ADDITIONAL® PRACTICE

SCIENCE 8

Answer Key

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INTERNATIONAL

WORKSHEET–I

1. a. iv) b. i) c. v) d. ii) e. iii)

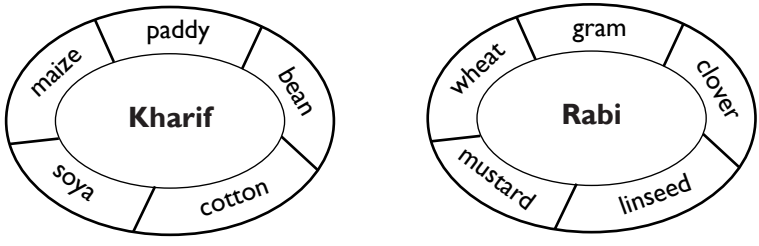
2. a. crop b. float c. sunlight d. Preparation
e. rabi crops

3. Hoe Seed drill Harvester
Leveller Plough Trowel

4. a. Sugarcane b. Combine
c. Tomato d. Animal husbandry
e. Weeding

5. a. iii) b. ii) c. iii) d. ii) e. i)

6.



7. a. DDT

b. Because grains with moisture are easily spoiled by microbes.

c. Because rice requires a lot of water, and in our country rainy season is best for such crops..

d. *Chenopodium* and *Amaranthus*.

e. Chilies and brinjal.

8. a. **Kharif crops:** They are grown in rainy season from June to October, e.g., paddy, maize, soya, etc.

Rabi crops: They are grown in winter season from November to March, e.g., gram, mustard, linseed, etc.

b. i) Tilling involves loosening the soil, turning it over and crushing it with the help of a plough. After tilling, levelling is done with a leveller in which the soil is levelled and made uniform.

ii) Levelling helps in uniform sowing on irrigation and avoids soil erosion. Tilling improves aeration and soil texture. It helps

in water retention and weeding while mixing the manure thoroughly.

c. Ploughing is the process of turning and loosening the soil. It helps in proper aeration and weeding of the soil. It also helps in mixing of manure and moisturing of the soil.

d. The unwanted plants which grow in the cropfield and compete with the main crop for sunlight, water and nutrients, are called weeds. They can either be removed manually using a sickle or are killed by chemicals called weedicides.

e. This is because seed drill ensures uniform distribution of seeds. The seeds are sown at suitable depth and distance and overcrowding is avoided. On the other hand, broadcasting is a manual and random process which results in seed wastage.

9. a. i) A: Drip irrigation system.

B: Sprinkler system

ii) **Drip irrigation system:** It involves a network of pipelines which irrigate the roots of plants dropwise avoiding wastage of water.

Sprinkler system: Water is sprinkled right over the crops at regular intervals through a network of pipes and nozzles.

iii) These methods ensure uniform, sufficient and effective irrigation of plants without wasting water.

b. i) Moist grains are easily attacked by microbes and fungi. Hence, they are dried before storage to keep them safe and viable.

ii) The method in which grains are dried in sun, is called sun drying method.

iii) Large scale storage of grains is done in silos and granaries to protect them from pests like rats and insects.

c. i) The plant of student 'C' will be the healthiest one as it has a mixture of both the manure and the fertilisers.

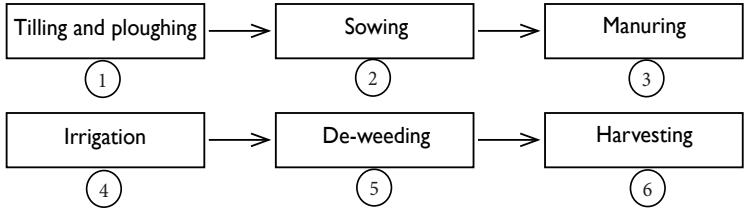
ii) Because manures are natural and biodegradable. They do not cause soil or water pollution. On the other hand, fertilisers are chemicals which pollute soil and water on excessive usage.

iii) Manures are organic substances made by decomposition of decaying matter. They are biodegradable and environment-

friendly. Fertilisers are chemical substances prepared in factories. They are non-biodegradable and can cause ollution.

10. Due to continuous plantation, soil gets depleted in certain nutrients which are absorbed by the plants. Hence, there is a need to replenish them at regular intervals to ensure a balance of all nutrients.

ACTIVITY ZONE



WORKSHEET–2

1. a. Because plants absorb nutrients from the soil, which then becomes deficient in nutrients over time.

b. It is required for proper aeration of soil so that the germinating seeds can respire.

c. It supplies water directly to plant roots and hence no spillage and wastage of water occur.

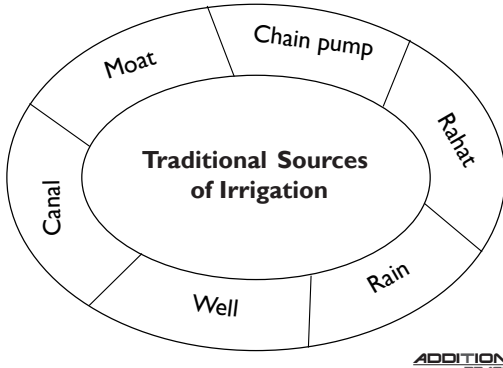
d. Because they grow along with the main crop and compete for space, light and nutrients.

e. Damaged seeds are hollow and hence lighter than viable seeds. So, they float on water.

2. a. Irrigation b. Saplings c. Rahat d. Sprinkler system

e. Winnowing

3.



4. a. False b. True c. True d. False
e. True

5. a. iii) b. ii) c. iii) d. iv) e. ii)

6.

Milk producing	Meat Yielding	Egg Yielding	Fibre Yielding	Drought Animals	Pets
Cow	Chicken	Hen	Sheep	Camel	Dog
Buffalo	Fish	Duck	Silkworm	Ox	Cat
Goat	Pig	Goose	Rabbit	Horse	Parrot

7. a. Seed drill and broadcasting.

b. To ensure food availability in case of agricultural failure.

c. Yes, weedicides are chemicals which can harm the sprayer.

d. Breeding, feeding and caring of animals on a large scale.

8. a. Two steps are involved: Ploughing and levelling. Ploughing is the tilling, loosening and crushing of soil. Levelling is done for making soil uniform.

b. During summers, crops transpire more and there occurs water deficiency in them. Hence, it is important to keep them hydrated.

c. The best time for the removal of weeds is before they produce flowers and seeds.

d. Excessive irrigation leads to water logging. This can block air supply and the plant may die off. It also results in change of soil pH.

9. a. i) Manures can be prepared by the farmers in the field itself by digging pits and dumping organic wastes in them over time. It gradually gets converted into manure.

ii) Kharif crops require large quantities of water. Hence, these rain-fed crops cannot be grown in rabi season.

b. i) Drip system or sprinkler system would be best because soil of such area will have less water retention capacity.

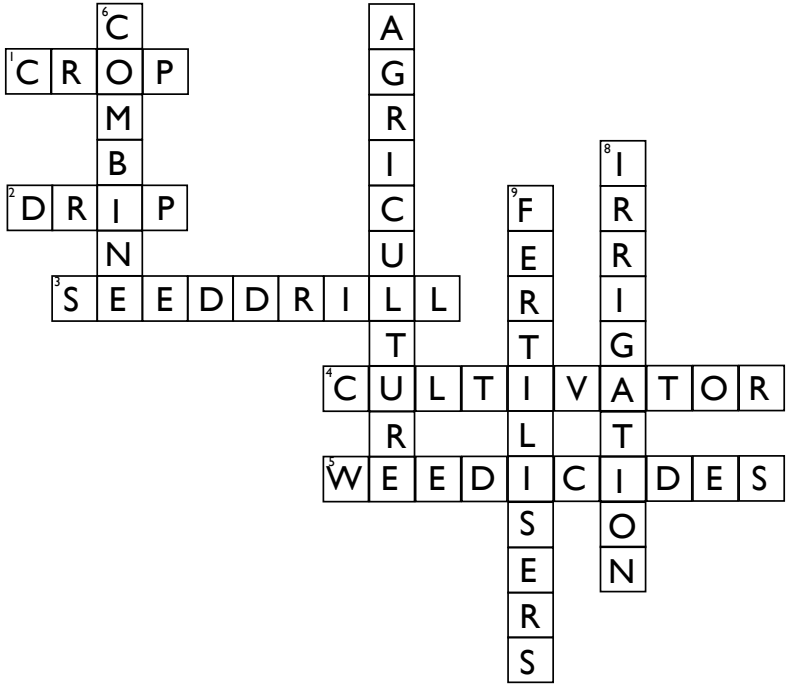
ii) Since, soil cannot hold more water, the rainwater will be drained out easily. Hence, they need alternative irrigation methods to provide water directly to their roots.

c. Weeds grow with main crop and compete for space, light, water and nutrients. Hence, they are harmful and need to be removed.

They can be removed manually by uprooting, or chemically by spraying weedicides which kill them. Crop rotation can also help in controlling weeds.

10. Maize is a kharif crop which requires large amounts of water. Hence, it should be grown in rainy season (from June to October). Wheat is a rabi crop and requires low temperature for its growth. Hence, it should be grown in winters (from November to March).

ACTIVITY ZONE



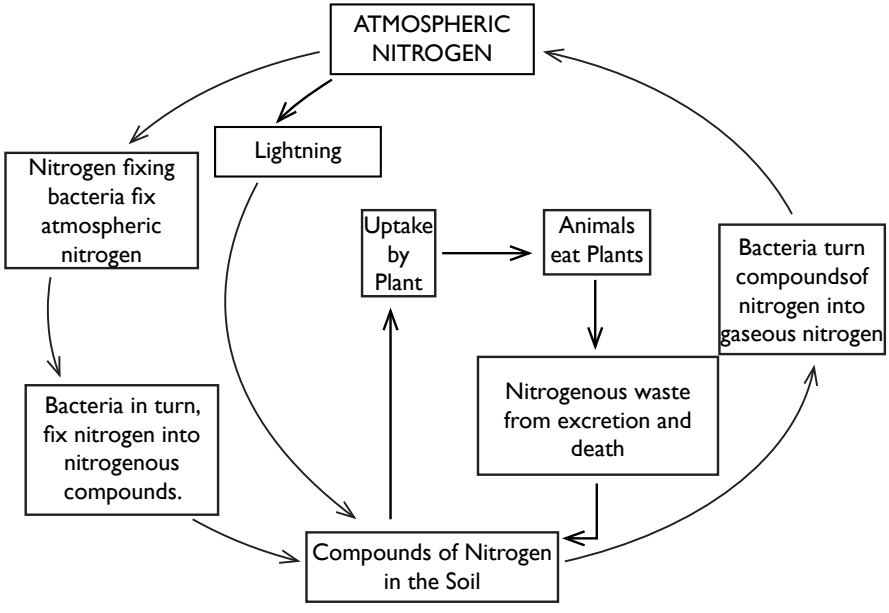
Chapter – 2. Microorganisms: Friend and Foe

WORKSHEET–1

1. a. immunity b. preservative c. protozoa
d. pathogens e. dengue

2. a. *Amoeba* b. Yeast c. *Lactobacillus*
d. Yeast e. *Rhizobium* f. *Bacteria* g. *Fungi*

3.



