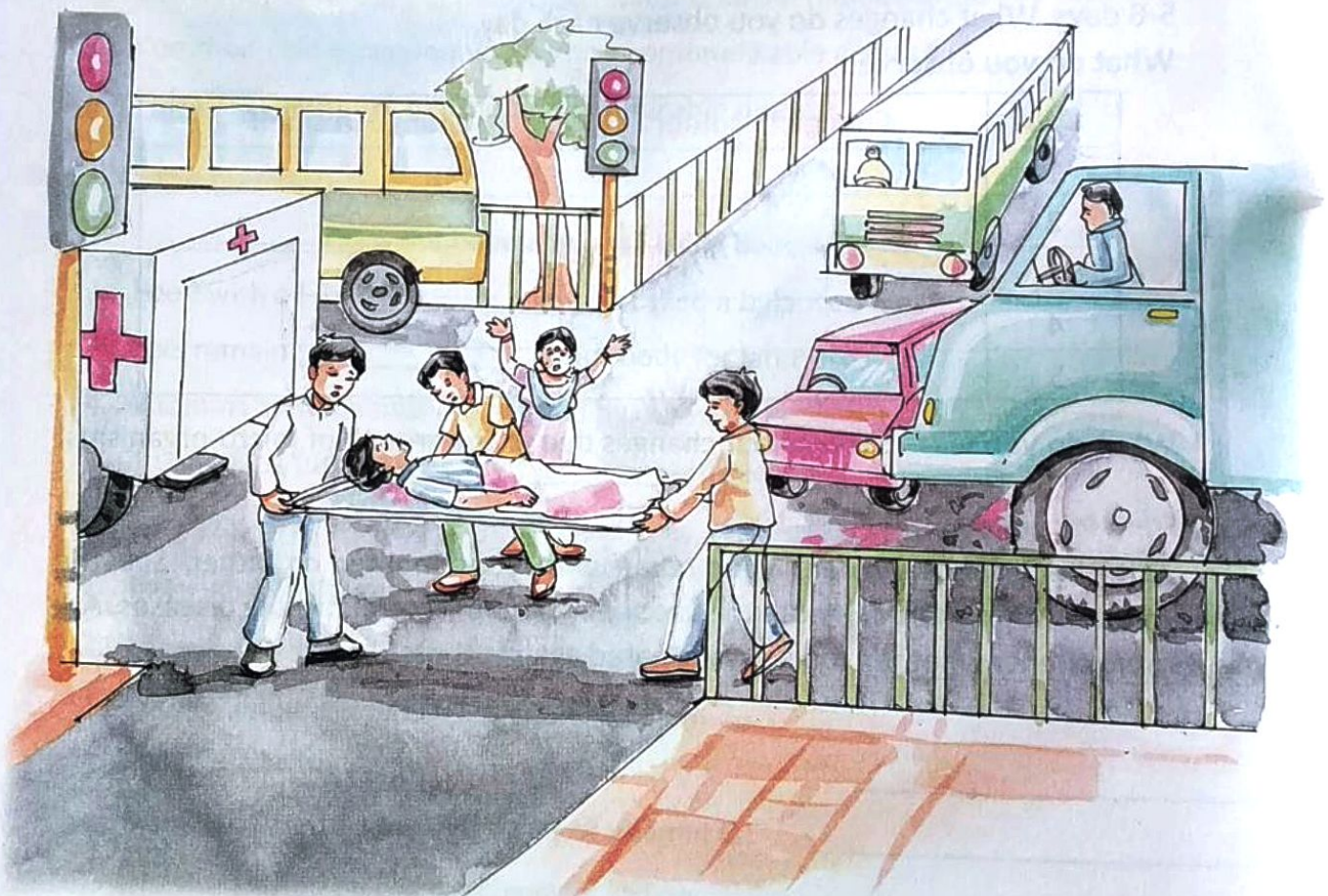
Accidents can happen anywhere, if we are not careful. The injuries may be from road accidents, fire, shock, animal bites and other reasons. Most accidents take place either on roads, at home or from fire. Therefore, one must be very-very careful and should follow the safety rules to avoid these accidents.

LESSON OBJECTIVE

You will know

- Safety on the roads
- Safety at home
- Safety from fire
- First aid

It is also necessary that we should know about the first aid to be provided to the accident victims so that the injured persons' condition can be improved from being worsened.



First aid provided during accident

SAFETY ON THE ROADS

We should observe the following safety rules on the roads.

1. Before crossing the road, check properly that no vehicle is coming from either direction.
2. Cross the road at a zebra crossing. If there is no zebra crossing, then make sure that there is no traffic from either side. If possible, use a subway or pedestrian bridge to cross the road. It is the safest way of crossing the road.
3. Never play on the road.
4. Read the road signs properly and try to understand the information they impart.



Some important road signs with their meanings.

SAFETY AT HOME

Most accidents occur at home due to our negligence. Observe the following safety rules to avoid them.

1. Keep your toys, books or other belongings on their proper place. Do not scatter them on the floor. They can hurt someone.
2. Never play on the stairs, terrace or other elevated places because falling down from there may cause severe injuries.
3. Keep the bathroom clean. Do not leave water with soap or detergent on the floor. Bathroom injuries are very fatal.
4. Never play with sharp objects like knife, blades etc. Playing with these objects can hurt you and cause tetanus.
5. In case of a gas leak, open all the doors and windows of your home. Do not switch on the lights. Inform your elders immediately, call a mechanic to repair the leak.



Avoid playing on the stairs



Injury from sharp objects may cause tetanus



The gas escapes out on opening windows and doors

SAFETY FROM FIRE

Domestic fires and kitchen injuries are the most common examples of accidents due to carelessness.

Most fires occur while working in the kitchen or while using electric gadgets. To prevent this, following instructions should be followed :

1. Use proper clothes / duster to hold hot pots and pans instead of your own clothes.
2. Get all electric gadgets checked from time to time.
3. If a crack is seen in the plastic covering of any wire, get it replaced.
4. Never keep a kerosene stove on the floor. If it gets knocked over, the oil can get spilled, resulting in a fire.
5. If the oil in the pan catches fire, smother the fire by covering the pan. Throw some baking soda on the burning oil. Never throw water, it will splutter the oil and spread the fire.
6. Never wear nylon or other synthetic clothes in the kitchen or while burning crackers during Diwali, because they catch fire very easily. Cotton clothes are safer to wear.



Do not keep kerosene stove on the floor



Cover the pan immediately if the oil in it catch fire



Do not burn crackers wearing synthetic clothes

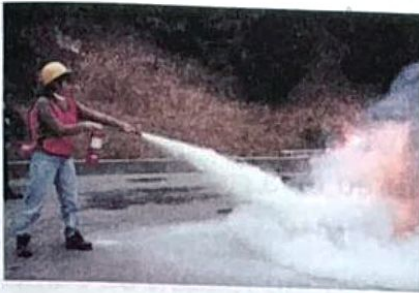
Prevention from Fire

1. To keep burning, fire needs air.
One method of putting out fire is to cut off the air supply. Throwing mud or sand over the fire cuts off air supply by covering the substance on fire.
2. Pouring water over the fire, cools down the burning substance and also cuts off its air supply.
3. Fire caused by electricity can be put off by throwing sand over it. There are special fire extinguishers to put off such fires.

A fire extinguisher is a simple device used to extinguish the fire. It cuts off the supply of air to the fires.

Water should never be thrown over a fire caused by electricity, electricity can flow through water and give an electric shock to the person who touches it.

4. Never throw water over burning kerosene or petrol. These are lighter than water and float over water and will continue burning.



Fire fighting officials



Wrapping a burnt person in a blanket cuts off the air supply

5. In case the fire is severe, call for help. Dial 101 and call for the fire brigade.
6. If clothes catch fire roll on the ground. This cuts-off the air supply to the fire and puts it out. If a blanket or a rug is available, rolling up in it is more effective.

FIRST AID

First aid is the immediate help given to a wounded or injured person before proper medical aid arrives. Proper first aid can prevent the injury from getting worse and can sometimes even save a life.

First Aid for Different Kinds of Injuries

Burns

- ▼ If the burn is minor, put the burnt area immediately under cold water. This will cool the area and prevent blisters from being formed.
- ▼ A severe burn can result in blisters. Never prick the blister. If a blister opens, wash the area with soap and water. Cover it lightly with a clean piece of cloth or bandage. A piece of clear cloth dipped in a solution of baking soda in water can be applied to the burnt area.
- ▼ In case of severe burn, the patient should be taken to a doctor immediately.
- ▼ Burns due to chemicals such as acids, should be washed with plenty of water. Then follow the treatment as in case of burn.



Wounds

Minor wounds : In case of minor cut and scratches, wash the wound with soap and water. Apply an antiseptic like Savlon or Dettol on it. In case there is lots of bleeding apply ice on the wound to stop the bleeding. Cover the wound with a band-aid.

Deep wounds : In case of deep wounds, clean the wound with soap and water, apply an antiseptic and take the person to a doctor. If the wound is caused by a rusted or iron or dirty object, ask the doctor for an anti tetanus injection.

Sometimes a tight band called **tourniquet** is twisted above a wound to stop bleeding. It applies pressure on the wounded area and thus stops bleeding.

Animal Bite

Dog or Cat Bites

The saliva of dogs or cats may carry rabies virus. So wash the wound thoroughly with soap and water and put an antiseptic cream. The patient should be taken to a doctor to give anti-rabies vaccine.

Snake Bite

The poison ejected by the snake travels through the blood and affects the heart and nervous system. A tight bandage should be tied between the wound and the heart to slow down the flow of blood so that the poison cannot circulate with blood. The patient should be rushed to a doctor immediately.

Broken Bones and Sprains

A crack or break in bone is called a fracture. If you think a bone is broken, do not move that part of the body. In case, a bone in the hand is broken, make a sling using a triangular piece of cloth. This will give support to the arm and prevent movement. Take the patient to a doctor.

A **sprain** is a twist in the ankle or the wrist. The joint swells up and is very painful. An elastic bandage can be wrapped around the joint to prevent it from moving. Soak the sprained joint in cold water, the first day. From the second day onwards it can be soaked in



Washing the animal bite



Snake bite



Sling supports the broken bone of the arm



Do not move sprained ankle or wrist

warm water 2 or 3 times a day. This will help it to heat. Some muscle relaxant ointments can be lightly rubbed over the sprained joint.

Remember, it is important to know what to do after an accident but it is more important to avoid an accident. This is what safety is all about.



Words to Remember

Fracture	: a broken bone
Sprain	: a twist in the joints of the ankle or the wrist
Tourniquet	: a tight bandage that helps to apply pressure to stop bleeding
Fire extinguisher	: a simple device to put off a fire
First aid	: the immediate help given to an injured person before the arrival of proper medical aid.
Sling	: a bandage or triangular piece of cloth looped round the neck to support the injured arm.



Quick Recall

- Most accidents can be prevented if we are careful.
- Using a zebra crossing, subway or pedestrian bridge, knowledge of road signs and not playing on the road are some measures to avoid road accidents.
- Keeping things on their proper place, not playing on stairs, terraces, balcony etc. and keeping the bathroom floor clean and dry are some instructions to avoid accidents at home.
- Fire can be put off by cutting off the air supply, throwing sand etc.
- First aid is the immediate help given to a wounded person before proper medical aid arrives.
- Minor burn injuries could be washed with cold water and an antiseptic should be applied.
- A wound should be properly cleaned and an antiseptic should be applied.
- Severe burn, wounds and animal bites require treatment by a doctor.
- In case of a broken bone or a sprain do not move the affected part, go to a doctor.

EXERCISES

A. Choose the correct answer.

1. The safest way of crossing the road is the use of
(a) zebra crossing (b) pedestrian bridge (c) subway (d) all of these
2. To keep on burning, fire needs
(a) air (b) water (c) carbon dioxide (d) sand
3. A subway is meant for
(a) pedestrians (b) car drivers (c) traffic police (d) two wheelers
4. The fire caused by electricity can be put off by throwing
(a) water (b) oil (c) sand (d) blanket
5. Anti-rabies vaccine should be given in case of a
(a) fracture (b) sprain (c) fever (d) dog bite
6. Rolling on the ground or wrapping a burning person in a blanket
(a) cuts off the air supply (b) increases the air supply
(c) supports burning (d) cools down the burnt area
7. A fracture is a
(a) rupture of ligaments (b) pain in the joints
(c) crack in a bone (d) twist in the ankle
8. A fire due to short circuit should be extinguished with the help of
(a) water (b) petrol (c) sand (d) blanket
9. A cut due to sharp objects like knife or blade can cause
(a) malaria (b) cold and flu (c) tetanus (d) dysentery
10. A sling is used to support the injured
(a) foot (b) leg (c) fingers (d) arm

B. Give short answers.

1. What is the tight band used to stop bleeding called ?
2. Which organs are affected by snake bite ?
3. What is looped round the neck to support an injured arm ?
4. What should be done if the oil in the pan catches fire ?
5. Name four things that catch fire easily.

C. Answer the following questions.

1. State three safety rules on the roads ?
2. What precautions should be taken to avoid accidents at home ?
3. How can a fire caused by electricity be put off ?
4. What first aid would you provide in the following cases ?
(i) Fracture (ii) Sprain (iii) Dog bite

D. Give reason for the following.

1. Never throw water to put off an electric fire.
2. Cover a person in a blanket if his/her clothes catch fire.
3. Electric switches should not be operated in case of a gas leak.
4. Damaged electric wires should be replaced.

Higher Order Thinking Skills (HOTS)

1. Why is the knowledge of first aid necessary ?

[Hint : What is the aim of first aid ?]

2. Why is it dangerous to play on the roads ?

[Hint : What moves on the roads ?]



**QUICK
ASSIGNMENT**

A. State T for true or F for false against the given statements.

1. Carelessness prevents accidents.
2. We should wear nylon clothes in the kitchen.
3. We should switch on electric switches in case of a gas leak.
4. A fractured part should not be moved.
5. A burn should be treated with warm water.
6. The cracked plastic cover of a wire needs not to be replaced.

B. Fill in the blanks.

1. _____ leads to accidents.
2. Prevention is always better than _____.
3. Never touch electric gadgets with _____ hands.
4. _____ is lighter than water, and floats on it.
5. Never use _____ to put off an electrical fire.
6. In case of a _____ open the windows and doors immediately.

C. Give one word for the following.

1. The immediate help provided to an injured person before the arrival of the doctor.
2. The rules or instructions to be followed to avoid accidents on the roads, at home etc.
3. Broad white stripes marked on the roads where vehicles must stop for people to cross the road.
4. A path under a road which people can use to cross the other side.
5. A device used to extinguish a fire by cutting off the air supply.
6. A piece of cloth looped around the neck to support injured arm.

D. Match the following column A with column B.

Column A

1. Application of cold water or ice
2. Use of tourniquet
3. Anti-rabies vaccine
4. Using a sling
5. Soaking the joint in warm water

Column B

- (a) sprain
- (b) dog bite
- (c) burn
- (d) bleeding wounds
- (e) fracture

E. Read the following situations carefully and state what first-aid would you provide in each case.

1. You are playing basketball in nearby park with your friend. Suddenly your younger sister who is barefoot, steps on a sharp object. Her foot is cut and is bleeding. What do you do?

2. You are enjoying a family picnic. Suddenly a dog comes and bites your cousin who is playing near a flower bush. What do you do?

3. Your mother is cooking food in the kitchen. You are playing with your sister. Both of you run into the kitchen and your sister slides on the floor. She puts her hand right on the hot cooker to keep herself from falling. What do you do?



Activity

Classroom Project

Paste the road signs on a chart paper with the information they impart. Display it in your classroom.

Project at Home

Make a fire extinguisher.

- Take a plastic bottle with a cap. Make a hole in the cap and insert a drinking straw in it, that can bend. Seal the hole by pressing some plastics lightly around the straw.
- Light a candle and put it in a bowl.
- Remove the cap of the bottle. Pour into the bottle, half a cup of vinegar and a table spoon full of sodium bicarbonate (baking soda). Immediately put on the cap and screw it tight.
- Put the straw towards the lighted candle. The candle gets extinguished because when vinegar and baking soda mix, the gas carbon dioxide is produced, which does not support burning.



ONLY FOR READING

info
hub

Human Body and Its Needs

Curiosity Corner

- The stomach of an adult can hold 1.5 litres of material.
- Muscles produce heat when they use energy, this is why people become warm when they exercise.
- Some animals have much better eyesight than humans. Cats have a mirror-like organ in their eyes that reflects light. That's why a cat's eye seems to glow at night.
- There are more nerve cells in the brain than there are stars in the milky way.
- In newborns, the brain is known to grow three times within the span of one year. As we grow older the brain loses a gram every year.

Fun with Science

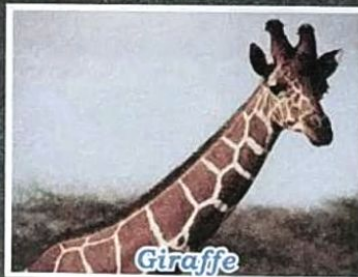
CHECK YOUR TEETH

Borrow two small makeup mirrors from your mother. To look at the upper set of teeth hold one mirror horizontally on the lower lip and



adjust the second mirror, vertically in front of your mouth, to see the reflection of teeth in the second mirror and see the reflection in the second mirror.

PHOTO SPEAKS



Giraffe



Body feature

Has same number of bones in neck as that of humans

The hands have the same number of bones, 27 in all

Amazing SCIENCE FACT

CARTILAGE COVER

The ears and end of the nose do not have bones. Their inner support is cartilage, which is lighter and more flexible than bones. That's why the nose and ears can be bent. After death, cartilage rots faster than bone. This is why the skeleton of skull has no nose or ear.



BALANCED DIET

To find out whether a balanced diet is being eaten, get a diet chart from your doctor. Make a record of everything eaten for 15 days. Compare what you have eaten with what is prescribed in the diet chart. See what you have not eaten, but provides nutrition to your body, include it in your new diet chart. Don't include too many sugary foods on the list.



Green Gallery

A baby is born with pink lungs. As we get older, our lungs darken from breathing in polluted air.

Green leafy vegetables are rich source of vitamins. These must be included in our daily diet.

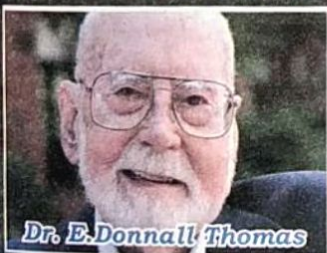


The smoke that is produced by a fire kills more people than a burn does because of carbon monoxide and other dangerous gases.

Ashwagandha, a medicinal plant is used to treat many diseases like nervous disorders, leprosy and intestinal infections. The roots, bark, leaves, fruits and seeds all the parts of this herb are used for medicinal purposes.



The cutting down of forests, and greater industrialization (which has led to chemicals being released into the atmosphere) have upset the balance between the carbon dioxide and oxygen.



Dr. E. Donnall Thomas



Dolphin

Father of Bone Marrow Transplantation

Best hearing sense, 14 times sharper than humans

Simple Machines



Machines make our work faster and easier. For example, scissors make it easier to cut things, a screw helps to join or hold wood blocks together and so on. Machines usually involve movement. All the machines we use in our daily life are the combinations of simple machines.

