Teacher Manual

Primary Science-5

1. Reproduction in Plants

EXERCISES

A. Choose the correct option:

1. (b) Fern 2. (d) Rose
3. (d) rhizome 4. (d) Bryophyllum
5. (c) Kerala 6. (b) seed leaves

B. Tick (✓) the correct words given in the brackets:

1. Ferns and mosses are non-flowering plants.
2. The shoot grows towards the light .
3. Pea is a dicot plant.
4. Seeds dispersed by wind are very light .
5. Rabi crops are grown in winter .
6. Crop Rotation is a useful practice.

C. Write two examples of each of the seeds dispersed by the following agents:

1. (i) Cotton (ii) Madar
2. (i) Lotus Fruit (ii) Coconut
3. (i) Blackbery (ii) Apple
4. (i) Pea (ii) Lady's finger

D. Answer these questions:

1. Reproduction is the process by which an adult organism gives birth to young ones of its own kind. Animals reproduce by giving birth to young ones of their own kind. Other animals give birth by laying eggs.

   The various ways of reproduction in plants is as follows:

   1. Seeds : Most plants reproduce new plants through seeds.

   2. Stem Cutting : Rose, Sugarcane and Money Plant grow from pieces of stems. A stem is cut into pieces which are put into soil. They grow into new plants.

   3. Grafting : A part of plant is attached to another plant called stock. Stock provides root system of new plant. The attached part becomes shoot of a grafted plant. It provides flowers and fruits.

   4. Layering : A new plant is grown by placing a layer of soil on a part of parent plant. The part under soil gives rise to roots. Then branch is cut off and planted separately which grows into a new plant.

   5. Roots : Potato, Beetroot and Dahlia grow from roots of parent plant.

   6. Stem: Potato, Ginger and Onion grow from underground stem of parent plant. They have eyes on them.

2. Two ways in which animals reproduce are:

   (a) Some animals reproduce by giving birth to the young ones of their own kind. The animals that give birth to young ones and suckle their young ones with their milk are called Mammals or Viviparous Animals.

   (b) Other animals give birth by laying eggs. The animals that lay eggs are called egg lying or Oviparous animals.

2. The main parts of a seed are as follows:

   1. Seed Coat : It is a covering of seed.
   2. Embryo : It is a baby plant in seed. The embryo derives nutrition from cotyledons as long as seed does not develop leaves. Shoot grows upwards from seed. Root grows downwards into soil.
   3. Cotyledons : The thick yellow fleshy parts are called seed leaves or cotyledons. They supply food to baby plant. Peas, Grams and Beans have two seed leaves. They are called Dicotyledons. Rice, Wheat, Maize and Mustard have one seed leaf. They are called Monocotyledons.

3. A seed needs air, water and warmth to germinate. Germination is a process in which embryo breaks open seed coat and develops roots and shoots. Air, water and warmth are necessary for germination. From seed, root develops downward into soil. Later, shoot develops upward towards sunlight. This stage is called Seeding. Seedling grows further into a new plant.

4. Seeds are scattered to different places from parent plant by some process. This is called Seed Dispersal.

   The main agents of dispersal of seeds are as follows:

   Wind : Some seeds are light, have wing-like structure or tuft of hair that make them float in air easily. Seeds of cotton,

hiptage, madar, etc. are dispersed by wind.

Animals : Some seeds have hair on them which allow them to attach to bodies of animals when they rub against plants. They drop them off when they move on. This way seeds get dispersed. Some seeds are buried in soil by animals like squirrels to hide them. Some birds eat fruits and throw away seeds thus dispersing them.

Explosion: Some seeds grow inside pods. When fruit ripens, pod explodes thus releasing seeds with force sending them to far-off places.

5. Most plants grow from seeds, but there are several plants that grow from different parts of plants like roots, leaves, stems. The process of growing new plants from different parts of plants is called Vegetative Propagation.

The different methods of vegetative propagation are as follows:

1. Stem Cutting: Rose, Sugarcane and Money Plant grow from pieces of stems. A stem is cut into pieces which are put into soil. They grow into new plants.

2. Grafting : A part of plant is attached to another plant called stock. Stock provides root system of new plant. The attached part becomes shoot of grafted plant. It provides flowers and fruits.

3. Layering : A new plant is grown by placing a layer of soil on a part of parent plant. The part under soil gives rise to roots. Then branch is cut off and planted separately which grows into a new plant.

4. Roots : Potato, Beetroot and Dahlia grow from roots of parent plant.

5. Stem: Potato, Ginger and Onion grow from underground stem of parent plant. They have eyes on them.

HOTS Questions

1. The seeds in our kitchen containers do not germinate because they do not get the right amount of warmth in the kitchen. Warmth is necessary apart from air, water, manure and soil.

2. Manure is better than fertilizers because fertilizers contain some chemical contents which are harmful to the soil.

Manure is nutrient rich organic matter which is used as organic fertilizer in agriculture. Manure is substances that are added nutrients to the soil. T he nutrients may be in the form of animal waste, plant waste, etc. Manure also helps to hold moisture in soil and enhances micro-organism activity.

Activity Time

Do it yourself.

2. Animal World

EXERCISES

A. Fill in the blanks:

1. Amphibians breathe through lungs and gills.
2. Animals like Chameleon have ability to merge to the surroundings.
3. A tortoise has shell all over its body.
4. Mammals breathe through their lungs.
5. Insects and worms are invertebrates.

B. Give one word answer:

1. Habitat
2. Shell
3. Hibernation
4. Migration
5. Vertebrate
6. Adaptation

C. Give two examples of each:

1. (i) Elephants (ii) Lions
2. (i) Fish (ii) Whale
3. (i) Turtle (ii) Crocodile
4. (i) Scorpions (ii) Spider
5. (i) Birds (ii) Fish
6. (i) Snakes (ii) Crocodiles
7. (i) Lizard (ii) Frog
8. (i) Chameleon (ii) Seahorse

D. Answer the following questions:

1. A habitat is the natural surroundings of an organism where it lives most of the time. Different animals live in different habitats. A habitat provides to an animal food, water, shelter and companions.
2. The different types of habitats are as follows:
   1. Different body coverings.
   2. Different organs for breathing
   3. Different feeding habits
   4. Different ways of movements.
   5. Different ways of defence.
3. The different body coverings of animals are as follows:

   1. Scales : Reptiles like crocodiles, snakes and lizards have scales on their body. Scale protects body while crawling on ground and helps retain water. Process of shedding old with new skin is called Moulting. Fish also have bodies covered with scales.

   2. Feathers : Body of a bird is covered

with feathers. Feathers are of 2 types: Down Feathers and Flight Feathers. Down feathers are on the under belly of the bird. They are fluffy and soft and keep bird warm. Flight feathers are found on wings and tail. They help them to fly.

3. Shell: Shells are hard covering bodies of some animals and insect. A shell protects soft bodies of animals like Turtle, Tortoise and Snail from any injury and being preyed upon.
4. Fur/Wool/Hair: Animals like Bear, Yak and Sheep have fur on their body. The fur keeps them warm.
4. Animals are adapted to move in different ways as follows:
    1. Terrestrial: Terrestrial animals live on land. They have well developed legs to walk, run, hop and jump. Snake has scales to crawl on ground. Camel has long legs to be safe from heat. It has hoof to walk on loose sand. It can live without water for many days.
    2. Aquatic : Aquatic animals live in water. Fish have fins to swim. Turtles and Whales have paddle-like flippers to move forward.
    3. Amphibians: Animals that live both on land and in water are Amphibians. Frogs have limbs with webbed feet to swim. Then breathe through lungs when on land and through the moist skin when in water.
    4. Arial: Arial animals spend most of their time in air. They have wings to fly. Most birds and insects can fly. Birds have streamlined bodies to cut through air while flying. They have hollow bones making bodies light for flight. They have feathers to assist in flying. Bats are the only mammals that can fly.
    5. Arboreal : Arboreal Animals live on trees. Examples: Monkey, Squirrel and Opossum. They have tails to climb and jump from tree to tree.
5. The difference between insects and mammals is as follows:

    1. Mammals : Mammals breathe through their lungs. The lungs have blood vessels which help in absorbing oxygen from the inhaled air. Exchange of gases takes place. The oxygen is taken by blood from air and passes to various parts of body. Carbon dioxide and water vapour are exhaled.

    2. Insects : Insects have six legs to move, crawl, walk and hop. Their wings have no bones, feathers or strong muscles. They are thin, delicate and are made up of tiny scales. Examples: Ants, cockroaches, grasshoppers, etc.

6. The difference between herbivore and carnivore is as follows:

    Herbivores : Herbivores Animals eat only plants. They have broad and flat teeth to chew and grind plant parts. Cow, deer, goat, etc. are herbivores. Giraffes have long necks to chew off leaves from tall trees.

    Carnivores : Carnivores Animals eat flesh of other animals. They have sharp and pointed canines to tear off flesh. They have strong and broad teeth to chew and grind flesh. Eagle, Vulture and Kite are carnivorous birds. They have sharp, hooked beaks to hold and tear the flesh.