4. a. True b. False c. False
d. True e. True

5. a. ii) b. i) c. i) d. ii)
e. iii)

6. a. Penicillin and Tetramycin.

b. Anton von Leeuwenhoek.

c. Nitrogen

d. It is in a crystalline form and uses host cell machinery to survive..

7. a. Vaccines are a type of immunity given against a particular disease in advance. It contains weekened microbes, which do not actually cause disease, but activate our immune system against those microbes.

b. Bacteria and fungi feed on organic matter and decompose them to get nutrition. Hence, they are called decomposers.

c. i) It should have inoculum. Warm conditions and anaerobic atmosphere are required for setting a good curd.

ii) Lactobacillus converts milk into curd by releasing lactic acid in anaerobic conditions.

d. i) These can spread through the air we breathe, the water we drink, the food we eat, by direct contact with an infected person or carried by an animal, by being bitten by an insect. Examples are cholera and chicken pox.

ii) By always keeping food covered, washing hands before eating, getting vaccinated, keeping a handkerchief on the nose and mouth while sneezing, maintaining personal hygiene, not sharing personal items and keeping a distance from infected persons.

8. a. i) Decaying bread.

ii) Moist condition

iii) No. It is not safe as this is contaminated food which may carry fungal spores. Consumption of such food can cause several diseases like food poisoning and diarrhoea.

b. i) He is suffering from food poisoning. It is a disorder caused by the consumption of spoiled or contaminated food.

ii) The food poisoning in the child occurred as he consumed the roadside food which is not hygienic and safe.

iii) When food is left uncovered, it gets contaminated by various microbes which can cause diseases.

c. i) Because nitrogen itself is unreactive and cannot be used by plants to make protein. It needs to be converted into nitrate compounds in the soil.

ii) Microorganisms in the soil, convert atmospheric nitrogen into soluble forms in the soil. The soluble nitrogenous forms are then absorbed by the plants through their roots from the soil.

9. a. Spoiled food has a bad odour and colour change. It also has an altered taste.

b. Because it contains germs and can cause food poisoning. It can lead to diarrhoea, nausea and vomiting and an upset stomach.

c. By cooking as much as needed, by storing food in refrigerator, by using the left over food or by supplying it to the needy.

ACTIVITY ZONE

1. Bacteria, organisms
2. cell
3. colonies
4. Cocci, bacillia
5. reproduce
6. tuberculosis, typhoid

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

WORKSHEET–2

1. a. Tuberculosis b. Dysentery c. Hepatitis A
d. Conjunctivitis e. Ringworm

2. a. v) b. iv) c. ii) d. i) e. iii)

3. a. ii) b. iii) c. iv) d. iii) e. iii)

4. a. Fresh milk is boiled before consumption to kill microorganisms in it, but milk stored in packets is pasteurised and does not contain any microorganisms.

b. Since raw vegetables and fruits get easily infected by microorganisms and get spoilt and in refrigerator low temperature inhibits growth of microbes. But jams and pickles contain sugar and salt as preservatives.

c. Since leguminous plants (beans and peas) have Rhizobium bacteria in their root nodules which fix atmospheric nitrogen to enrich soil with nitrogen and increase its fertility.

d. Because larvae of mosquitoes grow in water. If water stagnation is prevented, the larvae cannot survive.

5. a. 78% b. Penicillin

c. Because the bacteria can become resistant to the antibiotic due to overuse.

d. Yeast makes the bakery products soft, fluffy and produces CO_2.

e. Bacteria and fungi.

6. a. By using mosquito net and repellents, spraying insecticides and controlling breeding of mosquitoes by not allowing water to collect in the surroundings.

b. Bacteria cause various diseases like typhoid, diarrhoea, cholera. Fungi cause diseases in plants like rust disease in various plants, fruit rot in apple. They cause ringworm in humans. Algal bloom causes poisonous effect after they die which results in death of aquatic animals. Protozoa cause dysentery, pyorrhoea, etc., and viruses cause polio, influenza, etc.

c. i) AIDS is caused by a virus named HIV (Human Immunodeficiency Virus). Full form of AIDS is Acquired Immunodeficiency Syndrome.

ii) Because AIDS virus attacks and disables key cells including WBCs which ward off diseases and are the body's main defence against diseases. Thus, the body is not able to fight infections and diseases and these progress until the victim dies.

d. Because yeast consumes sugar and releases CO_2, heat and alcohol as the byproducts. It becomes alcoholic in taste since it digests sugar in the solution and releases alcohol as the by-product or waste product.

e. Polio, also called poliomyelitis or infantile paralysis, is an infectious disease caused by polio virus. Polio virus enters the environment in the faeces of infected person and spreads from faeces to water supply or by touch into food. In some cases, it leads to a muscle weakness resulting in inability to move. The children are vaccinated against polio in India under Pulse Polio Programme.

7. a. i) In cup B.

ii) Because curd formation needs mixing of warm milk and inoculum. In diagram A, inoculum is not mixed while in diagram C, milk is cold.

iii) *Lactobacillus*.

iv) Because bacteria (*Lactobacillus*) grow faster in hot conditions, they increase in number and make curd sour outside the refrigerator.

b. i) It is the administration of a vaccine to help the immune system develop protection from a disease. Vaccines contain a

microorganism in a weakened or killed state or proteins from the organism.

ii) Edward Jenner

iii) Aman's viewpoint is very well justified as following vaccination schedule is very essential for the child and has nothing to do with the gender of the baby.

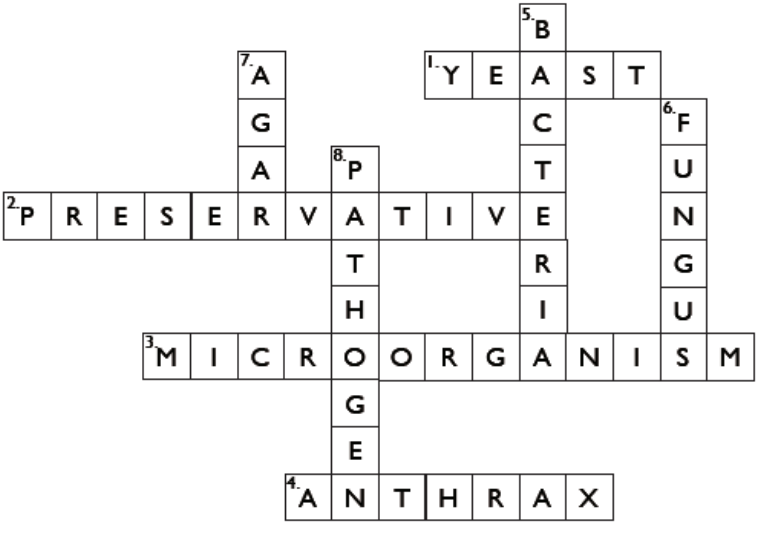
c. i) Citrus canker.

ii) Bacterium Xanthomonas axonopodis.

iii) It can spread by contaminated equipment or by transport of infected or apparently healthy plant. Bacteria can enter through plant's stomata or wounds on leaves or other green parts.

8. The milk is heated to about 70°C for 15 to 30 seconds and then suddenly chilled and stored. It is called pasteurisation which prevents the growth of microbes and hence its spoilage.

ACTIVITY ZONE



Chapter – 3. Coal and Petroleum

WORKSHEET–1

1. a. Petroleum b. Refining c. Carbonisation

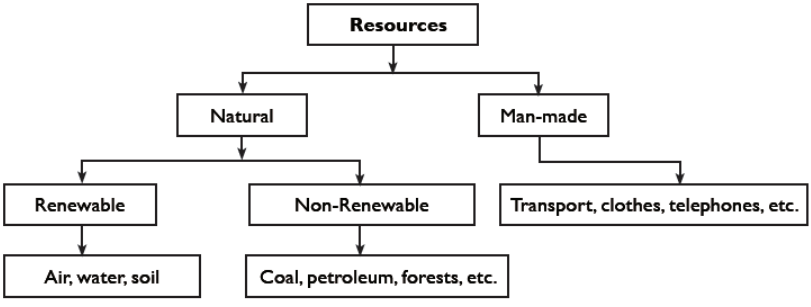
d. Coal e. Karnataka

2. a. True b. True c. True
d. True e. True

3. a. iii) b. ii) c. i)
d. v) e. iv)

4. a. iii) b. ii) c. iv)
d. iii) e. ii)

5.



6. a. Refining b. Coke c. In 1859
d. Petroleum Conservation Research Association

7. a. i) Coal is as hard as stone and is black in colour while coke is a tough, porous substance. Coal is a naturally occurring substance while coke is a prepared material with a few impurities. Coal is used as a fuel and in thermal power plants to produce electricity while coke is used in manufacture of steel and metals.

ii) It is a black, thin liquid with an unpleasant smell. It is a mixture of about 200 substances. Synthetic dyes, drugs, explosives, perfumes, plastics, paints, photographic materials, roofing materials, naphthalene balls, etc., are obtained from it.

b. Fossil fuels are the exhaustible natural resources like coal, petroleum and natural gas. These were formed from the dead remains of living organisms. So, these are called fossil fuels.

c. Exhaustible natural resources in nature are limited which can be exhausted by human activities, for example, forests, wildlife, minerals, coal, petroleum, natural gas. On the other hand, inexhaustible natural resources are present in unlimited quantity in nature and are not likely to be exhausted by human activities, for example, sunlight, air.

d. CNG stands for Compressed Natural Gas. It is easy to transport through pipes. It is less polluting and a cleaner fuel. It can be used directly for burning in homes and factories where it can be supplied through pipes.

e.