LESSON OBJECTIVE

You will know

- Simple machines

SIMPLE MACHINES

Simple machines are tools that make our work easier by applying force. This force is applied at a particular point. A knife is an example of the simplest machine used by us. The main simple machines which are the basis of all other machines are lever, inclined plane, wedge, wheel and axle, pulley and screw.



Activities involving simple machines

Lever

A lever is a simple machine which can be used to lift objects.

The lever is a bar that is free to move about a fixed point called **fulcrum**. It can be used to increase the force applied by us. For example, a long bar used to move a boulder.

Sometimes it is used to decrease the force to perform delicate jobs. For example, a tweezer used by a surgeon while performing an operation decreases the force.

All levers have three parts :

Load : The weight on which force is applied.

Fulcrum : The point on which a lever turns or is supported.

Effort : The push or pull that moves the lever or the force applied.

Levers are classified on the basis of the position of the load, the fulcrum and the effort.

First-Class Lever

When the fulcrum is between the load and the effort it is called a first class lever.

For example, see-saw, plier, broom, scissors, nail-cutter, etc. are first-class levers.



Second-Class Lever

A second class lever has the load between the fulcrum and the effort.

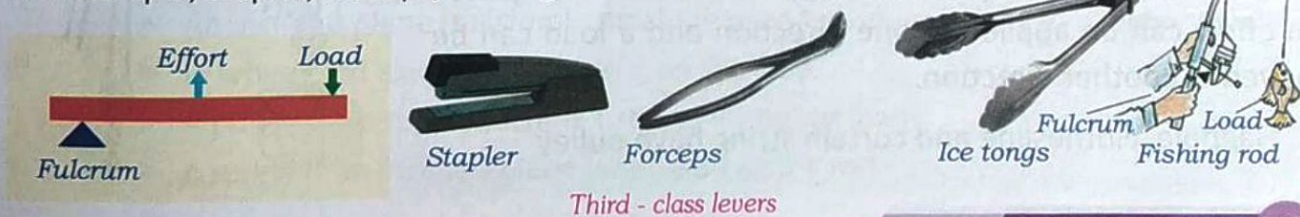
For example, nut cracker, bottle opener, wheel-barrow etc. are second-class levers.



Third-Class Lever

In a third-class lever, the effort is between the fulcrum and load.

For example, stapler, forceps, fishing rods and ice tongs or chimta.

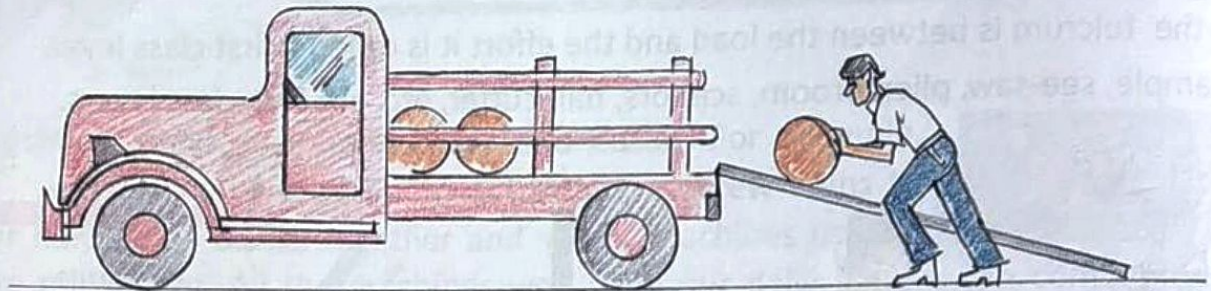


Inclined Plane

An inclined plane is a simple machine used to move objects to a higher place. A ramp is an example of an inclined plane.

Other examples of inclined plane are — wooden planks, slide, roads going up a hill etc.

It is easy to use an inclined plane while moving a load to a higher place. It is also easy to move a heavy load down the inclined plane as less force is needed in such a condition.



Inclined plane

Wedge

The wedge works on the principle of an inclined plane. The wedge has two inclined or sloping surfaces joined together. An axe is a kind of wedge. When the wedge is pushed into a gap, the load is forced on its sloping sides. This makes it easier to force things apart. Knife, razor are other examples of a wedge.



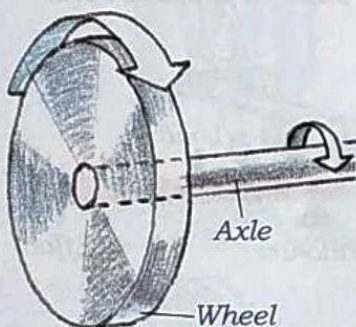
Axe

Wedge

Wheel and Axle

The wheel and axle is a simple machine with a wheel attached to an axle. The distance around the wheel is greater than the distance around the axle. Less force is needed to turn the wheel than to turn the axle. Work is easier to do. Sewing machine, cycle, grinding machines have wheel and axle.

A wheel with teeth is called gear. Teeth are made to fit together. When one gear turns, it turns another gear also. You can see gears in the table-clock or watch.

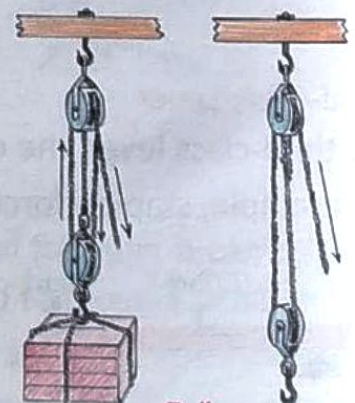


Wheel and axle

Pulley

A pulley is a simple machine used to lift heavy loads. It can also move objects to places that are hard to reach. Less force is needed to lift the objects when a pulley is used. In a pulley an effort can be applied in one direction and a load can be moved in another direction.

Flagpole, clothesline and curtain string have pulley.

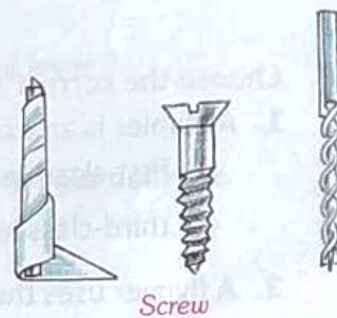


Pulley

Screw

A screw looks like a nail with grooves cut in it. It has winding edge called thread. It takes less force to insert a screw in wood than a nail. Therefore, screw increases force. The thread, holds the wood more firmly than a nail. A screw is actually an inclined plane wound around a rod.

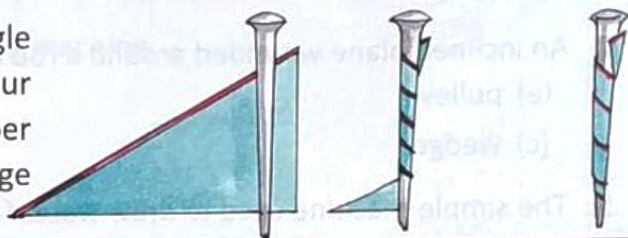
A screwjack that is used to lift a car or other heavy objects, works on the principle of a screw. Revolving stools and chairs, base of most light bulbs have screws.



Activity

To make a model of screw

Take a piece of paper. Cut a right triangle from it to form an inclined plane. Colour the thinner edge. Now wrap the paper around a nail. The coloured inclined edge forms the structure of a screw.



Words to Remember

- Machines** : devices that make our work easier
- Simple machines** : machines having a few parts
- Ramp** : (in buildings, hospitals or airports) slope provided next to staircase, it helps in pushing up wheelchairs or luggage
- Thread** : the raised line that runs around the length of a screw and that allows it to be fixed in place by twisting.



Quick Recall

- Machines make our work easier and faster.
- A lever is a simple machine consisting of a rod free to move about a fixed point.
- An inclined plane is a simple machine used to move objects to a higher level.
- In wheel and axle, a wheel turns on the axle.
- A pulley is a simple machine used to lift heavy loads.
- A screw is an inclined plane wound around a rod.

EXERCISES

A. Choose the correct answer.

1. A stapler is an example of a
(a) first-class lever (b) second-class lever
(c) third-class lever (d) pulley
2. A flyover uses the principle of a/an
(a) lever (b) wedge
(c) inclined plane (d) pulley
3. A wheel and axle is used in a / an
(a) sewing machine (b) flagpole
(c) ramp (d) axe
4. An inclined plane wound around a rod is called
(a) pulley (b) screw
(c) wedge (d) lever
5. The simple machine used to draw water from a well is a
(a) wedge (b) axe
(c) pulley (d) screw
6. The position of the load in a second-class lever is
(a) between the fulcrum and the effort (b) on the same side of the fulcrum
(c) before the effort (d) none of these
7. An example of a third-class lever is a
(a) see-saw (b) broom
(c) fishing rod (d) nut cracker
8. Wheels with teeth are called
(a) threads (b) gears
(c) pulleys (d) strings

B. Give short answers.

1. What makes our work easier and faster ?
2. Which class of lever is a nail cutter ?
3. What is the position of the effort in a third-class lever ?
4. Give an example of a wedge.
5. What is a screw ?

C. Answer the following questions.

1. What do you understand by load, fulcrum and effort ?
2. How is a first class lever different from a second and third class lever ?
3. What is a wedge ? On which principle does it work ?
4. Give an example of each of the simple machines that you use in your daily life.
5. Why is a screw more useful than a nail ?

D. Name the machine principle used in the following.

- | | |
|-----------------|-----------------|
| 1. Broom | 2. Wheel barrow |
| 3. Fishing rods | 4. Slide |
| 5. Axe | 6. Screw jack |

E. Name the simple machines associated with the following.

- | | |
|------------------|-------------------|
| 1. Screw | 2. Sewing machine |
| 3. Bottle-opener | 4. Slide |
| 5. Forcep | |

Higher Order Thinking Skills (HOTS)

1. In a wheel and axle, if the wheel is triangular or rectangular in shape, would it turn around easily ?

[Hint : If you roll a book and a circular disc on the ground, which one would be rolled easily ?]



A. State T for true or F for false against the given statement.

1. All simple machines increase force.
2. A pulley changes the direction of force.
3. A car is a simple machine.
4. It is easier to push up a load on a steep slope.
5. A wheel is a simple machine.

B. Fill in the blanks.

1. _____ planes are also called ramps.
2. A simple machine makes our work _____.
3. The _____ that we apply on the lever is called effort.
4. A screw is an _____ plane that goes round and round a rod.
5. A _____ becomes a machine when it is combined with an axle.

C. Unscramble the words and name the simple machine used in the following cases.

1. Cutting paper with scissors.

ELREV

--	--	--	--	--

2. A ramp used to carry patients in wheelchairs

NDENILCIEAPNL

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

3. A razor used for shaving.

EDEGW

--	--	--	--	--

4. A stage curtain makes use of it.

LYUPLE

--	--	--	--	--	--

5. A crane used to lift heavy objects.

WCSE

--	--	--	--	--

D. Match the following column A with column B.

Column A

1. First-class lever
2. Second-class lever
3. Third-class lever
4. Inclined plane
5. Pulley

Column B

- (a) bottle opener
- (b) ramp
- (c) nail cutter
- (d) flag pole
- (e) fishing rods

Crossword

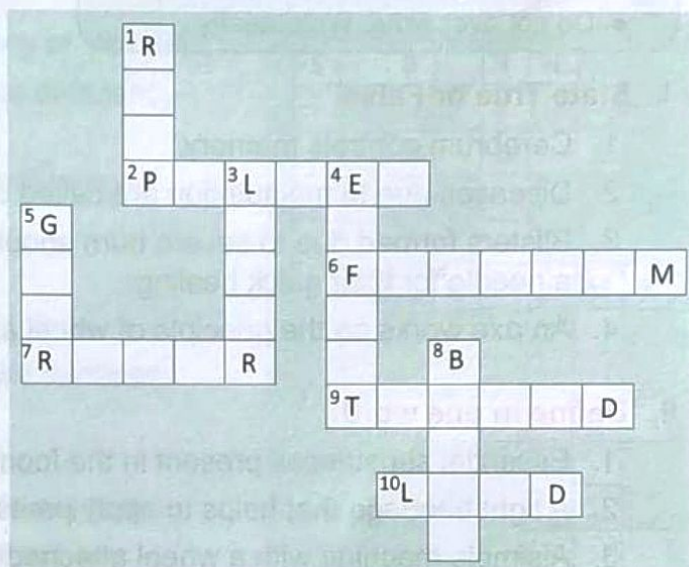
Solve the given crossword with the help of clues given below.

Across

2. Flagpoles, clothesline and curtain strings make use of this.
6. The point on which a lever turns .
7. An example of wedge.
9. Raised line running across the length of a screw.
10. The weight on which force is applied by the lever.

Down

1. An inclined plane provided next to staircase.
3. A bar that is free to move about a fixed point.
4. The force applied on a lever.
5. A wheel with teeth.
8. A common example of a first-class lever.



Activity

Classroom Project

Visit all rooms of your school and make a list of simple machines used there. Which room has the maximum numbers of machines ?

Project at Home

Make a Pulley

What is needed : An empty small tin, the inner part of a reel, a woollen string, three sticks of equal size, cello tape and allpins.

What to do : Cut the upper part of the tin. Attach two sticks with cello tape, on the either side of the tin. Cut 1/3 part of the inner part of a reel. Insert it in the stick. Arrange this stick between two sticks with the help of all-pins. Roll up woollen string on the reel. Now move it on one side and tie a weight on the other.

MODEL TEST PAPER-II

(Based on Chapters 4 to 7)

MM 20

Instructions

- Read the question paper carefully.
- Do not over write. Write neatly.

I. State True or False.

1. Cerebrum controls memory.
2. Diseases due to malnutrition are called deficiency diseases.
3. Blisters formed due to severe burn should be pricked with a needle for their quick healing.
4. An axe works on the principle of wheel and axle.

[4]

II. Define in one word.

1. Essential substances present in the food that provide energy.
2. A tight bandage that helps to apply pressure to stop bleeding.
3. A simple machine with a wheel attached to an axle or rod.
4. A diet containing all the nutrients in right proportion.

[4]

III. Match the following columns.

Column A

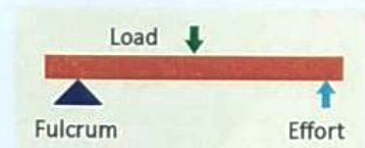
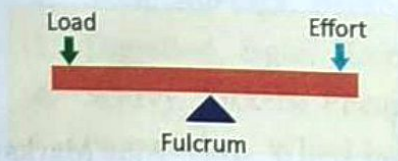
1. Automatic response of body to an event
2. Strong muscles and improved breathing, blood circulation and digestion
3. Vitamins and minerals
4. First aid in which a tight bandage is tied between the wound and heart
5. Simple machine used in clothesline, flagpole and curtain strings

Column B

- (a) protective food
- (b) snake bite
- (c) reflex action
- (d) pulley
- (e) exercise

[5]

IV. On the basis of position of the load, the fulcrum and the effort identify the class of lever. [3]



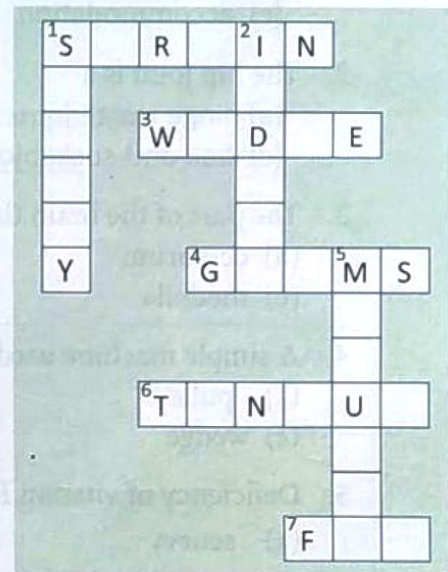
V. Solve the crossword with the help of clues given below. [4]

Down

1. A disease caused by the deficiency of Vitamin C.
2. An essential nutrient in diet whose deficiency causes goitre.
5. A part of brain that controls all involuntary movements of the body.

Across

1. A twist in the ankle or the wrist.
3. A simple machine with two inclined surfaces joined together.
4. Disease-causing micro-organisms
6. The sense organ that detects different tastes.
7. Cheese, milk, butter and nuts are rich in this nutrient.



SAMPLE PAPER-I

(Based on Chapters 1 to 7)

Max Marks : 50

[1 × 5 = 5]

I. Choose the correct answer.

1. The ability of an organism to adjust itself with its surroundings is called
(a) adaptation (b) migration
(c) accommodation (c) hibernation
2. The hip joint is a
(a) hinge joint (b) pivot joint
(c) ball-and-socket joint (d) gliding joint
3. The part of the brain that connects brain to the spinal cord is
(a) cerebrum (b) cerebellum
(c) medulla (d) thalamus
4. A simple machine used in sewing machine is
(a) pulley (b) wheel and axle
(c) wedge (d) needle
5. Deficiency of vitamin B causes
(a) scurvy (b) rickets
(c) night blindness (d) beri-beri

II. Answer in one word.

[1 × 5 = 5]

1. What is the process of growing plants with their body parts called ?
2. Name the strong tissue that connects bones together at joints.
3. What is the safest way of crossing a road ?
4. What are the different parts of brain ?
5. What is the mass movement of animals to avoid harsh weather conditions, called ?

III. Answer the following questions in short.

[2 × 5 = 10]

1. Mention two measures for getting good yield from crops ?
2. What are the functions of protein in the body ? (Give two points)
3. State two precautions to be taken at home for being safe.
4. What is the difference between a first-class lever and second-class lever ?
5. Name different nerves with their functions.

