Nutrition in Plants

EXERCISES

A. Tick (3) the correct option.

1. (d) 2. (a) 3. (e) 4. (d) 5. (c) 6. (b) 7. (c)

B. Fill in the blanks with correct words.

1. crop 2. ploughing 3. loosening the soil
4. broad casting 5. irrigation 6. decreases 7. combine

C. Match the Following.

1. e 2. c 3. b 4. f 5. a 6. d

D. Short Answer Type Questions.

1. (a) The crops which are sown in June/July and harvested in September/October are called kharif crops.
   (b) The crops which are sown in the month of October/November and harvested in March/April are called rabi crops.
   (c) Weeds are unwanted and uncultivated plants that grow along with the crop plants. They grow on their own. Some examples of common weeds are Amaranthus (Chaulai), Chenopodium (bathua) and wild oat (javin).
   (d) The process of separating grains from the harvested crop.
   (e) The process of adding manure to the soil.
2. If seeds are sown too deep in the soil, then their roots will not be able to respire while those sown close to the surface may be eaten by birds and insects.
3. Manual spacing leads to wastage and reduced crop yield. But by the method of seed drilling seeds are sown at correct depth and interval. It saves time and labour.
4. Traditional system, sprinkler system, Drip system.
5. Disadvantages of using a fertiliser :
   (i) It cause water pollution.
   (ii) They are expensive.
   (iii) They reduce soil fertility.

(iv) They change the nature of soil, making it either too acidic or too alkaline.

6. Yes, Weeds reduce crop yield as they complete with the crops for water, minerals and sunlight. So, it is necessary to remove them from the fields from time to time.
7. The ploughed field may have big pieces of soil called crumbs. It is necessary to break these crumbs with a plank. The field is levelled for sowing as well as for irrigation purposes. The levelling of soil is done with the help of leveller. Water can get collected during irrigation in the soil pits, in the absence of levelling.
8. Irrigation helps seeds to germinate. It is also essential for absorption of nutrients by plants from the soil and also essential for the elongation of roots. Water also protects crops from frost and dry hot air currents.

E. Long Answer Type Questions.

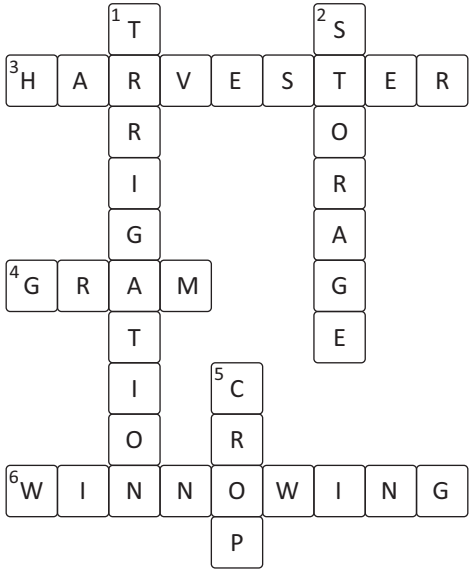
1. Benefits of Ploughing Advantages of Ploughing
   (i) The loose soil helps the crop roots to breathe easily even in deep soil.
   (ii) Loose soil helps the earthworms and microorganisms to grow better. Earthworms are called farmer's friends as they help to turn the soil and add nutrients to the soil in form of their excreta.
   (iii) It allows roots to penetrate deep into the soil.
   (iv) It helps to uproot weeds from the soil.
   (v) Manures and fertilizers mix better in ploughed soil.
   (vi) The loosening and turning of soil during ploughing brings the nutrient rich soil to the top so that the plants can use them.
2. The crops which are sown in June/July and harvested in September/October are called kharif crops. These crops are also called summer crops. Rice (paddy), soyabean, maize, pulses, cotton, groundnuts are some examples of kharif crops. These crops require plenty of water and largely depend on monsoon rains.
3. Some farmers practice crop rotation to improve the soil fertility. The process in which different types of crops (leguminous and non-leguminous) are grown alternatively in the same field is called crop rotation.
4. Earthworms are called farmer's friends as they help to turn the soil and add nutrients to the soil in form of their excreta.
5. Food materials like food grains on small scale or at domestic level, grain is stored in jute bags or metallic bins. On large scale or at commercial level, grain is put in gunny bags, in silos or in granaries.
6. Farmers remove weeds from their crops by anyone of the folowing methods:

Manual Removal : The weeds are removed or pulled out (uprooted) by hand or by cutting them close to the ground at intervals. This is done with the help of a trowel (khurpi).

Removal with Chemicals : Certain chemicals are also used to control weeds. Chemicals which destroy the weeds but do not harm the crops are called weedicides. 2,4-D is a commonly used weedicide.

Learn by Doing

CROSSWORD PUZZLE



Microorganisms

EXERCISES

A. Tick (3) the correct option.

1. (b) 2. (d) 3. (b) 4. (b) 5. (a)
6. (a) 7. (a) 8. (b)

B. Fill in the blanks with correct words.

1. Bacteria 2. Lactobacillus 3. Pathogen
4. vaccines 5. Penicillium mouls 6. Micro organisms
7. Moisture

C. Match the Following.

1. c 2. e 3. b 4. a 5. s

D. Short Answer Type Questions.

1. Microorganisms belong to five major groups – bacteria, algae, protozoa, fungi and viruses.
2. Yeast
3. Rhizobium bacteria are present in the root nodules of leguminous plants like pea and bean. These bacteria are able to fix atmospheric nitrogen and convert it into suitable forms like nitrates. Some bacteria and blue-green algae living in the soil can also fix atmospheric nitrogen into nitrates. These microbes are commonly called biological nitrogen fixers. Soil fertility increases with nitrogen fixation.
4. Vaccines injected into the body, stimulate the immune system to produce special proteins called antibiotics to fight against diseases. These antibiotics remain in the body and protect it from any microbial attack in future. The process of administering a vaccine in an organisms's body is called vaccination.
5. **Pasteurization** : This method is used for preserving milk. In this method, (i) milk is heated to about 700C for about 15-30 seconds and (ii) then quickly cooled (chilled) and stored in sterilized bottles or pouches. Heating kills the bacteria present in milk. Quick cooling prevents the remaining bacteria from growing.

   Salting and Adding Sugars : Many food items are preserved by adding salt and sugar. Due to the addition of these, the cells of the microbes lose water. Microbes are thus not able to grow in such food items.
6. Yeast is used in making bread, alcoholic drinks and other bakery items due to fermentation. It breaks down sugar to alcohol and carbon dioxide in the absence of oxygen.
7. • Mushrooms although bigger than the microorganisms, is a fungi which are eaten by many people. They are rich in proteins and vitamins.
   • Yeast is rich in proteins and vitamin B. It is an important source of food.
   • Many seaweeds and algae like Chlorella are used as food in China and Japan.
   • Algae are a source of food to fish and sea animals.
8. **Drying (Dehydration)** : Drying reduces the moisture content of food materials. Removal of water from the food materials is called dehydration. Dehydration prevents the growth of microorganisms. Food items like cereals, pulses, vegetables like spinach, cauliflower and methi

leaves and spices are dried in the sun (sun drying).

Boiling : Food items like milk and water are preserved by boiling. Boiling kills microorganisms. You may have observed your mother boiling milk before storing it.

Refrigeration and Freezing : Like boiling, cooling by refrigeration and freezing also helps to preserve food items. Refrigeration and freezing do not kill microorganisms, but only stop them from growing and multiplying.

E. Long Answer Type Questions.

1. Virus grow only inside cells of other plants and animals. whereas other micro organisms can grow by itself. Other micro organisms have both positive and negative uses but viruses only have negative effect-It causes diseases.
2. Bacteria and fungi breakdown (decompose) dead and decaying plant and animal matter into simple inorganic substances. They are thus called decomposers. Inorganic compounds like phosphates, nitrates, sulphates are mixed in the soil and are used by green plants during the process of photosynthesis. Hence, decomposers help to keep the environment clean by preventing the accumulation of remains and waste of dead organisms.
3. (i) Antibiotics are the medicines that kill or stop the growth of disease causing microorganisms. These are formulated to destroy bacteria by not effective against diseases causes by virus. Bacteria and fungi are used to manufacture them. Some common antibiotics made from fungi and bacteria are : Penicillin, Streptomycin, Erythromycin, Neomycin etc. Antibiotics are used to treat many diseases in plants and animals caused by microorganisms.

   (ii) Vaccines are substances used to produce immunity to diseases in the living body.
4. **Vectors and Carriers:** Houseflies, mosquitoes, rats, etc., carry bacteria, viruses or protozoans and pass them onto humans, thus causing diseases. Vectors transmit diarrhoea malaria, plague, etc.

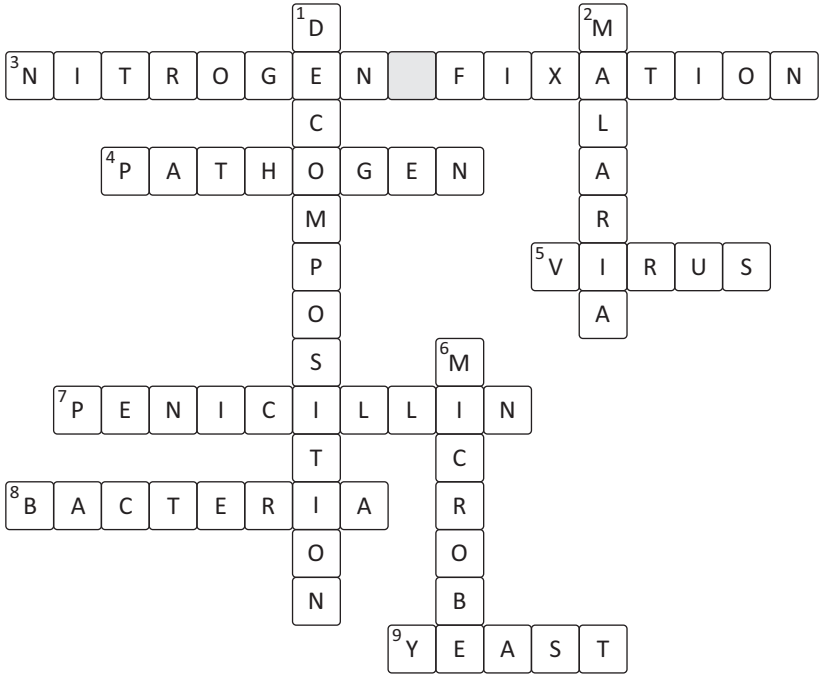
   Air: A person may inhale spores of bacteria, fungi and viruses present in the air and this may result in diseases. Common cold, whooping cough, measles, tuberculosis, etc., are spread through air.

   Infected Food and Water: Intake of food/water infected by bacteria/fungi may lead to diseases. Cholera, typhoid, diarrhoea, etc., are caused by infected food or water.

   Direct Contact with Infected Person: Diseases, such as measles, chicken pox, common cold, COVID-19, etc., spread through contact with infected persons or their belongings.