HOTS Questions

A. Reason: A Bat is a mammal. It's not a bird. In fact bats are the only mammals that can truly fly.

B. Reason: Dolphin and monkey are similar because both belong to the mammal family. Both are smart, intelligent and creative. Though different in their appearance, they will always be known as mammals.

C. Reason: Our canine tooth is different from cow. It is longer, pointed tooth located in either side of incisors. The molars are a fewer in number than other animals. It is because much work is one by teeth in the front of mouth.

Activity Time

Do it yourself.

3. Interdependence in Living Being – Plants and Animals

EXERCISES

A. Answer the following questions:

1. Plants dependent on the non-living components of the environment as follows:
    1. Plants get carbon dioxide from the air and release oxygen in the air.
    2. Plants obtain water and nutrients from the soil.
    3. When plants die, they get mixed with the soil as nutrients.
2. Animals cannot make their own food. They move from one place to another in search of

food. Animals are dependent on the non-living components of the environment as follows:

1. Animals need water to survive.
2. They breathe in oxygen from air and breathe out carbon dioxide.

3. Micro-organisms are very small organisms present in environment. We cannot see them with naked eyes. Most micro-organisms depend on dead plants and animals to get their food. They feed on dead organisms and release nutrients from them into the soil. Plants use these nutrients from soil for their growth.
4. Plants are eaten by animals. Animals are then eaten by other animals. This forms a food chain. For example – grass is eaten by a grasshopper. The grasshopper is eaten by a frog. The frog is eaten by a snake. And the snake is eaten by a hawk.
5. All living organisms are dependent on one another for food. This interaction for food leads to food chains in environment. Balance in nature is upset by presence of new animals or absence of some animals. It leads to the death of other animals and plants. For instance, a decrease in population of carnivores will cause increase in population of herbivores. It is because herbivores will not be hunted for food any more. Then herbivores will eat all plants in that area. The herbivores will also die due to absence of food. So, to maintain balance in nature, all plants and animals are important.

B. Tick (✓) the correct option:

1. (d) Micro-organism
2. (d) Light
3. (d) All
4. (a) Man

C. Fill up the blanks:

1. Plants provide animals with food, shelter and protection.
2. Our environment is made up of living and non-living components.
3. Plants make their own food by the process of photosynthesis.
4. We cannot see micro-organisms with naked eyes.
5. The animals that eat dead plants and animals are called scavengers.

D. Write true or false:

1. [True] 2. [True] 3. [True]
4. [False] 5. [False]

E. Match the following:

Column A		Column B
1. Very small organisms	(e)	micro-organisms
2. Herbivores	(d)	cow, giraffe
3. Carnivores	(b)	hawk, crocodile
4. Scavengers	(c)	vulture, termite
5. Decomposers	(a)	fungi, bacteria

HOTS Questions

1. Do it yourself.
2. Kaziranga National Park, Assam.

Activity Time

Do it yourself.

4. Food, Health and Hygiene

EXERCISES

A. Tick (✓) the correct option:

1. (c) disease 2. (c) ghee
3. (c) Vitamins 4. (b) Cholera
5. (a) Goitre 6. (a) Exercise

B. State whether the following statements are true or false.

1. [False] 2. [True] 3. [False]
4. [True] 5. [True]

C. Fill in the blanks.

1. The term 'health' refers to the state of complete physical and mental well-being.
2. Food contains nutrients which are the building materials of our body.
3. Vitamins and fruits and vegetables are protective components.
4. Exercises make our muscles and bones strong and flexible.
5. Washing hands with soap and water removes dirt and germs present on your hands.

D. Give one word answer for each of the following:

1. Anaemia
2. Scurvy
3. Weak bones Phosphorus.
4. Goitre
5. Rickets

E. Answer the following questions:

1. Food rich in carbohydrates give us energy. Therefore, carbohydrates are called energy-giving components of food.

   Carbohydrates contain high amount of sugar which gives energy. Food containing carbohydrates are: Bread, Rice, Noodles,

potato and Oats. People doing physical activity should eat these items.

2. 70% of our body weight is water. Water is vital for our survival. Water is essential for our body for the following reasons:
   1. Water helps in digestion of food.
   2. Water acts as a medium for many processes that occur in body.
   3. Water helps in removable of wastes from body in the form of urine and sweat.
   4. Water maintains body temperature.
   5. Water helps to keep our body hydrated.
3. Food contains nutrients which are building materials of our body and provide us energy for growth and other activities. A balanced diet contains carbohydrates, fats, proteins, vitamins and minerals. We must eat a balanced diet that is rich in all these nutrients to live healthy. Apart from these, we should drink plenty of water daily. We should also take roughage as a part of food intake.
4. The steps to prevent occurrence of communicable diseases are as follows:
   1. The house should be clean, well-ventilated and free of mosquitoes.
   2. Water should be boiled and kept covered. Food should also be kept covered.
   3. Water in villages should be chlorinated.
   4. We should drink pasteurized milk.
   5. We should not use items used by a person suffering from a communicable disease.
   6. Always wash hands with soap before and after meal.
5. A healthy diet contains all nutrients which are building materials of our body and provide us enough energy for our growth and other activities. A healthy diet contains carbohydrates, fats, proteins, vitamins and minerals. We must eat a healthy and balanced diet that is rich in all these nutrients to live healthy. A healthy diet protects us from many diseases.
6. The communicable diseases spread in the following ways:
   1. Food: Flies sit on food and transfer germs to food which infect a healthy person on eating it.
   2. Water : Unclean water also causes spread of diseases. Cholera, Typhoid and Jaundice are diseases that spread in this manner.
   3. Air : When an infected person sneezes or coughs, germs are released into air. A healthy person can get infected by these germs. Common cold, Influenza and Chickenpox spread in this manner.
   4. Animals & Insects: Some insects transmit disease-causing germs from a sick person to a healthy person. Malaria is spread by the bite of mosquitoes that carry disease-carrying germs. The bite of an infected dog spreads a disease called Rabies.

F. Do it yourself.

HOTS Questions

1. People living in the coastal areas do not suffer from Goitre because the seawater contains Iodine. Iodized salt prevents a person from getting the disease called goitre. People living in coastal areas inhale the water vapour containing Iodine and this is the reason why they don't suffer from Goitre. Also sea-foods are rich in Iodine.
2. Rickets is caused due to lack of Vitamin D, Calcium or phosphorus. Vitamin D deficiency can occur as a result of having dark skin and lack of exposure of skin to sunlight. Hence, exposure to sunlight reduces risk of rickets in babies because sunlight prevents deficiency of Vitamin D.

ACTIVITY

A. Find out the names of eight healthy food-items in the given grid.

1.	MILK	2.	FRUITS
3.	SUGAR	4.	EGGS
5.	VEGETABLS	6.	FISH
7.	PULSES	8.	NUTS

5. Bones, Muscles and Nerves

EXERCISES

A. Tick (✓) the correct option:

1. (b) Skeleton
2. (a) Cartilage
3. (b) Voluntary

B. Match the following:

	Column I		Column II
1.	Calcium	(a)	Jelly in bones
2.	Bone Marrow	(c)	Bones
3.	Nerves	(e)	carry messages
4.	Upper Jaw	(b)	Immovable joint

5. Medulla (d) Controls heartbeat

C. Fill in the blanks:

1. Skeleton is the framework of bones.
2. Skull is a bony box of thin bones that protects the brain.
3. The Spine is in the shape of 'S'.
4. Ligaments join bones to bones.
5. Cardiac muscles are not attached to any bone.

D. Give one-word answer:

1. Bones
2. Ligaments
3. Spine
4. Cardiac Muscle
5. Femur

E. Name the types of joint present in these body parts:

1. Neck : Pivot Joint
2. Wrist : Gliding Joint
3. Hip : Ball and Socket Joint
4. Elbow : Hinge Joint
5. Shoulder : Ball and Socket Joint
6. Knee : Hinge Joint
7. Fingers : Hinge Joint
8. Toes : Hinge Joint

F. Answer the following questions:

1. The functions of Skeleton System are as follows:

1. It gives shape to our body.
2. It enables us to stand upright.
3. It gives support to our body.
4. It protects inner parts of our body.
5. Bones help us to move about in different ways.
6. Muscles attached to bones help in various movements of body.
7. Backbone helps us in bending and stretching.
8. Ribcage protects organs like heart, lungs and stomach.
9. Lower jaw bone is movable and because of it we are able to speak and eat our food.
10. Red and white blood cells are produced by the Bone Marrow present in our bones.

2. The Human Skeleton is a structure of bones that gives shape and support to the body.

The different parts of a human skeleton are as follows:

1. Hinge Joints in Elbows and Knees.
2. Ball and Socket Joints in Shoulders and Hips.
3. Pivot Joint between Skull and Vertebrae.
4. Gliding Joints at Wrist and Ankles.
5. Ribcage at the back on Backbone and in front with Sternum except last 2 pairs.
6. Forelimbs joined to Shoulder Girdle with Ball and Socket Joint.
7. Hind-limbs joined to Hip Girdle with Ball and Socket Joint.
8. Femur (Thigh Bone) connecting Lower Bone at Knee.

3. The bones found in our Fore Limbs and Hind Limbs are as follows:

1. Fore Limbs: There are 27 bones in our hand and wrist.

The upper arm has a single bone called Humerus.