IV. Tick the odd-one-out giving reason.

[2 × 5 = 10]

1. Rabbit, Cow, Rat, Squirrel
2. Skull, Rib cage, Backbone, Voluntary muscles
3. Digestion, Sight, Hearing, Taste, Touch
4. Scurvy, Rickets, Pneumonia, Anemia
5. Nut cracker, Wheel-barrow, Bottle opener, Broom

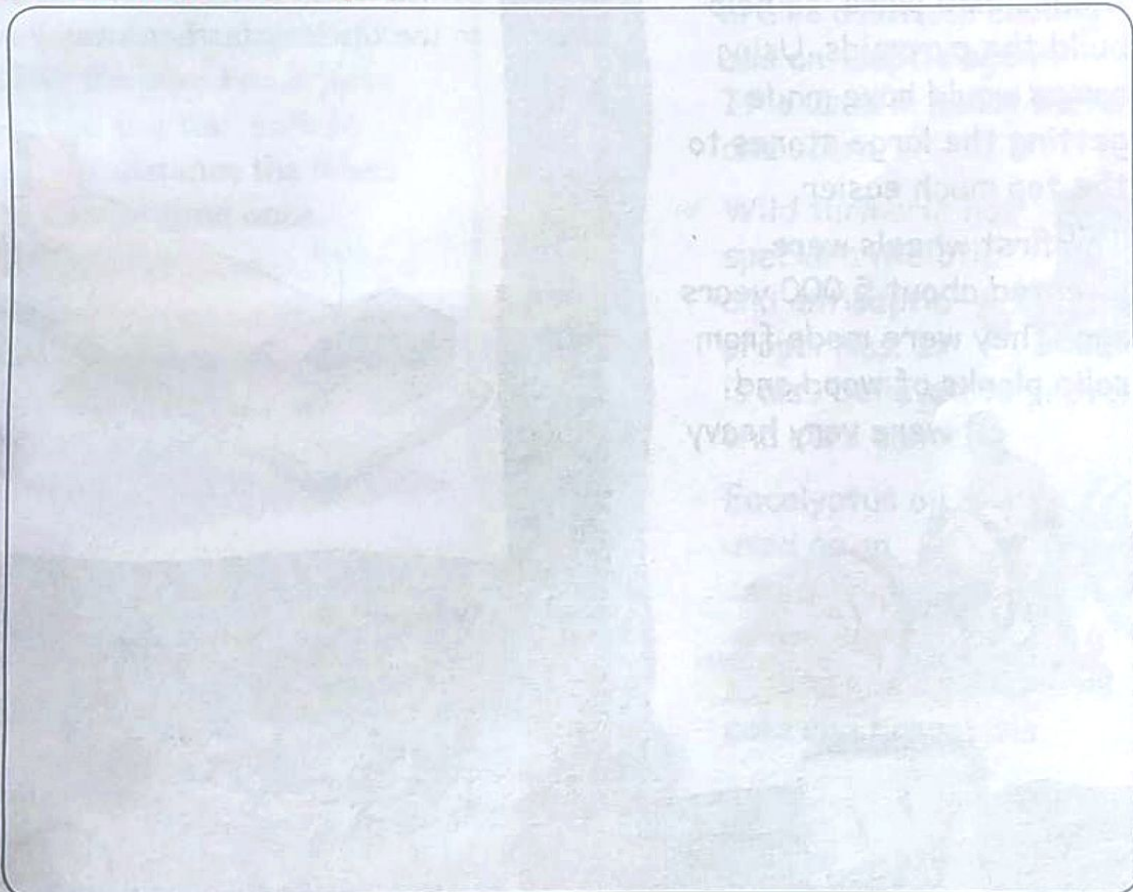
V. Answer the following questions in not more than three sentences.

[3 × 5 = 15]

1. Mention three ways with example by which new plants can be grown.
2. Mention three functions of skeleton.
3. Give two examples of each of the following
(a) proteinated food (b) second class lever (c) amphibians
4. What is reflex action ? How is it different from other actions.
5. List three causes of communicable diseases.

VI. Name and draw sense organs.

[5]





ONLY FOR READING

info
hub

Matter & Material

Curiosity Corner

- Simple machines were first discovered and described by greek philosopher Archimedes.
- The Egyptians likely used the inclined plane to help build the pyramids. Using ramps would have made getting the large stones to the top much easier.
- The first wheels were invented about 5,000 years ago. They were made from solid planks of wood and were very heavy.



Fun with Science

MAKE A LEVER

Make a lever by balancing a plank of wood over a small block of wood. The block is the fulcrum. Try to lift a brick with your lever. Is it easier to lift the brick if the fulcrum is nearer to the brick or farther away?

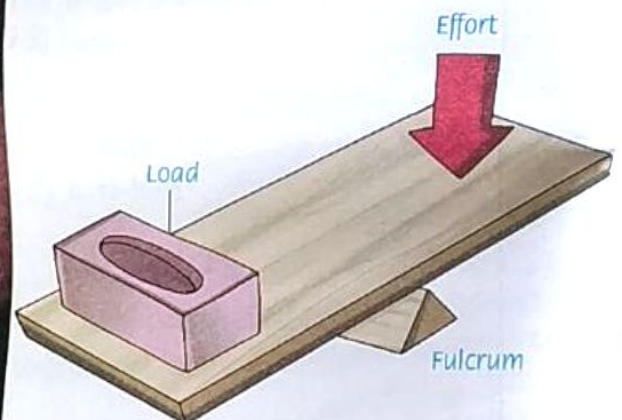


PHOTO SPEAKS



Orangutan

Uses sticks as levers to get seeds from fruits



Bicycle

A complex machine, uses each kind of simple machine

Amazing SCIENCE FACT

ARCHIMEDES' SCREW

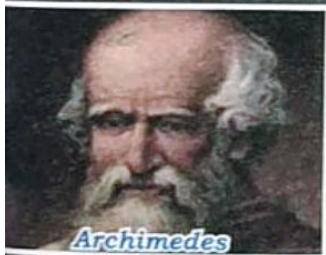
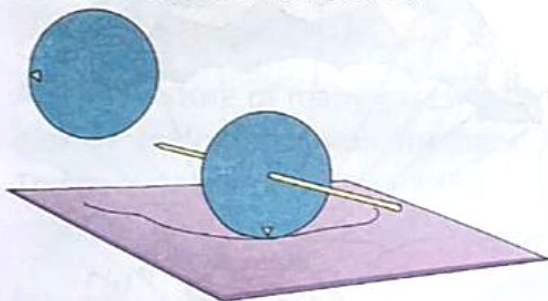
Believed to be invented by Archimedes, it has been used to lift water since ancient times.

Its one form consists of a circular pipe enclosing a helix and inclined at an angle of 45° with its lower end in water. Rotations of the device causes the water to rise in the pipe.



WHEELS FOR MEASURING

Wheels can also be used for measuring distances. Make your own measuring wheel. Cut out a circle of cardboard and push a toothpick through the middle. Make a mark on the edge of the wheel. Lay the wheel on a piece of paper and use the mark to measure the distance the wheel takes to turn around once.



Archimedes



Hanging garden, Babylon

Greek scientist discovered the Laws of Levers

Believed to be used screw pump to lift water

Green Gallery

Aloe-vera gel is believed to heal wounds and burns, minor skin infections, sebaceous cysts, diabetes, and elevated blood lipids in humans.



Honey has amazing medicinal properties. It not only moisturises the skin, it is also a natural cooling and antiseptic agent. It is used in minor burns and scars.



Wild turmeric has special antibiotic and antiseptic properties. It is also believed to prevent and cure cancer.



Eucalyptus oil is used as an antiseptic and an insect repellent. It also helps to cure flu, cold and bronchitis.





Air and water both are essential for us. Plants and animals both depend on air and water to live. Life on the earth is possible due to presence of air and water in it.

AIR

The air has surrounded us from all sides. Air is everywhere, even in an empty box, in the cracks of rocks and also in water. We cannot smell air. It is odourless. We can only feel it. Air helps us in various ways. We need air to breathe, filling in the balloon, flying parachute, flying the kite and for many other purposes. Aeroplanes also fly in the air.

LESSON OBJECTIVE

You will know

- Air
- Atmosphere
- Composition of air
- Properties of air
- Air and its uses
- Air pollution
- Water
- Removing impurities from water
- Purification of water



Different uses of air

ATMOSPHERE

The earth is surrounded by a blanket of air called atmosphere. Atmosphere has a mixture of gases in several layers. It extends from the earth's surface to about 800 km above the earth.

Layers of the Atmosphere

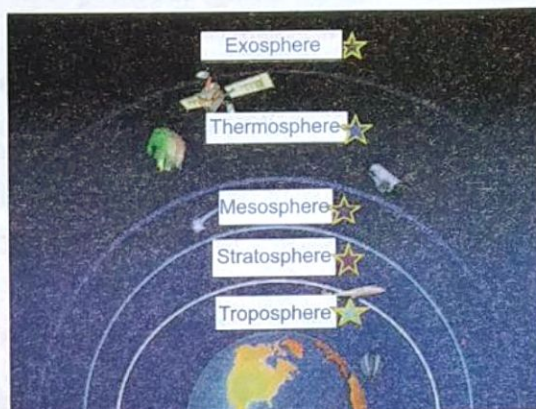
(a) **Troposphere** — It is the layer of the atmosphere closest to the earth's surface. It contains water and gases, mostly oxygen and nitrogen. Weather changes take place in troposphere. The conditions in this layer change very quickly.

(b) **Stratosphere** — It lies above the troposphere. It is about 30 km thick. It is a clear, cloudless layer. The upper part of the stratosphere has the ozone layer. The ozone layer is like a huge shield that blocks most of the sun's harmful ultraviolet rays.

(c) **Mesosphere** — Mesosphere is the coldest layer on the earth. It extends from the upper boundary of the stratosphere up to 85 km. Here is where most meteor burnup.

(d) **Thermosphere** — Here the atmosphere is very thin. The space shuttles orbit in this layer.

(e) **Exosphere** — It is the outermost layer of the atmosphere. It contains very little air.

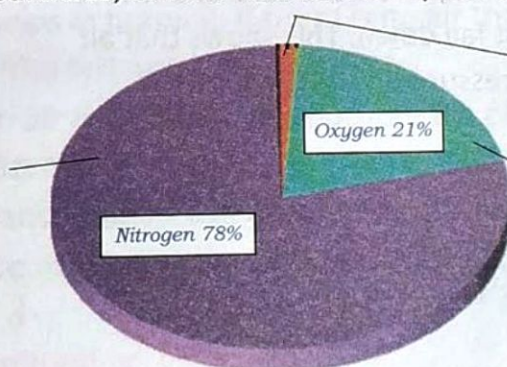


Layers of atmosphere

COMPOSITION OF AIR

Air is a mixture of many gases. It contains — nitrogen, oxygen, some other gases (carbon dioxide, hydrogen, argon, methane in very small amount), water vapour, smoke and dust. The percentage of dust particles, smoke and water vapour may vary from place to place.

Nitrogen : It is the major constituent of air. Living beings cannot use it directly from the air. It is used by plants with the help of bacteria in the soil. It also keeps the process of burning under control.



Other gases : Argon, carbon dioxide, hydrogen, methane and water vapour.

Oxygen: Plants and animals need it for respiration. It helps in burning (combustion).

Composition of air

The amount of water vapour present in air is called humidity.

The humidity is high when the amount of water vapour is more in air. We can feel the humidity in air before and after the rain.

PROPERTIES OF AIR

Properties of air can be described through following activities.

Activity 1

● Air occupies space.

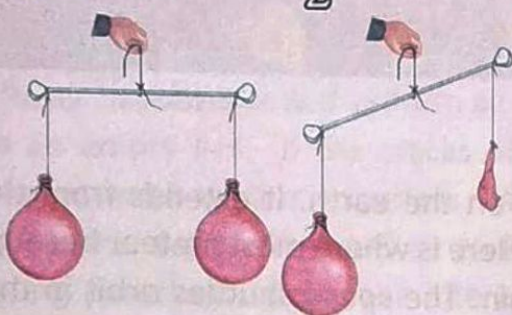
Take a glass. Fill a bucket with water. Place the glass upside down on the water. You cannot press the glass with water as air is present inside the empty glass.



Activity 2

● Air has weight.

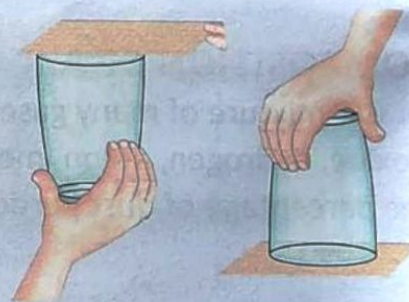
Make a balance with a stick. Fill the balloons with air. Both of them should be filled equally with air. Tie them on the two ends of the stick. Prick one of the balloons with a pin. The balloon with air weighs more. This shows that air has weight.



Activity 3

● Air exerts pressure.

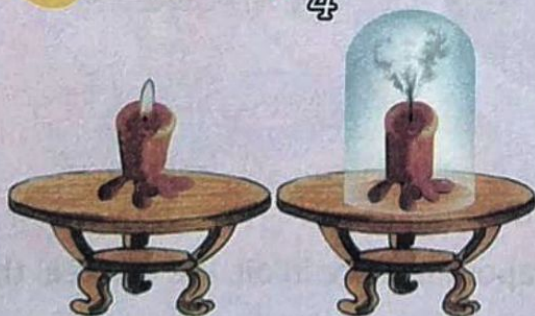
Fill a glass with water upto the brim. Cover the glass with a thick cardboard. Put your hand on the card and invert it quickly. The card will not fall down. This shows that air outside the glass exerts pressure on the card.



Activity 4

● Air is needed for burning.

Take a candle. Light it. Cover it with a jar. After sometime the candle extinguishes. This shows that air is necessary for candle to burning.



AIR AND ITS USES

Air is Needed for Breathing

All living beings need oxygen to breathe. Oxygen is used by animals to produce energy. The oxygen goes into the lungs. From there it is carried by the blood to every part of the body. Food is burnt there by oxygen and carbon dioxide is produced and thrown out from the lungs. This process is called respiration.

Air Carries sound

Air helps us to listen to the sounds around us. Without air, the drum would beat but you won't hear it. It is because sound needs a medium to reach us. When you speak or clap, the air around you vibrates. These vibrations reach your ears and your ears turn them into sound.

Air Pressure is Important in Daily Life

Air pressure plays an important role in our daily life. Many things like syringe, dropper, drinking straw, hand pump and many other things work on the principle of air pressure.

Activity 5

Take a straw. Fill a glass with water. Suck the air in straw with your mouth. Now blow out the air in the straw.

You will see bubbles of air in water.

The water rises up in the straw as the air pressure above the water is more than the air pressure present in the straw.

This moves the water up in your mouth.



Some other uses of air are given below.

- Oxygen in the air helps in burning. If there is no air there will not be any fire.
- Air is used in filling the tyre tubes, footballs etc.
- Nitrogen present in air is an important nutrient for plants. Nitrogen is also used in making many fertilizers.
- The marine plants and animals use air which is dissolved in water.
- Wind is also a source of energy. It is used to produce electricity and to do mechanical works.

AIR POLLUTION

Air is a precious resource. Without air, the earth will be a cold, dry, silent and lifeless planet. Man is contaminating the air by releasing unwanted poisonous gases from factories, power stations and exhausts of vehicles. This contamination of air with undesirable substances is called air pollution. Breathing in polluted air can cause several diseases like asthma, bronchitis etc.

Prevention of Air Pollution

- More and more trees should be planted. Trees give fresh air and absorb harmful substances from the air.
- Car engines should be designed to produce less exhaust.
- Lead-free petrol should be used in vehicles.
- Factories should use filters in chimneys before releasing the fumes in the air.

WATER

Like air, water is also very important for life. We need water for many purposes. Water exists in three forms, i.e., solid, liquid and gas. We get water from different sources such as rivers, ponds, lakes and wells but rain is the main source of water.

Water from the above sources is often unfit for consumption. It is due to presence of sand, dirt, mud and germs. These substances are called impurities.



The impurities found in water are of two types.

(i) Soluble impurities

(ii) Insoluble impurities

Soluble impurities : These impurities like salt dissolve in water.

Insoluble impurities: These impurities like sand do not dissolve in water.

REMOVING IMPURITIES FROM WATER

There are various methods used to remove the insoluble and soluble impurities from water.

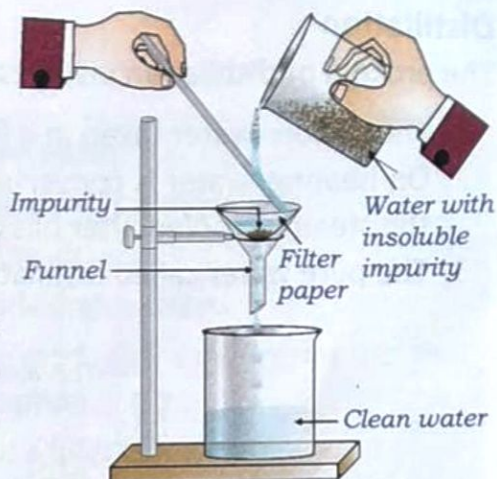
Removal of Insoluble Impurities

Insoluble impurities are separated through the process of filtration and sedimentation.

Filtration

Separation of insoluble impurities with the help of a filter paper is called filtration.

In the process of filtration, a circular piece of filter paper is folded twice to make a cone. This paper cone is kept inside a funnel. A beaker is kept below the funnel and the mixture with insoluble impurity like sand, chalk etc. is poured into the beaker through the funnel. The impurity is left behind in the filter paper and clean water is poured in the beaker.



Process of filtration

Sedimentation

In this process, water is allowed to stand undisturbed in a container. This process involves the following steps.

1. Water with insoluble substance is kept in the beaker for some time.
2. The mud settled down at the bottom of the container as sediment.
3. The clean water can be poured out into a separate container.

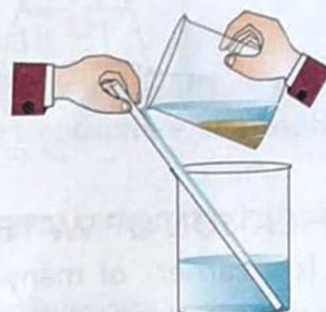
This process is called decantation.



Water with insoluble impurity is allowed to stand



impurity settles down after some time



Clean water poured out into a separate container

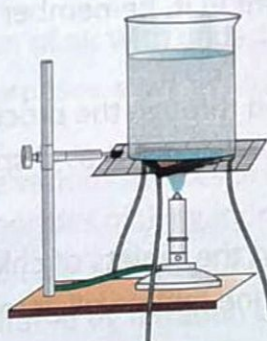
Process of sedimentation

Removal of Soluble Impurities

Soluble impurities are more difficult to separate than insoluble impurities. These impurities can be separated through evaporation or distillation.

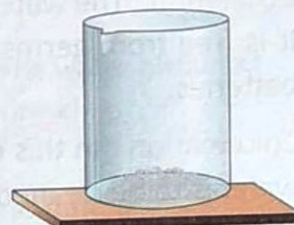
Evaporation

The impure solution with impurities such as salt or sugar is heated till all the water evaporates. The impurity is left behind in the evaporating dish.



Water with impurity is boiled and water evaporates, impurity remains in the beaker

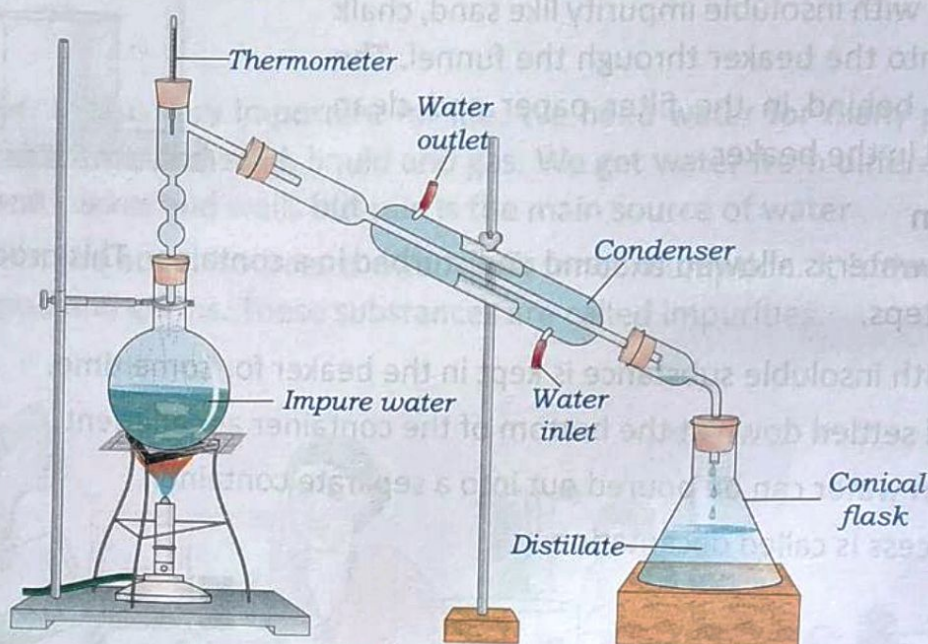
Process of evaporation



Distillation

The process of distillation involves the following steps.

