



Amazing Science

A Textbook of Science

*For
Juniors*



Teacher's
Resource
Book



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1. Reproduction in Plants

Check Knowledge

- A. 1. (a) Germination 2. (d) Leaves
 3. (b) Cotyledons 4. (c) Mushroom
 5. (d) Mustard
- B. 1. Protects 2. Food
 3. Coconut 4. Stems
 5. Kharif
- C. 1. Correct 2. Wrong
 3. Correct 4. Wrong
 5. Wrong
- D. 1. Plants of the same kind growing in a particular field at a particular time are collectively called known as crop.
 2. The growth of a seed into seedling is called germination.
 3. The practice of raising crops for food and other purpose is called agriculture.
- E. 1. Plants reproduce through the following ways.
Reproduction through seeds: Most plants produce seeds which grow into new plants. A seed needs a medium such as soil, air, water and warmth to grow into a new plant.
Reproduction through stems: Stems of some plants, such as sugarcane and rose, bear buds. When these stems are buried in the soil, the buds grow into new plants.
Reproduction through roots: Some roots, such as sweet potato, bear buds. When these roots are sown in the soil, the buds grow into new plants.
Reproduction through leaves: The plants like bryophyllum can grow many new plants from its leaves.
Reproduction through spores: All plants do not bear flowers, leaves and seeds. They have spores in stead of flowers. Spores develop inside spore-sacs. When spores are ripe, the spore-sac ruptures and spores are dispersed by wind. Under favourable conditions the spores grow into new plants.
2. The germination of a seed takes place when the it gets favourable conditions of air, water and warmth.

3. A plant produces a large number of seeds. If all seeds fall on the ground under the parent plant, there would grow a large number of seedlings at that place. They would not get sufficient amount of water, minerals and sunlight. As a result many of them would die. So seeds need to be dispersed for their proper growth into new plants.

Examples:

- (a) Seeds of cotton are dispersed by wind.
 (b) Seeds of coconut are dispersed by water.

4. See answer to question 2 above.
5. The practice of growing a large number of plants for food or other purpose is called agriculture. The various processes of agriculture are
Ploughing: This is the process of loosening soil.
Manuring : Adding nutrients to the soil to increase its fertility is called manuring.
Seed sowing : Burying seeds into the soil is called sowing seeds.
Irrigation : Watering plants is called irrigation.
Harvesting : Gathering mature crop from the field is called harvesting. It is done either by machine or by hand.

2. Nutrients and Deficiency Diseases

Check Knowledge

- A. 1. Carbohydrates 2. Vitamins
 3. Vitamin C 4. Iron
 5. Bacteria
- B. 1. Proteins 2. Communicable
 3. Food and water 4. Anaemia
 5. Vitamin B₁
- C. 1.-(b) 2.-(c) 3.-(f) 4.-(e) 5.-(d) 6.-(a)
- D. 1. Carbohydrate — wheat
 2. Protein — fish
 3. Roughage — fruits and vegetable
 4. Vitamin B — Milk
 5. Vitamin D — Eggs.
- E. 1. Diseases caused by the deficiency of any nutrients in the diet is called deficiency disease.
 2. The diseases which are caused by microorganisms, such as bacteria and viruses, are called communicable or infectious

- C. 1. Beetle 2. Lion
 3. Deer 4. Snake
 5. Dog

D. 1. The natural home or environment of an animal, plant, or other organism is called its habitat. Desert, water, forest, mountain and marshy land are types of habitats.

2. Different kinds of animals have different types of body coverings. The bodies of snakes, fish and lizards are covered with scales. A bird's body is covered with feathers. Mammals have hair on their bodies. Snails, tortoises and turtles have shells as their body covering.

3. Gills are comb-like structures that help animals in breathing. As water passes over the gills, the animal takes in oxygen which is absorbed by the blood.

4. According to their feeding habits, animals are classified as herbivores, carnivores and omnivores.

Herbivores eat plant parts. They have sharp incisors and broad molars to cut and grind their food.

Carnivores eat flesh of other animals. They have sharp canines to tear the flesh apart. Their molars are very strong to chew the bones.

Omnivores eat both plants and animals. They have well adapted teeth to eat their food.

5. Most mammals have four limbs to move. Humans are also mammals but they have use their legs to move. Their forelimbs are modified as hands.

Fish have fins to swim. Most water birds have webbed toes that act as oars to swim. Turtles have paddle-like flippers. Insects have six legs to move. Some insects have wings to fly.

Birds forelimbs are modified into wings which are used by birds to fly. Birds have two legs to move on ground or swim in water. Reptiles crawl on the ground with their short limbs.