The lower arm has two bones: Radius and Ulna.

2. Hind Limbs: There are 26 bones in our Leg and Ankle.

The upper leg i.e. Femur is also known as Thigh Bone. It is the longest bone of our body.

The lower leg has two bones: Labia and Fibula. Both these bones are joined at knees like arm bones joined at elbow.

4. The different parts of Nervous System with their functions are as follows:

1. Brain : It receives messages from different parts of body, interprets and sends instructions via nerves about responses to be carried out. Brain has 3 parts:

Cerebrum : It is thinking centre, controlling working of sense organs and voice. Memories are stored here.

Cerebellum: It helps to balance our body and keeps it upright. It helps in working of muscles.

Medulla : Medulla Oblongata takes care of those actions not in our control like Lungs and Heart muscle movements. It remains active even in sleep.

2. Spinal Cord : It runs right across from neck till base of back. It connects nerves from other parts of body to brain.
3. Nerves : Nerves carry messages in different parts of body in the form of

impulses. Nerves are of 3 types:

Sensory : Sensory Nerves carry messages from sense organs to brain.

Motor : Motor Nerves carry orders from brain to different parts of body.

Mixed : Mixed Nerves carry messages to brain and also responses or instructions from brain.

Reflex Actions: Actions happening in split seconds are carried out as quick reactions to stimuli and do not involve Brain.

5. The different kinds of muscles in a human body are as follows:

Voluntary Muscles : Voluntary Muscles are under our control and can be moved according to our will. They are also known as stripped or striated muscles as they have stripes or bands on them. These muscles are present in arms, legs, hands, feet, etc.

Involuntary Muscles : Involuntary Muscles are not under our control and cannot be moved according to our will. They work automatically. They do not have any bands or stripes on them. These muscles help in the movement of food from stomach to intestines.

Cardiac Muscles : Heart muscles are known as Cardiac Muscles. These muscles are not attached to any bone. They are branches and have stripes on them. They work throughout our life-time and never get tired due to their strength.

HOTS Questions

Voluntary Muscles are called skeletal muscles because we can control these types of muscles. We can voluntarily choose to move them. These muscles are attached to bones, move the skeleton and are found in the arms, legs, neck or anywhere we can voluntarily move a body part. These muscles produce strong contractions. Skeletal muscles are made up of voluntary muscles usually attached to the skeleton. Skeletal Muscles move the body. Voluntary Muscles are under our control and can be moved according to our will. They are also known as stripped or striated muscles as they have stripes or bands on them. These muscles are present in arms, legs, hands, feet, etc.

Activity Time

Do it yourself.

6. Rocks and Minerals

EXERCISES

A. Tick (✓) the correct option:

1. (a) different 2. (b) energy
3. (a) Igneous 4. (a) Sandstone
5. (b) non-metallic
6. (a) Sedimentary Rocks

B. Fill in the blanks:

1. Sedimentary Rocks are formed from sediments.
2. The action of the wind, water and dead remains of plants and animals affects the formation of rocks.
3. Non-metallic minerals may contain plant and animal matter.
4. Coal and petroleum are fossil fuels.
5. Igneous Rock is formed when magma cools under the ground.

C. Give one word answer:

1. Igneous Rock 2. Igneous Rock
3. Disintegration 4. Alloy
5. Pumice

D. Give two examples of each:

1. (i) Granite (ii) Pumice
2. (i) Sandstone (ii) Limestone
3. (i) Marble (ii) Quartzite
4. (i) Copper (ii) Gold
5. (i) Coal (ii) Mica
6. (i) Petroleum (ii) Kerosene

E. Answer the following questions:

1. Rocks are made up of minerals. A mineral is a natural non-living substance. The Earth's crust is a hub of minerals. When these minerals combine together, they form rocks. Rocks are found everywhere on the Earth. They are found in molten state inside the core of Earth, under seas and oceans.
2. The three types of rocks on Earth are as follows:
   1. Igneous Rocks : Granite, Pumice, Basalt, Obsidian
   2. Sedimentary Rocks : Sandstone, Conglomerate, Limestone, Sale.
   3. Metamorphic Rocks : Marble, Slate, Gneiss, Quartzite
3. Metamorphism is a process in which there is gradual change in the form of a rock. Metamorphic Rocks were earlier Igneous or Sedimentary. They changed due to high

pressure and heat. Minerals of existing rock break down into smaller pieces or flatten. Metamorphic Rocks of following types:

1. Slate: Slate comes in different shades of grey. It is composed of Clay, Mica, etc. minerals. It can be broken into thin layers and used for slates to write on blackboards and cement. It is used for roofing materials.
2. Marble : Marble is called Limestone in sedimentary form. Due to heat and pressure, limestone changes into marble and is used for construction, floorings, artefacts and statues. Taj Mahal is one example.
3. Quartzite: Sandstone undergoes metamorphism to form Quartzite. It contains Iron, Quartz and Silica. It is hard and is not easily broken. It is used as flooring material and staircases. Glass and Ceramic industries used them for artefacts.

4. Three minerals are as follows:
   1. Metallic : Metallic Minerals give us metals. Iron, Gold, Silver, Copper and Aluminium are some metals which are used in various ways. Some minerals are found in the form of crystals. They are known as gems. Diamond, Ruby, Sapphire and Emerald are some beautiful gems which are used in making jewellery.
   2. Non-Metallic: Non-Metallic minerals give us non-metals. Non-metals can be in all states of matter like solid, liquid and gas. Coal, Petroleum, Mica, Silicon and Quartz are non-metallic minerals. Coal is used for producing electricity in power stations. It is also used as fuel in household fires. Coal is used to make drugs, plastics, fertilizers and cosmetics.
   3. Fossil Fuels : Petroleum and Coal are the fossil fuels which are formed by remains of dead plants and animals that were buried under Earth's surface millions of years ago. These fuels are dug out of Earth from deep underground mines and wells.

      Coal is used for producing electricity in power stations. It is also used as fuel in household fires. Coal is used to make drugs, plastics, fertilizers and cosmetics. We use LPG a cooking gas.

5. The difference between Sedimentary Rocks and Igneous Rocks is as follows:

   Sedimentary Rocks: Natural forces like Sun, Water, Wind break rocks into smaller pieces called Sediments. When these sediments get deposited in layers and hardened under Earth's surface, Sedimentary Rocks are formed. Upper layer compresses lower layers and over millions of years, they turn into Sedimentary Rocks. Sometimes, dead plants or animals get trapped between sediments and leave an impression on rocks. These dead remains are called fossils. Sedimentary Rocks are:

   Shale: It is a soft rock that smells like wet mud. Shale is gray, red, brown or black found on bed of water-bodies.

   Sandstone: It is made up of sand grains. It mostly contains quartz. Sandstones are white, red, pink, brown or yellow. It is used as a building stone. Examples: Qutub Minar and Hawa Mahal.

   Conglomerate: These are semi-rounded rock fragments. It is grey or orange and is used for decoration purposes.

   Limestone: It is made up of Calcite. Shells of many sea animals deposit on sea-bed after death. It varies from brown to dark or light grey. Example: Chalk.

   Igneous Rocks: The substances at core of earth are in molten states. Molten rock present inside earth is called Magma. Magma flows on surface as Lava. When Lava cools down and hardens, it forms Igneous Rock. These are of 3 types:

   Granite: It is formed on cooling of Magma. Minerals found in granite are Mica, Feldspar and Quartz. Colour varies from grey to pink. Granite is used for buildings, interiors of kitchens, floorings, etc.

   Pumice: It is grey or cream in colour. When Lava cools, Pores are formed in lava and it gives rise to Pumice. Pumice is light in weight and used for toothpaste.

   Obsidian: It is dark or black rock, smooth and glassy, formed due to rapid cooling of lava. It has sharp edges. Obsidian is called Volcanic Glass too.

6. Three R's stand for Recycle, Reduce and

Reuse.

Recycle : Recycle is a process of reusing waste materials for new use. Example: Fruits and vegetable peels, pencil shavings, etc.

Reuse : Re-use is the process of using something again for another purpose. This helps to minimize wastes and control pollution. Example: Empty glass bottles can be used to store pickles, pulses, etc.

Reduce : Reduce means to bring down production of wastes. This is possible by using resources and minimizing use of non-renewable resources. Example: Take cloth bag for shopping instead of plastic.

HOTS Questions

Write suitable reasons for the following:

A. Reason: When Lava cools, pores are formed in lava and it gives rise to Pumice. By rapid cooling, pores become permanent. Pumice is light in weight and is used for toothpaste. Pumice Rock is grey or cream in colour.

B. Reason: Since diamond is found only in very little quantity in a few parts of the world. It is not found in good quantity as copper and silver. Therefore, its less availability makes it more expensive.

C. Reason: Fuels such as Liquid Oxygen and Liquid Hydrogen are used in launching rockets because these fuels are light in weight and gives maximum result.

Activity Time

Do it yourself.