5. If food has been' spoilt, then the following reasons can be:
   (i) Change in its smell. (ii) Change in its texture.
   (iii) Change in its taste. (iv) Change in its colour.
6. (i) It decease the food wastage.
   (ii) It increases the storage period of perishable food materials.
   (iii) It ensures the all year availability of seasonal food materials.
7. (i) Salting is used to preserve pickles,
   (ii) **Pasteurization :** This method is used for preserving milk. In this method, (i) milk is heated to about 700C for about 15-30 seconds and (ii) then quickly cooled (chilled) and stored in sterilized bottles or pouches. Heating kills the bacteria present in milk. Quick cooling prevents the remaining bacteria from growing.
   (iii) Sugar is used to preserve jam.

CROSSWORD PUZZLE



Combustion and Flame

A. Tick (3) the correct option.

1. (b) 2. (c) 3. (a) 4. (c) 5. (b)
6. (c) 7. (b) 8. (a)

B. Fill in the blanks with correct words.

1. Oxygen 2. LPG 3. Combustible 4. carbon dioxide
5. combustion 6. Carbon monoxide 7. Calorific

C. Match the Following.

1. f 2. g 3. e 4. d 5. a 6. b 7. c

D. Give two examples of each of the following:

1. Paper, Petrol 2. Glass, Cement 3. LPG, Alcohal
4. Coal, Wood 5. Petrol, Diesel 6. CNG, Biogas

E. Short Answer Type Questions.

1. **Combustion :** A chemical reaction in which a fuel react with oxygen to give out heat and light.
2. **Rapid Combustion :** Some substances catch fire very quickly. Such type of combustion that takes place very fast with the emission of large amount of heat and light is called rapid combustion. ely with the evolution of heat and light.

   Spontaneous Combustion : Some substances catch fire on their own when they exposed to air. Such type of combustion is called spontaneous combustion.
3. Water cannot be used in case of fire caused due to liquid fuel like oil or electric short circuit. Oil is lighter than water and floats on its surface, hence water cannot extinguish such fire.
4. Good fuels have high calorific value. They have moderate rate of combustion and moderate ignition temperature, are least polluting and burn completely.
5. Characteristics of a Good Fuel
   - It should be cheap and easily available.
   - It should have high calorific value.
   - It should not produce harmful gases on burning and should not leave ash behind.
   - It should be safe to handle and transport.

6. Carbon containing fuels release the carbon dioxide which is a greenhouse gas. It has the ability to trap heat. The excessive use of such fuels lead to increase in the level of carbon dioxide in the atmosphere. Due to this, the average temperature of earth increases. This increase in the temperature is called global warming.
7. Carbon dioxide is the best extinguisher for fire caused by burning of inflammable liquids like petrol or oil and also electrical fires. Carbon dioxide being heavier than air forms a layer on the burning material and cuts the supply of oxygen. This stops fire. Also, the carbon dioxide gas does not harm most of the electrical equipment.
8. Wood unburnt carbon particles into the environment on burning. These are very fine particles that can cause respiratory problems such as asthma and bronchitis.

F. Long Answer Type Question.

1. The calorific value of gaseous fuel is greater than that of solider and liquids, which means that it will release a large amount of energy when burned.
2. High atmospheric temperatures and dryness offer favorable circum stance for a fire to start.
3. Those substances which burn easily to produce heat and light are called combustible substances. For example : paper, wood, petrol, kerosene, coal, diesel, natural gas, etc.

   Substances which do not burn easily in air or oxygen are called non-combustible substances. For example : glass, cement, soil, iron, stones, etc.
4. **(a) Fuels :** Any substance that burns to produce heat and light energy is called fuel. On the basis of the physical state, fuels are grouped into three categories :
   (i) **Solid Fuels :** The fuels like wood, coal, coke and cow dung cake which exist in solid state at room temperature are called solid fuels.
   (ii) **Liquid Fuels :** The fuels like oil, alcohol, petrol and diesel which exist in liquid state at room temperature are called liquid fuels.
   (iii) **Gaseous Fuels :** The fuels like natural gas, biogas and petroleum gas which exist in gaseous state at room temperature are called gaseous fuels.

   (b) A Candle Flame : A candle flame is divided into the following three zones:
   (i) The innermost zone : It appears black and is the dark zone of a candle. No combustion occurs here because of lack of oxygen. It

contains unburnt wax and is the least hot region of the candle flame.

(ii) The middle zone : Partial combustion takes place here and wax vapour start burning with a yellowish flame. This region of the candle flame is moderately hot. It is also known as the luminous zone.

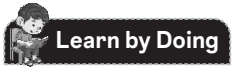
(iii) The outer zone : This is the region of complete combustion of wax vapour, with a blue colour flame. The wax burns here completely and produces carbon dioxide, water vapour and heat. This region is the hottest part of the candle flame.

5. **Conditions Necessary for Combustion :** There are three conditions necessary for combustion as follows :
   - Presence of air or oxygen.
   - Presence of a combustible substance.
   - Attainment of ignition temperature or kindling temperature of the combustible substance.

6. (a) The lowest temperature at which a particular substance burns in the presence of air is called its ignition temperature. A substance cannot catch fire if the temperature is lower than its ignition temperature.

   (b) The amount of heat energy produced by the complete combustion of 1 g of a fuel is called calorific value of fuel. Calorific value of a fuel is expressed in kilo joules per gram (kJ/g).

   (c) A fire extinguisher is a handheld active fire protection device usally filled with a dry or wet chemical used to extinguish or control small fires, after in emergences.



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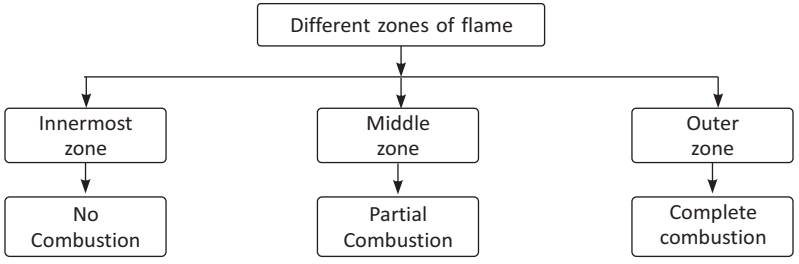


Coal and Petroleum

A. Tick (3) the correct option.

1. (d) 2. (c) 3. (b) 4. (c) 5. (b) 6. (d)

B. Fill in the blanks with correct words.

1. Carbonization 2. Coal, Petroleum 3. petroleum
4. coal tar 5. paraffin was 6. Natural gas

C. Match the Following.

1. f 2. a 3. e 4. b 5. c 6. d

D. Short Answer Type Questions.

1. Nature has provided us with lots of useful things to fulfil our needs. These are called natural resources. Natural resources are of two types – renewable and non-renewable.

2.

S.No.	Breathing	Cellular Respiration
1.	Petroleum gas (LPG-Liquified Petroleum Gas)	• Fuels for home and industries. • In the production of carbon black.
2.	Petrol	• Fuel in vehicles like cars, scooters. • As a solvent for dry cleaning clothes.
3.	Kerosene	• As a fuel in wick stoves. • Used for lighting in petromaxlamps. • As a fuel in jet aeroplanes.
4.	Diesel	• As s a fuel in heavy vehicles like ships, trucks, etc. • To run water pumps and generators.
5.	Lubricating oil	• Used to lubricate machinery.
6.	Paraffin Wax	• Used for making candles, wax paper, vaseline, grease, shoe polish.
7.	Bitumen	• Used for making road surfaces and paints.

3. **Renewable Resources :** The natural resources which are present in unlimited quantity in nature are called renewable or inexhaustible natural resources. Inexhaustible means something which cannot be used up completely. They cannot be exhausted by human activities. For example – water, air and sunlight.

Non-renewable Resources : The natural resources which are present in limited quantity in nature are called non-renewable or exhaustible natural resources. Exhaustible means something which can be used up completely. They can be exhausted by human activities. For example – wildlife, forest, coal, petroleum and natural gas.

4. (i) Coal is used to produce electricity.
   (ii) Coal is used as fuel for cooing and a source of heat.
5. Natural resources which are formed by decomposition of dead remains of living organisms (fossils) are called fossil fuels.
6. **Common Varieties of Coal:**

   Peat : It is brown is colour and most inferior in quality. It is the youngest variety of coal and contain 50% to 60% of carbon (lowest carbon content). It has high moisture content and burns with a sooty flame.

   Lignite : It contains 60% to 70% of carbon. It is a soft coal and catches fire easily. It contains some amount of sulphur which causes pollution when burnt.

   Bituminous : It contains approximately 75% of carbon. It is used for domestic purposes and also known as household coal.

   Anthracite : When bituminous coal remains on the earth for a long time and undergoes extreme pressure, then anthracite coal is formed. It contains 90% to 95% of carbon. It is called as hard coal. It is present at maximum depth as compared to other types of coal.
7. Crude petroleum is a mixture of about 200 hydrocarbons. It contains useful substances like petroleum gas, petrol, diesel, paraffin wax, lubricating oil, etc. The process of separation of various constituents of petroleum is called refining of petroleum. It can be done by fractional distillation.

E. Long Answer Type Questions.

1. **Formation of Coal :** Coal was formed from the dead remains of trees, ferns and other planets that lived 300 to 400 million years ago. In some areas of eastern united states, coal was formed from swamps covered by sea water. It is believed that dead plants were covered by rocks and soil and were decomposed by bacteria. New plants grew in the soil and they too got burried under the soil and rocks. Volcanic eruptions and earthquakes destroyed forests which also got burried under the surface of the earth and got covered with sand, clay and water.

   Over the years, these remains went deeper and deeper and due to high temperature and high pressure inside the earth and in absence of air, they got converted into coal.
2. Natural gas is a fossil fuel. It is found deep inside the earth, between two

layers of non-porous rocks, either alone or along with oil above petroleum deposits. It is stored under high pressure as Compressed Natural Gas (CNG). Natural gas contains mainly 95% methane and small amounts of gases like ethane, propane, butane, pentane with small amount of nitrogen, carbon dioxide, hydrogen sulphide and traces of water.

Uses of Natural Gas

(i) It is used as a cooking and heating fuel in household and industries.

(ii) It is also used an non-polluting fuel for vehicles.

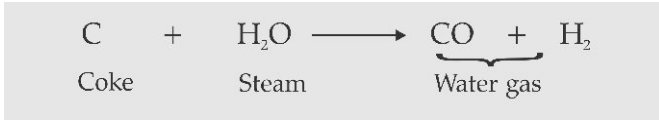
(iii) Natural gas is used for manufacturing many chemicals and fertilizers.

(iv) Natural gas is used as fuel in thermal power stations for generating electricity.

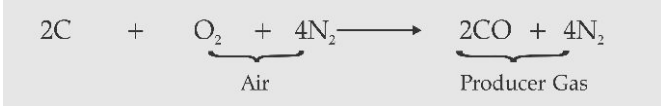
3. **Destructive Distillation of Coal :** When coal is heated strongly in the absence of air it produces various useful organic and inorganic products.