Constituents of Petroleum	Uses
LPG	Fuel for industry and home
Petrol	Motor and aviation fuel, solvent for dry cleaning
Kerosene	Fuel for stoves, lamps and for jet aircrafts
Diesel	Fuel for heavy motor vehicles, electric generators
Lubricating oil	Lubrication
Paraffin wax	Ointments, candles, vaseline, etc.
Bitumen	Paints and road surfacing

8. a. i) Natural gas is a very important fossil fuel which is stored under high pressure as compressed natural gas (CNG).

ii) Because on burning CNG, the quantity of CO_2 that is burnt is half of what is emitted when coal or other fossil fuels are burnt.

iii) It is formed from the decaying remains of pre-historic plant and animal life.

b. i) A fuel is a material such as coal, gas or oil that is burned to produce heat and power.

ii) A good fuel because it has a number of advantages like it is less expensive, produces more heat, has high calorific value, etc.

iii) It is readily available, less expensive, burns easily in air at a moderate rate, produces a large amount of heat, can be transported easily, has high calorific value and does not leave any undesirable substances.

iv) A good fuel is advantageous because it is less expensive, readily available, produces a large amount of heat, has high calorific value and does not leave any undesirable substances.

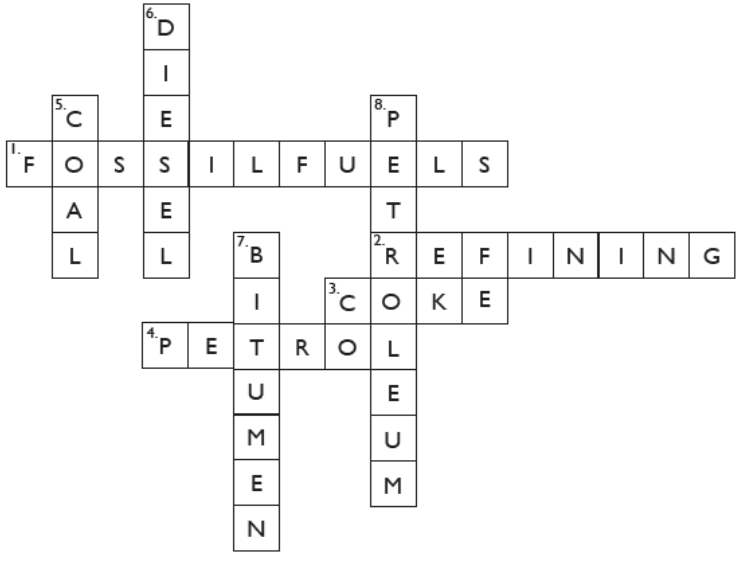
c. Coal is as hard as a stone which is used to cook food. It is also used in thermal power plants to produce electricity. Its products

are coke, coal tar and coal gas. Coke is used in manufacture of steel and in extraction of many metals. Products of coal tar are used as starting materials for manufacturing synthetic dyes, drugs, explosives, perfumes, plastics, paints, naphthalene balls, etc. Coal gas is used as a fuel in many industries situated near the coal processing plants.

d. No, survival of living beings would not be possible without exhaustible resources. Because in that case, ecological balance cannot be maintained. For example, forests are an important resource which cause rainfall, prevent soil erosion and floods, provide oxygen and valuable products, etc. We cannot imagine life without them. Similarly, without wildlife, our nature will get disturbed. Without fossil fuels, we will have to opt for alternative sources of energy which are expensive and not easy.

9. When fossil fuels are burned, they release nitrogen oxide into atmosphere. They emit toxins and global warming emission. On burning, they emit carbon dioxide and nitrous oxide thus trapping heat in the atmosphere.

ACTIVITY ZONE



WORKSHEET–2

1. a. ii) b. iii) c. i) d. v) e. iv)

2. a. iii) b. ii) c. iii) d. iii) e. iii)

3. a. fossil fuels b. Diamond c. Coal gas

d. coal tar e. exhaustible

4. a. Because CNG is the cleanest burning transportation fuel. It burns cleaner due to less carbon content. It produces the fewest emissions of all other fuels.

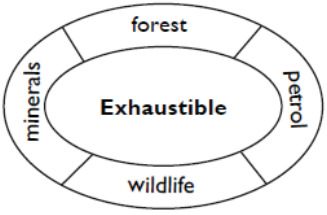
b. Since fossil fuels are exhaustible natural resources present in limited quantity in nature. And life would be very difficult/ impossible without them.

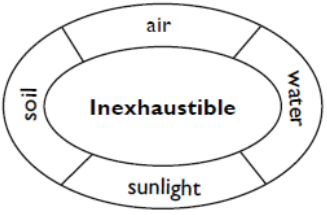
c. Topsoil is considered a non-renewable resource due to the very large amount of time that is required to regenerate it.

d. CNG is made by compressing natural gas to less than 1% of the volume it occupies at standard atmospheric pressure.

e. No, their formation is a very slow process and conditions for their formation cannot be created in the laboratory.

5.





6. a. Refining is the process to separate them.

b. Natural – Water, sunlight; Man-made – Plastic, paper

c. Coal

d. Petroleum Conservation Research Association

7. a. i) Perfumes and paints

ii) Acetylene, benzene, ethane, ethylene, methane, propane, etc.

b. Bitumen contains 60-80% of carbon while anthracite contains more than 80% carbon. Bitumen is of lower grade than anthracite. Bitumen is found in Jharkhand, West Bengal, Chhattisgarh, etc., while anthracite is found in Jammu and Kashmir.

c. i) Petroleum is a natural resource, from which petrol and diesel are obtained. Different fractions of petroleum are separated by refining which is done in petroleum refinery.

ii) Natural gas is used for power generation. It is used as a fuel for transport vehicles.

d. Maybe Soumya is not using LPG in a planned and proper manner. She should use pressure cooking, use optimum quantity of water, reduce the flame when boiling starts, soak before cooking, use shallow and wide vessels, use small burner, and so on.

e. i) "A" is coal.

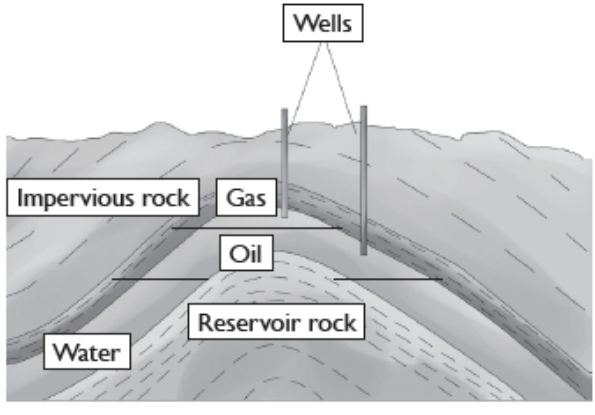
ii) Gas "B" is carbon dioxide.

iii) $C + O_2 \rightarrow CO_2$

$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

iv) If the percentage of gas "B" (CO_2) increases in the atmosphere, it will result in air pollution.

8. a.



Fossil fuels like coal, petroleum and natural gas, were formed hundreds of millions of years ago from the dead remains of living organisms by the exposure to heat and pressure in the earth's crust. The age they were formed is called the carboniferous period.

b. Coal is found in solid state while petroleum is found in liquid state. Coal is formed by mild reduction of land life while petroleum is formed by strong reduction of aquatic life. Different byproducts of coal are used in various industries while petroleum constituents are used as fuels.

c. If a resource can be replaced within 10 years by natural processes, it is considered as renewable resource. To understand it in a better way, take an example of topsoil. Topsoil is considered non-

renewable only because of the amount of very long time that is required to regenerate it.

9. a. Because switching off the engines of vehicles at traffic light saves fuel (petrol) which is an exhaustible natural resource.

b. Ways to help prevent energy crisis are as follows:

i) Switching off the power of fan/TV when not in use.

ii) Using solar cooker to heat water.

iii) Using solar panel in fields to draw water from bore wells.

ACTIVITY ZONE

1. CARBON ISATION
2. DESTRUCTIVE DISTILLATION
3. FRACTIONAL DISTILLATION
4. PETROLEUM REFINERY

BANNER FOR CREATING AWARENESS

CONSERVE

FOSSIL

FUEL

Chapter – 4. Combustion and Flame

WORKSHEET–1

1. a. iv) b. i) c. v) d. ii) e. iii)

2. a. True b. False c. True d. False

e. False

3. a. Because in this way, fire stops getting the required amount of oxygen for the combustion and thus it extinguishes.

b. Water is not used because it is a good conductor of electricity and may result in electrocution or electric shock.

c. Because the outermost zone of the flame is the hottest (temperature = 800°C) and is non-luminous in nature.

d. Although both are fuels, yet ignition temperature of kerosene is lower than that of coal, and it can catch fire more easily than coal. Therefore, more care is needed to store kerosene than coal.

e. Because incomplete combustion produces carbon monoxide which is a poisonous gas and is harmful to human beings.

4. a. iii) b. iv) c. iii) d. iii) e. i)

5. a. In liquid form, carbon dioxide is stored in cylinders.

b. No, a matchstick cannot catch fire on its own at room temperature.

c. Petrol and alcohol.

d. The outermost non-luminous zone of a candle flame is the hottest.

e. A fuel is a material such as coal, gas or oil that is burned to produce heat or power.

6. a. i) The substances which have very low ignition temperature and can easily catch fire with a flame are called inflammable substances.

ii) The conditions required for combustion to take place are:

– Presence of a fuel

– Air (or oxygen)

– Ignition temperature (minimum temperature at which a substance catches fire)

b. Antimony trisulphide and potassium chlorate are the chemicals used in the preparation of matchsticks.

c. i) Global warming is the rise in temperature of the atmosphere of the earth. Increased concentration of carbon dioxide in the air is believed to cause global warming.

ii) Because burning of coal emits carbon dioxide in the air which is harmful for us. Also, the incomplete combustion of coal can emit carbon monoxide which is a very harmful gas and can cause suffocation and even death to the person. Carbon monoxide reduces the ability of blood to carry oxygen.

d. Combustion is a chemical process in which a substance reacts with oxygen and gives out energy during the process in the form of either heat or light or both. Rusting of iron is an exothermic process as heat is released during rusting. Therefore, rusting is a kind of slow combustion.