7. Soil Erosion and Conservation

EXERCISES

A. Tick (✓) the correct option:

1. (b) soil erosion
2. (d) deforestation
3. (a) planting trees

B. Fill up the blanks:

1. When land becomes infertile, it cannot support any form of life.
2. Embankments are built along river banks to prevent soil erosion.
3. Insects and rat are animals that live in the soil.
4. Soil is the topmost layer of the Earth.
5. Wind blows away the top layer of the soil.

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

1. [False] 2. [True] 3. [True] 4. [False] 5. [True] 6. [False] 7. [True] 8. [True]

D. Answer the following questions:

1. When there is a strong wind or heavy rainfall, top layer of soil gets washed away. This process in which toper layer of soil gets washed away is called Soil Erosion. It results in loss of nutrients thus affecting growth of plants in soil.

   Soil erosion is of following types:

   1. Sheet Erosion is when water removes even layers of soil.
   2. Rill Erosion is when water makes channels that are approx. 30 cm deep. Sheet and Rill erosions occur on sloping land.
   3. Gully Erosion is when water makes a deep groove as it washes away soil. Each time it rains, grooves get deeper.
   4. Mass movement when erosion removes a lot of soil and rocks; it can destroy even houses including landslides.
   5. Wind Erosion is when wind removes topsoil as in desert.

2. The agents of soil erosion are as follows:

   1. Water : Water flows on land with great force and washes away top soil. Erosion is much severe in hill areas. Mud is carried with it and reaches plains. Over a period of time, mud settles and makes river change its course. Hwang Ho of China and Kosi of Bihar in India frequently change their course. They cause great loss of life and property in nearby areas.
   2. Wind : In areas of less vegetation, soil is exposed to wind. Wind carries away top soil and thus removes the top fertile soil.
   3. Human: Hazardous human activities like deforestation have removed forest cover to a great extent. Over-grazing of animals is another problem which exposes top soil to wind and water.

3. Soil conservation is protection of soil and its prevention against erosion. Soil is important as a natural resource for sustaining life on Earth. Hence, it is the responsibility of mankind to preserve soil and avoid losing it.

   We can conserve the soil by the following:

   1. Not leaving land or fields bare. Wind

and water blow away topsoil on barren lands. We should plant creepers and climbers after crop is harvested.

2. Plant trees in a row as it acts as barriers to wind and water. It slows down their force and prevents removal of top soil.
3. Practicing Terrace Farming on hills.
4. Allowing cattle to graze on different parts of land so that plants may get time to re-grow and cover the exposed soil.
5. Build embankments along river banks. It controls flow of water in river. This also prevents soil erosion.

4. Soil can be conserved in the following ways:
   1. Not leaving land or fields bare. Wind and water blow away topsoil on barren lands. We should plant creepers and climbers after crop is harvested.
   2. Plant trees in a row as it acts as barriers to wind and water. It slows down their force and prevents removal of top soil.
   3. Practicing Terrace Farming on hills.
   4. Allowing cattle to graze on different parts of land so that plants may get time to re-grow and cover the exposed soil.
   5. Build embankments along river banks. It controls flow of water in river. This also prevents soil erosion.
5. The difference between Afforestation and Deforestation is as follows:

   Afforestation: Afforestation is growing trees on barren lands or land with lesser trees. We should plant trees in large numbers and it helps to conserve soil. Roots of plants hold soil together. It provides habitat to several animals and microbes. It enables seeping in of water into soil to maintain water-table.

   Deforestation: Deforestation is cutting of trees in large numbers. When trees are cut down, the soil becomes loose and gets blown away by wind or washed away by rain.
6. Soil is a valuable natural resource for sustaining life on Earth. Soil is a home to small animals like ant, mole, rats, earthworms and rabbits, etc. Mineral and ores are obtained from rocks which lie under soil. Plants grow in soil. The soil supports and holds plants. Soil also has essential nutrients that plants need for their growth. All living things depend on plants directly or indirectly. Therefore, soil is basis of all forms of life on Earth.
7. Soil is formed when rocks are broken down by natural forces like heat of sun, rain, water, wind and lightning. The actions of these forces break rocks into smaller sizes. Small rocks also get rubbed against one another and degrade further. Dead remains of plants and animals degrade and mix with smaller pieces of rocks. Smaller pieces are further broken own until they form particles called soil. Soil is following types:

   Sandy - Big particles, A lot of space for air, does not hold water.

   Clayey - Fine particles, no air space, can hold water.

   Loamy - Mixture humus, can hold water.

HOTS Questions

Do it yourself.

Activity Time

Do it yourself.

8. Solids, Liquids and Gases

EXERCISES

A. Tick (✓) the correct option:

1. (a) melting of butter
2. (b) Chemical change
3. (b) Sugar

B. Match each word with its description:

Column A		Column B
1. Molecule	(e)	smallest unit of a substance
2. Matter	(f)	anything that takes up space and has weight.
3. Miscible in water	(d)	sugar
4. Gas	(c)	attraction between molecules is the least.
5. Liquid	(a)	has no definite shape, but a definite volume.
6. Solid	(b)	has a definite shape and volume.

C. Answer the following:

1. Anything that occupies space and has weight is called matter. Everything around us is matter.

   Matter is found in 3 forms as follows:

   1. Solid - Iron
   2. Liquid - Water
   3. Gas - Oxygen

2. A Molecule is the smallest particle of a

substance that possesses all properties of that substance. For example, a salt molecule is the smallest particle of salt. Each salt molecule has properties of salt. Molecules are always in a state of motion. They never stop moving.

3. A molecule is made up of atoms that are held together by chemical bonds. These bonds form as a result of the sharing or exchange of electron among atoms.
4. In a solid, the particles are packed very close to one another. Solids have definite shape, size and volume. There is a strong force of attraction between molecules. So, molecules are packed very close to one another. They may be hard like stone, table, chair, iron. They may be soft like paper, powder, cloth, etc. They do not flow. They cannot be compressed. Examples: Ice cubes, Book.
5. There is no fixed shape and size of liquids, but have a definite volume. They take shape of container into which they are pored. Molecules are not packed very close to one another as they have less force of attraction between them. It results in free movement of molecules in liquid. Because of this, liquids flow easily. They have fixed volume that can be measured. Water, petrol, soft drink and milk are liquids that flow.
6. Two differences between liquids and gases are:

   Liquids : (1) Molecules are not packed very close to one another. They flow.

   (2) Liquids do not have definite shape and size, but have a definite volume.

   Solids : (1) Molecules are packed very close to one another. They do not flow and cannot be compressed.

   (2) Solids have definite shape, size and a definite volume.
7. Liquids that completely dissolve in water are called Miscible Liquids. Example: Milk completely dissolves in water. Alcohol is also miscible in water.
8. A physical change is a temporary kind. A physical change is mostly reversible. It is reversible. No new substance is formed.

   Examples of physical changes are:

   (a) Water changes into ice on cooling.
   Ice changes into water on heating.

   (b) Water changes into water vapour.
   Water vapour changes into water on cooling.

   (c) Solid wax changes into liquid wax.
   Liquid wax changes into solid wax on cooling.

HOTS Questions

A. Evaporation and condensation help in the occurrence of rain as follows:

Evaporation : When sun heats up water, it changes into vapour. Process in which water changes to water vapour on heating is called Evaporation. Process of evaporation is affected moisture, air and temperature.

Condensation : When water vapour is cooled, it forms droplets of water. Process in which water vapour changes to water on cooling, it is called Condensation. When water condenses, it forms clouds. Clouds fall as rain. Water also exists in other forms like snow, dew, fog and frost.

Activity Time

A. Do it yourself. B. Do it yourself.

9. Force, Energy and Machines

EXERCISES

A. Write and tick (✓) the correct option:

1. (a) Inclined 2. (a) Hammer
3. (b) Pulley 4. (a) Electrical
5. (a) Force 6. (a) Friction

B. Fill in the blanks:

1. The pull or push on an object change the direction of an object.
2. Friction produces heat.
3. Force can make a stationary object move.
4. A spring returns to its natural length because of elastic force.
5. Simple Machines change the direction of an object.
6. In a First Class Lever, the Fulcrum is in the centre.

B. Give one word answer:

1. Force 2. Frictional Force
3. Gravitational Force
4. Fulcrum 5. Energy
6. Simple Machines

D. Give two examples of each:

1. (i) Frictional Force
   (ii) Gravitational Force
2. (i) Solar Energy
   (ii) Electrical Energy
3. (i) Scissors
   (ii) See-saw bar

4. (i) Nut Cracker
   (ii) Tongs
5. (i) Scissors
   (ii) Staplers
6. Wheel and Axle:
   (i) Car
   (ii) Bicycles
7. (i) Knife
   (ii) Shovel, Axe
8. (i) A Jar Lid
   (ii) A Bolt, Bottle Cap
9. (i) Fixed Axle Pulley
   (ii) Moveable Pulley
10. (i) Ramps
    (ii) Sloping roads, Hills

E. Answer the following questions:

1. A push or a pull action which changes or tries to change the state of motion of a body when acting on it is called Force.

   The change caused in an object due to force exerted on it is known as the effect of force.

   A force can do the following effects:

   1) A force can make an object start moving.

   Example: When we push or pull the door, it opens or closes.

   2) Example: A ball stops moving after sometime due to frictional force.

   3) A force can stop a moving object.