Coke : The solid residue left behind after dry distillation of coal is known as coke. It is tough, porous and black. It contains about 98% carbon and is used to manufacture steel and extract many metals from their ores.

When steam is passed over red hot coke, it produces water gas which is a fuel gas. It is a mixture of carbon monoxide and hydrogen.



When air is passed over red hot coke, producer gas which is a mixture of carbon monoxide and nitrogen is formed.



Coal Tar : It is a thick black liquid with an unpleasant smell. It is a mixture of about 200 substances which are used in the manufacture of dyes, drugs, perfumes, explosives, paints, etc. Pitch derived from coal tar is used to construct roads but these days bitumen, a petroleum product is used for making roads.

Coal Gas : This gas produced during processing of coal is a mixture of methane, carbon monoxide and hydrogen. It is known as coal gas. It is a very good fuel and is used in many industrial units situated near the coal processing plants.

4. These measures include the following :

(i) In India 75% of the total amount of coal used every year goes in the

produced of electricity in thermal power station. Hence, electricity also needs to be conserved.

(ii) Use alternative sources of energy like solar energy by setting up or installing solar energy heating panels and lighting devices.

(iii) Our cars eat up a lot of petrol carpooling can be done. This is shared use of a car by the driver and one or more passengers, usually for commuting.

(iv) Short distances can be travelled by bicycle or by foot. This will also prove to be heatlhy.

(v) Proper tuning and checkups of the vehicles should be done.

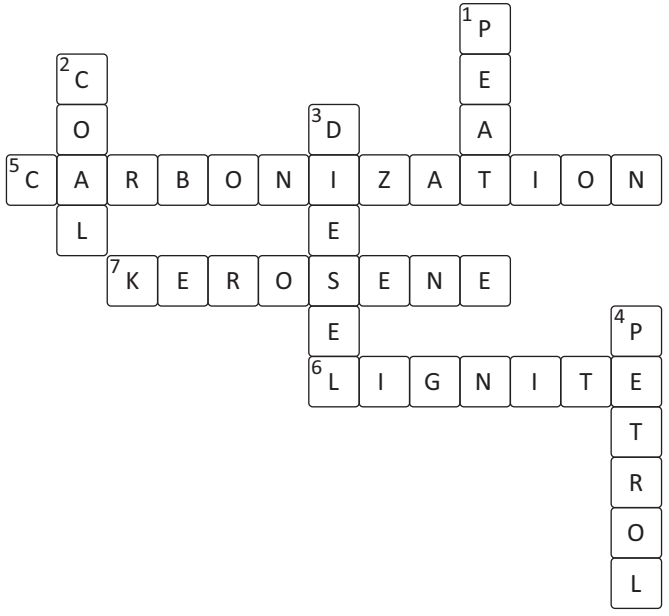
(vi) Go for cleaner fuels like CNG.

5. The slow chemical process of conversion of wood into coal is called carbonization. The volatile substances were driven off while the carbon content of the dead and decayed plant matter grew. Carbonisation is a very slow process and may have taken thousands of years to convert decayed plant matter into coal.

6. They are called exhaustible natural resources because all the fossil fuels are used up, they will be gone forever. In this chapter, we will learn about exhaustible fuels, such as coal, petroleum and natural gas.

Learn by Doing

CROSSWORD PUZZLE



Conservation of Biodiversity

A. Tick (3) the correct option.

1. (a) 2. (a) 3. (d) 4. (b) 5. (c) 6. (c) 7. (b)

B. Fill in the blanks with correct words.

1. natural 2. biodiversity 3. endemic 4. overgrazing
5. overgrazing 6. endagered 7. soil erosion 8. afforestation

C. Short Answer Type Questions.

1. The diverse forms of plants and animals on the earth is called biodiversity.
2. Different plants growing in a particular area tare called flora Animals found in a particular area are called fauna.
3. **Industrialization and Urbanization :** The land cleared by deforestation is used for erecting industries, homes and roads to fuliill the needs of the increasing population.

   Overgrazing : Overgrazing by increasing population of animals also leads to loss of biodiversity.
4. To protect the flora and fauna and their habitats, our government under the wildlife (Protection) Act, 1972 created protected areas.
5. The forest conservation act is the proctice of planting more trees and maintaining the forested areas for the sustain ability for future generations.
6. **Extinct Species :** Some species of plants and animals which do not exist anymore on the earth are known as extinct species. Dinosaur, dodo are some examples of extinct animals. Similarly nilgiri holly and cry pansy are examples of extinct plants.

   Endangered Species : There are some species of plants and animals that are at high risk of becoming extinct. Such species are called endangered species. Their numbers have been drastically reduced due to their indiscriminate hunting or destruction of their habitats. For example- the Indian rhinoceros, Asiatic lion, crocodile and blue whale are endangered species.
7. Planting of new trees where forests have been destroyed is called reforestation.
8. (a) Pachamarhi Biosphere Reserve. (b) Nilgiri Biosphere Reserve.

   (b) • Gir Wildlife Sanctuary (Gujarat)

- Sultanpur Bird Sanctuary (Haryana)
- Dachigam Sanctuary (Srinagar)
- Mudumalai Sanctuary (Tamil Nadu)
- Kaziranga Santuary (Assam)
- Periyar Santuary (Kerla)

(c)
- Jim Corbett National Park (Uttarakhand)
- Dudhwa National Park (Uttar Pradesh)
- Ranthambore National Park (Rajasthan)
- Kanha National Park (Madhya Pradesh)
- Simplipal National Park (Orissa)

D. Long Answer Type Questions.

1. All living things depend on non-living natural resources and there needs to be a balance between them. But with increase in human population, the demand for natural resources has increased tremendously. There is, thus, a need for conservation of natural resources. The wise and judicious use of natural resources is called conservation. Such a use would ensure that resources are available for future generations as well as overuse or wastage of resources must be avoided.

   Conservation is broadly aimed at two aspects :

   (i) to ensure a continuous availability of useful plants, animals and materials for future generations.

   (ii) to preserve the quality of our environment.

2. **Causes of Deforestation:** Various man-made causes of deforestation are:
   - construction of houses and industries.
   - clearing land for agricultural purposes.
   - using wood as fuel.
   - using wood to make paper, furniture and other things.

   Deforestation also occurs naturally due to forest fires, earthquakes, severe droughts and floods.

   Consequences of Deforestation :

   (i) Deforestation leads to increase in temperature and pollution level on the earth. This disturbs the water cycle and reduces rainfall.

   (ii) The level of carbon dioxide in the atmosphere increases on account of deforestation. You know that plants need carbon dioxide for photosynthesis.

   (iii) Deforestation results in soil erosion. Soil erosion removes the top layer of the soil that contains the fertile humus. Removal of top layer, thus makes the soil less fertile, as the lower layers of soil contain less humus. If this goes on, the fertile land gets converted into a desert.

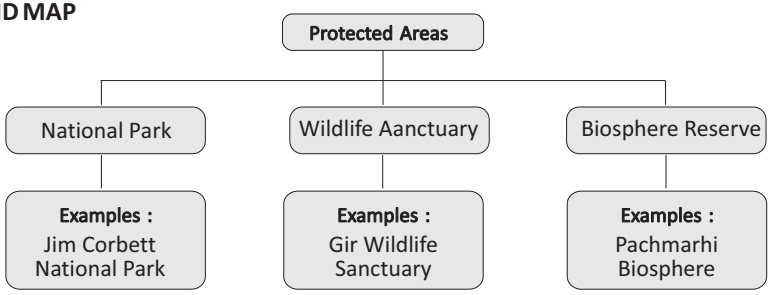
(iv) As a result of deforestation, groundwater level also gets lowered. The capacity of the soil to hold water is reduced. The movement of water from the soil surface into the ground slows down. In the absence of trees and their root system, water is not able to seep into the soil. As a result, in rainy season water just flows over the soil, bringing about floods.

3. The level of carbon dioxide in the atmosphere increases on account of deforestation. You know that plants need carbon dioxide for photosynthesis. Reduced number of trees require lesser carbon dioxide. So the level of this gas has gone up in the atmosphere, resulting in global warming.
4. The factors leading to formation fo endemic species :
   (i) Destruction of habitat. (ii) Increasing population
   (iii) Introduction of new species.
5. Project tiger was launched by the Indian government in 1973 to protect the tigers in the country. The tiger population in India has been decreasing sharply over the years. In 1948, population of tigers was about 20,000. In 1989, it was about 4,000 and it went down to about 1,233 in 2000.

   Realising this decline, the project tiger was initiated by the Government of India. At present, there are 39 Tiger Reserves in 17 Indian states. According to the latest tiger census report released by the National Tiger Conservation Authority on March 28, 2011, the current tiger population estimated is 1706.
6. Red data book is a source which gives a record of all the endangered animals and plants. This is published by the International Union for Conservation of Nature and Natural Resources (IUCN), now known as the World Conservation Union (WCU). The main aim of IUCN is to focus the attention of conservationists towards species that are endangered and are at high risk of extinction.

Learn by Doing

MIND MAP



Reproduction

A. Tick (3) the correct option.

1. (b) 2. (c) 3. (a) 4. (a) 5. (a)
6. (b) 7. (c) 8. (a)

B. Fill in the blanks with correct words.

1. internal 2. Fallopian tube 3. Oviparous 4. external
5. Test Tube Babies 6. 23 7. Foxtus 8. sex

C. Give two examples of each of the following :

1. Amoeba, Hydra
2. Human, Birds
3. Hen, Frog
4. Cow, Dog

D. Match the following.

1. c 2. a 3. f 4. b 5. e 6. d

E. Short Answer Type Questions.

1. (a) The process by which living organisms produce young ones of their own kind.

   (b) In this mode of asexual reproduction, a unicellular organism, like amoeba divides itself into two equal individuals. During the process of binary fission, first the nucleus divides, forming two nuclei. This is followed by the division of the cytoplasm into two parts. Finally two daughter amoebae are formed, having cytoplasm with one nucleus each. Each daughter amoeba grows into an adult or fully grown amoeba.

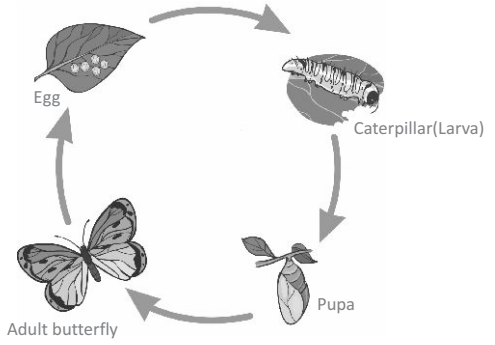
   (c) In this mode of asexual reproduction, a small bulb-like projection called 'bud' is formed on the body of the animal. Hydra reproduces by budding. In Hydra, small 'buds' are formed on the body. The nucleus of the parent hydra divides into two and one of the nuclei moves into the bud. After some time when the bud is grown, it gets detached from the parent Hydra and grows into an independent individual.

   (d) The process of fusion of male and female gametes to form the zygote is called fertilization.

2. **Asexual Reproduction :** In this mode of reproduction, a single parent is involved in the production of a new individual of its own kind.