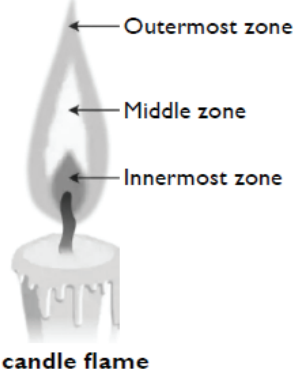
e. The substances which vapourise during burning, give flame. For example, kerosene oil and molten wax rise through the wick and are vapourised during burning and form flame. So candle burns with a flame while charcoal does not vapourise and hence does not produce a flame and just glows red when lit.

7. a. i) Water cannot extinguish fires containing oil. Thus, this action of Manu was not uitable.

ii) No, the fire did not extinguish with water because it was containing oil.

iii) Manu should have switched off the flame of the burner and put a lid on the frying pan. By doing this, the contact between fuel and oxygen is cut off and the flame goes off.

b.



A candle flame

Mechanism of breathing in human beings

Three zones of a candle flame are as follows:

i) **Innermost zone:** It is formed just around the wick and is called dark zone of flame.

ii) **Middle zone:** It is moderately hot with a limited oxygen supply and is called luminous zone.

iii) **Outermost zone:** It is the zone of complete combustion and is called non-luminous zone.

c. i) Glass container is used to cover lighted candle.

ii) In case (a) the candle burns freely while in case (b) the flame flickers and produces smoke.

iii) Air (or oxygen) supply is cut off.

iv) It proves that air (oxygen) is essential for combustion.

v) Yes, it gives out smoke which is caused by unburned soot particles that have escaped from the flame due to incomplete combustion.

8. a. Because green leaves contain moisture while dry leaves do not contain moisture, due to which the ignition temperature of green leaves is higher than that of dry leaves.

b. Heat produced by 45 kg of fuel = 180,000 kJ

Therefore, heat produced by 1 kg of fuel = $\frac{180,000}{45} \times 1KJ/kg$

= 4000 kJ

So, the calorific value of the fuel is 4000 kJ/kg.

ACTIVITY ZONE

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

WORKSHEET–2

1. a. Kilojoule/kg or kJ/kg b. Innermost or dark zone

c. Wood d. Inflammable

e. Carbon monoxide

2. a. iv) b. iii) c. i) d. v) e. ii)

3. a. combustion b. combustible

c. ignition d. calorific value

e. kerosene

4. a iii) b. ii) c. ii) d. iv) e. i)

5. a. Coal and natural gas

b. These are called suspended particulate matter (SPM).

c. Red phosphorus.

d. Carbon dioxide

e. Middle zone

6. a. The fuel will catch fire rapidly without application of external heat. This type of combustion is called spontaneous combustion.

b. Sodium bicarbonate, potassium bicarbonate or monoammonium phosphate.

c. Take a candle and burn it. Take a metal plate and put it near the inner zone of candle flame. After some time, remove the metal plate. A collection of unburnt carbon particles is seen which shows that unburnt carbon particles are present near the innermost zone of a candle flame.

d. i) Heat produced by 9 kg of a fuel = 360,000 kJ

So the calorific value of the fuel = $\frac{360,000}{9}$ = 40,000 kJ

ii) Coal required to produce heat energy of 132,000 kJ = $\frac{132,000}{33,000}$

= 4 kg

e. Rapid combustion is burning of a substance rapidly producing heat and light, e.g. burning matchstick on rubbing. Spontaneous combustion is bursting of a material into flame without heating it, e.g., phosphorus burning in air at room temperature. Slow combustion is the reaction that occurs slowly producing less amount of heat, e.g., rusting of iron.

7. a. i) It is a fire extinguisher.

ii) Schools, cinema halls, government offices, factories, warehouses.

iii) A fire extinguisher is used to extinguish fire inside a building, etc.

iv) It works by smothering the fire. When a layer of powder or foam is put from the extinguisher on the fire, the fuel is cut off from the oxygen around it and the fire goes out.

b. i) Petrol and kerosene will catch fire easily because they have low ignition temperatures.

ii) Lemon juice and milk will not catch fire at all because these are not inflammable.

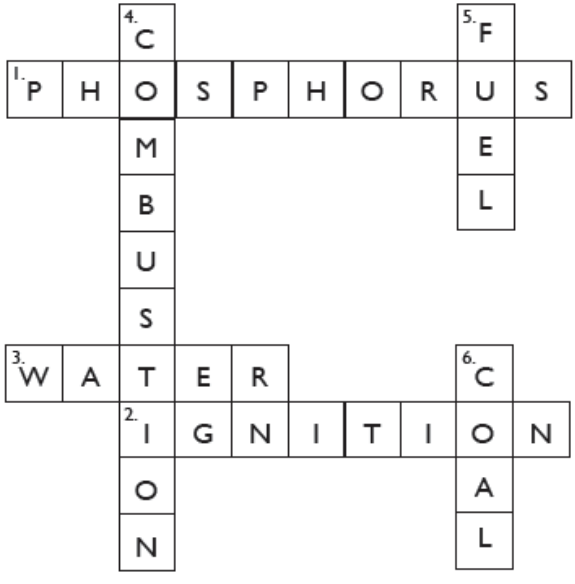
c. i) I will prefer CNG.

ii) Because CNG is more efficient having more calorific value than the petrol.

iii) The amount of heat energy produced on complete combustion of 1 kg of a fuel is called its calorific value.

8. It is advised to keep the door open because insufficient availability of oxygen will lead to incomplete combustion which produces carbon monoxide gas. It is a poisonous gas which can kill the person sleeping in that room.

ACTIVITY ZONE



Chapter – 5. Conservation of Plants and Animals

WORKSHEET–1

1. a. iv) b. iii) c. ii) d. v) e. i)

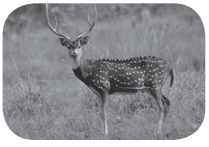
2. a. True b. True c. False d. True e. True

3. a. iii) b. iv) c. ii) d. iv) e. ii)

4.

Asiatic lion
Gir National Park

Bengal tiger
Sunderbans National Park



Cheetal
Jim Corbett National Park

Antelope
Bandipur National Park

Lion-tailed macaque
Periyar National Park

One-horned rhinoceros
Kaziranga National Park

5. a. Core area, buffer zone, transition zone.

b. International Union for Conservation of Nature

c. *Homo sapiens*

d. Its purpose was to ensure the survival and maintenance of tiger population in the country.

e. Plants, animals, microorganisms, non-living components like climate, soil, river deltas, etc.

6. a. i)

Siberian crane
Eastern population – Siberia to China
Western population – Russia to Iran

Bar-headed goose
Tibet to India

ii) Biodiversity refers to the variety of organisms on the earth, their inter-relationships and their relationship with the environment. The biodiversity of a desert and a grassland is not same because of different environmental conditions.

b. i) Deforestation is the removal of a forest or stand of trees where the land is thereafter converted to a non-forest whereas afforestation is the establishment of a forest or stand of trees in an area where there was no forest.

ii) Deforestation results in loss of biodiversity. It also increases greenhouse gas emissions, disrupts the water cycle, causes droughts, increases soil erosion and decreases the natural beauty of an area.

c. Poaching is illegal hunting or capturing of wild animals for various purposes. Despite laws against poaching, it is still a threat to biodiversity because body parts of various animals have a huge commercial value. Since there is shortage of them, their value has increased.

d. In a zoo, animals can be bought, sold, can make them breed or trade, while a sanctuary does not buy, sell, trade or breed animals. In a zoo, animals are required to satisfy the interest of the zoo whereas in a sanctuary only those animals are acquired who can no longer survive in the wild.

e. Migratory birds fly to far away areas every year because of climatic changes. They fly for laying eggs as the weather in their natural habitat becomes very cold and inhospitable.

7. a. i) The animal in the given picture is tiger.

ii) The reasons are hunting of the tiger, along with loss of forest habitat (destroyed for agricultural uses) and the reduction in prey population.

iii) Jim Corbett National Park and Kanha National Park

b. i) It is biosphere reserve. It is the area of terrestrial and coastal ecosystems promoting solutions to conserve biodiversity with its sustainable use.

ii) Its various zones are core area, buffer zone and transition zone.

iii) Core area acts as a reference point on the natural state of ecosystem. Buffer zone involves experimental research, ways to manage natural vegetation, forests, etc. In transition area, people live and work, using the natural resources of the area in a sustainable manner.

c. i) The new species X will affect the local species in the following ways:

– There may be competition between them for food and shelter.

– It may prey on the local species.

– It may prevent local species from reproduction.

– It may cause change in food chain or food web.

ii) The biodiversity found in Pachmarhi biosphere reserve is similar to those of the upper Himalayan peaks and to those belonging to the lower western ghats. Preserving areas of such biological importance make them a part of our national heritage.

8. Red Data Book is the source book which keeps a record of all the endangered animals and plants. Red Data Book is maintained internationally by an organisation. India also maintains Red Data Book for plants and animals found in India.

ACTIVITY ZONE

G	C	G	E	P	S	H	L	E	A	E	R
R	O	T	I	G	E	R	O	L	L	I	A
E	N	P	O	L	A	R	B	E	A	R	L
Y	D	A	B	A	T	W	R	P	S	H	E
W	O	N	D	N	U	O	H	H	G	I	O
O	R	D	U	F	R	F	U	A	H	N	P
L	M	A	N	A	T	E	E	N	L	O	A
F	E	O	T	S	L	A	E	T	T	E	R
O	N	A	C	H	E	E	T	A	H	A	D

WORKSHEET–2

1. a. iv) b. iii) c. i) d. ii) e. v)

2. a. Deforestation b. Reforestation

c. Biodiversity d. Flora e. Kangaroo

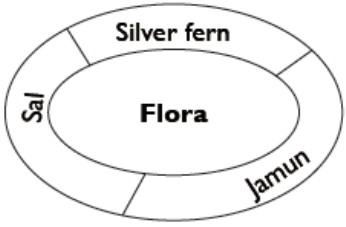
3. a. iv) b. ii) c. iv) d. iv) e. iii)

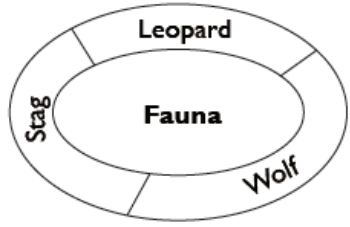
4. a. Dodobird b. fauna c. Siberia

d. desertification

e. Biosphere

5.