   4) A force can make a moving object go faster or slower.

   Example: When a person is pushing a car, it will start moving, but if two persons will push the same car, it will move faster.

   5) A force can change the direction of a moving object.

   Example: When a batsman hits the cricket ball, the direction of ball changes.

   6) A force can change the shape of an object or even break it.

   Example: When we hit hard upon a utensil, it will either break or its shape will be changed.

2. The two main categories of force are as follows:

   1. Contact Forces: When objects touch each other, a force happens between them. It is known as Contact Force. There are 4 types of Contact Force as under:
      1. Muscular Force
      2. Elastic Force
      3. Buoyant Force
      4. Frictional Force
   2. Field Forces: When two objects interact without touching each other, a force happens which is called Field Force. This force can create a push or pull even at a long distance. There are 3 types of Field Force as under:
      1. Gravitational Force
      2. Magnetic Force
      3. Electrostatic Force

3. Frictional Force is opposing force. If 2 objects are moving and touch each other, one object exerts a certain force that opposes motion of another. This slows down motion of moving body.

   Friction is necessary when we walk or stand on ground. If there is no frictional force, we can't walk or stand on the ground easily.

   We are able to write or hold due to frictional force.

   Friction between shoe soles and the ground prevent slipping while walking.

4. Two advantages of friction are:

   1. We are able to walk or stand on ground. If there is no frictional force, we can't walk or stand on the ground easily.

   2. We are able to write or hold due to frictional force.

   Two disadvantages of friction are:

   1. It slows down the speed of movement of an object. We have exert extra pressure.

   2. It produces heat.

5. A tiny bit of Sun's energy falls onto earth. On Earth some of Solar Energy is changed by photosynthesis into chemical energy stored in carbohydrate molecules in plant cells. Inside the muscle cells of human, the chemical energy is transformed into mechanical work and heat.

6. There are three types of levers are as follows:

   1) 1st Class Lever: In this, Fulcrum is located between Load and Effort.

   Examples: Crowbar, a pair of scissors, See-saw.

   2) 2nd Class Lever: In this Load is located between Fulcrum and Effort.

   Examples: Wheelbarrow, Nutcracker, Bottle Opener.

   3) 3rd Class Lever: In this Effort is

located between Fulcrum and Load.

Examples: A pair of Tongs, Tweezer, Stapler, Fishing Rod.

7. Machines are useful to us in the following ways:
   1. They help us to do our work easier.
   2. They help us to do our work faster.
   3. They help us to do our work with less effort.

Some machines are:

Lever : It is used for to lift heavy weights or loosen light objects. Example: A long rod or stick and spoon.

Pulley : Pulley is used to lift things. Wells have Pulleys to draw water.

Screw : Screw holds two things together.

Wedge : Wedge is a surface with a sharp and a blunt Edge. It looks like 2 inclined planes attached back to back. It is used to cut objects.

Scissors : It is used for cutting things.

Stapler : It is used for stitching papers together.

Plaas : It is used for cutting wires and pulling things.

Petchcus : It is used for tightening and un-tightening keels.

Nut Cracker: It is used for cracking and breaking the nuts.

Inclined Plane: It is a Slanting platform or Ramp. Heavy objects are pushed over it or made to roll down. It makes lifting easier.

HOTS Questions

Write suitable reasons for the following:

A. Reason: It is difficult to walk on an oily floor because the oily floor is a smooth plane and does not offer much frictional force. In order to walk, we need to have a surface that offers a very good deal of frictional force. In case of less frictional force, we might slip.

B. Reason: Reading a book is not considered as a work because almost all the body parts remain in a standstill position. Only eyes and brain are at work and require almost nil physical movement. That's why reading a book is not considered as a work.

Activity Time

Do it yourself.

EXERCISES

A. Tick (✓) the correct option:

1. (b) atmosphere 2. (b) five
3. (a) all 4. (a) stops
5. (a) pollution 6. (a) space

B. Fill in the blanks:

1. Air is made up of gases, some water vapour and dust particles.
2. Most of the weather changes takes place in Troposphere layer.
3. Nearly three-fourth of the air is Nitrogen gas.
4. Common Salt can be removed from water by the process of Evaporation.
5. Rain water is the purest form of water.

C. Give two examples of each:

1. (i) Nitrogen (ii) Oxygen
2. (i) Troposphere (ii) Stratosphere
3. (i) Dust particles
   (ii) Poisonous gases from factories and industries
4. (i) Air occupies space.
   (ii) Air has weight.
5. (i) Mud (ii) Oil

D. Answer the following questions:

1. The different layers of atmosphere are:
   1. Troposphere : This is 1st layer just above earth's surface. It is where we live in and aeroplanes fly. It consists of gases we breathe every day.
   2. Stratosphere : This is 2nd layer where Ozone gas is present. It absorbs harmful radiations from Sun. Jet planes also fly in this layer.
   3. Mesosphere : This is 3rd layer of atmosphere. It is coldest layer. Meteors burn up here on entering earth's surface. We see them as Shooting Stars.
   4. Thermosphere : This is 4th layer of atmosphere. Space shuttles and spacecrafts fly in this layer.
   5. Exosphere : This is 5th layer of atmosphere. It joins the outer space because of which molecules and atoms escape into space.
2. The properties of air are as follows:
   1. Air occupies space:
   - We take a glass and a bowl filled with water.

- Place glass on water surface. We feel an opposing force that does not allow glass to get immersed in water.
- This is because water has no space to go.
- When we see glass is empty, actually it is not empty as space is occupied by air gas.
- We tilt glass a little and immerse it in water. We see air bubbles coming out. This is air gas that is escaping from glass as water enters it.
- So, we can say air occupies space.

2. Air has Weight:
   - We take a long scale and two balloons of equal size and blow them. Tie each balloon on either side of scale with thread.
   - Holding scale, we see two balloons are at same level and scale is horizontal.
   - Now we pierce one balloon with a needle. Scale tilts towards that balloon which is intact.
   - Tilting shows balloon has air in it and makes its heavier.
   - So, we can say air has weight.
3. Air exerts pressure:
   - We take a glass filled with water.
   - Place a cardboard covering mouth of glass.
   - Place our palm on cardboard and turn glass upside down.
   - Slowly remove our hand from cardboard.
   - We see cardboard does not fall. Instead, it sticks to glass.
   - It is because air outside glass is exerting pressure on the surface of cardboard.
   - So, we can say air exerts pressure.

3. The uses of air pressure are as follows:
   1. Drink juice from a straw.
   2. Play with water gun during Holi.
   3. Give injection in doctor's syringe.
   4. Give medicine in dropper.
   5. Blow balloons.
   6. Fill tyres of bicycles, cars, buses and aircrafts.

4. Air Pollution is caused by vehicles and factories that emit harmful gases into air. It is also caused by burning of fuels like petrol, diesel, kerosene, coal, etc. Bursting crackers too pollute air. They all make air unhealthy. Air Pollution causes respiratory problems like asthma, lung cancer, etc., blood and heart diseases, irritation in eyes and skin; headaches, acid rain, depletion of ozone layer and global warming.

Some ways to control air pollution are as follows:

1. Plant more and more trees.
2. Use fuels like CNG in vehicles.
3. Use a bicycle, a public transport or walk whenever possible.
4. Factories should be away from residential areas.
5. Chimney of factories should have filter.

5. The difference between Sedimentation and Distillation is as follows:

   Sedimentation : Water is collected in large tanks. It is left undisturbed for a few days so that insoluble impurities may settle down. The heavier impurities settle at bottom. The tanks are also exposed to sunlight so that germs may be killed. Water is then passed onto another tank. The residue is left behind in the first tank.

   Distillation : Distillation is the process by which we get pure water from of all harmful germs. Distilled water is obtained by Distillation method. This method helps to separate both solute and solvent. Water is evaporated on heating and when it enters condensation, it cools down and changes into water. Distilled water is pure and free from impurities. Distilled water is also used in car batteries, science experiments and in medicines.

6. The different ways by which water can be purified are as follows:
   1. Boiling : It is the best and simplest way to get purified water. Boiling water for about 10 minutes kills the germs present in water. Boiling makes the water safe for drinking. Clean and covered containers can be used to store boiled water.
   2. Distillation: Distillation is the process by which we purify water from of all harmful germs. In this method, water is evaporated on heating and when it enters condensation, it cools down and changes into water. Distilled

water is pure and free from impurities.

HOTS Questions

Give Reasons of the following:

A. Reason: Each balloon has a limited capacity to contain the air inside it. If we over-fill the balloon, it will certainly not be able to contain the air any further and will finally burst.

B. Reason: The higher we go, lesser becomes the level of oxygen. In lower regions of mountains, the moisture level is less and oxygen content is more.

But as we go higher in the mountain region, the moisture level increases i.e. water content is more in the atmosphere and oxygen content becomes lesser.

This is the reason why the mountaineers carry oxygen cylinder when they climb high mountains.

C. Reason: The inflated balloon cannot fit into our bag because it has occupied more space. Air occupies space and as we keep on filling the balloon, it occupies more and more space. This is the reason why, an inflated balloon cannot fit into our bag.

Activity Time

Do it yourself.