6. Seasonal movement of animals from one region to another is called migration. They migrate to avoid unfavourable condition. As

the conditions become favourable they come back to their original region.

5. Safety and First Aid

Check Knowledge

- A. 1. Deep cut 2. Mouth
 3. Animal 4. Sand
- B. 1. Injured 2. Bone
 3. Cold water 4. Viruses
 5. Antirabies
- C. 1. Correct 2. Wrong
 3. Correct 4. Correct
 5. Correct

D. 1. First Aid is the immediate help given to an injured or a sick person before a doctor arrives.

2. First we wash the wound with clean water. Then we press a clean cloth or pad of sterile gauze tightly on the wound and try to stop the bleeding.

3. We will make the person sit or lie down with the head and shoulders raised above the body. We will pinch the nostrils together to stop bleeding. Applying ice pack on the nose can also stop bleeding.

4. Any break or crack in the bone is called a fracture.

5. Injuries are of many types. We give different first aid in different injuries.

6. Sprain is the twisting and swelling up of a joint. For the first aid, an ice-pack is used to relieve the pain. Applying the ointment on the affected area help in a sprain.

D. In case of an animal bite, first we clean the wound with soap and water to wash the animal saliva. Then we take the victim to the doctor immediately. In case of a snake bite, we apply a tight bandage on the part just above the bite to stop the flow of the blood to the heart. Then we take the victim to the doctor without any delay.

6. Force, Work and Energy

Check Knowledge

- A. 1. Mechanical 2. Elastic
 3. Sun 4. Kinetic
- B. 1. Force 2. Slow
 3. Mechanical 4. Work, force

- C. 1.-(c) 2.-(a) 3.-(b) 4.-(e) 5.-(d)
6. dead plants and animals
- D. 1. A fruit falling of a tree is an example of gravitational force.
2. A ball moving on the ground stops because of frictional force.
3. The life on earth gets solar energy to survive.
4. Heat energy is used to cook food.
5. The ceiling fan moves due to mechanical energy.
- E. 1. Force is a push or pull which can
(a) move a body at rest
(b) stop a moving body
(c) change the shape of a body
(d) change the size of a body.
2. **Muscular force** : The force of our muscles which we use to push, pull or lift any thing is called the muscular force.
- Gravitational force** : The force by which the earth pulls any thing towards its gravity is called gravitational force.
- Frictional force** : The force between two surfaces that tends to stop a moving object is called frictional force.
- Magnetic energy** : The force applied by a magnet to attract iron object is called magnetic force.
3. Work is said to be done when we apply a force on an object and the object moves in the direction of the force.
4. Energy is the ability to do work. Only a body possess energy can produce a force to carry out work.
5. **Muscular energy** : Energy of our muscles
Solar energy : Energy given out by the sun
Wind energy : Energy of the moving air
Water energy : Energy of the flowing water
Atomic energy : Energy stored in an atom
Geothermal energy : Heat energy beneath the earth
Kinetic energy : Energy of a moving object
Potential energy : Energy of a body becomes of its position
6. A force is used to
(a) move an stationary object

- (b) slow down or completely stop a many object
(c) change the direction of motion
(d) change the shape and size of an object.

Model Test Paper-I

- A. 1. (a) Stem 2. (b) Communicable
3. (c) Both (a) and (b) 4. (a) Dog
5. (b) Sprain 6. (a) Light
- B. 1. Sweet potato 2. Night blindness
3. Muscles
4. Muscles of the walls of the stomach
5. Siberian crane
6. 17,000 7. Virus
8. Movement of ceiling fan
- C. 1. The growing of a seed into seedling is termed as gravitation.
2. A balanced diet contains all necessary nutrients in right proportion for the proper growth. So a balanced diet keeps our body healthy.
3. Roughage is not a nutrient but it helps in the process of food digestion.
4. The skeletal system gives our body the shape. With the help of muscles it help our body parts move.
5. A dense liquid found in the hollow of our bones is called bone marrow. It gives birth to the blood cells.
6. Gills are breathing organs in the fish. With the help of gills fish are able to breathe oxygen dissolved in water.
7. First, we apply a cold ice pack on the sprain as the first aid.
8. Force is a push or pull which can
(a) move a body at rest
(b) stop a moving body
(c) change the shape of a body
(d) change the size of a body.