1. The impure water taken in a flask is heated.
2. On heating, water is converted into steam and the impurities are left behind. When the steam is cooled after passing through the condenser, it turns into liquid water.
3. The pure water called **distillate** is collected in a conical flask.



Separating impurities through distillation

PURIFICATION OF WATER

Water is a carrier of many diseases. Therefore, drinking water needs to be purified before using it. Normally three methods of purification are in practice. These are boiling, distillation and chlorination.

Boiling : This is the easiest and the most common method to purify water before drinking. Boiling kills the germs present in it. Remember that boiling should be continued for at least 10 minutes.

Distillation : The water stored through the process of distillation is the purest form of water. It is free from germs. It is widely used as distilled water in injections, medicines and car batteries.

Chlorination : In this method the tablets of chlorine are added to the container where the water is to be cleaned. Chlorine tablets kill germs and make the water pure.



Words to Remember

Atmosphere	: envelope of air that surrounds the earth
Meteor	: a meteoroid that has entered the earth's atmosphere
Humidity	: the amount of water-vapour in the air
Air pollution	: the contamination of air with undesirable things
Impurities	: (Here) unwanted substances like mud, dirt, sand, germs etc. that make the water unfit for consumption
Filtration	: removing impurities by means of a filter
Sedimentation	: separating insoluble impurities from water by allowing them to settle down.
Distillation	: purification of water by evaporating, then condensing it and collecting the resulting liquid.



Quick Recall

- Air and water both are essential for life.
- Air is everywhere. We cannot see it but we can feel it.
- A blanket of air called atmosphere surrounds the Earth. It is a mixture of gases in several layers. The main layers of atmosphere are troposphere, stratosphere, ionosphere and exosphere.
- Air is a mixture of many gases like nitrogen, oxygen, carbon dioxide, water vapour and dust.
- The amount of water vapour present in air is called humidity.
- Air has weight, it occupies space and exerts pressure.
- Air has many uses — helps in burning, carries information and is needed for breathing.
- Air pollution is the contamination of air with undesirable substances.
- Water is needed for several purposes such as drinking, cooking, washing, bathing, watering the plants etc.
- Rivers, ponds, lakes and wells are various sources of water. The water obtained from these sources contains impurities making it unfit for drinking.
- Impurities are of two types — soluble and insoluble.
- Insoluble impurities can be separated by filtration or sedimentation.
- Soluble impurities can be removed by evaporation or distillation
- Water can be purified by the process of boiling, distillation or chlorination.

EXERCISES

A. Choose the correct answer.

1. The blanket of air that covers the earth is called
 - (a) lithosphere
 - (b) hydrosphere
 - (c) atmosphere
 - (d) biosphere
2. The ozone layer is found in
 - (a) troposphere
 - (b) stratosphere
 - (c) ionosphere
 - (d) exosphere
3. The component of air that cannot be used directly by the living beings, is
 - (a) oxygen
 - (b) nitrogen
 - (c) carbon dioxide
 - (d) water vapour
4. The component of air that helps in burning, is
 - (a) oxygen
 - (b) carbon dioxide
 - (c) dust
 - (d) smoke
5. Diseases like asthma, bronchitis etc. are caused due to
 - (a) polluted water
 - (b) polluted air
 - (c) deficiency of minerals
 - (d) lack of food
6. The process in which impure muddy water is allowed to stand undisturbed in a container, is called
 - (a) filtration
 - (b) sedimentation
 - (c) decantation
 - (d) evaporation
7. The easiest and most common method to purify water before consumption is
 - (a) distillation
 - (b) boiling
 - (c) chlorination
 - (d) all of these
8. Purification of water first by evaporation and then by condensation is called
 - (a) distillation
 - (b) sedimentation
 - (c) filtration
 - (d) bleaching
9. Things like syringe, dropper, drinking straw work on the principle of
 - (a) water pressure
 - (b) air pressure
 - (c) pressure of container
 - (d) all of these

10. Aquatic plants and animals get air dissolved in
- (a) water
 - (b) atmosphere
 - (c) plants
 - (d) none of these

B. Give short answers.

1. What is the contamination of air with undesirable substances called ?
2. Name one method of separating insoluble impurities from water.
3. What is the main source of water ?
4. Name the various layers of atmosphere.
5. What is the composition of air ?

C. Answer the following questions.

1. What are the causes of air pollution ? List some ways to prevent air pollution.
2. What are the different methods used for the purification of water ?
3. What are the characteristics of air ?
4. What is sedimentation ?
5. List three uses of water.

D. Give reason for the following.

1. We sweat more in rainy season.
2. One cannot hear the sound of clapping on the moon.
3. Method of filtration cannot be used to separate sugar from the sugar solution.

Higher Order Thinking Skills (HOTS)

1. Why is distilled water used in medicines, syringes etc.
[Hint : What is the purest form of water ?]
2. The oxygen in air is needed for respiration and nitrogen controls burning. What is the importance of carbon dioxide ? What would happen if carbon dioxide is removed from the air ?
[Hint : How do plants make their food?]



QUICK ASSIGNMENT

A. Write T for true or F for false against the given statements.

1. We cannot feel air but we can see it.
2. The change in weather takes place in stratosphere.
3. Water from wells and rivers is fit for consumption.
4. The liquid moves up in the syringe due to humidity.
5. Chalk is an insoluble impurity.
6. Soluble impurities in water can be removed by evaporation.

B. Fill in the blanks.

1. A fire cannot be lighted if there is no _____.
2. The air becomes _____ as we go _____.
3. Contamination of atmosphere causes _____ pollution.
4. _____ impurities are left behind after evaporation.
5. _____ water is widely used in injections and medicines.
6. _____ travels through air.

C. Name the following.

1. The blanket of air surrounding the earth _____
2. Atmospheric layer nearest to the earth's surface _____
3. The gas which animals breathe in _____
4. The gas used for making fertilizers _____
5. The simplest way to purify water _____
6. The coldest layer of atmosphere _____

D. Match the following column A with column B.

Column A

1. Air
2. Separation of sand and water
3. Wind vane
4. Adding chlorine in water
5. Water rises in a straw
6. Turning of water into vapour

Column B

- (a) filtration
- (b) mixture of gases
- (c) chlorination
- (d) evaporation
- (e) air pressure
- (f) direction of wind

E. Unscramble the following jumbled words with the help of clues given below.

1. The gas present in major fraction in the air and an important nutrient for plants.

INORTNEG

--	--	--	--	--	--	--	--

2. The layer that protects us from harmful ultra-violet radiations of the sun.

EOZONYLRAE

--	--	--	--	--	--	--	--	--	--

3. The amount of water vapour present in the atmosphere.

MUHIDYIT

--	--	--	--	--	--	--	--

4. The method used to separate insoluble impurities from water.

NIOTLIFART

--	--	--	--	--	--	--	--	--	--

5. The pure water obtained from the distillation of impure water.

IDTSLIALET

--	--	--	--	--	--	--	--	--	--



Activity

Classroom Project

Draw diagram to show

(a) Air has weight. (b) Layers of the atmosphere. (c) The process of filtration

Project at Home

To see the pressure of air inside a can.

What is needed : Can with lid, a water-filled bucket.

What to do : Take little water in the can. Boil it with lid covered. Hold it with a cloth or tongs. Press the hot can in cold water-filled bucket. Observe what happens to the can.

What do you observe : _____

What do you learn : The can crushed because _____

[Note : Perform this activity under the supervision of an adult.]

Volcanoes, Earthquakes and Tsunamis

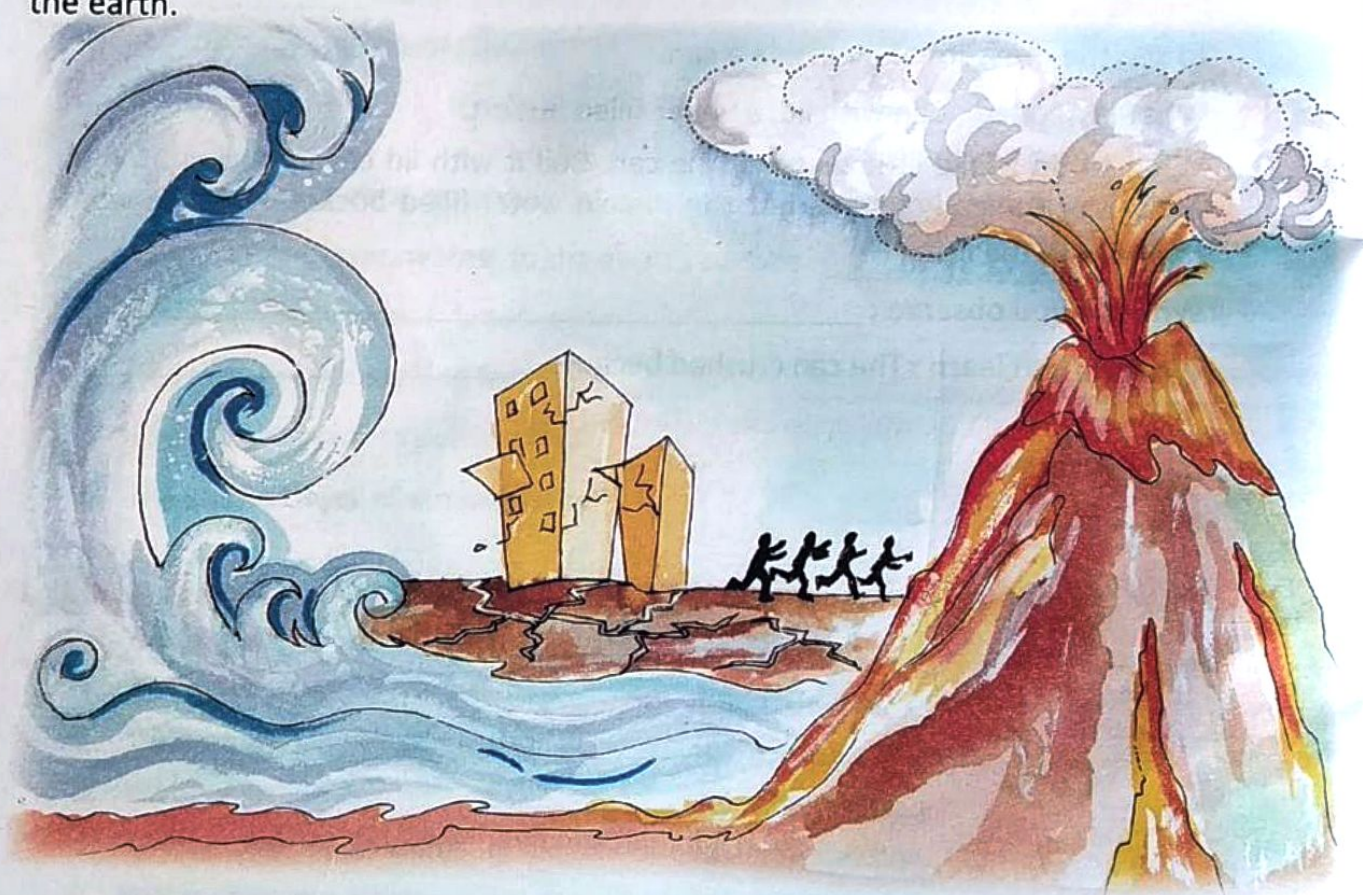


Our earth is a beautiful and safe place for all living beings. It provides shelter to all. But sometimes it becomes furious and shows its anger through natural disasters such as volcanoes, earthquakes and tsunamis. These cause great damage of life and property on the earth. These are caused by the natural forces. We have no control over these happenings. But with the availability of advance information systems there are possibilities to reduce the impact of disasters when they occur. All these natural activities take place due to movement of molten materials within the earth.

LESSON OBJECTIVE

You will know

- Volcanoes
- Earthquakes
- Tsunami

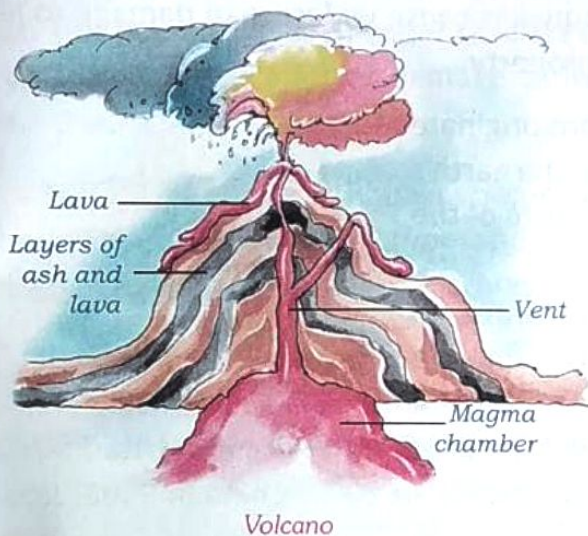


The natural calamities

VOLCANOES

The word volcano originally comes from the name of Roman god of fire, Vulcan. A volcano is an opening in the earth's crust that allows molten rocks or magma, ash or gases to reach the earth's surface. The magma that reaches the earth's surface is called lava and the passage through which it travels is called vent. Volcanoes are usually in the form of conical mountains.

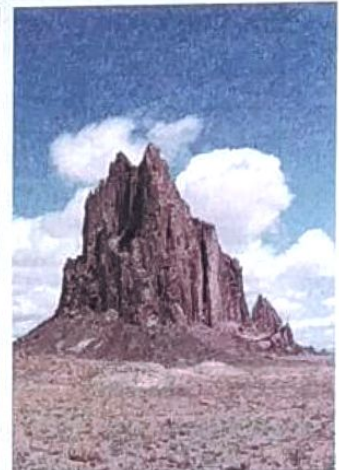
In nature there are three types of volcanoes : active volcanoes, dormant volcanoes and extinct volcanoes.



Active volcano



Dormant volcano



Extinct volcano

Active Volcanoes : These volcanoes are active and may erupt any time or have erupted in recent past. Mount Vesuvius, Mount Fuji and Mount Erebus are some active volcanoes.

Dormant Volcanoes : Those volcanoes that have not erupted in a long time but may erupt in the future. Examples are Chile, Sitick and Alaska.

Extinct Volcanoes : An extinct volcano is one that has not erupted for thousand of years. In this category of volcanoes the erupting activities are completely subsided. Some islands have been formed by the eruption of undersea volcanoes. Some of the extinct volcanoes are Mount Egeont in New Zealand, and Mount Kilimanjaro in Tanzania.

Hot Springs

Water from the ground gets heated in the volcanic rocks and comes out from the ground in the form of fountains of hot water. These are called hot springs or geysers.

EARTHQUAKES

Earthquakes occur when two large pieces of the earth's crust suddenly slip. This causes shock waves to shake the surface of the earth in the form of an earthquake.

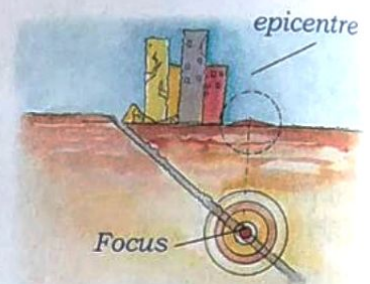


Damage caused by an earthquake

Earthquakes usually occur on the edges of large sections of the earth's crust called tectonic plates. These plates slowly move over a long period of time. Sometimes the edges which are called fault lines can get stuck, but the plates keep moving. Pressure slowly starts to build up where the edges are stuck and once the pressure gets strong enough the plates suddenly move causing an earthquake. Earthquakes cause widespread damage to life and property.

The point under the ground where the vibrations originate is called the focus of the earthquake. The point on the earth's surface directly above the focus is called the epicentre of the earthquake.

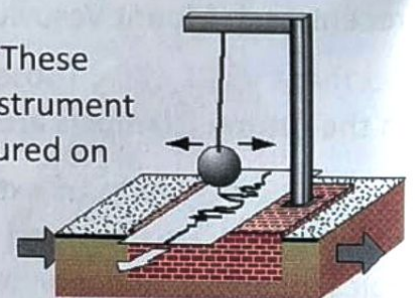
Some areas on the earth's surface are more prone to the earthquakes. In India the Himalayan region and the Ganga-Brahmaputra valley are prone to earthquakes. A large number of people lost their lives in massive earthquakes that occur in Uttarkashi in 1991, Chamoli in 1999, Gujarat in 2001 Jammu & Kashmir in 2005, China in 2008, Japan in 2011 and Nepal in 2015.



Focus and epicentre of an earthquake

Measuring Earthquakes

An earthquake generates waves that travel all over the earth. These are called seismic waves. Seismic waves are recorded by an instrument called seismograph. The magnitude of an earthquake is measured on Richter scale. The numbers on this scale range from 1 to 10. Earthquakes below 6 are considered as moderate and mild and those above 6 are considered as severe.



Seismograph

Effects of an Earthquake

- An earthquake always causes destruction of lives and property.
- The undersea earthquakes can cause disasters like tsunamis. They cause harm to the lives in the water
- The earthquakes also cause landslides and fires. They disrupt the transport and communication system.

TSUNAMI

The word tsunami is of the Japanese origin meaning "harbour wave." Tsunamis used to be called tidal waves, but they actually have nothing to do with the tides.

A tsunami is a huge wave in the ocean that develops as a result of an earthquake, volcanic eruption, undersea landslides or nuclear strike. It can reach about a height of 100 feet (or 30 metres) with a great speed. It can travel even faster than a commercial Jet. This powerful wall of water reaches the coast and causes a lot of damage to lives and property



Destruction caused by tsunami

The undersea earthquake occurred in the Indian Ocean caused the tsunami of December, 2004 in which thousands of people from India, Sri Lanka and Indonesia lost their lives and property worth crores was damaged.

JAPAN EARTHQUAKE 2011

One of the most deadly earthquakes in recent times that measured 8.2 on the Richter scale, shattered Japan in March 2011. This mega earthquake left behind a series of disasters and a story of destructions. Over 10,000 people lost their lives and property of worth millions damaged. This resulted in a major tsunami which brought destruction and caused the loss of thousands lives and devastated entire towns. A massive fire was caused by the earthquake in an oil company, which could be extinguished after 10 days.

The working of 11 nuclear reactors was automatically shutdown following the earthquake. Over 200,000 people were evacuated from there. The problems were further compounded when a volcano also erupted sending ash and rocks over two miles into the air. Japan struggled a lot to overcome the shocks of these natural disasters.



It is important to know about tsunami because it causes a major damage and loss of life in the areas along coastlines which are affected by it. Its knowledge serves several interests.

Scientific interest : Measuring tsunami may help to understand the structure and nature of earth's oceans.

Cultural interest : The major devastation sometimes caused by tsunami has an impact on lives for a long time.

Technological interest : By studying tsunami, early warning sensor systems could be put into place to provide advance notice of when a tsunami is coming, although they travel at very fast pace.