11. The Earth, The Sun and The Moon

EXERCISES

A. Tick (✓) the correct option:

1. (a) atmosphere
2. (a) New Moon

B. Give one word for each of the following:

1. Core
2. Moon
3. Satellites
4. Apollo 11

C. Match the columns:

	Column A	Column B
1.	The largest planet	(c) Jupiter
2.	The sister planet of Earth	(d) Venus
3.	The planet with rings	(b) Saturn
4.	Red planet	(e) Mars
5.	The blue planet	(a) Earth

D. Answer the following questions:

1. The Sun is considered as ultimate source of energy because its energy is inexhaustible. Sun is a permanent source of energy.
2. The moon has uneven surface. The surface is grey. It has mountains and plans covered with rock dust. There are many big bow-shaped holes or craters on Moon. Moon has no atmosphere. Moon is extremely hot during day and extremely cold during night.
3. Moon has no air and water which are essential for existence of life. There is no life on because of absence of atmosphere. Moon is extremely hot during day and extremely cold during night.
4. The Sun is a huge ball of hot, burning gases. Its inner core consists of Hydrogen and Helium gases with traces of Nitrogen too. The outer layer mainly consists of Hydrogen gas. Sun also has a thin layer of atmosphere called Corona. Solar Energy is the most important source of energy for us.
5. Earth moves around Sun and Moon moves around Earth. During course of their movements sometimes, Moon comes between Earth and Sun and sometimes Earth comes between Moon and Sun. The object present in middle, blocks path of sunlight from reaching other object. Shadow of this object falls on other object and is known as an Eclipse. An Eclipse occurs when Sun, Moon and Earth happen to be in straight line. There are two types of eclipses: Solar Eclipse and Lunar Eclipse.
6. Three layers of Earth are the following:
   1. Crust : It is outermost covering of Earth. It is made up of solid rocks. It is thinnest of 3 layers of Earth. Its thickness varies from 6-11 km under oceans and stretches up to 70 km under mountain ranges. Granite and Basalt are main rocks in this layer. It has Water, Oil, Coal, Minerals, Oxygen, Silicon, Aluminium, Iron and Calcium.
   2. Mantle : It is second layer of Earth lying below Crust. It is about 2900 km deep. It consists of solid and molten rocks. It is largely made up of a rock called peridotile.
   3. Core : It is innermost layer of Earth. It lies in innermost of Earth. It is primarily made up of Iron and Nickel – the magnetic metals that give earth its magnetic field. Temperature increases as we travel towards interior of Earth.
7. A Lunar Eclipse occurs when Earth comes in between Sun and Moon. A Lunar Eclipse occurs on a Full Moon Night.

   A Lunar Eclipse is of 2 types as follows:

   1) Total Lunar Eclipse : It occurs when Moon is totally hidden by Earth.

2) Partial Lunar Eclipse : It occurs only when Moon is partially hidden by Earth.

8. A Solar Eclipse occurs when Moon comes in between Sun and Earth. Moon casts its shadow on Earth.

A Solar Eclipse is of 2 types as follows:

1) Total Solar Eclipse : It occurs when sun cannot be seen at all for a brief period of time.

2) Partial Solar Eclipse : It occurs only when a part of Sun can be seen for a brief period of time.

E. DO it yourself.

F. Unscramble the given words:

1.	Crater	2.	Satellite
3.	New Moon	4.	Solar Energy
5.	Lunar Eclipse	6.	Full Moon

HOTS Questions

Imagine you are an astronaut. List all the things you will need on a mission to the Moon.

An astronaut will need following things on a mission to Moon:

1.	Spacesuit	2.	Rocket or Spacecraft
3.	Oxygen	4.	Food (Dry)
5.	Water	6.	Pressurized bed

Activity Time

Do it yourself.

12. Light and Shadow

EXERCISES

A. Fill in the blanks:

1. Luminous objects give light to see the things.
2. Transparent objects do not form shadows.
3. Opaque materials blocks the light completely.
4. A shadow is longer during early mornings.
5. Lunar eclipse forms when the Earth comes in between the Sun and the Moon.

B. Give one-word answer:

1.	Sun	2.	Luminous
3.	Non-luminous	4.	Shadow
5.	Opaque	6.	Transparent
7.	Translucent		

C. Give two examples of each:

1.	(i)	Sun	(ii)	Bulb
2.	(i)	Table	(ii)	Chair
3.	(i)	Clean Glass	(ii)	Clean Water
4.	(i)	Coloured Glass	(ii)	Butter Paper
5.	(i)	Lunar Eclipse	(ii)	Solar Eclipse

D. Answer the following questions:

1. The differences between Luminous and Non-Luminous objects is as follows:

Luminous objects : The objects that give out light are called Luminous Objects. Examples: Sun, Bulb, Torch, Candle and Firefly.

Non-luminous objects : The objects that do not give out light are called Non-luminous objects. Examples:

2. The things required to form shadows are as follows:

1. An opaque object - to block the path of light.
2. A source of light - to reflect on the object.
3. A screen or surface - for a shadow to form on

Shadow is always formed on opposite side of light. A shadow always moves along with us. Length of shadow is different at different times of day. A shadow is longest in morning and evening. A shadow is shorter in afternoon and shortest at noon when sun is overhead.

3. The characteristics of a shadow are as follows:

1. Shadow is always formed on opposite side of light. We see that our shadow forms at our back if we are facing source of light. It will be in the front if light is at our back.
2. A shadow is always black in colour even if the object is coloured. A shadow gives the outline or shape of an object. The size of a shadow depends on the distance between object and source oflight.
3. Shadows always move along with us. Length of shadow is different at different times of day. Shadows are longest in morning and evening. They are shorter in afternoon and shortest at noon when sun is overhead.

4. Translucent and Opaque objects form shadows as follows:

Translucent : Translucent Objects are those objects that allow only some light to pass through them. Example: Tracing Paper, Smoked Glass, Tissue Paper.

Opaque : Opaque objects are those objects that do not allow any light to pass through them. Example: Wood, Stone, Cardboard, Coal.

5. The difference between Solar and Lunar Eclipse is as follows:

Lunar Eclipse : A Lunar Eclipse occurs when Earth comes in between Sun and Moon. A Lunar Eclipse occurs on a Full Moon Night. A Lunar Eclipse is of 2 types as follows:

Total: Total Lunar Eclipse occurs when Moon is totally hidden by Earth.

Partial: Partial Lunar Eclipse occurs only when Moon is partially hidden by Earth.

Solar Eclipse: A Solar Eclipse occurs when Moon comes in between Sun and Earth. Moon casts its shadow on Earth. A Solar Eclipse is of 2 types as follows:

Total: Total Solar Eclipse occurs when sun cannot be seen at all for a brief period of time.

Partial: Partial Solar Eclipse occurs only when a part of Sun can be seen for a brief period of time.

HOTS Questions

Give short reasons of the following:

A. Reason: When we dance, our shadow also dances because a shadow always moves along with us. So, if we move, our shadow will also move accordingly.

B. Reason: Shadows are always black in colour even if object is coloured. A shadow has nothing to do with the colour of object. It primarily depends on size of object and nature of object. Only requirement for a shadow to be formed is that object must either be translucent or opaque.

C. Reason: Transparent objects do not cast a shadow because the light passes through them and they do not block the path of light. A shadow can form only and only when an object blocks the path of light. Only translucent and opaque objects block the path of light.

Transparent objects do not cast a shadow because they do not block the path of light.

D. Reason: Shadows are shorter at noon time as compared to mornings and evenings because sun's rays are slanting at these two times as the sun is away from us. Shadows are longer in morning and evening because sun is away from us compared to noon time. They are shorter in afternoon and shortest at noon when sun is overhead.

Activity Time

Do it yourself.

13. Safety First

EXERCISES

A. Tick (✓) the correct option:

1. (d) Safety Rules
2. (a) Cuts caused by a rusted object
3. (d) Burns
4. (c) Reducing the temperature
5. (d) Rabies

B. Fill up the blanks.

1. A crack or a break in a bone is called a Fracture.
2. First Aid is the immediate help given to a person before actual medical help arrives.
3. Sprain is the injury around the joints.
4. The fractured area should not be moved.
5. Vinegar or lemon juice can be applied for wasp stings.

C. Write 'T' for a true statement and 'F' for a false one:

1. [F] 2. [T] 3. [F]
4. [T] 5. [F]

D. Look at the picture and identify it. Now write a few lines on it.

The picture shows a Fire Extinguisher.

1. A Fire Extinguisher is a special, red-coloured device that is used for putting out fire.
2. If a fire breaks out, the pin of Nozzle is pulled out and gas (carbon dioxide) is sprayed on the burning object which forms a layer on the burning object.
3. A Fire Extinguisher cuts the air supply and extinguishes the fire.
4. It can be used in case of electrical fires also.

E. Answer the following questions:

1. Tourniquet is a bandage or a piece of cloth tied tightly around cut to stop bleeding. If cut is deep, tie a tourniquet around wound. Tourniquet should not be used unless pressure applied fails to stop bleeding.

If we tie the tourniquet for too long, it will cause blood to become Hemo-concentrated below constriction. So, it is not advisable to have it for a longer period.