6. a. To provide protection and suitable living conditions to wild animals.

   b. Extinct, Extinct in the wild, Critically endangered, Endangered, Vulnerable, Near threatened, Least concern, Data deficient, Not evaluated.

   c. They grow in salt water in oceans and then migrate to fresh water for spawning.

   d. We can prevent biodiversity by saving the habitat of species and by stopping hunting or poaching.

7. a. The basic difference between the two is that endemic species are those which belong to a particular area, whereas exotic species are those species which are introduced into a particular place from somewhere else.

   b. These areas are called mega diversity because extreme biodiversity dominates these places. Ample rainfall, temperature, altitude and soil texture ensure mega diversity at these places. Suitable ecosystem also helps sustain the flora and fauna in such places.

   c. i) Chipko movement practised the non-violent resistance. This is mainly done through the act of hugging trees to protect them from being cut down. It began in 1970 in Rani village of Chamoli district, Uttarakhand and went on to become a rallying point for many future environmental movements all over the world.

      ii) Two aims of conservation are as follows:

      – To maintain the balance of nature.

      – For sustainable development so that future generations can avail their benefit.

d. i) A wildlife sanctuary is the area where animals are protected from any disturbance to them and their habitat, while a biosphere reserve is a large area of protected land for conservation of wild life, plant and animal resources and traditional life of the tribals living in the area.

ii) An endangered species is a species of organisms facing a very high risk of extinction. They are living today but their number has decreased and may become extinct in future. While extinct species are the organisms that have become extinct either in the wild or completely.

e. Conservation is the planned management of something to prevent waste, destruction, damage or neglect. Conservation is the maintenance of environment so that a species can survive in the wild while preservation is simply the keeping of species to avoid complete extinction.

8. a. i) It is a Siberian crane.

ii) In order to save itself from chilling winter, to rear its young ones and for better living conditions, it migrates.

iii) Eastern population – Yangtze river and Lake Poyang in China,
Western population – Fereydoon Kenar in Iran.

iv) Resident birds are the ones that are non-migratory in nature while migratory birds are those that visit different places in order to survive in adverse living conditions.

v) The conditions that may lead to a decline in the numbers of migratory birds visiting our country may be hunting, trapping in the migratory route, habitat destruction, pollution of wetland through domestic sewage, pesticides and fertilisers.

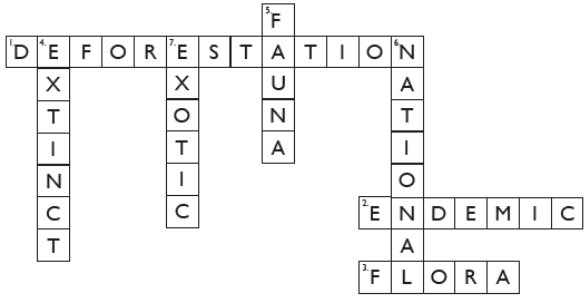
b. i) Plants – Acaena, Acalypha, Begonia, Cyanea
Animals– Baiji river dolphin, Western black rhinoceros, Golden toad, Javan tiger

ii) Reasons were change in temperature, destruction to their habitat, introduction of new species and hunting and poaching.

c. Deforestation leads to decreased water-holding capacity of soil. This reduces the infiltration of water into the ground which causes floods. On the other hand, deforestation results in higher level of carbon dioxide in the atmosphere which causes global warming. Scarcity of trees disturbs the water cycle and may reduce rainfall leading to droughts.

9. No, it is unfair. Their symbiotic relationship can be maintained by allowing them to live peacefully in designated forest areas without interference. Forests provide them employment through harvesting of forests, raising of plantations and collection and processing of forest products. The survival and maintenance of forests are also equally dependent on tribals as they are protective of forests.

ACTIVITY ZONE



Chapter – 6. Reproduction in Animals

WORKSHEET–1

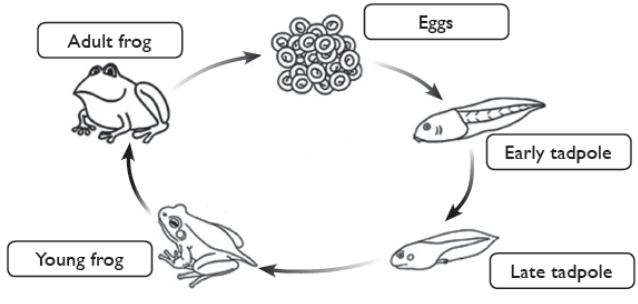
1. a. iii) b. i) c. v) d. ii) e. iv)

2. a. Progesterone b. Testosterone
c. Scrotum d. Sperm e. Ovum
f. Frog g. Test-tube baby
h. Oviduct (fallopian tube) i. Fertilisation j. Tadpole

3. a. external fertilisation b. foetus c. splits d. tail
e. hermaphrodites f. Ovary

4. a. iii) b. ii) c. iv) d. iv) e. iv)

5.



6. a. Chick

b. It is the zygote which develops into a new individual.

c. Internal fertilisation takes place in hens, cows, dogs, cats, etc.

d. Ovary produces egg cell.

e. Only one sperm can fuse with the egg during fertilisation.

7. a. i) In vitro fertilisation is a process of fertilisation when an egg is combined with sperm outside the body. It involves removing an ovum from the woman's ovaries and letting sperm fertilise it in a liquid in a laboratory.

ii) A zygote is a diploid cell resulting from fusion of two haploid gametes, usually a sperm and an egg. A zygote divides and becomes two cells, then divides again and becomes four cells. This process continues and it becomes an embryo. Zygote is single cellular while embryo is multicellular.

b. i) Human beings are viviparous and therefore give birth to a baby, whereas a hen is oviparous and hence lays eggs.

ii) The organisms reproduce to produce young ones like them. It helps to carry their generation. If reproduction does not take place, no living being will survive on earth. If the process of reproduction had not been there, all the plants and animals would have become extinct.

c. After fertilisation, the lining of uterus thickens and is richly supplied with blood to nourish the growing embryo. The embryo gets nutrition from mother's blood with the help of a special tissue called placenta. It is embeded in the uterine wall.

d. i) Testes produce millions of male gametes called sperms. Ovaries produce female gametes called ova. In human beings, a single matured egg is released into the oviduct by one of the ovaries every month.

ii) The gonads, the primary reproductive organs, are the testes in male and ovaries in female. These organs are responsible for producing the sperms and ova, but they also secrete hormones and are therefore considered to be endocrine glands as well.

e. Events of reproduction in humans in correct sequence are as follows:

vii) Formation of male and female gametes.

i) The fusion of gametes from both the parents to form a zygote.

ii) The female is then said to be pregnant or to have conceived.

v) The zygote divides repeatedly and develops into an embryo.

iv) The embryo becomes implanted in the wall of the uterus.

iii) The embryo develops its body parts and is called foetus.

vi) At the end of the gestation period, the mother gives birth to a baby.

8. a. i) Female reproductive system.

ii) Zygote formation and development of embryo from zygote is shown here. Fertilisation results in the formation of zygote which divides again and again and begins to develop into an embryo.

iii) Development of baby takes place in uterus.

b. i) These are oviparous animals.

ii) Hens – Internal fertilisation, Frogs – External fertilisation.

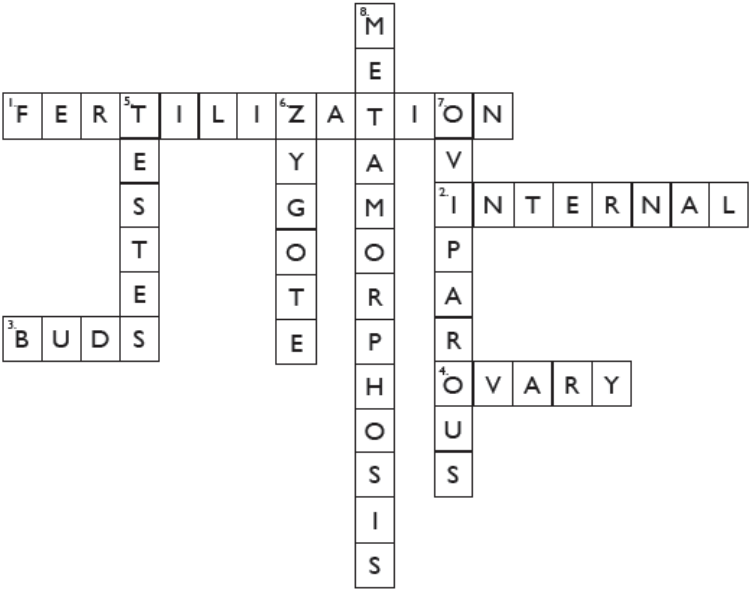
iii) Both hen and frog produce eggs but different types of fertilisation take place in them. In frogs, fertilisation occurs in water, i.e., outside the female's body, while in hens fertilisation occurs inside the female's body, because hen's eggs have a hard shell while frog's eggs are like a soft jelly.

c. i) Amphibians are vertebrates which are able, when adult, to live both in water and on land. Frog is an amphibian.

ii) The life cycle of a frog begins with a fertilised egg. It develops into a tadpole. The fertilised egg and tadpole stages are found in water. The tadpole develops into an immature frog. As the immature frog develops, it is transformed into an adult frog through the process of metamorphosis. The tail is absorbed and the external gills are replaced by lungs.

9. Since the water currents, insects and animals can harm them or make them flow away, or the animals can eat them. They lay eggs in water which live to high risk to external fertilisation. Therefore, they produce a large number of sperms and eggs.

ACTIVITY ZONE



WORKSHEET–2

1. a. two b. Cells c. gametes d. sexual
e. fertilised egg

2. a. iii) b. ii) c. iv) d. ii) e. i)

3. Oviparous Viviparous Oviparous Viviparous
Viviparous Oviparous Oviparous Viviparous

4. a. True b. True c. False d. False
e. True

5. a. ii) b. iii) c. i) d. v) e. iv)

6. a. After fertilisation, zygote repeatedly divides to form a ball of hundreds of cells called embryo. The embryo moves down from the oviduct into the uterus where it gets embeded.

b. Urethra carries urine from bladder to outside of body and also allows seman ejaculation.

c. Amoeba and Paramecium.

d. The basic function of reproductive system is to produce male and female gametes, i.e., ova and sperms.

e. Since female fish lays eggs which get fertilised by sperms produced by male fish in the water outside the female's body.