Words to Remember

- Volcano** : usually a conical mountain or hill with an opening through which lava, rock fragments, hot vapour or gas are erupted
- Earthquake** : disturbance in the earth, that causes trembling and shaking of the surface violently
- Focus** : the point inside the earth where the disturbance occurs
- Epicentre** : the point on the earth's surface directly above the focus
- Seismograph** : an instrument that records the size, force and direction of earthquakes
- Richter scale** : a scale on which the magnitude/strength of an earthquake is represented



Quick Recall

- A volcano is an opening in the earth's crust that allows molten rocks or magma to reach the earth's surface.
- Volcanoes are usually in the form of conical mountains.
- In nature there are three types of volcanoes: active volcanoes, dormant volcanoes and extinct volcanoes.
- Earthquakes are caused due to sudden movement of large pieces of earth's crust called tectonic plates.
- Earthquakes cause widespread damage to life and property.
- The earthquake or seismic waves are recorded by an instrument known as seismograph.
- A tsunami is a huge wave in the ocean caused due to undersea earthquake, volcanic eruption, undersea landslides etc. It causes a great damage to the people and property near coastal areas.

EXERCISES



A. Choose the correct answer.

1. In terms of natural disasters, active, dormant and extinct are the types of
(a) avalanches (b) landslides (c) earthquakes (d) volcanoes
2. Earthquakes are caused due to
(a) heavy rain (b) excessive heat
(c) movement in earth's crust (d) high pressure
3. The epicentre of the earthquake is a point
(a) under the earth (b) on the earth's surface above the focus
(c) upto which tremors are felt (d) none of these
4. An opening in the earth's crust that allows magma to reach the earth's surface is called a
(a) spring (b) fountain (c) volcano (d) geyser
5. The instrument used to record seismic waves, is
(a) seismograph (b) seismometer (c) wind vane (d) barometer
6. A phenomenon that is not a cause of tsunami, is
(a) undersea landslide (b) undersea earthquake
(c) cloud burst (d) nuclear strike
7. The country hit by a massive earthquake followed by tsunami and volcanic eruption in March 2011, is
(a) China (b) Japan (c) Bangladesh (d) U.S.A.

B. Give short answers.

1. What is the cause of natural disasters ?
2. Name the passage through which lava travels.
3. Name the underground origin of the vibrations in an earthquake.
4. How does a tsunami occur ?

C. Answer the following questions.

1. How is the intensity of an earthquake decided on a Richter scale ?
2. What are the different kinds of volcanoes ? How do they differ from each other?
3. What is tsunami ? How does it cause damage ?
4. What are the focus and epicentre of an earthquake ?

D. Define the following terms.

1. Active volcanoes
2. Dormant volcanoes
3. Epicentre

Higher Order Thinking Skills (HOTS)

1. How does an earthquake affect the transport and communication system ?
[Hint: What are the effects of an earthquake ?]
2. How are the volcanic activities on the earth useful for natural resources?
[Hint: How are igneous rocks formed ?]



A. Write T for true and F for false against the given statement.

1. Some areas in India are most prone to the earthquakes.
2. Tsunami means "young child" in Japanese.
3. Seismograph is an instrument which measures the magnitude of tidal waves.
4. Earthquakes cause widespread damage to life and property.
5. Tsunami is important from scientific point of view.



B. Fill in the blanks.

1. The magma that reaches the earth's surface is called _____.
2. Volcanoes are usually in the form of _____ mountains.
3. The waves generated during an earthquake are called _____ waves.
4. Tsunamis are _____, _____ and very large ocean waves.
5. Extinct volcanoes are _____.

C. Match the following Column A with Column B.

Column A

1. Earthquake
2. Focus
3. Richter scale
4. Tectonic movement
5. Ocean waves

Column B

- (a) measuring magnitude of earthquake
- (b) disturbance to earth's interior
- (c) tsunami
- (d) underground origin of vibrations
- (e) earth's movement

D. Tick the odd-one-out giving reason.

1. Earthquakes, Landslides, Terrorist attacks, Volcanic eruption
2. Magma, Avalanche, Lava, Ash
3. Seismograph, Rain gauge, Epicentre, Mercalli scale
4. Kashmir earthquake 2005, China earthquake 2008, Japan earthquake 2011, Bhopal gas tragedy 1984
5. Shock waves, Tremors, Dormant volcano, Aftershocks



Activity

Field Project

Find out whether the buildings/structures located in the area where you reside are made earthquake proof. Conduct a survey and find out the safety measures to be followed during a quake.

Collecting Information

1. With the help of an atlas find out earthquake-prone zones in India.
2. Search the internet and collect information about Tsunami Warning System.



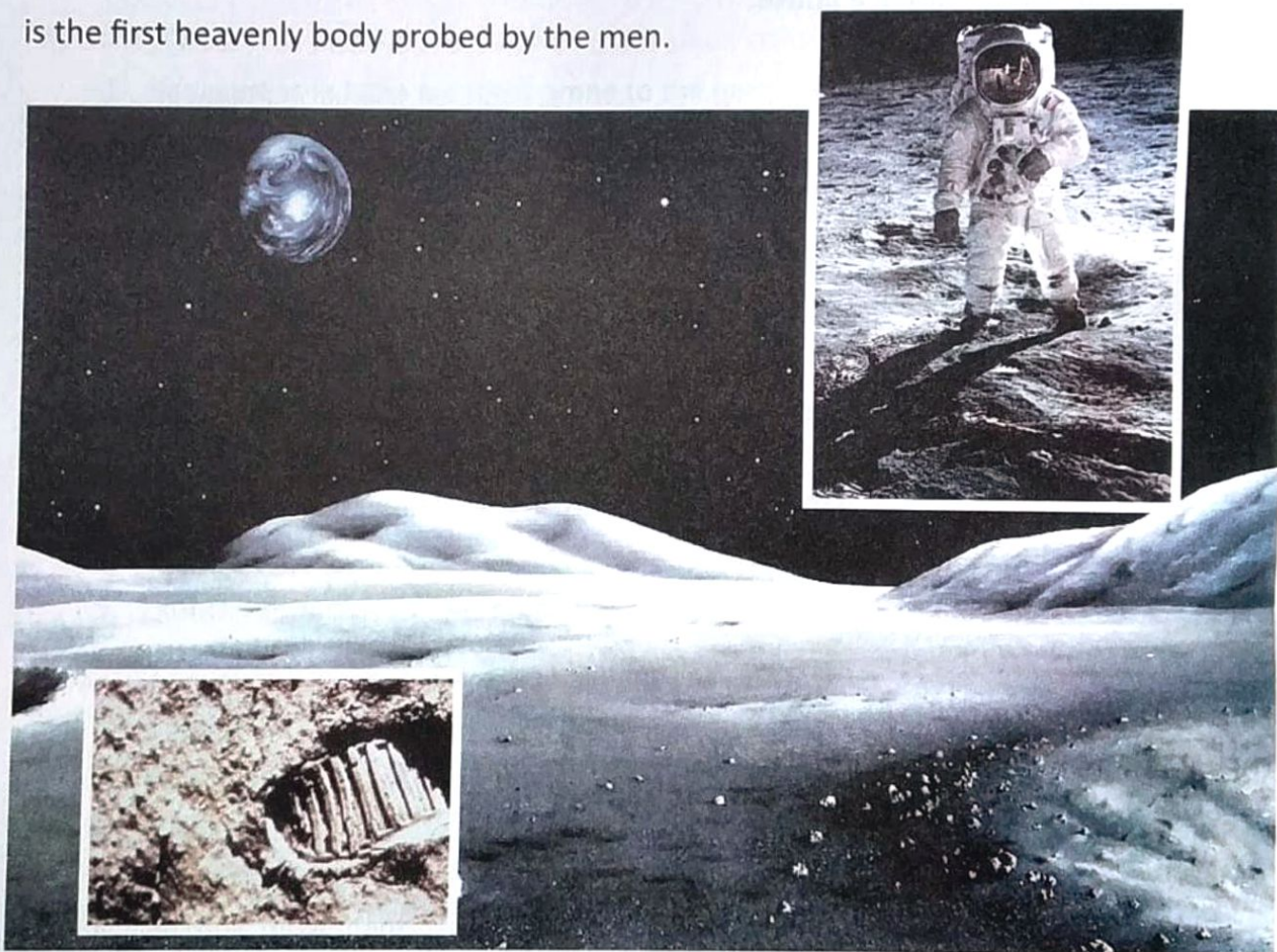
The Moon and Eclipses

The moon is our closest neighbour in space. It appears very bright because it reflects light from the sun. From day-to-day, the moon seems to change its shape. This is because as it travels around the earth, different parts of the moon are lit up by the sun's light. Unlike the earth, the moon has no atmosphere or no life. The astronauts' foot prints left on the moon will remain there for centuries because there is no wind to disturb them. This is the first heavenly body probed by the men.

LESSON OBJECTIVE

You will know

- The moon's surface
- Phases of the moon
- Gravity of the moon
- Eclipses
- Satellites



Surface of the moon

THE MOON'S SURFACE

The surface of the moon is not plane. It has hills, mountains, valleys and craters. Craters are deep holes in its ground created by hitting of the heavenly bodies like meteorites on to the moon's surface. Mountains on the moon are very rough and sharp. They are made of bare rocks and soil.

Soil of the moon is dry and is made up of small pieces of rocks. Life does not exist on the moon, due to the absence of air and water. As there is no air on the moon, no sound can be heard there.

The temperature of the moon also changes very quickly. It changes with day and night. Moon is very hot when sun shines on it. On the darker side it is very cold. Astronauts that visit moon have to wear special dresses to bear the quick change in temperature.

PHASES OF THE MOON

The shiny moon you see at night, does not have light of its own. The moonlight which we see from the earth is the light of sun. The sunlight reflects on the moon and shines on the earth. We call this light as moonlight.

Half of the moon's surface always faces the sun. The part facing the sun gets sunlight. The other half remains dark. Sometimes, we see only a part of the lighted side. The amount of the lighted side that we see changes every night. The changing shapes of the moon that we see from earth are called phases of the moon.

Different shapes of the moon are Full moon, New moon, Crescent and Gibbous. All these phases repeat again and again.

The moon never changes its shape. The changing shapes of the moon that we see from the earth are actually the shapes of its lighted part; as it revolves around the earth.



New moon



Crescent



Half moon



Gibbous



Full moon

Different phases of the moon

GRAVITY OF THE MOON

We know that gravity is the force by which the earth pulls each object towards itself. The force of gravity can also be felt on the moon. But the gravity of moon is $\frac{1}{6}$ times less than the earth. In other words, we would weigh less on the moon. For example, if our weight is 30 kg on the earth, our weight on the moon will be only 5 kg. For the same reason, one would find it very difficult to walk on the moon. Unless one is weighed down, he/she would float.

Tides

Due to gravity, moon pulls water from seas and oceans towards itself. This is called tide. Tides are of two types—high tide and low tide. Every high tide is followed by a low tide. When water is pulled by moon it is called high tide. In the area between two high tides the water forms low tides. The highest tide occurs on full moon night. Tides are useful to ships. When there is a high tide, ships can come easily to a port. The knowledge of tides is also important to fishermen when they go out for catching fish in the seas. In a low tide, they cannot bring back their boats to the shore because the sea water recedes far away from the shore.

ECLIPSES

Eclipses occur due to the revolution of earth and moon. The position of moon and earth keeps on changing due to the revolving movements. Eclipses occur when the sun, the earth and the moon are in straight line. These are the most spectacular shadows cast by the earth and the moon by blocking the sunlight falling on each other.



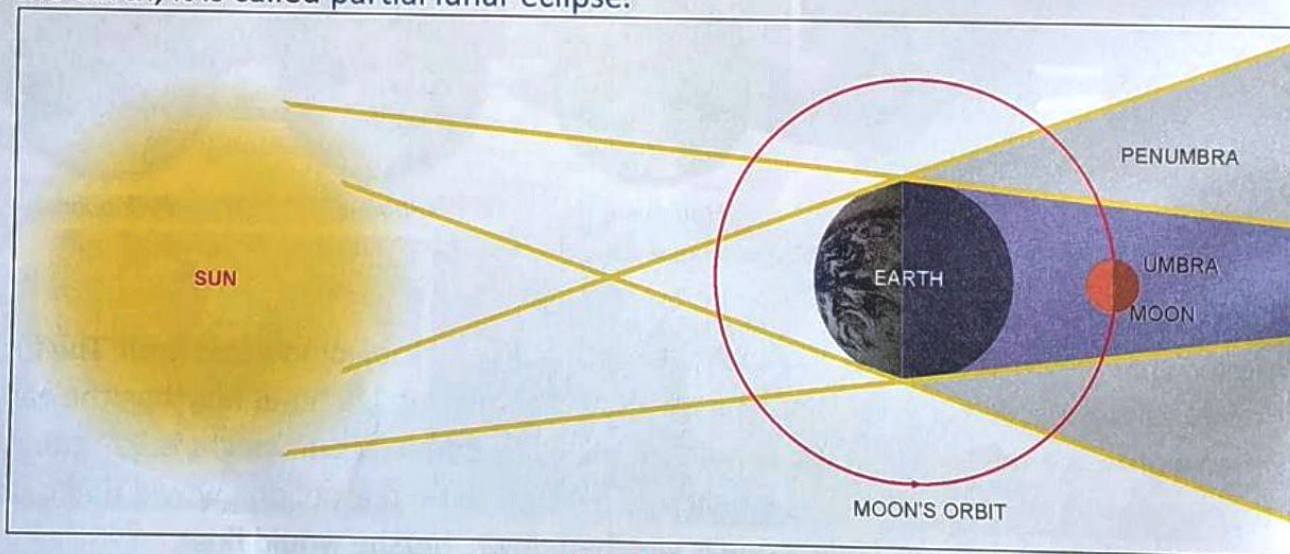
Total solar eclipse

Lunar Eclipse

When earth comes between the sun and moon, lunar eclipse occurs. When the earth revolves around the sun, sometimes it comes between the sun and moon.

The shadow of earth casts on moon. The part of the shadow that totally blocks the sunlight is called the umbra. The other part that blocks only a part of the sunlight is called the penumbra.

Lunar eclipse can be total or partial. When moon is completely in the dark shadow of the earth, it is called total lunar eclipse. When moon is only partly hidden by the shadow of the earth, it is called partial lunar eclipse.

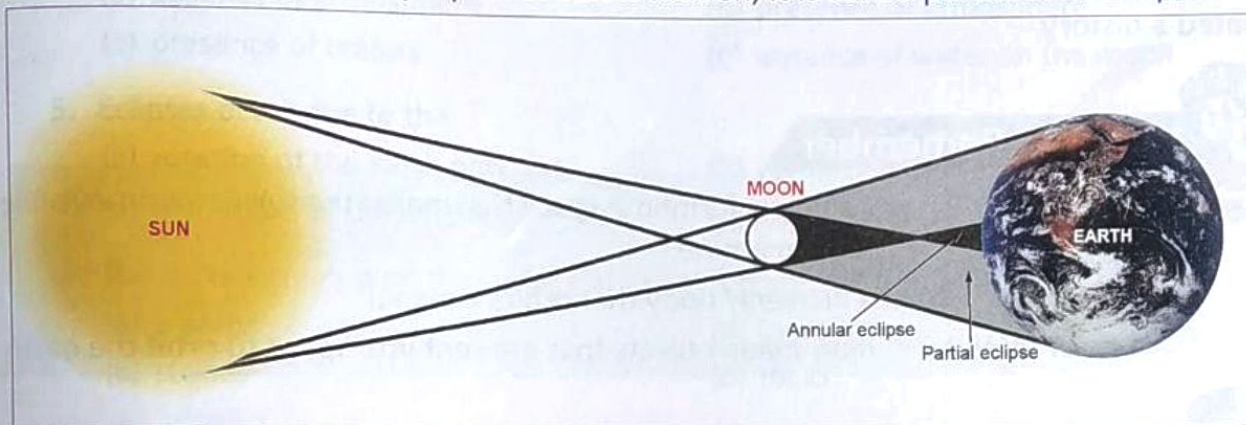


Lunar Eclipse

Solar Eclipse

When the moon comes between the sun and the earth, solar eclipse occurs.

We know that moon is much nearer to the earth than the sun. When the moon revolves round the earth, it sometimes comes between the sun and the earth. The rays of the sun cannot reach the earth. In other words, you can say the shadow of the moon casts on the earth. This is called solar eclipse. When sun is completely hidden by the moon, it is called total solar eclipse. When only a part of sun is hidden, it is called partial solar eclipse.



Solar eclipse

Eclipses should not be seen through naked eyes. Special equipment can be used to see the eclipses.

SATELLITES

A satellite is a heavenly body that moves around a planet. Moon is the natural satellite of the earth. Man has also made artificial satellites that revolve around the earth in space. Artificial satellites are man-made objects sent into space to orbit a planet.



Sputnik 2

The spacecraft Chandrayaan 1, India's first unmanned Moon Mission, was finally called off on 28 August, 2009. It has completed most of the objectives of this historical Moon Mission.

Now, India is planning its second lunar exploration *chandrayaan-2*. Developed by ISRO, the mission is planned to be launched to the moon by the end of 2016 or beginning of 2017.

The spacecraft is launched in the space with the help of rockets. Rockets are the vehicles which are powerful enough to carry spacecraft away from the surface of the earth. Saturn-V is the largest rocket ever built. It launched American spacecraft Apollo 11 to the moon on 20 July 1969.

Sputnik 2 was the first spacecraft in which a living creature, a dog named, Laika was sent for the first time to the space.

Artificial satellites are sent to space for performing different tasks. For example, Military satellites can spy, guide missiles and even used as weapons. Communication satellites relay television,

radio and telephone transmissions. Weather satellites help with weather forecasting and also give warning about cyclones. Scientific satellites carry out studies of the earth and its environment.

India has also launched many satellites into the space. Its first satellite *Aryabhata* was launched in 1975. Since then, satellites of many types including *Bhaskara*, *Rohini*, *Insat 1 A*, *Insat 1 B*, *Insat 1 C* and others have been launched. On February 2017, Indian Space Research Organisation (ISRO) launched 104 satellites in a single rocket (PSLV, C-37) and created a history.



Words to Remember

- Eclipse** : a shadow formed in space that makes the sun or moon invisible for some time
- Satellite** : a heavenly body that orbits a planet
- Artificial satellite** : man-made objects that are sent into space to orbit the earth



Quick Recall

- Moon does not have light of its own. It only reflects the light of sun to the earth.
- The surface of moon has rocky craters and mountains.
- The lighted part of the moon that we see from earth is called phase.
- The earth revolves around the sun and moon revolves around the earth.
- The gravity of moon is $\frac{1}{6}$ th times less than that of the earth. Due to gravity, moon pulls water from seas and oceans towards itself causing tides.
- Eclipses are formed when the earth, the sun and the moon are in a straight line.
- Satellites made by man, that revolve around the earth in space are called artificial satellites.
- Artificial satellites are sent to the space for defence purposes, communication, weather and scientific studies.