2. A sprain is a condition in which tissues are injured around joints. A sprain of the muscle usually occurs when we fall.

The following things should be done in case of a sprain:

1. Do not move around when you have a sprain.
2. Sit in a comfortable position and keep the affected area still.
3. Apply cold compress to the affected area.
4. Loosen the clothes.
5. Sprinkle water on the face.
6. Give him or her glucose water to drink.

3. A fracture is a crack or a break in the bone. A sling can be tied to give support to a fractured arm or hand. A sling can prevent movement of a fractured hand. Tying a sling gives support to a fractured leg. But all this must be done with extreme care. In case leg is fractured, make person lie down comfortably. Any kind of movement of fractured part must be avoided. Give patient glucose water to drink. The patient must be taken to doctor immediately.

4. Following First Aid should be given in case of an animal-bite:
   1. Wash the bite area with soap and water.
   2. Try to stop bleeding (if any) with a sterile gauze.
   3. Apply antiseptic ointment.
   4. Bites of some animals like monkeys, dogs, rats can cause Rabies. Visit a doctor and take the course of injections, if necessary.

5. We must not prick blisters because an open blister can catch infection.

6. First Aid is the assistance given to any person suffering from a sudden injury of any kind. It saves the life of a person, prevents the condition from worsening and promotes recovery. It is given to the victim before the professional medical help is available.

   First Aid to be given to a person suffering from burn injuries is as follows:
   1. Hot water and steam can cause burns.
   2. Keep the burnt area under cold water.
   3. Do not prick if blisters are formed as open blister can catch infection.
   4. Apply an antiseptic lotion over the burnt area.
   5. We can also apply Aloe Vera Gel.

7. The different causes of fire are as follows:
   1. Kitchen Fire : It is caused due to leakage of gas from gas pipe or burner.
   2. Electrical Fire : It is caused due to a fault in wiring, broken plastic cover on wire and operating too many appliances at the same time in one socket.
   3. Domestic Fire : These are caused due to miss-handling of match-sticks and other inflammable objects. Synthetic clothes can also catch fire easily and result in fire accident.

   Fire hazards can be prevented in the following ways:
   1. Cutting off the supply of air to the burning object.
   2. Cooling the burning object.
   3. Electrical appliances should be checked regularly for any faults.
   4. We should not wear synthetic clothes like nylon while cooking.
   5. Gas pipes should be checked regularly for any leakage.
   6. All doors and windows should be opened in case of gas leakage. Electrical switches should not be operated in such cases.

8. Fire Extinguisher works in the following ways:
   1. A Fire Extinguisher is a special, red-coloured device that is used for putting out fire.
   2. If a fire breaks out, the pin of Nozzle is pulled out and gas (carbon dioxide) is sprayed on the burning object which forms a layer on the burning object.
   3. A Fire Extinguisher cuts the air supply and extinguishes the fire.
   4. It can be used in case of electrical fires also.

9. Minor burns can be treated at home by giving the following First Aid measures:
   1. Hot water and steam can cause burns.
   2. Keep the burnt area under cold water.
   3. Do not prick if blisters are formed as open blister can catch infection.
   4. Apply an antiseptic lotion over the burnt area.
   5. We can also apply Aloe Vera Gel.

HOTS Questions

Do it yourself.

Activity Time

A. Do it yourself. B. Do it yourself.

14. Natural Disasters

EXERCISES

A. Tick (✓) the correct option:

1. (c) Earthquake
2. (b) Seismologists
3. (b) dormant
4. (c) Floods
5. (b) Potassium

B. State whether the following statements are true or false.

1. [True] 2. [False] 3. [True]
4. [False] 5. [True]

C. Answer the following questions:

1. A natural disaster is a natural phenomenon that causes great loss of life and property. Earthquakes, volcanic eruptions, tsunamis, dough and floods are all examples of natural disasters.
2. An earthquake is shaking or rolling of earth's surface. When two blocks of landmass deep below earth's surface suddenly slip past each other or break apart, the energy trapped is released with great force which causes landmass to shake. Earthquakes come in many forms. An earthquake can be felt as a shock or a tremor. It can be destructive enough to flatten an entire city. It can happen anywhere on land or in sea.
3. When the lava is below the earth's surface, it is called Magma.
4. A Tsunami is a large ocean wave caused by an earthquake on ocean floor or a volcanic eruption. If earthquake is powerful enough, sudden movement of ocean bed causes water to rise upwards and then falls back. This causes water to race to the shore and form series of waves known as a wave train of a Tsunami. Waves of Tsunami are not like normal ocean wave. Tsunami wave can travel at a speed of 500 miles an hour. The wave may be 100 feet high. When Tsunami hits the coastal area, it floods the land does causes a lot of large scale destruction.
5. The active volcanoes are:
   1) Mount Vesuvius
   2) Mount Etna
   3) Mount Erebus
   4) Mount Fuji.
   5) The Barren Island in India.
6. Volcanoes can be advantageous in the following ways:
   1) Soil formed by volcanic rock is rich in minerals like Potassium is very fertile. This is the reason why millions of people live close to volcanoes.
   2) Volcanoes are great tourist sites.

D. Match the following:

Column I	Column II
1.	(f)
2.	(a)
3.	(d)
4.	(g)
5.	(b)
6.	(h)
7.	(c)
8.	(e)

HOTS Questions

Following precautions must be taken during Tsunami:

1. Listen to warning signals on Radio or Television.
2. Animals like dog, elephant, buffalo and goat have a 'sixth sense' and are able to predict earthquakes and tsunamis. They start behaving weirdly i.e. escaping from or to somewhere in large numbers. Birds may even be seen flying towards higher ground. We should move away from sea-shore if you see such animal behaviour.
3. Sailors and people in sea should not return to port if a tsunami warning has been issued. The impact of tsunami is much more on sea-shore than in middle of sea.
4. Always be away from sea-shore.

Activity Time

Do it yourself.

MODEL TEST PAPER - 1

A. Tick (✓) the correct option:

1. (b) Fern 2. (d) All
3. (a) Goitre 4. (a) Cartilage
5. (a) Sandstone
6. (d) deforestation

B. Answer the following questions:

1. A seed needs air, water and warmth to germinate. Germination is a process in which embryo breaks open seed coat and develops roots and shoots. Air, water and warmth are necessary for germination. From seed, root develops downward into soil. Later, shoot develops upward towards sunlight. This stage is called Seeding. Seedling grows

further into a new plant.

2. The different body coverings of animals are as follows:
   1. Scales : Reptiles like crocodiles, snakes and lizards have scales on their body. Scale protects body while crawling on ground and helps retain water. Process of shedding old with new skin is called Moulting. Fish also have bodies covered with scales.
   2. Feathers : Body of a bird is covered with feathers. Feathers are of 2 types: Down Feathers and Flight Feathers. Down feathers are on the under belly of the bird. They are fluffy and soft and keep bird warm. Flight feathers are found on wings and tail. They help them to fly.
   3. Shell: Shells are hard covering bodies of some animals and insect. A shell protects soft bodies of animals like Turtle, Tortoise and Snail from any injury and being preyed upon.
   4. Fur/Wool/Hair: Animals like Bear, Yak and Sheep have fur on their body. The fur keeps them warm.
3. Plants are eaten by animals. Animals are then eaten by other animals. This forms a food chain. For example – grass is eaten by a grasshopper. The grasshopper is eaten by a frog. The frog is eaten by a snake. And the snake is eaten by a hawk.
4. Food contains nutrients which are building materials of our body and provide us energy for growth and other activities. A balanced diet contains carbohydrates, fats, proteins, vitamins and minerals. We must eat a balanced diet that is rich in all these nutrients to live healthy. Apart from these, we should drink plenty of water daily. We should also take roughage as a part of food intake.
5. The functions of Skeleton System are as follows:
   1. It gives shape to our body.
   2. It enables us to stand upright.
   3. It gives support to our body.
   4. It protects inner parts of our body.
   5. Bones help us to move about in different ways.
   6. Muscles attached to bones help in various movements of body.
   7. Backbone helps us in bending and stretching.
   8. Ribcage protects organs like heart, lungs and stomach.
   9. Lower jaw bone is movable and because of it we are able to speak and eat our food.
   10. Red and white blood cells are produced by the Bone Marrow present in our bones.
6. Three R's stand for Recycle, Reduce and Reuse.

   Recycle : Recycle is a process of reusing waste materials for new use. Example: Fruits and vegetable peels, pencil shavings, etc.

   Reuse : Re-use is the process of using something again for another purpose. This helps to minimize wastes and control pollution. Example: Empty glass bottles can be used to store pickles, pulses, etc.

   Reduce : Reduce means to bring down production of wastes. This is possible by using resources and minimizing use of non-renewable resources. Example: Take cloth bag for shopping instead of plastic.
7. Soil is formed when rocks are broken down by natural forces like heat of sun, rain, water, wind and lightning. The actions of these forces break rocks into smaller sizes. Small rocks also get rubbed against one another and degrade further. Dead remains of plants and animals degrade and mix with smaller pieces of rocks. Smaller pieces are further broken own until they form particles called soil. Soil is following types:

   Sandy - Big particles, A lot of space for air, does not hold water.