7. Simple Machines

Check Knowledge

- A. 1. Lesser 2. Inclined plane
3. Rope 4. Complex
5. Two lever
- B. 1. Tool 2. Lever

3. Second 4. Screw
5. Car
- C. 1. Correct 2. Correct
3. Wrong 4. Correct
5. Correct
- D. 1. Lever — Bottle opener
2. Pulley — Crane
3. Inclined plane — Ramp
4. Screw — Screw jack
5. Wedge — Axe
- E. 1. A simple machine is a tool that makes our work easier.
2. A wedge is a combination of two inclined planes. Examples: Axe and knife
3. A machine made of one or two tools is called a simple machine. Lever, inclined plane, wedge, pulley and wheel and axle are simple machines.
4. A lever is a simple machine that turns around a fixed point. Examples: nut-cracker and bottle opener
5. On the basis of the relative position of the effort, load and fulcrum, levers are classified into three classes — Class I, Class II and Class III.
A lever in which the fulcrum is in between the effort and the load is called the lever of Class I. Examples: Scissors and pliers.
A lever in which the load is in between the effort and the fulcrum is called the lever of Class II. Examples: Wheel opener and bottle opener.
A lever in which the effort is in between the load and the fulcrum is called the lever of Class III. Examples: Fishing rod and forceps.
6. Some of the works cannot be done by a simple machine. So a combination of many simple machines help to perform such complex works. For example, a car is a complex machine with the help of which we can travel long distances in a short time.
7. Complex machines are made by combining many simple machines. So complex machines perform complex work which cannot be performed by a simple machine.

8. Soil Erosion and Conservation

Check Knowledge

- A. 1. Top soil 2. Reduces
3. Afforestation 4. Hilly areas
- B. 1. Erosion 2. Plants
3. Earthworms, termites
4. Soil erosion 5. Afforestation
- C. 1.-(c) 2.-(a) 3.-(d) 4.-(b)
- D. 1. Wrong 2. Correct
3. Correct 4. Wrong
5. Correct
- E. 1. The uppermost layer of the earth's crust is called soil. Plants grow in the soil.
2. Soil is a mixture of mineral particles, humus and air. Air is present in between the spaces of particles.
3. The soil has three main layers — top soil, subsoil and bed rock. The top soil is the uppermost layer of the soil. It is rich in humus and so is dark in colour. The humus makes the soil porous and soft thus increasing its air and water holding capacity.
The subsoil lies below the top soil. It is comparatively harder than the top soil. It contains sand and stones.
The bed rock lies below the subsoil. it contains only big rocks.
4. The process of carrying away of the top soil by the natural forces such as water and wind is called soil erosion.
5. Man is clearing forest by cutting trees. This is called deforestation, which makes the soil loose and causes erosion of soil. Mining is another activity that leads to soil erosion.
6. An embankment is a wall or bank of earth or stone built to prevent a river flooding an area.
7. The process of protecting soil from erosion is called soil conservation. It is done by growing more and more trees, avoiding overgrazing or by making boundaries in the fields.

9. Rocks and Minerals

Check Knowledge

- A. 1. Minerals 2. Granite
3. Pumice 4. Metamorphic

- B. 1. Minerals 2. Igneous rocks
 3. White marble 4. Sedimentary rock
 5. Fossil
- C. 1. Wrong 2. Wrong
 3. Correct 4. Correct
 5. Wrong
- D. 1. A naturally occurring solid material from which a metal or valuable mineral can be extracted is called an ore.
 2. Separation of a liquid mixture into fractions differing in boiling point by means of distillation, typically using a fractionating column is called fractional distillation.
 3. A natural fuel such as coal or gas, formed from the remains of living organisms buried underground millions of years ago is called fossil fuel.
 4. A fossil fuel present in suitable rock strata and can be extracted and refined to produce fuels including petrol, paraffin, and diesel oil is called petroleum.
- E. 1. Rocks are of three kinds— Igneous, sedimentary and metamorphic.
 2. Sedimentary rocks are types of rock that are formed by the deposition of material at the earth's surface brought by rivers.
 3. Igneous rocks are formed by the cooling of lava.
 4. A hard metamorphic form of limestone, typically white with coloured mottlings or streaks is called marble. It is used in sculpture and architecture.
 5. Millions of years ago animals got buried deep into the earth's crust. Due to the heat interior of the earth and pressure above, these converted to petroleum.
 6. Petrol, kerosene, diesel and paraffin wax are derivatives of distillation of petroleum.
 7. Granite, sandstone, limestone, shale, marble, slate and gneiss are the rocks that are used in construction. Learn about these rocks in the book.