7. a. During fertilisation, only nucleus of sperm enters egg cell and fuses with egg nucleus to form single-celled structure called zygote. The cell formed consists of only one nucleus but is diploid in nature.

b. Because in humans, body parts of an adult are present from the time of birth itself, i.e., while beginning of life as a baby until adulthood, the basic plan of body does not change.

c. Because birds are oviparous and lay eggs outside their body, but dogs are viviparous so they do not lay eggs and give birth to young ones. Their eggs are extremely small which remain inside their bodies.

d. A layer of jelly holds the frog's, eggs together thus providing them protection. This jelly or gelatinous covering also protects them from drying up and prevents them from being eaten up by other animals or predators.

e. Budding Binary fission Regeneration

Fragmentation Spore formation

8. a. After the embryo gets embeded in the uterus, it continues to develop here. It gradually develops body parts such as hands, legs, head, eyes, ears, etc. The stage of embryo in which all the body parts can be identified is called a foetus. When the development of foetus is complete, the mother gives birth to the baby.

b. i) The animal is a sheep named Dolly.

ii) The process of cloning was used to produce it.

iii) Cloning is the production of an exact copy of a cell, any other living part, or a complete organism. Ian Wilmut and his colleagues discovered this process.

iv) During the process of cloning Dolly, a cell was collected from the mammary gland of a female Finn Dorsett sheep and an egg was obtained from a Scottish blackface ewe.

The nucleus was removed from the egg. Then, the nucleus of the mammary gland cell from the Finn Dorset sheep was inserted

into the egg of the Scottish blackface ewe whose nucleus had been removed. The egg thus produced was implanted into the Scottish blackface ewe. Development of this egg followed normally, and finally Dolly was born.

c. During sexual reproduction in humans, testes in male produce sperms and ovary in female produces ovum. Sperm and ovum fuse to form a zygote. This process is called fertilisation. Zygote divides repeatedly and forms an embryo which gets embedded in the wall of uterus. The embryo develops body parts like hands, legs, head, eyes, ears, etc. The stage of embryo in which all the body parts can be identified is called a foetus. When the development of foetus is complete, the mother gives birth to the baby.

9. Because the baby is formed from the fertilisation of male and female gametes which come from father and mother, respectively. The nuclei of both parent gametes fuse to form a zygote with new character combinations from both parents. Thus, the zygote formed from fertilisation has characters of both parents, which develops inside the female's body and takes birth as a baby.

ACTIVITY ZONE

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

WORKSHEET–1

1. a. ii) b. ii) c. i) d. iii) e. i)

2. a. Sebaceous gland b. Ovulation
   c. Luteinising hormone d. AIDS e. Thyroxine

3. a. ductless b. taller c. menopause d. thyroid e. sex

4. a. ii) b. iii) c. i) d. v) e. iv)

5. a. A female ends her reproductive period at menopause.

b. Hypophysis and master gland are the other names of pituitary gland.

c. The growing voice box or larynx in boys can be seen as a protruding part of the throat, which is called Adam's apple.

d. Chromosomes are located inside the nucleus in a cell.

e. Growth hormone (GH).

6. a. i) Increase in height and change in body shape in both males and females, growing voice box and deep voice in males and high-pitched voice in females, increased activity of sweat and sebaceous glands causing acne and pimples in both males and females, development of testes and penis in males while ovaries and breasts in females, facial hair in males, growth of hair under arms and pubic hair in both males and females are the changes.

ii) At puberty, secretion of sebaceous glands increases, and many young people get acne and pimples on face due to increased activity of sebaceous glands.

b. A balanced diet is important for an adolescent because the body is growing; however, a balanced diet is needed by every human being at any age to stay healthy.

c. Insufficient production of insulin hormone by pancreas in human beings is the cause of diabetes in them.

d. Hormones from pituitary gland stimulate testes and ovaries to release testosterone in males and estrogen in females. Testosterone and estrogen are released in the bloodstream and reach parts of the body or target sites and stimulate changes in the body at the onset of puberty.

e. Menstrual cycle is controlled by hormones. The cycle includes the maturation of egg, its release, thickening of uterine wall and its breakdown if pregnancy does not occur. The cycle is required for the production of egg cells and for the preparation of uterus for pregnancy.

7. a. i) Adrenaline hormone.

ii) It is located on top of each kidney.

iii) Adrenal gland.

iv) It is an endocrine gland.

v) Another hormone produced by adrenal gland is aldosterone. It helps control blood pressure.

b. i) Yes, it is true.

ii) AIDS and syphilis.

iii) Full form of AIDS is Acquired Immunodeficiency Syndrome.

Human Immunodeficiency Virus (HIV) causes it.

iv) It spreads by sharing the syringes used for injecting drugs, to an infant from the infected mother through her milk and through sexual contact with a person infected with HIV.

c. i) A – Pineal gland, B – Hypothalamus, C – Pituitary gland, D – Thyroid gland, E – Thymus gland, F – Pancreas, G – Adrenal gland, H – Ovary, I – Testes

ii) Following is given the function of one hormone secreted by the endocrine glands:

– Pineal gland secretes melatonin. Its release during night hours helps with sleep.

– Hypothalamus secretes growth hormone releasing hormone. It regulates growth hormone release in the pituitary.

– Pituitary gland secretes growth hormone. It affects growth and development, stimulates protein production.

– Thyroid gland secretes thyroxine hormone. It controls metabolism and affects nervous system activity.

– Thymus gland secretes humoral factor. It helps develop the lymphoid system.

– Pancreas secretes insulin. It lowers blood sugar levels and stimulates metabolism of glucose, protein and fat.

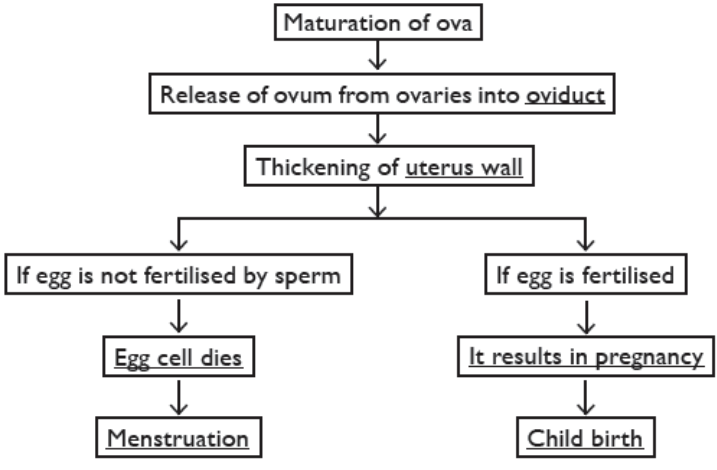
– Adrenal gland secretes epinephrine. It increases heart rate, oxygen intake and blood flow.

– Ovary secretes progesterone. It stimulates uterus lining for fertilisation and prepares the breasts for milk production.

– Testis secretes testosterone. It develops and maintains male sexual characteristics and maturation.

8. When a sperm containing X chromosome fertilises the egg, the zygote would have two X chromosomes and develop into a female child. If the sperm contributes a Y chromosome to the egg at fertilisation, the zygote would develop into a male child.

ACTIVITY ZONE



WORKSHEET–2

1. a. True b. True c. False d. True
   e. False

2. a. iv) b. i) c. iii) d. iii) e. iv)

3. a. It is because of low levels of growth hormone.

b. Because the body is growing.

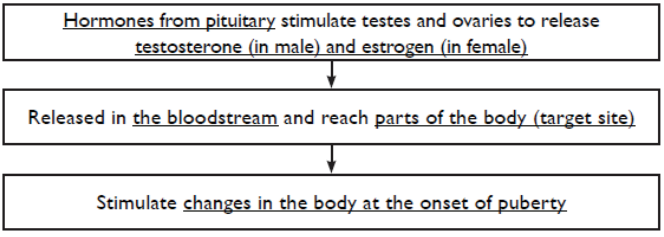
c. Because endocrine glands release hormones directly into the bloodstream.

d. Since adolescence is a period of inevitable disturbance and confusion.

e. Because of increased activity of sweat glands and sebaceous glands.

4. a. Pituitary b. reproduction c. Iron
   d. high e. Menopause

5.



6. a. Adrenaline b. Diabetes c. Aldosterone

d. No, boys and girls undergo different changes during adolescence like growth of facial hair in boys and breast development in girls.

7. a. i) Growth of facial hair, deep voice, growth of pubic hair, development of testes and penis, growth of muscles, production of sperms in testes.

ii) Because the period of adolescence covers the teens (13 to 19 years of age), it is known as teenage.

b. Because drugs are addictive. If we take them once, we will feel like taking them again and again. These harm the body in the long run. They ruin health and happiness. So, we should say 'No' to drugs.

c. Height, in general, depends on the genes inherited from the parents. However, eating the right kind of food during the growing years is also a factor, on which the height of an individual depends.

d. i) Adrenalin ii) Growth hormone
   iii) Insect hormone iv) Thyroxine

e. i) No, it is not permanent. During maturation, the uterus prepares itself for the development of baby. If fertilisation does not take place, the tissues from uterus are expelled during menstruation.

ii) The unfertilised egg will get dissolved, and pass down the uterus, along with uterine wall, ultimately coming out with blood during menstruation.

f.

Meat

Fruits

Vegetables

Egg

Cereals and pulses

8. a. i) Sita was suffering from goitre.

ii) Because boys develop larger voice box or larynx than that of girls which can be seen as a protruding part of the throat, called Adam's apple.

iii) No, the two friends were undergoing different conditions.

iv) Protrusion on Shyam's throat indicates a physical change during adolescence.

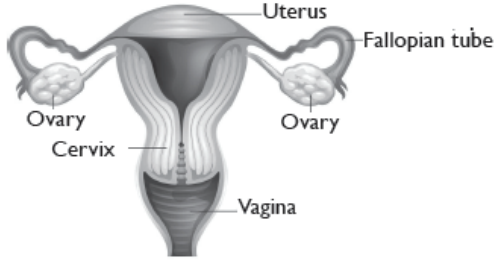
b. i) During adolescence, the secretion of sweat glands and sebaceous glands increases which leads to the formation of pimples and boils on face.

ii) Because regular face wash keeps the face clean and dry and helps to reduce the pimples.

iii) No. Generally those adolescents get pimples on their face who have an oily skin.

iv) Besides washing face at regular intervals, Sonali should avoid using cosmetics, avoid touching her face or popping pimples, apply ice on skin, remove excess oil and dirt.

c.