   Clayey - Fine particles, no air space, can hold water.

   Loamy - Mixture humus can hold water.

C. Fill in the blanks:

1. Amphibians breathe through lungs and gills.
2. We cannot see micro-organisms with naked eyes.
3. Vitamins and fruits and vegetables are protective components.
4. Skull is a bony box of thin bones that protects

the brain.

5. Coal and petroleum are fossil fuels.
6. Insects and rat are animals that live in the soil.

D. Give two examples of each:

1. (i) Elephants (ii) Lions
2. (i) Fish (ii) Whale
3. (i) Turtle (ii) Crocodile
4. (i) Scorpions (ii) Spider
5. (i) Birds (ii) Fish
6. (i) Coal (ii) Mica
7. (i) Petroleum (ii) Kerosene

E. Name the types of joint present in these body parts:

1. Neck : Pivot Joint
2. Wrist : Gliding Joint
3. Hip : Ball and Socket Joint
4. Elbow : Hinge Joint
5. Shoulder : Ball and Socket Joint
6. Knee : Hinge Joint
7. Fingers : Hinge Joint
8. Toes : Hinge Joint

F. Find out the names of eight healthy food-items in the given grid. The names may read downward or across:

1. MILK 2. FRUITS
3. SUGAR 4. EGGS
5. VEGETABLS 6. FISH
7. PULSES 8. NUTS

G. Do it yourself.

MODEL TEST PAPER - 2

A. Tick (✓) the correct option:

1. (a) melting of butter
2. (a) atmosphere 3. (d) Burns
4. (c) Floods 5. (b) Pulley
6. (a) stops

B. Answer the following questions:

1. There is no fixed shape and size of liquids, but have a definite volume. They take shape of container into which they are pored. Molecules are not packed very close to one another as they have less force of attraction between them. It results in free movement of molecules in liquid. Because of this, liquids flow easily. They have fixed volume that can be measured. Water, petrol, soft drink and milk are liquids that flow.
2. A tiny bit of Sun's energy falls onto earth. On Earth some of Solar Energy is changed by photosynthesis into chemical energy stored in carbohydrate molecules in plant cells. Inside the muscle cells of human, the chemical energy is transformed into mechanical work and heat.
3. Machines are useful to us in the following ways:
   1. They help us to do our work easier.
   2. They help us to do our work faster.
   3. They help us to do our work with less effort.

Some machines are:

Lever : It is used for to lift heavy weights or loosen light objects. Example: A long rod or stick and spoon.

Pulley : Pulley is used to lift things. Wells have Pulleys to draw water.

Screw : Screw holds two things together.

Wedge : Wedge is a surface with a sharp and a blunt Edge. It looks like 2 inclined planes attached back to back. It is used to cut objects.

Scissors : It is used for cutting things.

Stapler : It is used for stitching papers together.

Plaas : It is used for cutting wires and pulling things.

Petchcus : It is used for tightening and un-tightening keels.

Nut Cracker: It is used for cracking and breaking the nuts.

Inclined Plane: It is a Slanting platform or Ramp. Heavy objects are pushed over it or made to roll down. It makes lifting easier.

4. The difference between Sedimentation and Distillation is as follows:

Sedimentation : Water is collected in large tanks. It is left undisturbed for a few days so that insoluble impurities may settle down. The heavier impurities settle at bottom. The tanks are also exposed to sunlight so that germs may be killed. Water is then passed onto another tank. The residue is left behind in the first tank.

Distillation : Distillation is the process by which we get pure water from of all harmful germs. Distilled water is obtained by Distillation method. This method helps to

separate both solute and solvent. Water is evaporated on heating and when it enters condensation, it cools down and changes into water. Distilled water is pure and free from impurities. Distilled water is also used in car batteries, science experiments and in medicines.

5. Three layers of Earth are the following:
   1. Crust : It is outermost covering of Earth. It is made up of solid rocks. It is thinnest of 3 layers of Earth. Its thickness varies from 6-11 km under oceans and stretches up to 70 km under mountain ranges. Granite and Basalt are main rocks in this layer. It has Water, Oil, Coal, Minerals, Oxygen, Silicon, Aluminium, Iron and Calcium.
   2. Mantle : It is second layer of Earth lying below Crust. It is about 2900 km deep. It consists of solid and molten rocks. It is largely made up of a rock called peridotile.
   3. Core : It is innermost layer of Earth. It lies in innermost of Earth. It is primarily made up of Iron and Nickel – the magnetic metals that give earth its magnetic field. Temperature increases as we travel towards interior of Earth.
6. The characteristics of a shadow are as follows:
   1. Shadow is always formed on opposite side of light. We see that our shadow forms at our back if we are facing source of light. It will be in the front if light is at our back.
   2. A shadow is always black in colour even if the object is coloured. A shadow gives the outline or shape of an object. The size of a shadow depends on the distance between object and source oflight.
   3. Shadows always move along with us. Length of shadow is different at different times of day. Shadows are longest in morning and evening. They are shorter in afternoon and shortest at noon when sun is overhead.
7. A Tsunami is a large ocean wave caused by an earthquake on ocean floor or a volcanic eruption. If earthquake is powerful enough, sudden movement of ocean bed causes water to rise upwards and then falls back. This causes water to race to the shore and form series of waves known as a wave train of a Tsunami. Waves of Tsunami are not like normal ocean wave. Tsunami wave can travel at a speed of 500 miles an hour. The wave may be 100 feet high. When Tsunami hits the coastal area, it floods the land does causes a lot of large scale destruction.

C. Fill in the blanks:

1. Amphibians breathe through lungs and gills.
2. Simple Machines change the direction of an object.
3. A spring returns to its natural length because of elastic force.
4. Common Salt can be removed from water by the process of Evaporation.
5. The fractured area should not be moved.

D. Give one-word answer:

1. Force 2. Frictional Force
3. Gravitational Force
4. Fulcrum 5. Energy
6. Simple Machines

E. Give two examples of each:

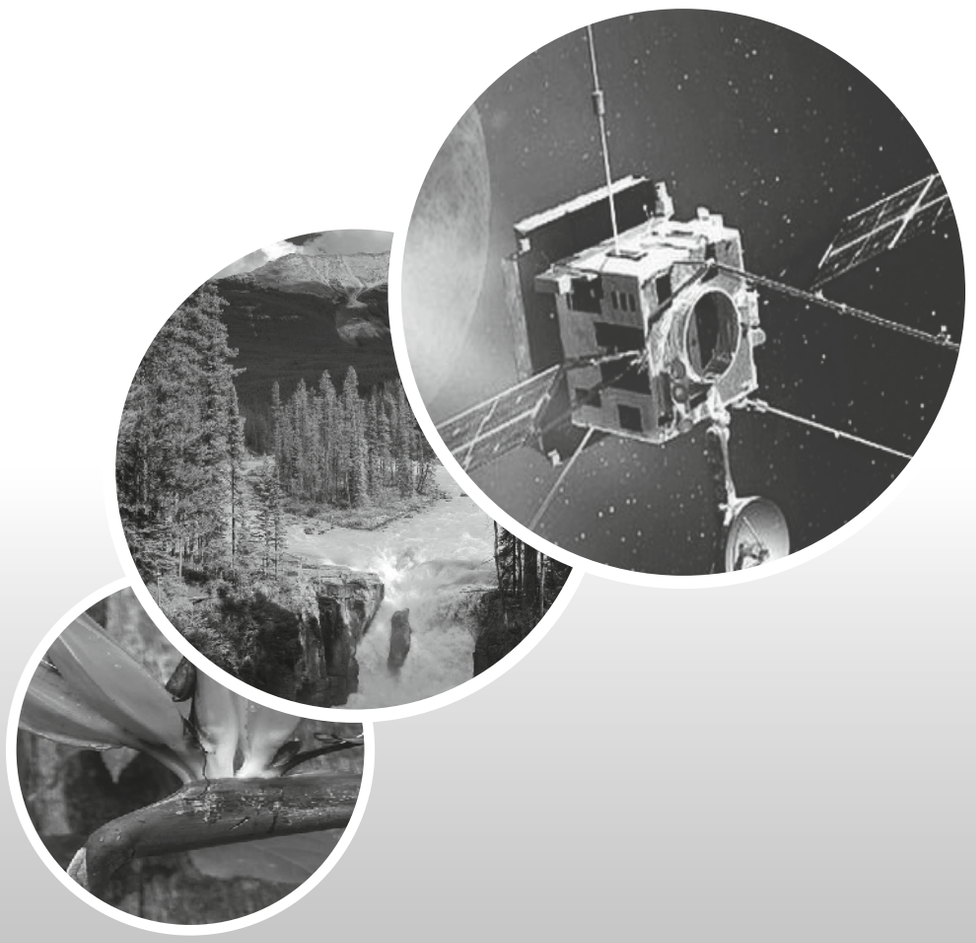
1. (i) Sun (ii) Bulb
2. (i) Table (ii) Chair
3. (i) Clean Glass (ii) Clean Water
4. (i) Coloured Glass (ii) Butter Paper
5. (i) Lunar Eclipse (ii) Solar Eclipse

F. Do it yourself.

G. Do it yourself.

Note

Note



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