- B. 1. Ultra-violet 2. Distillation
 3. Nitrogen dioxide 4. Atmospheric
- C. 1. Wrong 2. Correct
 3. Wrong 4. Correct
 5. Correct
- D. 1. Air is a mixture of gases such as nitrogen, oxygen, carbon dioxide, water vapour and argon.
 2. Since air has mass, therefore it exerts pressure on everything on the earth. This pressure is called atmospheric pressure.
 3. Harmful chemicals and disease-causing microorganisms that get mixed in water to make it impure.
 Impure water causes many disease such as amoebic dysentery.
 4. The process of purifying a liquid by heating and cooling is called distillation. The impure liquid is heated in a flask. After some time the liquid changes to steam and impurities are left behind in the flask. The steam is allowed to cool, which changes to liquid again. The distilled liquid is pure.
 5. Filtration is a process of removing insoluble impurities from a liquid. A filter paper is fitted in a funnel and water is poured into the funnel. The filtered liquid is collected in a vessel kept under the funnel. The impurities are left behind as residue.
 6. Decanting is a process to separate mixtures. Decanting is just allowing a mixture of solid and liquid or two immiscible liquids to settle and separate by gravity. Once the mixture components have separated, the lighter liquid is poured off leaving the heavier liquid or solid behind.
 7. When sulphur dioxide and nitrogen dioxide in the air combine with the rain. The main cause is the industrial burning of coal and other fossil fuels, the waste gases from which contain sulphur and nitrogen oxides which combine with atmospheric water to form acids.
 8. Potable water is water which is safe enough to be consumed by humans.
 9. Electric water purifiers use ultra-violet rays

10. Air and Water

Check Knowledge

- A. 1. Oxygen 2. Oxygen
 3. 100°C 4. Soluble
 5. Water vapour

surface. At the surface, it erupts to form lava flows and ash deposits.

2. Volcanoes are grouped into four types: cinder cones, composite volcanoes, shield volcanoes and lava volcanoes.
3. An extinct volcano is one which has erupted thousands of years ago and there's no possibility of eruption.
4. An earthquake is the shaking, rolling or sudden shock of the earth's surface.
5. There are about 20 plates along the surface of the earth that move continuously and slowly past each other. As the plates move they put forces on themselves and each other. When the force is large enough, the crust is forced to break. When the break occurs, the stress is released as energy which moves through the Earth in the form of waves, which we feel and call an earthquake.
6. A flood results from days of heavy rain or melting snow, when rivers rise and go over their banks.

A flood occurs when floodwater rises rapidly with no warning within several hours of an intense rain. It often occur after intense rainfall from slow moving thunderstorms. In valleys, floodwater flows faster than on flatter ground and can be quite destructive.

13. Greenhouse Effect and Global Warming

Check Knowledge

- A. 1. (c) Both (a) and (b) 2. (b) Carbon dioxide
3. (d) Greenhouse effect 4. (b) Air pollution
5. (a) Less
- B. 1. Global warming 2. Increasing
3. Glaciers 4. Snow
5. Solar
- C. 1. Correct 2. Wrong
3. Correct 4. Correct
5. Correct
- D. 1. When the rock beneath the earth's surface gets heated, it becomes molten and is called magma. The magma rushes out through a vent. When it reaches the earth's surface, the magma is called lava. The lava on the earth's surface cools and hardens into rocks.

2. There are about 20 plates along the surface of the earth that move continuously and slowly past each other. When the plates squeeze or stretch, huge rocks form at their edges and the rocks shift with great force, causing an earthquake.
- D. 1. A volcano is a mountain that opens downward to molten rock below the surface of the earth. A volcano is formed when magma from within the Earth's works its way to the surface. At the surface, it erupts to form lava flows and ash deposits.
2. Volcanoes are grouped into four types: cinder cones, composite volcanoes, shield volcanoes and lava volcanoes.
3. An extinct volcano is one which has erupted thousands of years ago and there's no possibility of eruption.
4. An earthquake is the shaking, rolling or sudden shock of the earth's surface.
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Model Test Paper-II

- A. 1. (a) Amphibians 2. (a) Humans
3. (b) Force 4. (c) Storm
5. (a) Saturn 6. (b) Recycle
- B. 1. An insect has six legs.
2. A scavenger eats dead and decayed animal bodies.
3. The young frog is called a tadpole.

4. Electric energy is one of the various types of energies.
 5. Oxygen has no smell and colour.
 6. Formation of clouds is because of condensation of water.
 7. Jupiter is the largest planet of the solar system.
 8. Yes, the global warming is bad for our environment.
- C.
1. Vertebrates have backbone whereas invertebrates lack backbone.
 2. Some animals blend themselves with the environment in which they live to protect from enemies is called camouflage.
 3. The stages of growth in the life of an insect to be adult is called metamorphosis.
4. The energy of a body due to its motion is called kinetic energy.
 5. The energy of a body due to its position is called potential energy.
 6. Filtration is a process of removing insoluble properties from water with the help of a filter paper.
 7. The presence of air, water and suitable distance from the sun makes life possible on Earth.
 8. The addition of unwanted substances into air, water and land is called pollution. It lowers the quality of air, water and land.