   Sexual Reproduction : In this mode of reproduction, two individuals the

male and the female are involved in the production of a new individual of their own kind.

3. In Hydra, small 'buds' are formed on the body. The nucleus of the parent hydra divides into two and one of the nuclei moves into the bud. After some time when the bud is grown, it gets detached from the parent Hydra and grows into an independent individual.
4. On the basis of the mode of reproduction, animals can be categorised into oviparous and viviparous animals. Animals which lay eggs are called oviparous animals like hen, frog, lizard, fish etc., while those that give birth to young ones are called viviparous animals like mammals (cows, dogs, etc.).
5. 

Life cycle of butterfly
6. The sex of a baby is determined by strands of genetic material present inside the nucleus of a cell. These strands or thread-like structures are called chromosomes.

F. Long Answer Type Questions.

1. (a) When the egg get fertilized. it result in pregnancy.
   (b) If the egg is not fertilized by the sperm then lining of the uterus wall with blood vessels breaks down and passes out of the vagina with the unfertilized egg. resulting in bleeding.
2. Zygote moves from the oviduct to the uterus and gets attached to the wall of the uterus. As it moves, it divides repeatedly by the process of cell division and forms a ball of cells. The ball of cells gets embedded on the wall of the uterus for further development. This developing structure is called an embryo. The cells in the embryo form groups which develop into different tissues and organs of the body.
3. We should take care of our health at all ages but adolescents should take extra care of themselves as their body demands are high. To grow healthy both physically and mentally, you should strictly follow some health rules. Some of these are listed below.

Balance Diet : Adolescence is a stage of rapid growth and development. Hence during this age, a balanced diet should be taken and junk foods should be avoidable. A balanced diet includes adequate amount of all the nutrients required by the body. Indian meal (roti, rice, dal and vegetables) constituents a balanced diet. In addition milk, fruits, green leafy vegetables, jaggery, amla, nuts, eggs, meal, etc., should be included as per the food preferences.

Personal Hygiene : Cleanliness must be maintained by girls during menstrual cycle otherwise they might catch various RTIS (Reproductive Tract Infections).

Teenagers should take care of their cleanliness as there is an increased activity of sweat glands which causes body odour. Hence taking a bath is very important.

Physical Exercise : All teenagers must do some physical exercises on a regular basis. Walking and playing in fresh air keeps the body fit and healthy. Teenagers must take walks, exercise and play outdoor games.

4. **Male Reproductive System :** A male reproductive system includes a pair of testes (singular– testis), two sperm ducts, urethra and a penis.

Testes : The testes are the site where millions of male gametes or sperms are produced.

Sperm ducts : The sperms formed in testes leave the testes through a pair of narrow ducts called sperm ducts or vas deferens. Sperms are the male gametes of male reproductive system.

Urethra : The two vas deferens open into the urethra. Urethra carries the sperms to an organ called penis.

Penis : It opens outside the body. It passes the sperms from the man's body to the woman's body form the purpose of reproduction. It is used to pass urine as well.

Female Reproductive System

A female reproductive system of humans includes a pair of ovaries, two oviducts, uterus and vagina.

Ovaries : A woman has two ovaries. Each ovary produces the female gametes called eggs or ovum. Usually one ovum is produced from one of the ovaries every month by a process called ovulation.

Oviduct or Fallopian Tube : A tube is present just above each ovary, called oviducts. It is a muscular tube which joins the uterus with the ovary. The sperms and the ovum meet in the oviduct and fertilisation occurs.

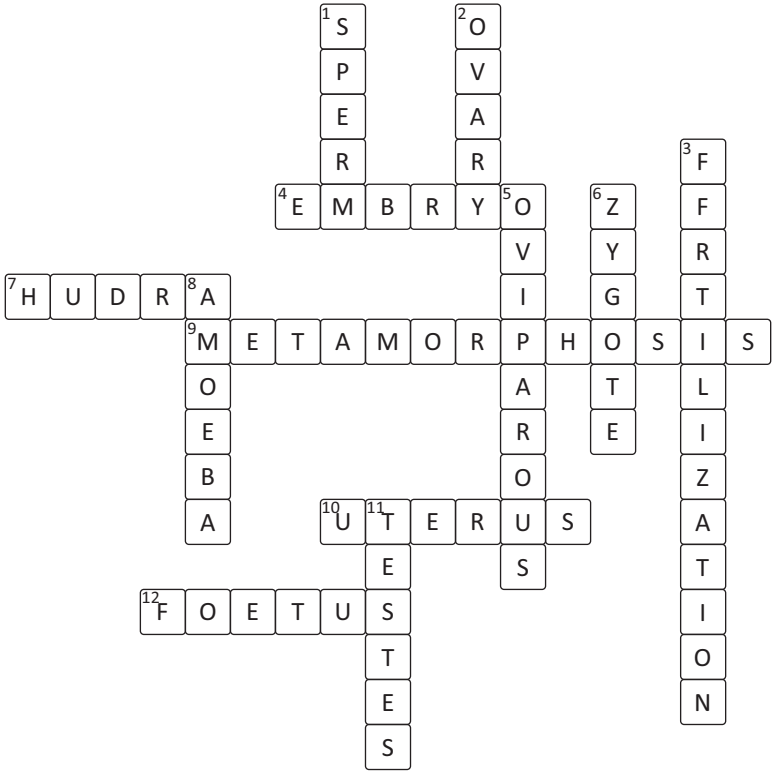
Uterus or Womb : It is a hollow, muscular pear shaped organ. The development of foetus occurs inside it. The lower narrow part of the uterus is called cervix which is connected to the vagina.

Vagina : The uterus opens into a wide muscular tube called vagina. It is the female genital organ. It receives the sperms from the male's body.

5. On the basis of the mode of reproduction, animals can be categorised into oviparous and viviparous animals. Animals which lay eggs are called oviparous animals like hen, frog, lizard, fish etc., while those that give birth to young ones are called viviparous animals like mammals (cows, dogs, etc.).
6. Human body cells contain 23 pairs of chromosomes. The 23rd pair of chromosome differs in males and females. In a male, the 23rd pair consists of an X (long) and a Y (short) chromosome (XY). In a female, the 23rd pair consists of two X chromosomes (XX). X and Y chromosomes are called the sex chromosomes.

   The sex chromosomes determine the sex gender of the body. Hence, they are named sec chromosomes.

CROSSWORD PUZZLE



Reaching the Age of Adolescence

A. Tick (3) the correct option.

1. (b) 2. (d) 3. (a) 4. (c) 5. (d)

B. Fill in the blanks with correct words.

1. thyroid 2. menarche 3. menopause
4. Ovaries 5. Ovulation

C. Match the following.

1. d 2. a 3. b 4. e 5. c

D. Short Answer Type Questions.

1. In females, one of the two ovaries produce one egg or ovum, which is released once in every 28-30 days. This process of the release of a mature ovum by an ovary is called ovulation.
2. The age at which reproductive organs become functionally active is called puberty.
3. The full form of AIDS is Acquired Immuno Deficiency Syndrome. It is caused by the HIV virus. This virus destroys the defence mechanism of the body. It can pass from an infected person to a normal person by sharing syringes used for injecting drugs, blood transfusion, sexual contact with a person infected with HIV. It can also pass to an infant from the milk of an infected mother.
4. The beginning of menstruation at puberty is called menarche (it is the first menstrual flow). In the beginning, menstrual cycle may be irregular but after sometime it becomes regular.

   Menstrual stops at the age of 45-50 years. The permanent stoppage of menstruation is called menopause.
5. The use of drugs for purpose other than medicinal use is called drug abuse.

E. Long Answer Type Questions.

1. This is also known as master gland, as it produces several hormones which control the activities of other endocrine glands. The growth hormone stimulates growth in the body, and the thyroid stimulating hormone stimulates thyroid gland. Other hormones secreted from this gland stimulates testes and ovaries.
2. Human body cell contain 23 pair of chromosomes. The 23rd pair of

chromosome differs in male and females. In a male, the 23rd pair consists of an x (long) and Y (Short) chromosome (XY). In a female, the 23rd pair consists two. X chromosome (XX). X and Y chromosomes are called the sex chromosome.

Testes : It secretes the male sex hormones testosterone which is responsible for the development of secondary sexual characters in a boy.

Ovaries : They produce the female sex hormone oestrogen which helps in the development of secondary sexual characters in a girl. Another hormone called progesterone is also released from the ovary. It is sometimes called the pregnancy hormone and is responsible for the maintenance of pregnancy.

3. If the egg is not fertilized by the sperm, then the lining of the uterus wall with blood vessels breaks down and passes out of the vagina with the unfertilized egg, resulting in bleeding. This is called menstruation. Menstruation occurs for 4-5 days after every 28 to 30 days.
4. During puberty, a number of physical and psychological changes take place. Some of the changes which take place in boys and girls are as follows :

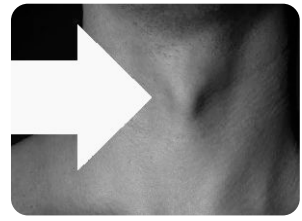
Increase in Height : There is a sudden increase in height during puberty. It is one of the most visible changes in puberty. This is due to the elongation of long bones in both arms and legs.

It is observed that girls initially grow faster than boys. Both boys and girls reach their maximum height at around 18 years of age.

Changes in Body Shape: In boys, the shoulders become broader and the chest becomes wider. The muscles develop more in boys than in girls.

In girls, the pelvic bones grow and hips broaden. Breasts develop and increase in size.

Change in Voice: At puberty, the voice box or larynx begins to grow. The increase in its size is more visible in boys than in girls. In boys, it is seen as a protruding part of the throat, called Adam's apple. Boys develop a deep or low pitched voice that occassionally becomes hoarse. This is temporary and becomes normal after a few days or months.



Adam's apple

The voice box is smaller in girls and is not visible from the outside. Girls have a high pitched voice.

Increase in Activity of Sweat and Oil Glands: During puberty, the secretions from sweat and oil (sebaceous) glands increase leading to increased sweating. The skin becomes oily. The increased activity of

these glands leads to acne and pimples on the faces of adolescents.

Development of sex organs

- At puberty, the male sex organs (the testes and penis) develop completely. The testes start producing male gametes called sperms.
- In girls, the ovaries enlarge and start releasing mature eggs.

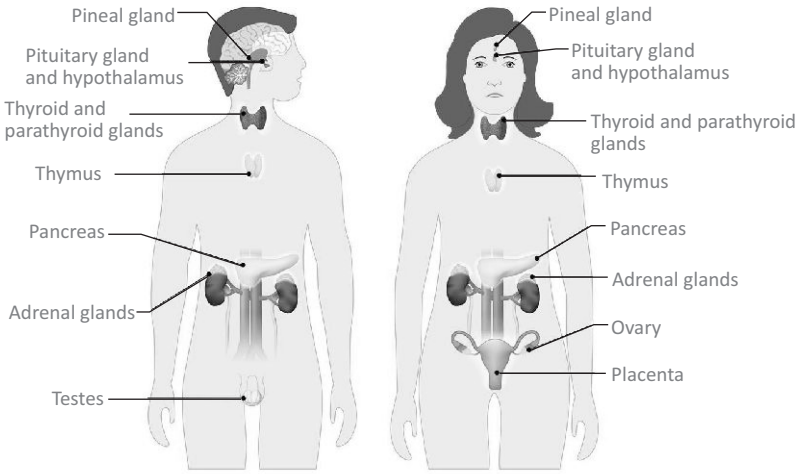
Mental, intellectual and emotional changes

- The adolescents become more independent and self-conscious.
- Intellectual development takes place and they start contemplating about various things and situations in life.
- At times, they may feel insecure and confused while trying to adjust to the changes in the body and mind.