EXERCISES



A. Choose the correct answer.

1. The closest neighbour of the earth in space is the
(a) Sun (b) Mercury (c) Moon (d) Venus
2. The moon shines because of
(a) its own light and heat (b) the light of the sun reflected by it
(c) the gases present on its atmosphere (d) the craters on its surface

3. The gravity of the moon is
 - (a) equal to the gravity of the earth
 - (b) less than the gravity of the earth
 - (c) more than the gravity of the earth
 - (d) zero
4. One cannot hear any sound on the moon because of
 - (a) absence of atmosphere
 - (b) presence of atmosphere
 - (c) presence of craters
 - (d) absence of water on the moon
5. Eclipses occur due to the
 - (a) rotation of the earth only
 - (b) revolution of the moon only
 - (c) revolution of the earth only
 - (d) revolution of the earth and the moon both
6. The craters created on the surface of the moon are due to the hitting of
 - (a) planets
 - (b) meteorites
 - (c) stones
 - (d) rocks
7. The first satellite launched by India was
 - (a) Apple
 - (b) Rohini
 - (c) Insat 1 B
 - (d) Aryabhata
8. The spacecraft that carried a living creature into the space for the first time was
 - (a) Apollo 11
 - (b) Voyager-II
 - (c) Sputnik 2
 - (d) Mariner

B. Give short answers.

1. Which is the first heavenly body probed by the men ?
2. What are the changing shapes of the moon called ?
3. What occurs when the sun, the earth and the moon are in straight line ?
4. Why is there no life on the moon ?
5. What are tides ?

C. Answer the following questions.

1. How do eclipses occur ?
2. Describe lunar eclipse.
3. What is an artificial satellite ? Name some artificial satellites launched by India.
4. What are the uses of artificial satellites ?
5. What is the difference between solar eclipse and lunar eclipse ?

D. Differentiate between :

1. The surface of the earth and that of the moon.
2. Natural and artificial satellites.

Higher Order Thinking Skills (HOTS)

1. Why do astronauts need a special space suit ?

[Hint : Does the temperature change in the same way in the space as on the earth ?]

2. What would happen if there are no communication satellites ? Would you be able to watch TV at your home ?

[Hint : What is the function of communication satellite ?]



**QUICK
ASSIGNMENT**

A. Write T for true or F for false against the given statements.

1. Life exists on moon as it has light.
2. The part of the moon facing the earth gets light from the sun.
3. Mountains on the moon are very rough and sharp as there is no air or water.
4. The highest tide occurs during no moon night.
5. When the sun is completely hidden by the moon, it is called solar eclipse.

B. Fill in the blanks.

1. The light from the _____ shines on the moon.
2. The amount of light of the moon that we see, _____ every night.
3. _____ eclipse occurs when the _____ comes between the sun and the earth.
4. The moon is covered with _____.
5. If your weight is 48 kg on the earth you will weigh only _____ kg on the moon.

C. Name the following.

1. The changing shapes of the moon that we see from the earth : _____
2. Holes on the surface of the moon : _____
3. The pull of water in sea and ocean towards the moon : _____
4. The natural satellite of the earth : _____
5. The largest rocket : _____

D. Match the following column A with column B.

Column A

1. Aryabhata
2. Solar eclipse
3. Chandrayaan-1
4. Lunar eclipse
5. Sputnik 2

Column B

- (a) first Indian satellite
- (b) the earth between the sun and the moon
- (c) India's first moon mission
- (d) the spacecraft which carried a living creature into space for the first time
- (e) the moon between the sun and the earth



Activity

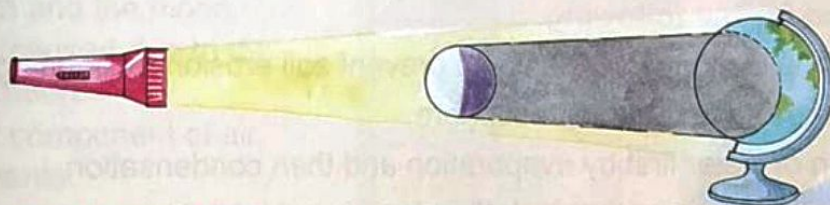
Classroom Project

To see how eclipse is caused.

What is needed : Torch, globe, ball, pencil and paper.

What to do :

1. In a dark room, arrange the flashlight, ball, and globe as shown.
2. Shine the flashlight on the globe.
3. Move the ball between the light and the globe.
4. Record your observations.



Collecting Information

Name the organisation that conducts space researches in India. Take help of the internet and make a list of satellites launched by this organisation in last ten years.

MODEL TEST PAPER-III

(Based on Chapters 8 to 10)

MM 20

Instructions

- Read the question paper carefully.
- Do not over write. Write neatly.

I. Rewrite the following statements correctly.

[4]

1. The contamination of air with desirable materials is called air pollution.
2. In the process of distillation, chlorine tablets are added to the container with water.
3. The micro-organisms present in the soil make it infertile and disturb in maintaining the eco system.
4. Eclipses occur when the sun, the earth and the moon are at right angles with each other.
5. Sputnik-1 was the first satellite launched by India.

II. Give one word for the following.

[4]

1. Structures build along river banks to prevent soil erosion by flooding.
2. The outermost layer of the atmosphere.
3. Purification of water first by evaporation and then condensation.
4. Farming in the hilly area in which the slope is cut into steps.
5. Man-made objects that are sent into space to orbit the earth.

III. Match the following columns.

[5]

Column A

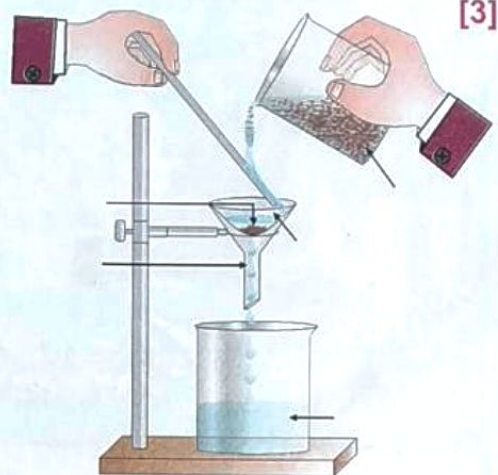
1. Amount of water vapour present in air
2. Removal of insoluble impurities from water
3. Indiscriminate cutting of trees
4. Weather forecasting and cyclone warnings
5. Gravity of moon

Column B

- (a) tides
- (b) deforestation
- (c) humidity
- (d) sedimentation
- (e) weather satellite

IV. Label the adjoining diagram with the help of words given in the box.

Water with insoluble impurity, Clean water, Impurity, Funnel, Filter paper, Stand.



[3]

V. Solve the following crossword with the help of clues given below.

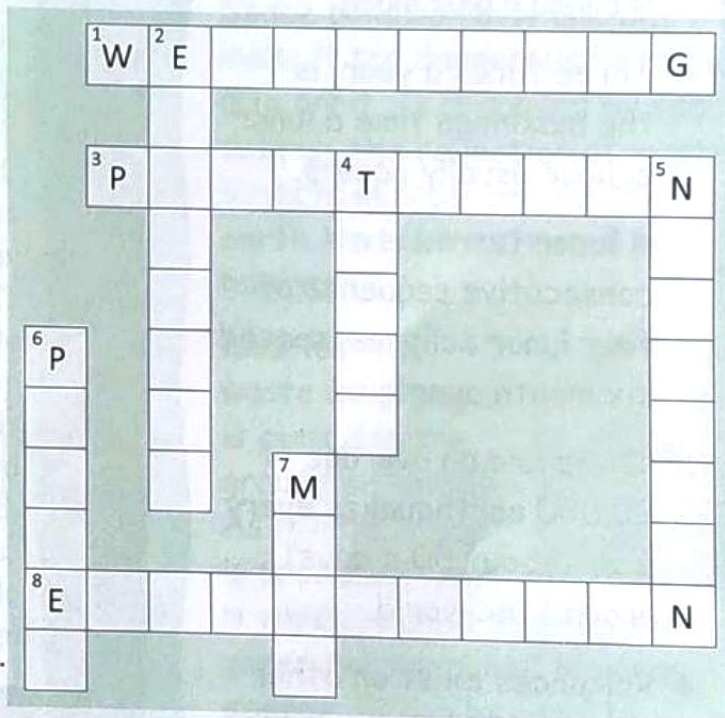
[4]

Across

1. The process by which soil is formed.
3. It reduces soil erosion.
8. A simple way to remove soluble impurities from water.

Down

2. These occur due to the revolution of the earth and the moon.
4. These are caused due to the gravity of moon.
5. The major component of air, used by plants.
6. Changing shapes of the moon.
7. Nearest neighbour of the earth in space and its natural satellite also.





ONLY FOR READING

info
hub

Space & Environment

Curiosity Corner

- When a month has two full moons, the second full moon is called a blue moon.
- Three times a year, is the maximum time a lunar eclipse usually occurs.
- A lunar tetrad is a consecutive sequence of four lunar eclipses, spaced six month apart.
- There are an average of 20,000 earthquakes every year (about 50 a days) around the world.
- Volcanoes exist on other planets and satellites too. Olympus Mons, the biggest crater on the Mars is in fact a volcano.

Fun with Science

MAKING A VOLCANO

Fold a piece of card in the shape of a cone and cut the top as shown. Take a small plastic cup, pour some red colour powder and soda bicarbonate into it. Place the cone over the cup. Pour some drops of vinegar through the cone into the cup to see the volcano erupt. The bicarbonate of soda reacts quickly with vinegar to form bubbles of carbon dioxide gas, causing a sort of volcanic eruption.

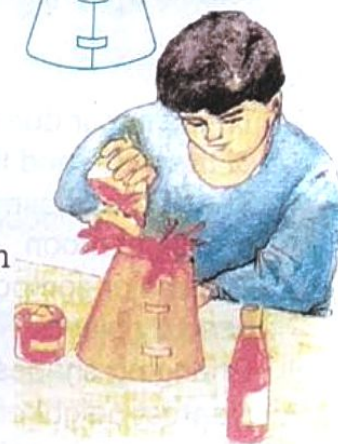
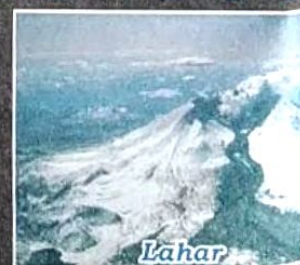


PHOTO SPEAKS



Blood moon

Referred to total lunar eclipse due to its reddish colour



Lahar

Volcanic mudflow with rock fragments, hot gases & water

Amazing SCIENCE FACT

STRIKING SOFIA

The Stratospheric Observatory for Infrared Astronomy (SOFIA) is the first and largest flying observatory of the world launched by NASA. It is capable of making observations that are impossible for even the largest and highest ground-based telescopes.



AIR PUSHES BACK

Can you use a balloon to lift up a plastic beaker? Put a balloon inside a beaker and blow up the balloon. You will find that the sides of the balloon grip the beaker tightly. You would be able to lift the beaker just by holding on to the neck of the balloon.

This works because air can be squeezed or compressed into a smaller space. The compressed air inside the balloon presses outward on the sides of the beaker, so you can lift it up.



Charles F. Richter

American seismologist
creator of Richter scale



Ganymede

Largest moon of solar
system, a satellite of Jupiter

Green Gallery

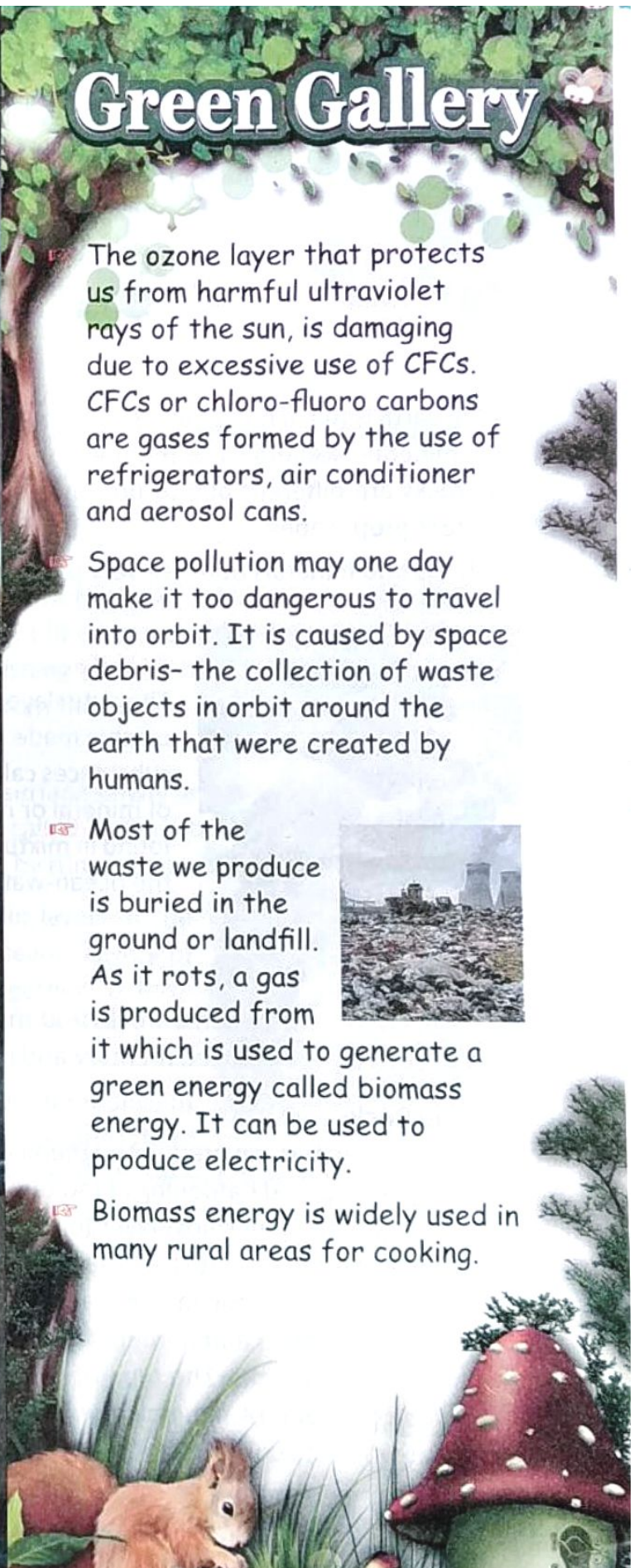
The ozone layer that protects us from harmful ultraviolet rays of the sun, is damaging due to excessive use of CFCs. CFCs or chloro-fluoro carbons are gases formed by the use of refrigerators, air conditioner and aerosol cans.

Space pollution may one day make it too dangerous to travel into orbit. It is caused by space debris- the collection of waste objects in orbit around the earth that were created by humans.

Most of the waste we produce is buried in the ground or landfill. As it rots, a gas is produced from it which is used to generate a green energy called biomass energy. It can be used to produce electricity.



Biomass energy is widely used in many rural areas for cooking.



Rocks and Minerals



The earth is full of rocks. All rocks are made of substances called minerals. Minerals are the building blocks of earth's rocks. The rocks are different due to presence of different minerals in different proportions.

Rocks and minerals both are very useful for our daily life.

LESSON OBJECTIVE

You will know

- Rocks
- Kind of rocks
- Minerals
- Uses of rocks and minerals
- Need to conserve natural resources



Rocks on the earth

ROCKS

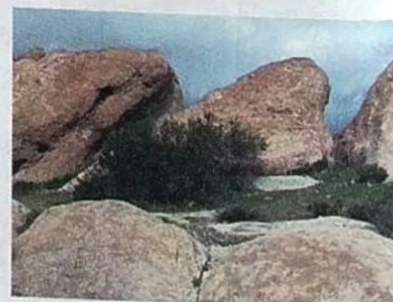
The outer layer of the earth is called crust. Most of the Earth's crust is made of solid rocks. Rocks are made up of chemical substances called minerals. Rocks may contain only one type of mineral or may have many minerals in them. Minerals are found in mixture called ores. Rocks are also present beneath the ocean-water.

KIND OF ROCKS

According to the formation of rocks and the quantity of minerals present in them, rocks are classified as igneous, sedimentary and metamorphic rocks.

Igneous Rocks

Most of the earth is covered with igneous rocks. They are formed by cooling and hardening of molten rocks. Magma or molten rocks in the innermost layer (or core) of the earth is pushed upwards by other rocks. When it reaches the earth's surface, it flows out through the cracks and is called lava. Some of the lava cools and hardens below the earth's crust and forms igneous rocks. The type of igneous rock formed depends on the type of minerals the magma contains and the rate at which it cools down.



Igneous rocks

Different types of igneous rocks are :

Granite

It is the most common igneous rock. Granite is a hard rock. Granite is used to make paving stones or in buildings. Granite is of different colours. White, grey, pink and red are the most common.

Granite contains basically three minerals. These are quartz, mica and feldspar. It is used to make building and floors.



Granite



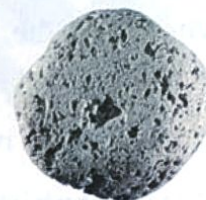
Basalt

Basalt

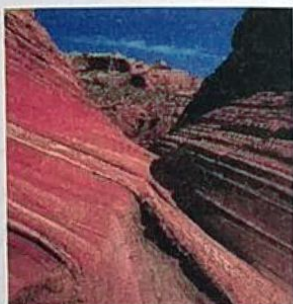
Basalt is formed by quick lava cooling on the earth's surface. It is fine-grained and almost black in colour.

Pumice

It is a light weight rock. Pumice is formed by lava froth. Air is trapped inside the pumice stone. This makes it very light. It is used as a building material like concrete blocks, as a teeth polishing powder by dentists and as a scrubber to remove dead skin cells from the body.



Pumice



Sedimentary rocks

Sedimentary Rocks

All rocks on the earth's surface slowly break down into small pieces. These small pieces are called **sediments**. Sediments are moved or deposited at one place, by running water, wind, waves and gravity.

They get deposited in layers at the bottom of lakes and oceans. Layers of sediment cemented together to form sedimentary rocks. Pressure of upper layers and cement change sediments into sedimentary rocks.

Sedimentary rocks are very useful to know about ancient plants and animals. Scientists study these rocks because there are traces of ancient plants and animals called **fossils** in the layers of these rocks.



Fossils

Different types of sedimentary rocks are :

Sandstone

Sandstone is made from grains of sand which have been naturally cemented together. It is of many colours. The colour of sandstone depends on the colour of depositing sand. It contains grains of a mineral quartz which lends it pink or reddish colour. The famous Red Fort and Qutb Minar in Delhi are made of red sandstone.



Sandstone

Conglomerate

Conglomerate is formed when gravel, pebbles and stones get cemented together by minerals. It is uneven and coarse in texture. It is used in construction work.



Conglomerate



Shale

Shale

Shale is made by the deposition of clay and mud particles. It is a soft rock. It is mainly used to make bricks and cement.

Limestone

This sedimentary rock is different from other types as it is not formed by deposits of mud and sand. Limestone is made up of a mineral 'calcite' which is present in the shells of sea animals. When they die, the shells stick to the bottom of the sea and form layers there.



Limestone

It is used in making cement and bricks. Chalk is also one form of limestone.

Metamorphic Rocks

The rocks which are formed by the action of heat and pressure are called metamorphic. Both igneous and sedimentary rocks can be changed into metamorphic rocks.

Different kinds of metamorphic rocks are :

Slate

Slate is formed from soft shale. It can be broken into thin sheets and is used for making 'slates' and blackboards.

It is also used for making roofs of the buildings.



Slate



Marble

Marble

Marble is the most commonly used metamorphic rock. Marble is made from limestone and is found in various colours. It can be cut and polished easily. Taj Mahal in Agra is made of white marble.

Gneiss

The metamorphic rock made from granite is called gneiss. It has parallel bands of minerals and glitter because of mica in it.