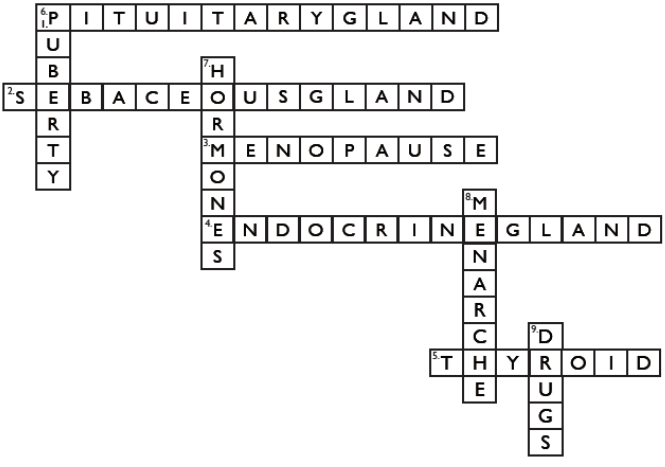
Human female reproductive system

9. a. Burgers and fries are junk food which is not a healthy diet at all and causes one to fall ill.

b. She should take a balanced diet and include cereals, pulses, fruits, vegetables and protein in her diet.

c. Obesity, asthma and some allergies like pollen fever, eczema, rhinoconjunctivitis, etc.

ACTIVITY ZONE



Chapter – 8. Force and Pressure

WORKSHEET–1

1. a. Gravitational force b. Buoyant force
c. Atmospheric pressure d. Pascal e. Contact force

2. a. pressure b. directions c. contact d. attracts
e. area

3. a. iii) b. i) c. iii) d. ii) e. i)

4. a. ii) b. iii) c. i) d. v) e. iv)

5. a. Forces add to one another and the object moves.

b. Bullocks pulling the cart (muscular force).

c. Gravitational force, electrostatic force and magnetic force.

d. Direction of force of friction and direction of motion are always opposite to each other.

e. Manometer

6. a. Pressure is defined as the force exerted on a surface divided by the area over which that force acts. Pressure = $\frac{\text{Force}}{\text{Area}} = \frac{F}{A}$

b. The action of a force can cause:

i) a stationary object to move

ii) a moving object to change its speed

iii) a moving object to change its direction of motion

iv) an object to change in size and shape

c. $F' = F \cos 30° \Rightarrow 10 \times \cos 30° = 10 \times \frac{\sqrt{3}}{2}$

$= 5\sqrt{3}N$

d. i) A contact force is a force applied to a body by another body that is in contact with it, while a non-contact force is a force which acts on an object without coming physically in contact with it.

ii) Atmosphere is a blanket of air that surrounds the earth while atmospheric pressure is the pressure exerted by the weight of the air on any object.

e. i) Weight of the car (downward), Normal reaction (upward), Frictional force, Driving force

ii) Weight of car and normal reaction are balancing each other as both are equal. Uniform velocity means that car is in equilibrium so driving force = frictional force and they are balancing each other.

iii) If one of the forces increases, the state of uniform motion will be changed.

7. a. i) Area = $30 \times 10 = 300\ cm^2$

$= 0.3\ m2$

Pressure = $\frac{\text{Weight}}{\text{Area}} = \frac{24}{0.3} = 80\ Pa$

ii) Pressure = $\frac{\text{Force}}{\text{Area}}$

Force = Pressure × Area

$300 \times 0.5 = 150$ N

b. i) When more than one forces are acting on an object, the net force which causes some effect on the object is called resultant force.

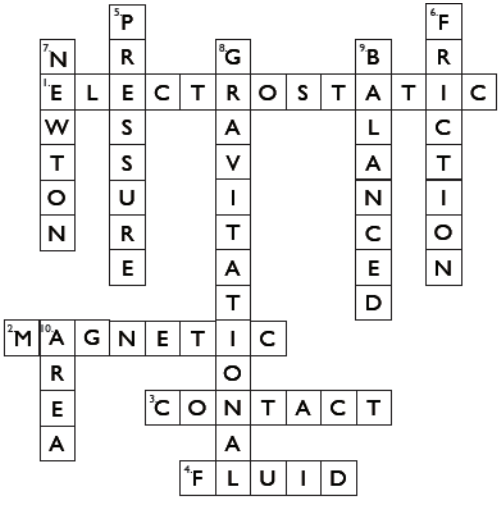
ii) Resultant force = 700N + 500N = 1200N

iii) Resultant force = 700N – 500N = 200N

c. Because particles that make up liquids can move in any direction and are bouncing about in a highly random motion. Therefore, pressure exerted by them (and gravitation) pushes the liquid down and against the walls of container.

8. A jet plane has high pressure inside as compared to outside. It the window breaks, pressure inside the plane will decrease. As a result, there is a sudden drop in the air. Hence, it will affect the breathing and to breathe properly, oxygen mask would be required.

ACTIVITY ZONE



WORKSHEET–2

1. a. Because long flat skies have a lot of surface area which decreases pressure exerted on the snow and therefore one does not end up sinking in the snow.

b. Because their wider feet allow the weight of their body to act on a larger surface of land reducing the pressure exerted on the land by the camels.

c. Because wide straps increase the area of contact which reduces the pressure exerted.

d. Since a blunt knife has more area of contact so it exerts less pressure when we apply force on it.

e. Because it spreads their heavy weight on the soft ground. This prevents the sinking of land under the weight of tank as more the surface area, less the pressure.

2. a. False b. False c. True d. False

e. False

3. a. ii) b. ii) c. i) d. i) e. i)

4.

S. no.	(Column A) Situation	(Column B) Contact/Non-Contact	(Column C) Type of Force
1.	Bat hitting a ball	Contact	Muscular
2.	Force between earth and moon	Non-contact	Gravitational
3.	Man rowing a boat	Contact	Muscular
4.	Water in river flowing downwards	Non-contact	Gravitational
5.	Force between a magnet and a nail	Non-contact	Magnetic
6.	Force between a comb (rubbed with hair) and bits of paper	Non-contact	Electrostatic
7.	Force between tyres of moving vehicle and the road	Contact	Frictional force

5. a. Air b. equal c. net force d. inertia

e. blood

6. a. The unit is Newton. It is the force needed to accelerate one kilogram of mass at the rate of one metre per second squared.

b. 1000 grams.

c. Force of friction will act towards west.

d. A water tank is placed at a higher level (usually on roof) in a house.

e. Because jute is rough having more friction and silk is smooth having less friction.

7. a. i) Because pressure applied on us by air is balanced by the blood pressure in veins.

ii) Because the air is very thin at the altitude they fly. At this altitude, humans cannot breathe very well and the body gets less oxygen.

b. Advantage – It keeps us warm in winter by rubbing our palms together.

Disadvantage – Components of machines worn and energy is lost due to heat produced because of friction.

c. The pressure is greater at 20m below the surface of sea because the pressure increases with the depth of the liquid.

d. i) $\text{Pressure} = \frac{\text{Force}}{\text{Area}} = \frac{4000}{20} = 200 \text{ Pa}$

ii) $\text{Area} = \frac{\text{Force}}{\text{Pressure}} = \frac{2000}{25} = 80 \text{ m}^2$

e. i) Because all the air between the cup and the surface does not escape out and vacuum is not created.

ii) It will stick easily on a smooth surface because all the air between the cup and the surface escapes out.

iii) As there is no air between cup and smooth surface, atmospheric pressure acts on it and it sticks.

8. a. i) On earth, the air pressure on the surface of drink forces the drink up through the straw. Because pressure inside straw is less than the air pressure outside, the liquid is forced up.

ii) On the moon, we cannot sip lemonade because there is no air and so no air pressure.

iii) Gopal went to the correct person, that is science teacher, to ask his query. He showed curiosity and willingness to learn.

b. i) Friction can be reduced by making the surfaces smoother, lubricating the surfaces, making the object more streamlined, reducing the forces acting on the surfaces, reducing the contact between the surfaces, using wheels and ball bearings.

ii) Friction can be increased by making the surfaces rough, by increasing the fluid viscosity, by increasing the mass of the object. Surfaces of matchbox and matchstick are rough and soles of shoes and tyres are treaded to increase friction.

c. Take a glass tube and stretch a thin rubber sheet, say rubber balloon, over one end of it. Pour some water in the pipe and notice the bulge in rubber sheet and height of water column. Pour some more water and you will observe that bulge in rubber sheet increases as the height of water column increases. This activity shows that pressure exerted by water at the bottom of container depends on the height of column and it increases with the depth of liquid.

9. a. Because if atmospheric pressure becomes too low at places during the flight, the fluids inside fountain pens may come out.

b. Wood pencil, because it is simple with no moving parts, except sharpener.

ACTIVITY ZONE

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

Chapter – 9. Friction

WORKSHEET–1

1. a. iv) b. iv) c. iii) d. iv) e. ii)

2. a. Streamlined b. Rolling c. Stylus instrument
d. Lubricants e. Ball bearing

3. a. iv) b. i) c. v) d. ii) e. iii)

4. a. motion b. less c. less d. spikes
e. Wheels

5. a. Because on applying brakes, no external force is applying on vehicles.

b. No, it is different for different types of surfaces.

c. When we rub our palms with each other, it feels warmth.

d. They do so for a better grip of their opponents.

e. From south to north.

6. a. i) **Rolling friction** is smaller than sliding friction, hence sliding is replaced in most machines by rolling by the use of ball bearings.

ii) **Sliding friction:** The force of friction between two objects which comes into play when one object slides over another.

b. i) Because the peel makes the surface smooth, so the friction between the feet of the man and ground decreases, causing him to fall, when he steps on the banana peel.

ii) On rough surfaces, there are a large number of irregularities. So the force of friction is greater if a rough surface is involved.

c. Buses and trucks have one tyre in the front and two tyres in the rear because most of the weight of these vehicles is on their rear axle. The double tyres increase the area of cross-section and therefore decrease the pressure.

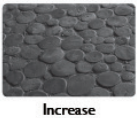
d.