Mood swing

- They develop attraction for the opposite sex or gender.
- Due to an increase in hormonal levels, mood swings may occur. One moment an adolescent may feel happy and the next moment sad.

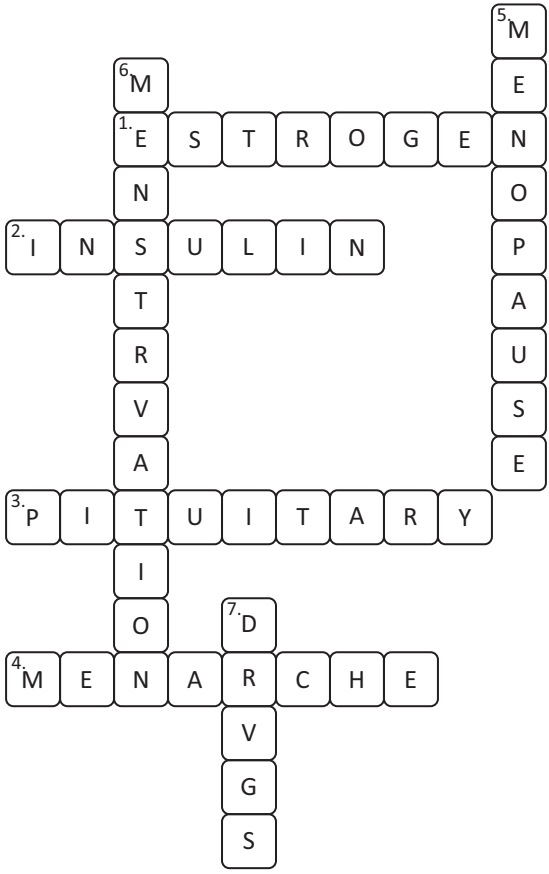
5.



Endocrine system in human body

Learn by Doing

CROSSWORD PUZZLE



Force and Pressure

A. Tick (3) the correct option.

1. (b) 2. (d) 3. (b) 4. (d) 5. (b) 6. (d) 7. (c)

B. Fill in the blanks with correct words.

1. Muscular 2. wider 3. non-contact 4. larger
5. pascal 6. pressure 7. Atmosphere

C. Match the following.

1. c 2. a 3. e 4. b 5. d

D. Short Answer Type Questions.

1. (a) A pull or push acting on a body which tends to change its state of rest of motion is called force.
   (b) Force acting per unit area is called pressure
2. The sharp knife has a very small area of contact with the surface, while the blunt knife has a larger area of contact. If both knives are pushed down with the same force, the sharp knife will exert a greater pressure on the surface as compared to the blunt knife so the sharp edge of a knife is used to chop vegetables rather than blunt edge.
3. Objects or things fall towards the earth because it pulls them. This force is called the force of gravity or just gravity. This is an attractive force. The force of gravity acts on all objects.
4. We have, pressure = 8 Pa
   and Area = 152 cm2
   We know, $\text{Pressure} = \frac{\text{Forcce}}{\text{Area}}$
   $8 = \frac{\text{Forcce}}{152}$
   Force = 8 x 152
   = 1216 N Answer
5. Pressure depends on the amount of force. The more the force, the more the pressure. Pressure is directly proportional to the force and inversely proportional to the area of contact.
   Pressure is thus defined as force acting per unit area.

   Pressure (P) = Force (F) / Area (A)

6. The pressure exerted by the atmosphere on an object is called atmospheric pressure.
7. The atmospheric pressure at a place depends on its altitude. The atmospheric pressure reduces as we go to high altitudes.

E. Long Answer Type Questions.

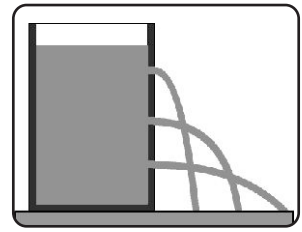
1. If we go into space without wearing a 'space suit', our bodies will burst. Space suits are designed to maintain a normal atmospheric pressure on the body, as there is no atmosphere in space.
2. **Aim :** To show that liquid pressure varies with depth.

   Method :

   (i) Take a plastic bottle and punch three holes at different heights.

   (ii) Now, pour some water into it and let the water flow through these holes.

   What do you observe?



Liquid pressure varies with depth

   Observations :

   You will observe that water from the lowest hole comes out with the greatest force and falls at the maximum distance. You will observe that water from the topmost hole comes out with the least force and falls at the minimum distance.

   Repeat the experiment with different liquids. This proves that liquid pressure varies with depth. The pressure increase with depth of the liquid.
3. **Force can produce motion** : Force can be applied on an object by pushing, pulling or hitting it with another object. This applied force can make the object move. For example –
   - We push a heavy box to move it ahead.
   - We pull a car door to open it.

   Force can stop motion : We can stop a moving body by applying force on it in the direction opposite to the direction of its motion. For example– we apply force to stop a moving ball or a rolling stone. However, if the stone is too bulky, we may not be able to stop it if the force applied by us is not sufficient.

   Force can change the direction of motion : In a game of cricket, football, hockey, tennis, etc. we can change the direction of the force applied is the same as the direction of the motion of the object, the direction of the object will not change, but its speed will increase.

   Force can change the speed of motion : We can increase the speed of a moving body by applying force on it in the direction of the motion of the

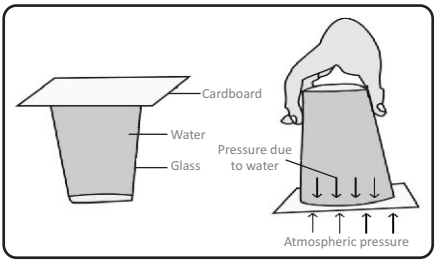
body. For example, by kicking a moving football in the direction of its motion, we can increase its speed.

By applying force in the direction opposite to the direction of the motion of the body, we can reduce its speed.

4. **Aim** : To confirm the presence of atmospheric pressure. Materials **Required:** A glass, water and cardboard

Procedure :

- Take a glass and fill it with water up to the brim, such that there is no air gap between the water level and the brim of the glass.
- Now cover the glass with the cardboard piece. Keeping one of the palms tightly pressed against the cardboard and invert the glass quickly.
- Now gently remove your hand from below the cardboard.



Existence of atmospheric pressure

Observation : You will observe that the cardboard remains intact at its place and does not fall down.

Discussion : This suggests presence of some force acting on the cardboard from below, which is strong enough to hold the weight of water above it. This force is the atmospheric pressure acting in the upward direction on the cardboard.

Conclusion : Atmospheric pressure surrounds us.

5. **Aim :** To show that liquid exerts the same pressure in all directions at a given depth.

Method:

(i) Take a plastic bottle.

(ii) Punch three holes in the bottle at the same height.

(iii) Now, pour some water into it and let it flow through these holes.


Liquid exerts the same pressure in all directions at given depth.

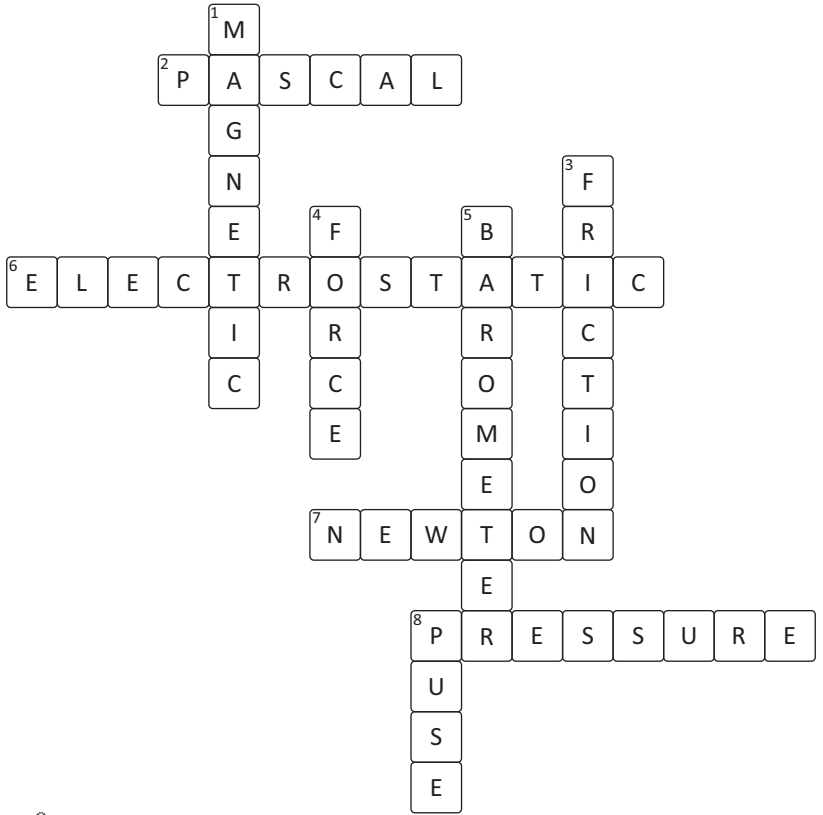
Observations :

You will observe that water comes out from all the holes with the same force and falls at the same distance.

This shows that liquids exert the same pressure in all directions at a given depth.

Learn by Doing

CROSSWORD PUZZLE



Friction

A. Tick (✓) the correct option.

1. (c) 2. (a) 3. (a) 4. (b) 5. (b) 6. (c) 7. (a)

B. Fill in the blanks with correct words.

1. opposite 2. rolling 3. more 4. heat
5. friction 6. roughness 7. decrease 8. smoth

C. Match the following.

1. b 2. e 3. d 4. a 5. c

D. Short Answer Type Questions.

1. (a) Friction is a force that opposes the motion of an object.

   (b) A substance used to reduce friction between two surfaces. are called lubricants.

   (c) All fluids (Liquids and gases) exert a force of friction on objects that move through them, which is called drag.

2. The friction can be reduced by making the surface smoother. We can reduce friction by using wheels. A suitcase with wheels can be pushed easily.

3. The use of brake pads is also another method of increasing friction. The brake pads in brake system of a bicycle do not touch the wheels until you press the brakes.

   Sand and gravel is thrown on slippery ground during rainy season to increase friction.

4. The boats and aeroplanes are made in streamlined shapes because these shapes less the friction.

5. When an object starts sliding the contact points on its surface do not get enough time to lock into the contact points on the floor. So sliding friction is slightly smaller than static friction.