It is used as a building stone.



Gneiss

Quartzite

This metamorphic rock is formed from sandstone that is rich in the mineral quartz. It is a very hard and weather resistant rock. Quartzite is used in glass and ceramic industry.



Quartzite

MINERALS

Minerals are chemical substances that occur naturally. They are the building blocks of all the rocks. Minerals are identified by their hardness, colour, density and the way they reflect light.

Minerals may be metallic or non-metallic. Metallic minerals such as iron, aluminium, copper and zinc are obtained from their ores. These are used for making machines, coins, wires, utensils etc. Metals like silver and gold are used for making jewellery.



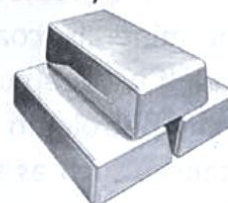
Copper



Aluminium



Gold



Silver

Some metallic minerals

Magnesium, calcite, mica etc. are non-metallic minerals. These are used for industrial purposes. Our body too requires some minerals such as calcium, sodium, iron etc. in small quantities.

USES OF ROCKS AND MINERALS

Almost all the materials we use in our daily life are made of minerals and rocks. For example, the house where we live is constructed by bricks, cement, marble and ceramic tiles. The utensils we use for cooking and eating are made of iron, aluminium, silver or ebonite. All are made of minerals. The bulk of minerals is used in industrial needs such as for the manufacture of housing materials and automobiles. Precious rocks containing ruby, diamond, emerald, sapphire etc. are used as gemstones. Fossil fuels like coal and petroleum are also obtained from rocks. These are very useful to us.



Gemstones



Coal as fuel



Coal

Coal — A Fossil Fuel

Coal is formed from the remains of plants. Millions of years ago there were thick forests on the earth, growing in swamps. As the trees of the forests died, they got buried in the swamps. More and more trees died on top, squeezing those below. Due to heat and pressure they gradually changed into coal.

The sun's energy makes plants grow. Coal thus has stored energy of the sun from million of years ago. When we burn coal as a fuel we use this trapped energy of the sun.

Petroleum — Another Fossil Fuel

When plants and animals living in the sea died, their bodies sank to the bottom. More and more sediments collected on the top. The plants and animals were squeezed and slowly changed into petroleum over millions of years. Like coal, petroleum also contains stored energy of the sun millions of years ago.

Coal and petroleum are used as a fuel. Petroleum is used for making chemicals, cosmetics, fertilizers, plastics and other things.

NEED TO CONSERVE NATURAL RESOURCES

All the minerals, coal and petroleum are valuable natural resources. However they are limited. If we keep using them as fast as we are doing today they will not last very long. Coal and petroleum are used excessively. Also, burning so much of fuel releases harmful substances such as smoke and poisonous gases in the air, causing pollution, which can result in dangerous diseases.

We can conserve these fossil fuels by using them judiciously and encouraging renewable sources of energy like the sun, water and wind. These are unlimited and do not cause pollution on being used.



Words to Remember

Igneous Rocks	: rocks formed as a result of cooling of lava
Sedimentary Rocks	: rocks formed by the deposit of rock particles washed from mountain etc.
Metamorphic Rocks	: rocks formed from igneous or sedimentary rocks
Minerals	: chemical substances that make up rocks
Ores	: useful minerals from which metals are extracted
Fossils	: traces of ancient plants and animals in the layers of sedimentary rocks
Fossil Fuels	: natural fuels formed from the remains of living organisms



Quick Recall

- Rocks are made of minerals.
- Rocks are found everywhere on the earth.

- Rocks formed from magma and lava are called igneous rocks, e.g., granite, basalt, pumice.
- Layers of sediment cemented together to form sedimentary rocks. e.g., sandstone, conglomerate, slate, limestone.
- Metamorphic rocks are formed by heat and pressure. Both igneous and sedimentary rocks can be changed into metamorphic rocks. e.g., slate, gneiss, marble.
- Fossil-fuels, like petroleum and natural gases are formed from the remains of ancient plants and sea-creatures.

EXERCISES

A. Choose the correct answer.

1. The building blocks of all the rocks are
(a) pebbles (b) sand (c) soil (d) minerals
2. The rocks formed by the cooling and hardening of lava are
(a) sedimentary rocks (b) metamorphic rocks
(c) igneous rocks (d) fossils
3. The rock mainly comprises quartz, mica and feldspar is
(a) pumice (b) basalt (c) granite (d) limestone
4. The traces of animals and plants in the layers of sedimentary rocks are called
(a) sandgrains (b) fossils (c) lava (d) fossil fuels
5. Metallic minerals are obtained from their
(a) ores (b) sediments (c) fossils (d) fuels
6. Coal and petroleum are called
(a) nuclear fuels (b) domestic fuels (c) fossil fuels (d) renewable fuels
7. Metamorphic rocks are formed due to change in
(a) physical structure (b) heat and pressure
(c) colour (d) density
8. The energy stored in coal and petroleum is
(a) solar energy (b) atomic energy
(c) nuclear energy (d) thermal energy

9. Which of the following products is not obtained from petroleum ?
(a) cosmetics (b) gold (c) plastics (d) fertilizers
10. The metamorphic rock made from granite is
(a) slate (b) marble (c) gneiss (d) quartz

B. Give short answers.

1. Name the substances by which all rocks are made.
2. What is the outermost layer of the earth called ?
3. Name the igneous rock formed by quick cooling of lava on the earth's surface.
4. Which rock is formed when gravel, pebbles and stones get cemented together by minerals?
5. On what basis rocks are classified ?

C. Answer the following questions.

1. Why are coal and petroleum known as fossil fuels ?
2. How is coal formed ?
3. How is petroleum formed ?
4. How minerals and rocks are useful to us ?
5. How can we conserve coal and petroleum ?

D. Differentiate between.

- | | |
|-----------------------|----------------------------------|
| 1. Magma and Lava | 2. Igneous and Metamorphic Rocks |
| 3. Pumice and Granite | 4. Marble and Limestone |

Higher Order Thinking Skills (HOTS)

1. Name the common mineral present in
(a) diamond jewellery (b) lead of your pencil
[Hint : This mineral is also present in coal.]
2. Name the igneous rock that floats on water.
(Hint. It is also used in your bathroom as a scrubber.)



QUICK ASSIGNMENT

A. Name the rock.

1. A light rock with lots of holes in it _____
2. A white rock made from limestone _____
3. A rock used for making slates and blackboards _____
4. An uneven and coarse rock made of gravel, pebbles and stones cemented together _____
5. A soft rock made of mud and clay _____

B. Fill in the blanks.

1. _____ and _____ are metamorphic rocks.
2. _____ is a hard rock while _____ is a soft rock.
3. Magma that reaches the surface of the earth is called _____.
4. _____ rock is formed from the lava froth.
5. _____ and _____ are renewable sources of energy.

C. Cross out the uncommon pair.

1. Sediments : Sedimentary Rocks
2. Heat and Pressure : Igneous Rocks
3. Chalk : Limestone
4. Slate : Sedimentary Rock
5. Marble : Limestone

D. Match the following Column A with Column B.

Column A

1. Red Fort
2. Taj Mahal
3. Chalk
4. Iron and aluminium
5. Mica and calcite

Column B

- (a) non-metallic minerals
- (b) limestone
- (c) metallic minerals
- (d) sandstone
- (e) marble



Activity

Project at Home

Take a close look of each room in your home. Make a list of articles in each room. Now write the names of things made of rocks and minerals in the following table.

Rooms	Things comprising minerals	Things comprising rocks
1. Kitchen		
2. Drawing room		
3. Bed room		
4. Wash room		

Collecting Information

On a map of India, mark the places where coal mines are found. Take help of an atlas. Also, do you know that India is the largest producer of mica ? Mark the places on the same map where mica is found.

Soil Erosion and Conservation



Soil is the most valuable resource on the earth. Soil not only contains metals and minerals in its layers but it also supports life on the earth. It grows plants the food-producers, supports animals and provides food. Most of our basic needs for food, shelter and clothing are fulfilled from land or soil.

LESSON OBJECTIVE

You will know

- Formation of soil
- Soil erosion
- Soil conservation

Life cannot be imagined without soil. But this precious resource is facing many problems. The factors responsible for damaging the soil are human activities, indiscriminate cutting of trees and overgrazing. It can be checked through conservation processes like planting more trees, changing pattern of farming, building dams and embankments.



Activities damaging the soil

FORMATION OF SOIL

Soil is formed by the weathering and breaking of rocks. The wind, water and living beings cause the rocks to break. Due to cooling, heating and drying for the millions of years, the rocks crack and break up into fine pieces to form soil. The process of soil formation is a slow, long and continuous process.

The quality of soil is an asset of a nation. It adds wealth to the country. The countries which do not have quality soil, have to depend on other countries for their basic needs.

Uses of Soil

There are various uses of soil. All living beings depend on soil because their basic needs are fulfilled through the soil. We get food, cloth, shelter, medicines, water—the basic needs of life system from soil.

- (a) Forests which grow on soil, bring rain and support various plant and animal activities.
- (b) Large deposits of metals and minerals are present in the soil.
- (c) Micro-organisms present in soil make it fertile and help in maintaining the ecosystem.
- (d) Soil is also used for making bricks, pots and porcelain.
- (e) Soil also stores water under the ground. This water is used for drinking and other purposes.

SOIL EROSION

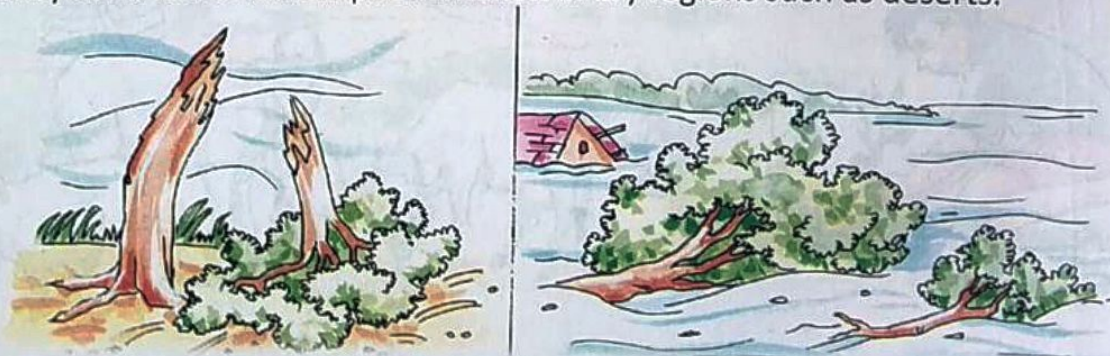
The process of carrying away of the top fertile layer of soil from one place to another by water, wind or human activities is called soil erosion.

Agents of Soil Erosion

Natural Agents

Water — River and rainwater cause soil erosion. When it rains, the top soil from the hills washes down to the rivers and plains. The running water deposits the mineral rich soil in river bed. During floods, the rivers get flooded and deposit the soil on another piece of land.

Wind — In nature, strong winds blow the top soil from one place to another, thus causing soil erosion. This happens more often, when land is not covered with grass or plants. Erosion by wind is a common phenomenon in dry regions such as deserts.



Erosion of soil by strong wind and flowing water

Human Activities

- (a) **Deforestation** — It is the cutting down of trees in large numbers. Man has cleared large areas of forests for his requirement of wood, living space etc. This results in soil erosion.
- (b) **Overgrazing by Cattle** — When animals reared by humans are left to graze on the same piece of land year after year, the land becomes bare. This results in soil erosion.
- (c) **Ploughing of Hill Sides** — This loosens the soil and increases soil erosion. In plains, after harvesting the crop, the soil lies bare for some time which helps the wind to blow away the soil.



Erosion of soil by deforestation and overgrazing

SOIL CONSERVATION

Man is constantly damaging the soil. Thousand tons of soil is carried away by wind or water due to the deforestation. The desert land is spreading speedily. The careful protection of the soil or to check soil erosion is called soil conservation.



Plantation checks soil from eroding

Different methods are adopted to check the soil erosion.



Afforestation

1. **Afforestation** — Trees should be planted in large numbers. Trees slow down the wind and prevent it from blowing away the soil. Planting grasses on hill sides also helps to stop water from carrying away the soil.

2. **Growing suitable crops** —The farmland remains bare when crops are harvested. Farmer can grow seasonal vegetables and pulses, as cover crops to protect the soil until the next crop is planted. These seasonal plants also increase the fertility of the soil by adding nutrients to it.
3. **Terrace farming** : This method should be adopted in the hilly areas. In this method of farming the slope is cut into steps or terraces. Soil eroded from one step gets deposited on the next. This reduces soil erosion.
4. More trees should be grown at slopes of mountains.
5. Overgrazing by the cattle should be prevented.
6. Strong embankments along river banks reduce soil erosion.
7. Proper use of fertilizers reduces the infertility of soil.



Terrace farming



Words to Remember

Deforestation	: cutting down trees in large number
Soil erosion	: carrying away of the top fertile layer of soil
Soil conservation	: protection of soil from erosion
Terrace-farming	: farming done in the steps on hill slopes
Afforestation	: planting trees in large numbers



Quick Recall

- Soil is formed by a long process of breaking of rocks due to the heat of the sun, cold water and wind.
- The process of removal of top fertile soil is called soil erosion.
- Wind, running water and human activities cause soil erosion.
- Protection of soil from erosion is called soil conservation.
- Afforestation, terrace-farming, growing cover crops are some measures to prevent soil erosion.

EXERCISES



A. Choose the correct answer.

1. The weathering of rocks results in the formation of
 - (a) coal
 - (b) petroleum
 - (c) soil
 - (d) fossils
2. The carrying away of top fertile soil is called
 - (a) soil profile
 - (b) soil erosion
 - (c) soil conservation
 - (d) soil fertility
3. A natural cause of soil erosion among the following, is
 - (a) wind
 - (b) running water
 - (c) heavy rain
 - (d) all of these
4. Soil can be conserved by
 - (a) terrace farming
 - (b) deforestation
 - (c) overgrazing
 - (d) ploughing hill sides
5. Cover crops are grown to
 - (a) reduce soil erosion
 - (b) increase soil fertility
 - (c) raise the income of the farmers
 - (d) all of these
6. Cutting down trees in large number is called
 - (a) afforestation
 - (b) deforestation
 - (c) plantation
 - (d) overgrazing
7. Terrace farming is a good measure to reduce soil erosion in
 - (a) hilly regions
 - (b) tarai regions
 - (c) deserts
 - (d) flood prone regions
8. One of the main reasons of spreading deserts is
 - (a) soil conservation
 - (b) soil erosion
 - (c) heavy rain
 - (d) melting mountains
9. The method of farming in which the slope is cut into steps is called
 - (a) jhoom farming
 - (b) intensive farming
 - (c) terrace farming
 - (d) extensive farming
10. The statement not true about soil is
 - (a) It is the most important natural resource
 - (b) It is the medium of plant growth
 - (c) It supports life on the earth
 - (d) It carries information

B. Give short answers.

1. What is the main medium of growing plants on the earth ?
2. Name the process due to which rocks are broken by the action of sun, rain or wind.
3. What are the natural agents of soil erosion ?
4. In which areas terrace farming is a good measure to reduce soil erosion ?
5. How do forests help in soil conservation ?

C. Answer the following questions.

1. How is soil formed ?
2. What is soil erosion ? What are its agents ?
3. In what ways is man responsible for increase in soil erosion ?
4. What is terrace farming ? How does it prevent soil erosion ?
5. List four measures to conserve soil.

D. Give reasons for the following.

1. The fertility of soil is lost due to soil erosion.
2. Embankments are built near rivers.
3. Seasonal vegetables and pulses should be grown after a crop has been harvested.
4. Trees prevent soil erosion.

Higher Order Thinking Skills (HOTS)

1. How does soil support life on the earth ?

[Hint : What are the uses of soil ?]



**QUICK
ASSIGNMENT**

A. Write T for true and F for false against the given statements.

1. Long ago, the earth was covered with rocks.
2. Soil provides us with food, clothes and minerals.
3. Afforestation increases soil erosion.
4. Soil erosion makes the soil infertile.
5. Water and air cause both soil erosion and soil formation.



B. Fill in the blanks. Choosing correct word.

1. Soil is formed by the weathering of _____ (trees / rocks).
2. Water and wind are _____ (natural / man-made) agents of soil erosion.
3. _____ (afforestation / deforestation) prevents soil from being eroded.
4. Strong embankments are build along _____ (river banks / hilly areas) to reduce soil erosion.
5. The seasonal plants grown as cover crops _____ (decrease / increase) the fertility of soil.

C. Write the scientific terms for the following.

1. Carrying away of soil by wind or water : _____
2. Cutting down trees in large number : _____
3. Protecting soil from erosion : _____
4. Structures along river banks to prevent soil erosion : _____
5. Planting trees in large numbers : _____

D. Match the following column A with column B.

Column A

1. Weathering of rocks
2. Water and wind
3. Terrace farming
4. Deforestation
5. Pulses and muskmelons

Column B

- (a) natural agents of soil erosion
- (b) cutting down of trees in large number
- (c) formation of soil
- (d) cover crops
- (e) prevention of soil erosion in hilly areas



Activity

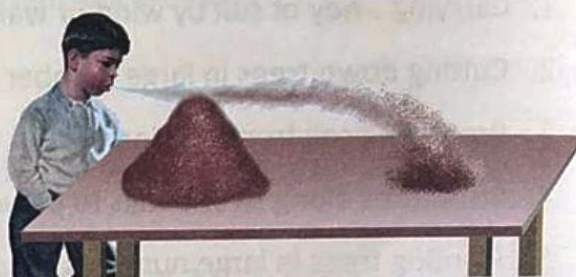
Classroom Project

To see the process of soil erosion.

What is needed : Two trays filled with soil.

What to do :

- ✎ Make hill of sand soil. Pour water on it from the top.
- ✎ Plant some grass on one tray. Leave the other tray filled with soil only. Make a hole or notch in both of the trays. Pour water in both of them with pressure.
- ✎ Again make a hill of sand soil. Blow air hard from your mouth or switch on the fan at full speed.



What do you observe :

- ✎ Soil of the tray in which grass is planted does not carry away.
- ✎ Water and air lower the hill of the soil.
- ✎ What do you learn : Soil erosion is caused by _____.

Field Project

Visit a nearby park. Observe the green grass covering the park. Now try to pull out some grass from a corner of the ground. Does the grass pull out easily or you have to apply some force ? If yes, then what may be its reason ?

Our Environment and Human Activities



There are a number of things around us like plants, animals, soil, water and human beings. These living and non-living things together form our surroundings. The surroundings in which we live is called the environment.

Over the years, man has contaminated the environment. The harmful changes brought in the environment by human activities are called pollution.

Look at the picture given below numbered as 1 to 4 carefully and mention the human activities that are contaminating the air, water and land.

LESSON OBJECTIVE

You will know

- Pollution
- Air pollution
- Water pollution
- Land pollution
- Noise pollution



1. _____

2. _____

3. _____

4. _____

POLLUTION

Pollution basically is the discharge of environmental contaminants. It is the contamination of air, water and land. Smoke from vehicles and factories pollutes the air, dumping of chemicals and factory wastes contaminate the water and garbage and other wastes spoil the land or soil. The main types of pollution are air pollution, water pollution, soil contamination or land pollution and noise pollution. Among other ill-effects pollution also disrupts ecosystem and can cause health problems.