6. **Sliding Friction** : The force of friction acting between two bodies when they slide on one another with a uniform speed is called sliding friction.

   Rolling Friction : The force of friction that exists between two surface when a body rolls over the other body is called rolling friction.

7. Friction is caused by the rubbing of irregularities on two surfaces in contact.

8. (a) A fluid friction is a resistance offered by a fluid against its flow. When an object moves through a fluid (air or water), it has to overcome the friction acting on it. In this process, it losses energy. Hence, object moving fluids must have special shapes. These shapes are called streamlined shapes.

   (b) **Sliding Friction** : The force of friction acting between two bodies when they slide on one another with a uniform speed is called sliding friction.

   Rolling Friction : The force of friction that exists between two surface when a body rolls over the other body is called rolling friction.

E. Long Answer Type Questions.

1. **Friction reduces the speed of a moving objects :** You cannot move faster on a rough road on your bicycle. It is difficult to drag a heavy object due to friction that opposes the motion.

Friction causes wear and tear : Rubber tyres of automobiles wear and tear due to friction produced between the tyre and the road while running. The sole shoes gets worn out due to friction caused between the shoes and the ground while walking.

2. **Static Friction :** Static friction is the frictional force that exists between two bodies so long as they are relatively at rest, even though an external force is acting upon them. It is the opposing force that comes into play when one body tends to move over the surface of another but actual movement has not started. Static friction must be overcome before an object can be set in motion.

   Sliding Friction : The force of friction acting between two bodies when they slide on one another with a uniform speed is called sliding friction.

   When an object starts sliding the contact points on its surface do not get enough time to lock into the contact points on the floor. So sliding friction is slightly smaller than static friction.

   Rolling Friction : The force of friction that exists between two surface when a body rolls over the other body is called rolling friction.

   Rolling reduces friction. That is why it is easy to move a heavy box when it is fitted with wheels. We will need to apply a lot of force, if it is without wheels.

3. The friction can be reduced by making the surface smoother. The material used to make a surface smooth is called a lubricant. The most commonly used lubricants are oil, grease, graphite, boric powder, talcum powder, etc.

   When oil or grease is applied between moving parts, it forms a thin layer so the surfaces do not rub directly and friction is reduced. By reducing friction, we can reduce the wear and tear of moving parts and movements becomes smooth.

4. Friction is a necessary evil because it has both harmful and beneficial efects Exp :

   (i) We can walk easily because the ground offers friction. with less friction, the walking situation because almost impossible.

   (ii) Years of vehicles have treads for better grip over the road. It provides friction to the surface of the road. when treads are worn out, the tyres need to be replaced with a new one. Because the tyres loos their friction.

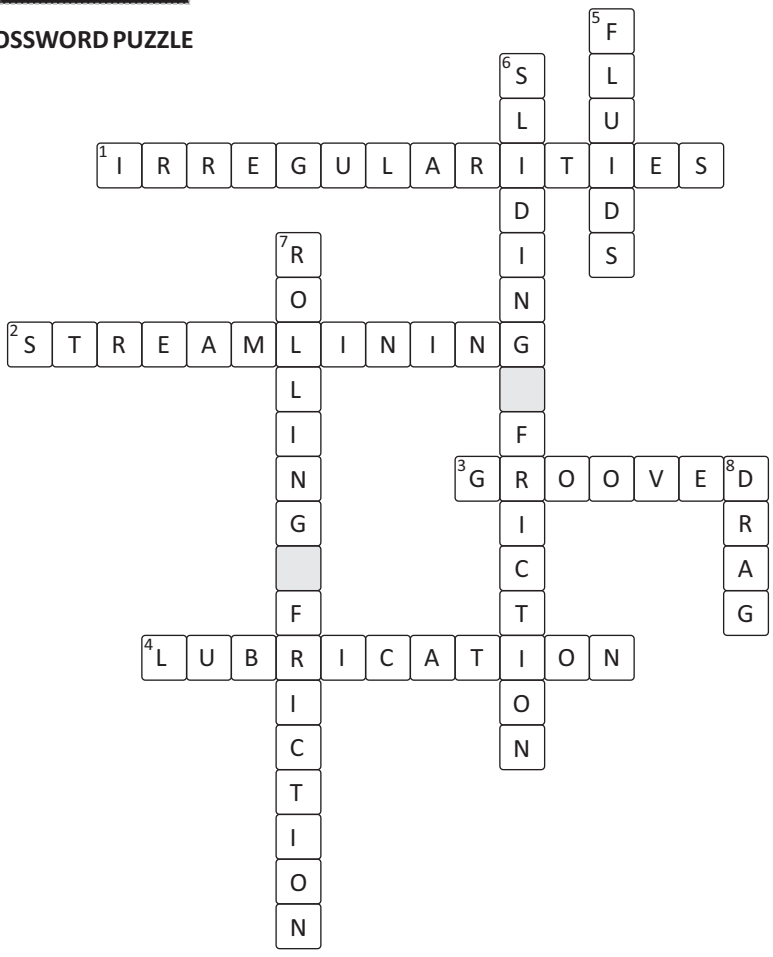
   (iii) Friction can also produce heat. Vigorously rub your palms together for a few minutes.

   (iv) Writing with a pen is possible because paper provides friction to the tip of a pen.

5. When an object moves through a fluid (air or water), it has to overcome the friction acting on it. In this process, it losses energy. That is why, objects having streamlined shape, experience lesser friction. Automobiles are designed narrow from front. So as to reduce friction of the air. The streamlined body of fish enables it to move easily in water by minimising fluid friction. Aeroplanes, rockets and missiles are made into streamlined shapes to enable them to move in air easily.
6. A fluid friction is a resistance offered by a fluid against its flow. When an object moves through a fluid (air or water), it has to overcome the friction acting on it. In this process, it losses energy. Hence, object moving fluids must have special shapes. These shapes are called streamlined shapes.

Learn by Doing

CROSSWORD PUZZLE



Sounds

A. Tick (3) the correct option.

1. (d) 2. (a) 3. (a) 4. (a) 5. (d) 6. (d) 7. (b)

B. Fill in the blanks with correct words.

1. vibration 2. hertz 3. neck 4. stirrup
5. Noise 6. medium 7. music

C. Match the following.

1. c 2. a 3. d 4. e 5. b

D. Short Answer Type Questions.

1. Sound is produced due to vibrations. The rapid back and forth movement of body about its mean position is called vibration. If you play a radio very loud and place your palm against its speaker, you will feel its vibrations. If you tightly stretch a rubber band and pluck it, it vibrates and produces a sound. You must have heard the sound of a mosquito. It flap its wings so many times in a sound that you are able to hear the sound its flap.
2. The time taken by the wave to transverse one wavelength is called its time period. It is denoted by the symbol T and is measured in second (s).
3. Any sound that is pleasing to the ears is called music. Any sound that is not pleasing to the ears is called noise.
4. (a) **Frequency :** The number of oscillations completed by medium particles in one second is called the frequency of a wave.

   Frequency = Number of oscillations/Time period

   It is denoted by the symbol f and is measured in hertz (Hz).

   Amplitude : The maximum displacement of medium particle on either side of their respective mean position is known as amplitude of the wave.

   (b) The sounds of frequencies below 20 Hz are called infrasonic sounds or infrasonics and the sounds of frequencies above 20,000 Hz are called ultrasonic sounds or ultrasonics.
5. The time taken by the wave to transverse one wavelength is called its time period. It is denoted by the symbol T and is measured in second (s).
6. Road traffic, air and rail traffic, noise from construction sites and industries, domestic noise like TV, kitchen appliances and many others.

7. **Percussion :** A percussion type of musical instrument is played by striking. Examples are the tabla, the drum and the tambourine and the dholak.

   Wind Instruments : The flute or bansuri, clarinet and saxophone are some examples of wind instruments. They all have a tubular structure. The air column within the tube of the instrument is made to vibrate by blowing in. This produces sound. There are holes along the side of the tube.

   String Instruments : Violin, sitar, guitar, sarangi, tanpura, etc., are some stringed instruments. String instruments produce sound through vibrating strings. These strings transfer the vibrations to the air. The strings are stretched across a hollow box. When the strings are made to vibrate the air inside the box is also set to vibrate and produce sound.

E. Long Answer Type Questions.

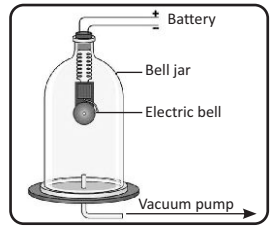
1. **Aim :** Sound cannot travel in vacuum, it requires a medium to travel.

   Method :

   (i) Take a bell jar connected with a vacuum pump and place a small electric bell in it.

   (ii) Connect the electric bell with a battery and close the circuit by switching on the current.

   (iii) Now close the jar. You will be able to hear the sound produced by the electric bell.



   (iv) Next pump out the air from the bell jar using a vacuum pump.

   Observation :

   You will notice that the sound of the electric bell gets feebler and finally disappears as more and more air is removed from the bell jar. This proves that sound cannot travel through vacuum.

2. A human ear consists of three parts.

   Outer Ear : The outer ear consists of the pinna and the cavity called auditory canal through which air vibrations travel to reach the tightly stretched membrane called the eardrum. These vibrations cause the eardrum to vibrate. The vibrations are then passed to the middle ear.

   Middle Ear : The middle ear consists of the eardrum and the three bones the hammer, anvil and stirrup attached to it. These bones transmit the vibrations to the inner ear.

   Inner Ear : The inner ear consists of the three semicircular canals and the cochlea. The cochlea is a coiled tube and is the real organ of hearing. Coiling down the middle of its whole length is the basilar membrane, which has a large number of hair cells cross its width. These cells are

connected with nerves to the brain. They transmit the vibrations as nerve impulses to the brain. The brain interprets the nerve impulses and produces the sensations, which we call sound.

Human ear is a sense organ which detects the presence of sound. It acts as a receiver of sound.

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   Human ear is a sense organ which detects the presence of sound. It acts as a receiver of sound.

4. • Noise pollution directly affects the mind. People take longer time to concentrate in the environment having lots of noise.
   • Prolonged exposure to high level noise can-load to temporary or permanent loss of hearing.
   • It can cause nervous tension, headache, high blood pressure, irritation.

5. When an object vibrates back and forth in air, the molecules of air in contact with the object begin to vibrate. These air molecules transfer their motion to the next layer close to them due to which they also start vibrating back and forth. A chain reaction initiates which is called sound wave. Sound waves travel in all directions from the body that produces sound.

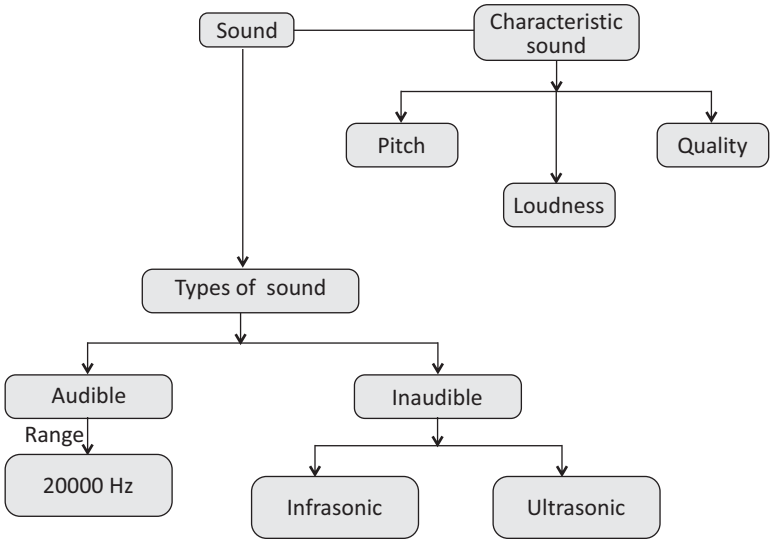
   Sound needs a medium to propagate from a source to a listener. When we hit the drum, membrane of the drum vibrates producing sounds. Sound can travel through solids, liquids and gases, but it cannot travel in vacuum.

6. • Factories and airports should be made away from the residential areas to reduce the noise created by aeroplanes and machines in the factories.

- Automobiles should be fitted with silencers.
- People should avoid blowing horns of vehicles unnecessarily.
- Workers in noisy factories should wear ear plugs.
- Television, radio, music system should be played at a low volume.
- Trees should be planted along roads and buildings. This will help in reduction of noise pollution because sound waves are absorbed by the trees or they act as a barrier for sound waves. You must have seen stones lying on the railway tracks. They actually absorb sound and help in reducing noise created due to the movement of trains.

Learn by Doing

MIND MAP



11 Chemical Effects of Electric Current

A. Tick (3) the correct option.

1. (c) 2. (a) 3. (b) 4. (b) 5. (b) 6. (d) 7. (b)

B. Fill in the blanks with correct words.

1. good 2. positive 3. Electrolysis 4. zinc
5. negative 6. anions 7. electrolysis 8. Zinc

C. Match the following.

1. e 2. c 3. f 4. a 5. d 6. b

D. Short Answer Type Questions.

1. The liquid which conducts electricity and undergoes decomposition is called an electrolyte.
2. Materials that allow electricity to flow through them easily are called conductors, while materials that do not allow electricity to flow through them are called insulators. Rubber, plastic, wood are examples of insulators. Most of the metals like iron and aluminium are good conductors of electricity.
3. The process of deposition a thin layer of a metal on any conducting substance by the process of electrolysis is known as electroplating.
4.
   - Chromium is plated on car and cycle parts, taps, kitchen gas burners, bicycle handle bars, wheel rims and many other things. It gives a shiny looks to the objects.
   - Iron vessels and containers used for storing food have to be plated with tin. Tin is less reactive with food and it does not rust, so food is protected from getting spoilt.
   - Jewellers electroplate gold and silver over inexpensive metals like iron and copper and make ornaments look precious at a lower cost sometimes gold is also plated over silver.
   - Zinc is coated on iron to avoid corrosion, in car parts as well as a construction of bridges.
   - Gold plating in done on electronic parts to reduce contact resistance. (If you open the CPU of your computer you may see this).
5. Top water consists of ions of dissolved salts and minerals, so when electricity passes through the top water, it conducts. Distilled water is pure water an it has very few ions. Due to lack of ions, distilled water

cannot conduct electricity.

6. LED (Light Emitting Diode) can be used in place of a bulb to detect weak currents flowing through the circuit. LED has two wires called lead. One lead is slightly longer and is always connected to the positive terminal of the battery. The shorter lead is connected to the negative terminal of the battery.
7. • Purification of metals • Extraction of metals
   • Electroplating
8. **Liquid Conductor :** Lemon juice, vinegar , salt solution, sea water rain water.

   Non-liquid Conductor : Milk, distilled water.

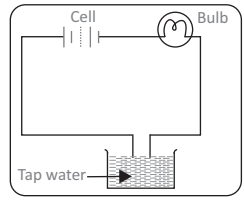
E. Long Answer Type Questions.

1. (a) An ion is an atom or a molecule with an electric charge created by losing or gaining one or more electrons.
   (b) The liquid which conducts electricity and undergoes decomposition is called an electrolyte.
   (c) It is a process of refining a metal by the process of electrolysis.
2. We should not handle electrical appliances with wet hand's because water is a good conductor of electricity and one might get electric shock.
3. Impurities in water contains ions. Impurities dissolved in water increases its conductivity because the electric current is transported by the ions increases.
4. The process of decomposition of electrolyte solution into ions on passing current through it is called electrolysis. Electrolysis is carried out in an apparatus called voltmeters or electrolytic cell. It consists of a glass vessel containing an electrolyte and two metal plates called electrodes connected to a battery. The electrode connected to the positive terminal of the battery is called anode and the one connected to the negative terminal is called cathode.
5. **Aim :** To test the electrical conductivity of tap water.

   Materials Required : A cell, a bulb, tap water and three wires

   Method :

   (i) Join the positive end of cell with the bulb using one of the wire.
   (ii) Then connect the negative end of cell with another wire whose other end is free.
   (iii) Similarly connect the other end of the bulb with the third wire and let the other end be free. Now your tester is ready.



(iv) Test the tester by joining its end to each other.

Observations :

If bulb glows, it is working. Now, take tap water in a beaker and dip the free ends of the tester into tap water. You will see that bulb of the tester glows. It shows that tap water conducts electricity.

6.
- Chromium is plated on car and cycle parts, taps, kitchen gas burners, bicycle handle bars, wheel rims and many other things. It gives a shiny looks to the objects.
- Iron vessels and containers used for storing food have to be plated with tin. Tin is less reactive with food and it does not rust, so food is protected from getting spoilt.
- Jewellers electroplate gold and silver over inexpensive metals like iron and copper and make ornaments look precious at a lower cost sometimes gold is also plated over silver.
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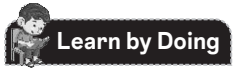
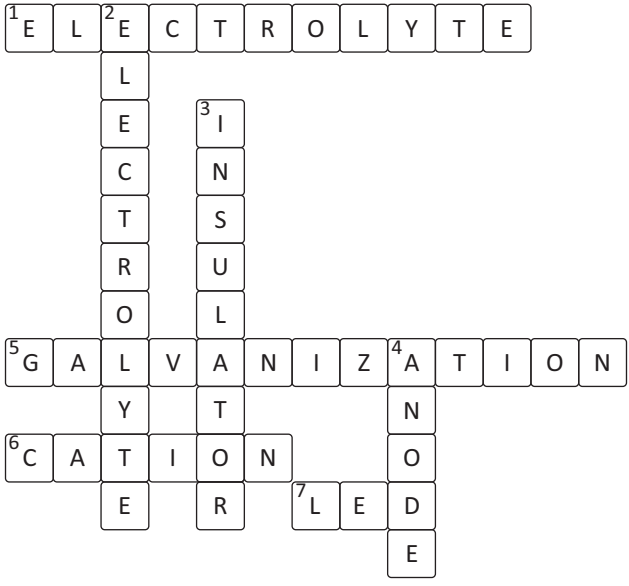


CROSSWORD PUZZLE



Some Natural Phenomena

A. Tick (3) the correct option.

1. (a) 2. (d) 3. (b) 4. (a) 5. (a)
6. (d) 7. (a) 8. (s)

B. Fill in the blanks with correct words.

1. opposite, equal 2. seismograph 3. lightning conductor
4. attract 5. crust 6. Earthquake
7. seismologist

C. Short Answer Type Questions.

1. (a) The streak of bright light produced when negative charges meet the positive charges called lighting.
   (b) Earthquakes are sudden shaking and vibration at the surface of the earth.
   (c) The process of transfer of charges from a charged body to the earth is called earthing or grounding.
   (d) Earth's lithosphere is not in one piece. It is divided into many fragments (pieces) called tectonic plates.
   (e) Tthe location directly above it on the earth's surface is called epicentre.
2. Earthquakes generate seismic waves, which can be recorded on seismograph.
3. Crust, Mantle and core the crust and the upper layer of the mantle together form the lithosphere.
4. • During an earthquake remember three things drop, cover and hold on.
   • Drop under something sturdy, like a large table and hold on.
   • Protect your eyes by covering your face against your arms.
   • If you are in bed, hold and stay there, covering your head with a pillow.
5. The scale which is used to measure the magnitude of an earthquake. is called the Richter scale.
6. In India, the Himalayan region is a place high in earthquake activity. Other high earthquake prone areas are the North-East, Rajasthan, Kachchh in Gujarat, parts of central India and some parts of South India.

7. On the principle of induction the gold leaf electroscope works.
8. To protect high storey from damage of lighting, a tall metal rod is fixed on them. This is called a lightning conductor.

C. Short Answer Type Questions.

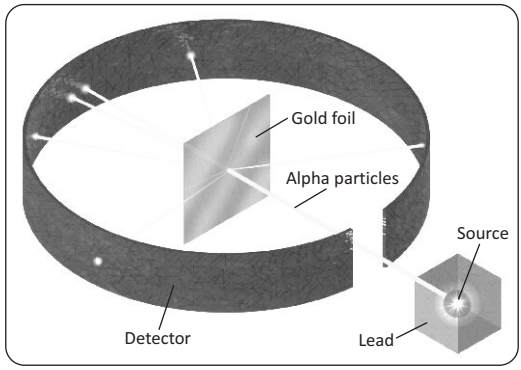
1. The temperature of the core is very high while the temperature of the crust is just about 300 C. So there is a constant flow of heat from the core to the crust. This sets a convection current in the molten magma. Due to this a pressure is developed in the magma. This pressure can cause movements in plates and the plates keep moving around slowly and continuously. The plates squeeze or stretch or suddenly slip past one another or get crushed or fractured.

   Due to movement of these plates forces are induced on themselves and released and it moves through the earth in the form of waves. On the surface of the earth, we feel it as a tremor. We call this an earthquake.

2. • No open place is safe during lightning or thunderstorm.
   • Rush to a safer place like a house or a building on hearing thunder.
   • If you are travelling by car or by bus, you are safe inside, with windows and doors of the vehicle shut.

3. **Aim :** To show transfer of charge from a charged body to an uncharged body using a gold leaf electroscope.

   Method : Take a gold leaf electroscope. Take a glass rod or plastic scale and rub it with a silk cloth, so that it gets positively charged. Bring the charged glass rod or plastic scale near the brass disc of the electroscope and touch it. You will observe that the gold leaves inside the electroscope diverge. This happens because on touching the charged rod with the brass disc the charge flows from the rod to the gold leaves along the brass rod. Since both the gold leaves carry the same charges, they repel, thus diverge.



The gold leaf expand experiment.

Next touch the brass disc with your hand, the gold leaves collapse and come back to their original position. This happens because the gold leaves lose charge to the earth through your body (as the human body is a good conductor).