AIR POLLUTION

The mixing of harmful gases with other particles in air is called air pollution. Human activities, industries and vehicles are the main sources of air pollution.

Effect : It causes breathing problem to mankind. It also causes harm to the plants. The growth of plants slows down and over a time they become weak and eventually die.



The smoke from industries and vehicles contaminates the air

WATER POLLUTION

When the water sources get contaminated, it is called water pollution. Water is polluted due to human activities. Industrial and household wastes are released into the water which



Different causes of water pollution

cause its pollution. Other activities like washing clothes or bathing animals in rivers in rural areas also cause water pollution. Sea water is mainly polluted by oil spill. It makes water unfit for marine plants and animals.

Effect : It is harmful for both plants and animals. It also makes people sick.

LAND POLLUTION

The land or soil pollution is caused by dumping of wastes such as plastic bags, glass bottles and metal containers. The main sources of land/soil pollution are; solid wastes, refuse from mines, forests and agriculture.

Effect : Land pollution makes the soil infertile. It harms the organisms living in the soil and adversely affects the growth of the plants.



Solid wastes cause the land pollution

GLOBAL WARMING

The earth is enveloped by a blanket of gases called atmosphere. Some of these gases like carbon dioxide, methane and water vapour have the property to trap the sun's heat. These gases do not allow the heat to escape into the space. This heat keeps the earth warm. This effect is called **greenhouse effect** and these gases are called **greenhouse gases**. But when the concentration of these gases increases in the atmosphere, it leads to the rise in the earth's average temperature. This is called **global warming**. Global warming causes climate change on the earth. This results into melting of polar ice, rise in sea level and submerging of low lying areas near the sea.

To reduce the effects of global warming we should reduce the release of green-house gases into the environment. One important step in this direction is to plant more and more trees because trees are good absorbers of carbon dioxide—the main greenhouse gas.



NOISE POLLUTION

Sound is essential for us but noise is not. Noise is the unwanted sound that causes discomfort to the ears. The pressure of noise in atmosphere is called sound or noise pollution.

The noise pollution is mainly caused by industrial machinery, vehicles, aeroplanes, loudspeakers and loud music.

Effect : It affects human health and is harmful for the ears.



Sources of noise pollution



Words to Remember

- Environment** : the surroundings around us
- Pollution** : addition of harmful and unwanted substances in the environment caused by human activities.
- Contaminated** : polluted
- Oil spill** : leakage of oil from tankers or ships.



Quick Recall

- Environment is formed by the things that surround us.
- The harmful changes brought in the environment by human activities are called pollution.
- Pollution is mainly of four types — air pollution, water pollution, land or soil pollution and noise pollution.
- Air pollution may cause many diseases in humans.
- Industrial effluents and household wastes are the main cause of water pollution.
- The fertility of soil is decreased due to land pollution.
- The pressure of sound in the environment causes noise pollution.

EXERCISES

A. Choose the correct answer.

- Men's activities lead to
 - air pollution
 - land pollution
 - water pollution
 - all of these
- Which one of the following is not caused by air pollution ?
 - asthma
 - AIDS
 - breathing problem
 - slow growth of plants
- Carbon dioxide, methane and water vapours are called
 - saturated gases
 - nobel gases
 - natural gases
 - greenhouse gases
- The soil becomes infertile and unfit for the organisms living in it because of
 - excessive use of fertilizers
 - dumping of solid wastes
 - dumping of industrial or radioactive wastes
 - all of these
- Noise pollution causes
 - visual ailments
 - asthma
 - hearing ailments
 - jaundice
- The climate of the earth is changing due to
 - global warming
 - Al Nino's effect
 - acid rain
 - natural calamities

B. Give short answers.

- What is the contamination of air, water or land called ?
- What are the main sources of air pollution ?
- Name some greenhouse gases.
- What is caused by the dumping of solid wastes ?
- How does air pollution affect our health ?

C. Answer the following questions.

1. What is environment ? What are the main causes of environmental pollution ?
2. What are the main types of pollution ?
3. What is noise pollution ? How is it caused ?
4. What is land pollution ? Describe the factors causing land pollution.

Higher Order Thinking Skills (HOTS)

1. How are trees helpful in reducing air pollution ?
[Hint: trees make their food using carbon dioxide.]
2. Give some measures to reduce noise pollution.
[Hint: What are the causes of noise pollution?]



**QUICK
ASSIGNMENT**

A. Write T for true and F for false against the given statements.

1. Air pollution is useful for plants' productivity.
2. Human activities are the main factor behind all types of pollution.
3. Water pollution may lead to typhoid.
4. Sound pollution causes hearing ailments.

B. Fill in the blanks.

1. The surroundings in which we live in called our _____.
2. The harmful changes brought in by human activities are called _____.
3. Human activities and vehicles are the main cause of _____ pollution.
4. When water sources get contaminated _____ pollution is caused.
5. Land pollution makes the soil _____.



C. Match the following Column A with Column B.

Column A

1. Polluted water
2. Polluted air
3. Polluted land
4. Noise pollution
5. Major cause for pollution

Column B

- (a) infertile soil
- (b) aeroplane and vehicles
- (c) human activities
- (d) breathing problem
- (e) jaundice



Activity

Classroom Project

Divide the class into three groups and make charts on the following topics .

- Generation of wastes and their disposal.
- Global warming and its effects.
- Environmental pollution

Collecting Information

Collect information about acid rain and its ill-effects from the internet or other sources.

MODEL TEST PAPER-IV

(Based on Chapters 11 to 13)

MM 20

Instructions

- Read the question paper carefully.
- Do not over write. Write neatly.

I. State True or False.

1. The main causes of air pollution are human activities like construction, deforestation etc. ☐
2. Trees are very helpful in reducing the effect of greenhouse gases. ☐
3. Earthquakes are caused due to excessive heat and rain. ☐
4. Chalk is made from limestone. ☐
5. Silver, gold, copper and zinc are non-metallic minerals. ☐

II. Fill in the blanks.

1. The _____ of coal and petroleum is necessary because they are limited.
2. Both igneous and _____ rocks can be changed into _____ rocks.
3. Volcanoes in which erupting activities are completely stopped, are called _____ volcanoes.
4. _____ pollution makes soil _____.
5. The _____ is the surroundings in which we live.

III. Unscramble the jumbled letters to define the following.

1. Building units of all rocks. N I M A R E S L
2. Traces of ancient plants and animals in the layer of sedimentary rocks. S O F S L I S
3. Crack in the form of conical mountain in the earth's surface that throws out lava. L O V O N C A
4. The point of disturbance on the earth's surface directly above the focus. P I E R E N C T E
5. Japanese term for huge ocean waves. S T U A N I M

IV. An eco-friendly activity is one that does not harm the environment. We have many eco-friendly substitutes for the products that disturb the environment. Match the following products with their eco-friendly substitutes. [5]

Products	Substitutes
1. Petrol/diesel	(a) jute/paper
2. Electric energy	(b) CNG
3. Polythene	(c) public transport
4. Wrapping sheets	(d) solar energy
5. Personal transport	(e) recycled paper

SAMPLE PAPER-II

(Based on Chapters 8 to 13)

Max Marks : 50

I. Choose the correct answer.

[1 × 5 = 5]

- The coldest layer of atmosphere is
 - troposphere
 - stratosphere
 - mesosphere
 - exosphere
- In the process of purification of water chlorine tablets are added to
 - kill the germs in water
 - remove the soluble impurities from the water
 - remove the insoluble impurities from the water
 - remove the suspended impurities from the water
- The soil is formed by the process of
 - fossilisation
 - weathering of rocks
 - volcanic eruption
 - rock cycle
- Tides are caused due to the
 - gravity of moon
 - mass of moon
 - atmosphere of moon
 - craters of moon
- A light rock with lots of holes in it is
 - marble
 - sandstone
 - pumice
 - slate

II. Give one word / sentence answer.

[1 × 5 = 5]

- Which rock is used to make blackboard and slates ?
- What is meant by tsunami ?
- Name the main greenhouse gas.
- Why are eclipses occur ?
- What is carrying away of top soil by wind or water called ?

III. Give short answer.

[2 × 5 = 10]

- What are the different methods used to purify water ?
- Describe lunar eclipse.
- What are minerals ? What are their uses ?

4. How is coal formed ? What are the main uses of coal ?
5. How would you show that air has weight ? Describe with diagram.

IV. Give reason for the following.

[2 × 5 = 10]

1. A mixture of sugar and water cannot be separated by the method of filtration.
2. The air near a forest is cleaner than the air near an industry.
3. Farmers make steps in hilly regions.
4. We cannot hear sound of clapping on the moon.
5. Coal and petroleum should be used judiciously.

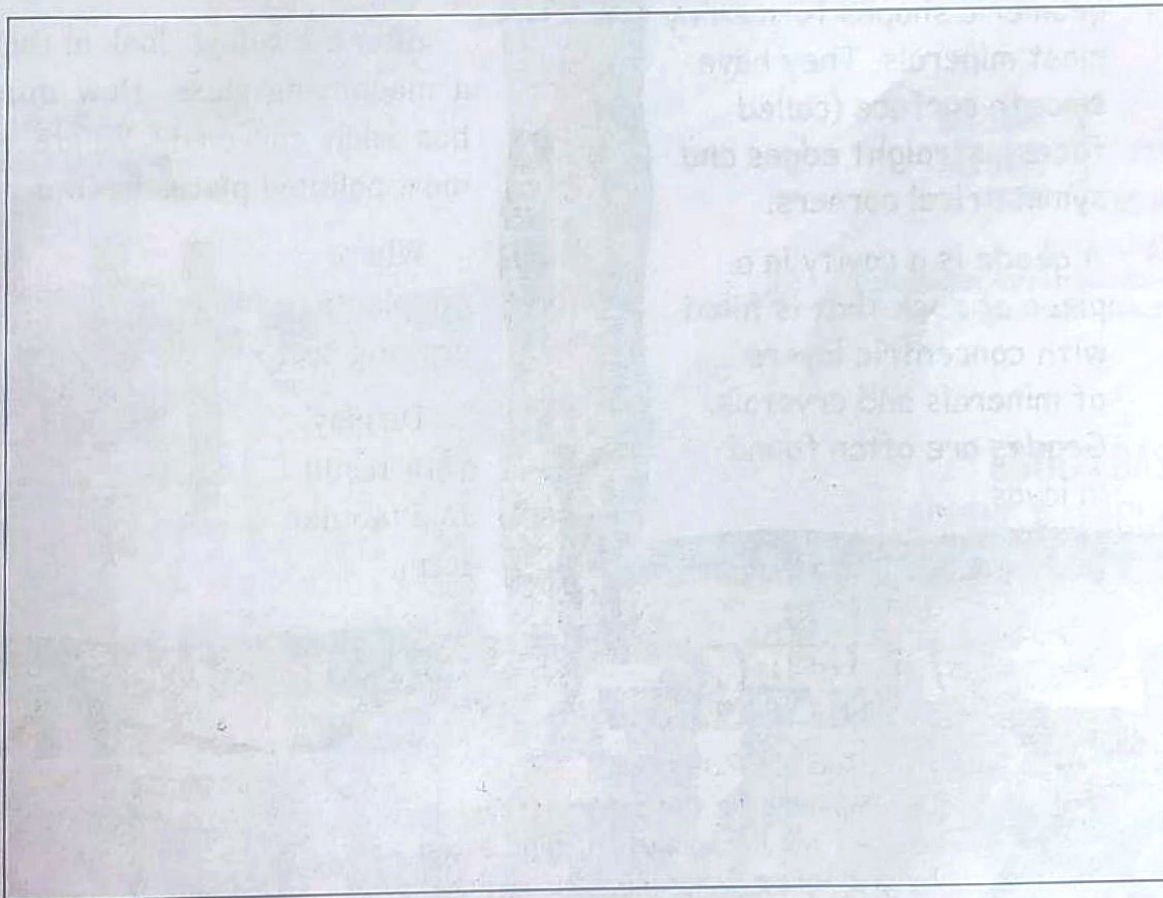
V. Answer the following questions.

[3 × 5 = 15]

1. Mention three steps involved in the process of distillation.
2. Describe the human activities that cause soil erosion. (*Give three points only*)
3. How do solar and lunar eclipses caused ? Can eclipses be seen through naked eyes ?
4. How does an earthquake occur ? What is the focus and epicentre of an earthquake ?
5. Define air, water and land pollution.

VI. Draw and colour different phases of the moon.

[5]





ONLY FOR READING

info
hub

Natural Resources

Curiosity Corner

- Acidification of ocean water is the worst type of pollution. Oceans become more acidic due to greenhouse emission from fossil fuels.
- Crystals are solid, regular, geometric shapes formed by most minerals. They have smooth surface (called faces), straight edges and symmetrical corners.
- A geode is a cavity in a piece of rock that is filled with concentric layers of minerals and crystals. Geodes are often found in lavas.

Fun with Science

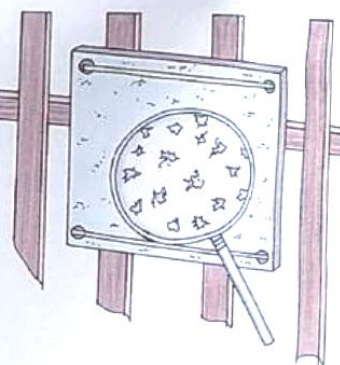
HOW POLLUTED IS THE AIR IN YOUR AREA

Make some sticky squares by gluing sticky-backed plastic on to cardboard. Fix them outside in different places such as near a park, a busy road, an industrial area and so on.

After a few days, look at them with a magnifying glass. How much dirt has each collected? Where are the most polluted places in your area?

Where are plants growing best?

Display your result in a tabular form.



Amazing SCIENCE 9 FACT

POLLUTION POINTERS

Lichens indicate the pollution level in an area. Medium pollution is indicated by grey-green or orange crusty lichens, whereas bushy, feathery lichens indicate clean air. And if the air is very polluted there are no lichens at all.





Prachi

**NOW
PUBLISHING
SMART eBooks**

**FUTURE IS
NOW!**

Read **SMART**
Teach **SMART**
Learn **SMART**



SMART BOOKS FOR SMART LEARNING

READ e DGE

eBook
Coursebook
Replica

LESSON
PLAN

WORK
SHEETS

VIDEO
TUTORIALS

SOLUTIONS

TEST
PAPERS

**EVERYTHING YOU NEED
ON TOP OF BOOK
IS IN ONE PLACE**

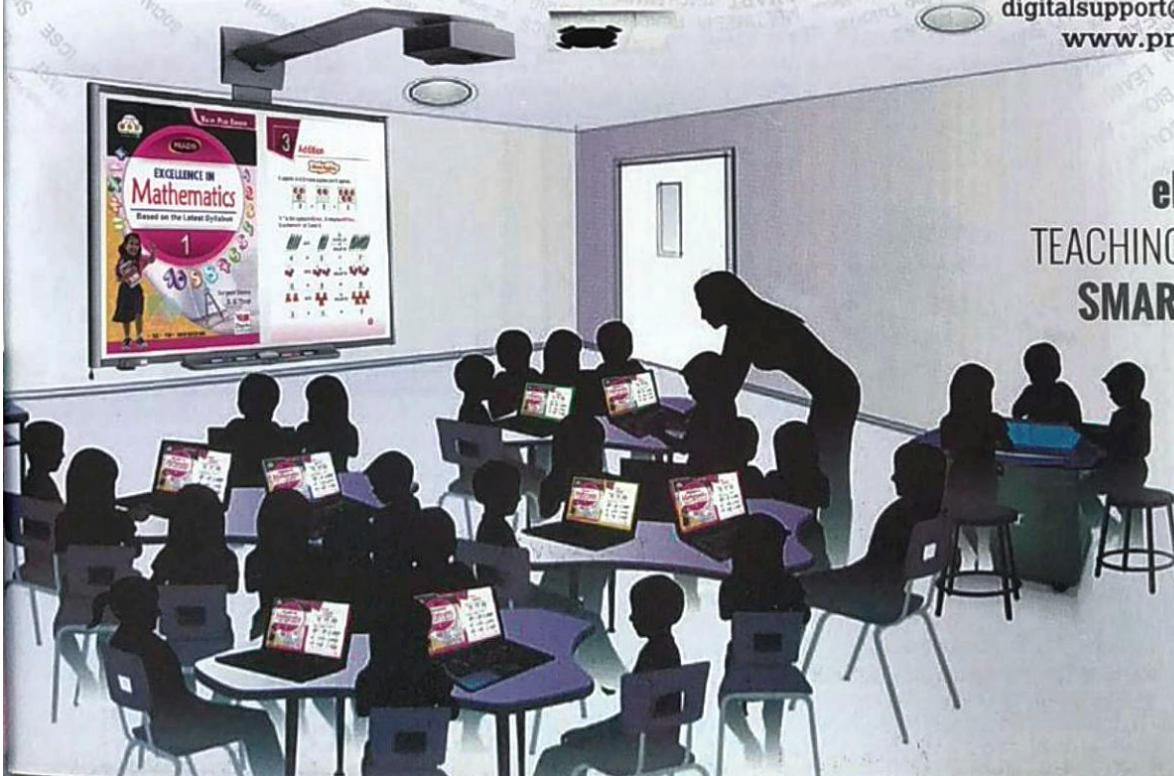
**GET YOUR
eBook
NOW**



Windows

9142-62-62-62

**digitalsupport@prachiindia.com
www.prachiindia.com**



**eBOOK BASED
TEACHING & LEARNING
SMART SOLUTIONS**

PRACHI

5

Science in Life Today

About the Series

- Based on the latest syllabus as per the **National Curriculum Framework 2005**.
- The whole content is divided into several units which are further sub-divided into chapters.
- Each chapter starts with **Lesson Objective**, a synopsis of the topics discussed.
- Simple and easy to understand content with colourful illustrations.
- **Words to Remember** and **Quick Recall** at the end of each chapter for better understanding of the learnt concept.
- The **Exercises** comprise a variety of questions in the form of True or False, Fill in the blanks, Correct the statements, Match the following columns, Answer the following questions, Think and Answer and Higher Order Thinking Skills (HOTS) type of questions to test the understanding of the students to the minutest detail.
- Experimental work is carried out under the heading **Activity**. It includes Classroom Project, Project at Home, Group Project, Field Project and Classroom Presentation.
- **Wordsearch** and **Unscramble** the jumbled words to develop observational, logical and analytical skills.
- A set of four **Model Test Papers** and two **Sample Test Papers** for continuous evaluation of the learners.

INFO HUB : An additional reading section after each unit comprises interesting information with colourful illustrations under the headings **Curiosity Corner**, **Fun with Science**, **Amazing Science Fact** and **Photo Speaks**. The column **Green Gallery** will encourage the young learners to practice eco-friendly activities in their day-to-day life.



Prachi [India] Pvt. Ltd.

SMART BOOKS FOR SMART LEARNING

address 309, ALLIED HOUSE, INDER LOK
DELHI-110 035

phone +91 11 47320666 (8 lines)

fax +91 11 43852438

+91 11 47320680

website www.prachiindia.com

email info@prachiindia.com

₹ 320.00

ISBN 978-81-89932-78-7