4. A gold device called electroscope is used to detect and measure charge and is based on the above principle. It consists of a brass rod fitted in a glass jar through a rubber stopper. A brass disc is present at the top of the brass rod. The lower end of the brass rod that lies inside the beaker has two thin gold leaves hanging parallel to each other. The lower inner sides of the glass jar has metal foil, which increases the sensitivity of the electroscope.
5. An electrically neutral object can be charged in three ways –

   (i) by friction (ii) by conduction (iii) by induction

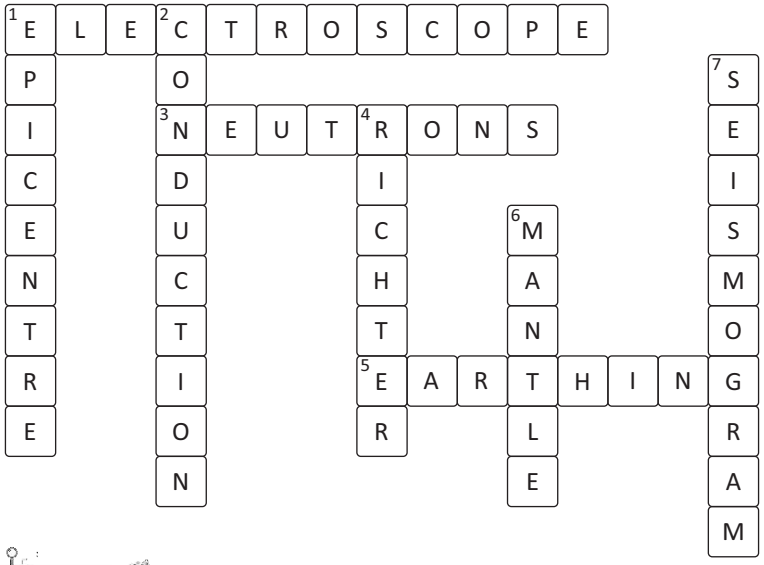
   Charging by Friction: A body can be charged by rubbing with the other body. Take a plastic scale or a comb and rub it against your dry hair 8-10 times. Keep small pieces of paper on a table. Bring the freshly rubbed comb near the pieces of paper. You will see that the pieces of paper get attracted to the comb. It happens because the comb gets charged.

   Charging by Conduction : A body can also be charged by conduction. If a charged object is touched to an uncharged object, the electric charge flows from the charged object to the uncharged object. By this, the object attains the same charge as the charged body. This method of charging a body is called charging by conduction.

   Charging by Induction : Induction is another method of charging a body. If a charged object is brought close to an uncharged object (but does not touch it), the charged body induces the opposite charge on the uncharged body. Thus, method of charge transfer is called induction.
6. when two clouds are different heights having enormous amount of positive and negative charges approaches each other, the air becomes a good conductor of electricity and this phenomena is called electric discharge. Electrons from a negatively charged clouds push their way through air to reach a positively charged cloud at different heights. As a result, air gets white hot and a yellowish white streak of light is formed, this is called lightning.
7. A seismograph consists of ta spring and a weight hanging from a frame that is placed along the earth's surface. As the ground vibrates, the vibrations are transferred to the frame to the weight through the spring. This movement is transferred to a recording drum which rotates and on which a pen attached from the height marks the movement. A plot of the motion of the ground is obtained which is called a seismograph.

Learn by Doing

CROSSWORD PUZZLE



13

Light

EXERCISES

A. Tick (3) the correct option.

1. (a) 2. (a) 3. (a) 4. (b) 5. (c) 6. (c) 7. (c)

B. Fill in the blanks with correct words.

1. concave 2. newton 3. seven
4. lens 5. Cornea 6. Far

C. Short Answer Type Questions.

1. The bouncing back of light from the surface of an object is called reflection of light.

   The two laws of reflection as given below :

   Law I : The incident ray, the reflected ray and the normal to the reflecting surface lie in the same plane.

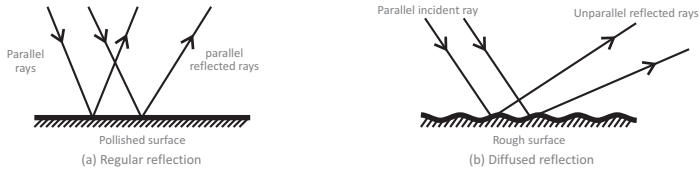
   Law II : The angle of incidence is equal to the angle of reflection.

2. **Regular Reflection**
   - It is called specular reflection.

- It is the reflection from polished surfaces.
- Reflected rays are parallel to each other.
- It can be seem in a plane mirror, unused stainless steel plate, water, etc.

Diffuse Reflection

- It is also called irregular reflection.
- It is the reflection from rough or irregular surfaces.
- Reflected rays move in various directions.
- The image is diffused or irregular.
- It can be seem in scratched mirrors, rippling water, etc.



Types of reflection

3. The plane mirror is use in barber's shop.
4. if two plane mirrors are inclined an angle q, them the number of images formed by them in given by a formula.

$$\text{Number of images formed} = \frac{360^\circ}{\theta} - 1$$

5. **Blind Spot** : It is an area on the retina that does not have light sensitive receptors. No vision is possible at this spot.
6. Blind spot is present at the junction of the optic nerve and the retina.
7. Some people can see only near objects clearly but cannot see distant objects clearly. This defect is called short sightedness or myopia. In such a defective eye, the image of a distant object is formed in front of the retina and not on the retina itself.
8. (i) Include foods rich in vitamin A. Such as raw carrots, broccli, green vegetables, cod liver oil egg, milk, curd, yellow fruits like papaya, etc., in your diet which are good for eyes.
   (ii) Eyes can become dry. When working on a computer or watching television for too long. You must blink often to keep the eyes moist.
   (iii) Always try to read from a normal distance of vision. If you have difficulty in reading a book or writing on blackboards, get your eyes checked by an eye specialist or a doctor immediately. If eye specialist advises, use suitable spectacles.
   (iv) Wash your eyes at least two times a day with clean water. Never rub your eyes. If particle of dust get into your eyes, wash them with clean water. Consult a doctor if there is no improvement.

9. (i) The image is formed behind the mirror.
   (ii) It is a virtual image which cannot be taken on the screen.

D. Long Answer Type Questions.

1. We can categories reflection into two types.

   Regular Reflection

   - It is called specular reflection.
   - It is the reflection from polished surfaces.
   - Reflected rays are parallel to each other.
   - It can be seem in a plane mirror, unused stainless steel plate, water, etc.

   Diffuse Reflection

   - It is also called irregular reflection.
   - It is the reflection from rough or irregular surfaces.
   - Reflected rays move in various directions.
   - The image is diffused or irregular.
   - It can be seem in scratched mirrors, rippling water, etc.

Types of reflection

2. The eye consist of an eyeball that is nearly spherical in shape. The eyeball is kept firm by the presence of a jelly like substance called the aqueous humour in front of the lens and vitrous humour behind the lens. Eyes help us to see things around us. The eyelids protect the eyes from injury and shut out light when not required. Let's study about the different parts of an eye.

   Sclera : It is the outer most covering of the eye that is made of white fibrous tissues. It protects the internal parts of the eye.

   Cornea : The sclera continues in the front of the eye as cornea, which is the transparent portion of the eye. It protects the eyes and also helps in focussing light.

   Iris : The coloured part of the eye behind the cornea is called iris. It regulates the amount of light entering the eye by adjusting the size of the pupil. Pupil is tiny hole in the centre of the iris.

   In dim light, the iris makes the pupil enlarge to allow more light to enter the eye. In bright light, the iris makes the pupil contract, to reduce the amount of light entering the eye.

Lens : A transparent double convex lens lies behind the iris. It is held in position by the ciliary muscles which can change the thickness of the lens and hence its focal length. The lens focuses light to form an image on the retina. When ciliary muscles relax, the lens become flatter and thinner for distance vision and when they contract the lens becomes rounder and thicker so that eyes can focus on nearby objects.

Retina : It is a delicate membrane just behind the eye ball. It acts as a screen as which the image is formed. It has light sensitive receptors called rods and cones. Cones are sensitive to colour. While rods are sensitive to the intensity of light.

Optic Nerve : It is a bundle of the nerves that connect the rods and comes of the retina to the brain. They carry optical messages in the form of electrical signals to the brain.

Blind Spot : It is an area on the retina that does not have light sensitive receptors. As blind spot is present at the junction of the optic nerve and the retina, where there are no rods or comes, so no vision is possible at this spot.

3. Ciliary muscles control the lens and help us to see both near and far objects clearly. When the eye focuses on distant objects the ciliary muscles relax, thus reducing the thickness of the lens. When the eye focuses an object close to us, the ciliary muscles contract, thus making the lens thicker and reducing its focal length.

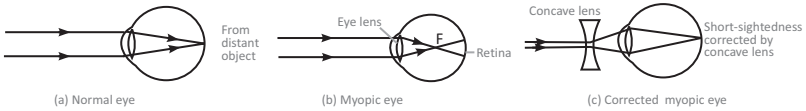
   The ability of the eye to adjust the focal length of the lens so as to see the objects clearly is called power of accommodation.

4. **Short-sightendness or Myopia :** Some people can see only near objects clearly but cannot see distant objects clearly. This defect is called short sightedness or myopia. In such a defective eye, the image of a distant object is formed in front of the retina and not on the retina itself. It can be corrected by wearing spectacles with concave lens of appropriate focal length. A concave lens of appropriate powder or focal length can bring the image of the object back on the retina itself.

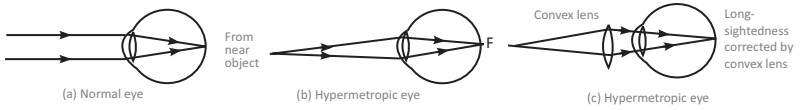
   Long-sightedness or Hypermetropia : Some people can see only distant objects clearly but cannot see nearby objects clearly. This defect of vision is called long sightedness or hypermetropia. In this case, the image is formed behind the retina. This defect can be corrected by wearing spectacles with convex lens of appropriate focal length. Eyeglasses with converging lenses supply the additional focusing power required for forming the image on the retina.

   Cataract : Till a person is around the age of 45 years, the shape of the lens can be changed. This allows the lens to focus on an object, whether it is close or far away. With the increasing age, proteins in the lens begin to

break down and the lens becomes cloudy. What the eye sees may appear blurred. This condition is known as cataract. Old people often suffer from blurred vision. Cataract can be treated surgically or through laser by replacing the eye lens with a new artificial lens.



Myopia and its correction



Hypermetropia and its correction

5. This phenomenon of splitting of white light into its component colours is called dispersion of light. The white light disperses into a spectrum of seven colours in the order violet, indigo, blue, green, yellow, orange and red (VIBGYOR). a prism can split white light
6. **Uses of convex lens.**
   (i) It is used to correct hypermetropia or long-sightedness.
   (ii) It is used in camera because it focuses light and produces a clear and crisp image.
   (iii) It is used in microscopes.

   Used of concave lens
   (i) It is used to correct myopia or short-sightedness.
   (ii) It is used in camera to focus on a single object.
   (iii) It is used in flashlights to widen the beam produced by the bulb.

Learn by Doing

MIND MAP