Decrease


Increase


Increase


Decrease


Increase

e. Take a wooden cylinder, and make it slide down on an inclined plane. Note down the distance moved by the wooden cylinder. Now, take a wooden block and allow it to slide down the same inclined plane. Note down the distance moved by wooden block. You will observe that distance moved by wooden cylinder is more than that moved by wooden block, which proves that rolling friction is less than sliding friction.

f. Three ways to minimise friction are as follows:

i) Friction can be minimised by making the surfaces smoother.

ii) It can be minimised by lubricating the surfaces.

iii) It can also be minimised by using wheels and ball bearings.

7. a. The figure shown is of spring balance. It is a device used for measuring the force acting on an object. It consists of a coiled spring which gets stretched when a force is applied to it.

Stretching of the spring is measured by a pointer moving on a graduated scale. The reading on the scale gives the magnitude of the force.

b. **Static friction:** It is the force of friction that acts between the object and the surface or between the two objects, when they are at rest, e.g., a book kept on a table.

Sliding friction: It is the force of friction between two objects which comes into play when one object slides over another, e.g., a book kept on a table is pushed and it moves.

Rolling friction: It is the force of friction which comes into existence when one object rolls over another, e.g., use of ball bearings between hubs and axles of bicycle.

c. **Advantages:** Friction helps in walking on floor. We cannot fix nail in wood or wall if there is no friction. A horse cannot pull a cart unless friction furnishes it a secure foothold. We can write on paper or board due to friction. It helps in applying brakes. It helps in dragging of atmosphere with earth. Friction helps to prevent life on earth by burning astroids.

Disadvantages: Friction produces heat in machines, so energy is wasted as heat energy. Due to friction, we have to exert more power in machines. It produces noise in machines. It consumes more fuel in automobile engines which is a money loss. It opposes

motion. It wears things out like shoes. Forest fires are caused due to friction between branches of trees.

8. Like solids, liquids and gases also exert frictional force and oppose the motion. It is called fluid friction. Fluid friction depends on the speed of object with respect to fluid. It also depends on the shape of object and the nature of fluid.

ACTIVITY ZONE

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

WORKSHEET–2

1. a. Because oil in hands acts as lubricant which reduces friction.

b. It is because friction produces heat.

c. It helps them reduce fluid friction.

d. It produces heat which can cause fire and burn machinery. Thus, moving parts wear off rapidly due to friction.

e. Because streamlined shape reduces fluid friction.

2. a. iv) b. iii) c. iv) d. iii) e. iii)

3. a. Heat b. nature c. oiling d. fluid

e. rolling

4. a. iv) b. i) c. ii) d. v) e. iii)

5. Static Rolling Sliding

6. a. Yes, it is called fluid friction.

b. Ball bearing.

c. Speed of object in fluid, shape of object and nature of fluid are the factors.

d. Boat, ship, bullet train, airplane, car, etc.

e. Rolling friction

7. a. Because a well-polished surface is a smooth surface and smoothness reduces friction.

b. They burn because there are enough gases in the earth's atmosphere which cause friction and create heat.

c. Because worn out tyres reduce friction and therefore the vehicle will slide or slip.

d. i) Ram will be able to push the trolly easily due to less friction.

ii) His friend sitting on the trolly has increased the friction because mass increases friction.

e. Things moving in fluid are made streamlined to overcome friction. Streamlined shape needs less force to move in fluid due to less friction. Fish, bird, boat, ship and airplane are all examples of streamlined shapes.

8. a. i) It is ball bearing.

ii) A ball bearing is used to replace sliding friction by rolling friction because it is smaller. It is used between the hubs and axles of ceiling fans and bicycles.

iii) Bearings reduce friction by using highly smooth and spherical balls to roll against each other. These balls bear the load, allowing the device to spin smoothly.

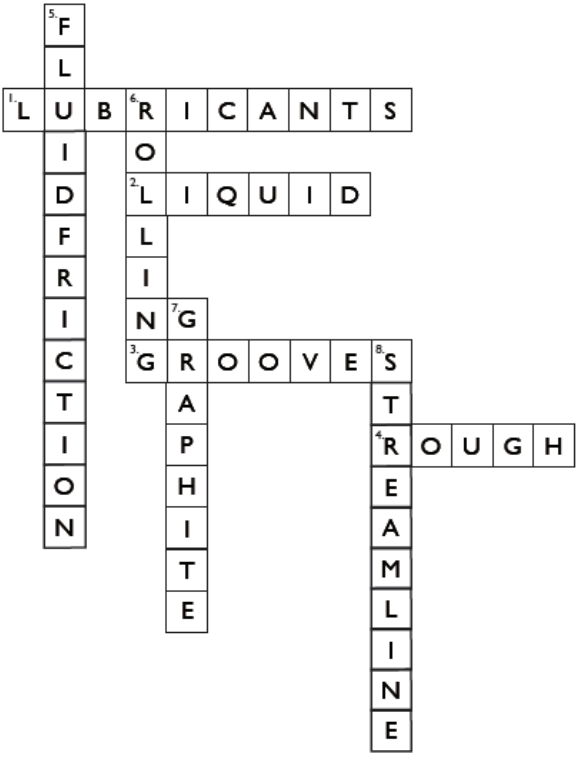
b. The marble will move the shortest distance on surface covered with a layer of sand. It is because a layer of sand makes a rough surface and roughness increases friction.

c. To move the car initially while it was standing, it requires more force as it involves static friction, whereas to keep the car rolling after it has started moving requires less force, since it involves rolling friction. Rolling friction is smaller than sliding friction. Also, when the car started rolling, contact points on the surface of

tyres did not get enough time to lock into contact points on the road.

9. Shoes with spikes make a much better choice because these shoes give a better grip while running. This is because the force of friction between the shoes and the ground increases with the help of spikes.

ACTIVITY ZONE



Chapter – 10. Sound

WORKSHEET–I

1. a. iii) b. v) c. ii) d. iv) e. i)

2. a. solid b. irregular c. hearing organ d. loud
e. decibel

3. a. Frequency b. Time period c. Ultrasonics
d. Infrasonics e. Noise

4. a. iii) b. ii) c. iii) d. i) e. iii)

5.

Harmonium

Air column

Flute

Air column

Sitar

Stretched string

Veena

Stretched string

Piano

Stretched string

Drum

Stretched membrane

Shehnai

Air column

Violin

Stretched string

6. a. Yes. It is vocal cords.

b. Sitar and veena.

c. From 20 Hz to 20,000 Hz.

d. Elephant and pigeon.

e. In solid state.

7. a. i) We hear the sound of an approaching truck before the truck reaches us because the speed of sound is more than the speed of truck.

ii) Auditory nerve.

b. Loudness of sound depends on amplitude of sound wave. Larger the amplitude, louder is the sound. Hence, some sounds are louder than others.

c. In our ear, at the end of ear canal, there is a thin stretched membrane called eardrum. Eardrum vibrates due to sound vibrations and sends them to the inner ear. From there, signal goes to the brain. In this way, we hear.

d. Loudness of sound is proportional to the square of the amplitude of vibration producing sound. E.g., if the amplitude becomes twice, the loudness increases by a factor of 4.

e. i) Noise is the sound that is unpleasant and annoying. It is an undesirable and unwanted sound. Its two sources are

factories/industries and traffic. Frequent oiling and lubricating machines, installing silencers in industrial equipment, avoiding use of loudspeakers and amplifiers, playing TV, radio, etc., at low volume, planting more trees as trees are absorbers of sound waves, can reduce noise pollution.

ii) Noise pollution is harmful for us because it can lead to deafness, lack of concentration, lack of sleep, hypertension, anxiety and many more.

8. a. i) Tabla ii) Stretched membrane

iii) Because a tight membrane vibrates at a much higher rate than the loose one. So, the sound produced with a tight membrane has a higher pitch.

iv) On tightening the membrane, the frequency of vibrations will be higher and therefore the sound produced will have a higher pitch.

v) Drum and dholak.

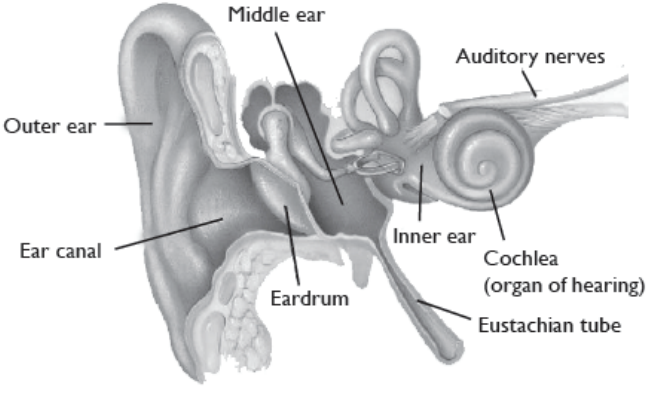
b. i) Ear

ii) **Malleus:** It receives sound vibrations from eardrum and transmits them to incus.

Incus: It conveys vibrations to the stapes.

Stapes: It transmits vibrations from incus to oval window, a membrane-covered opening to the inner ear.

iii)



Human ear

c. Time period = $\frac{1}{\text{Frequency of vibrations}} = \frac{1}{400} = 0.0025\,\text{second.}$

9. a. Frequency = 80/8 = 10 Hz

Time period = 1/10 = 0.1 second.

b. i) The sound will be 4 times louder.

ii) Pitch of the sound will also get doubled as it is directly proportional to frequency.

ACTIVITY ZONE

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

WORKSHEET–2

1. a. frequency b. echo c. shrill

d. percussion e. thickness

2. a. Because sound travels through vibrations of atoms and molecules in a medium (like air or water), and there is no medium in space.

b. Bats can use echolocation to locate objects in dark. Echolocation is the use of sound waves and echoes to determine where the objects are in space.

c. Because the membrane of large drum sets more volume of air into vibrations, as compared to that of small drum.

d. Because sound needs a medium to travel like air or water and there is no such medium on the moon.

e. It is because the vocal cords in men are about 20 mm long while in women, these are about 5 mm long.

3. a. ii) b. i) c. v) d. iii) e. iv)

4. a. ii) b. iv) c. i) d. ii) e. iv)

5. a. Loud voice b. High-pitched voice

6. a. Deafness, hypertension, anxiety, lack of sleep, lack of concentration.

b. Frequency c. Tuning fork d. Hard

e. Second

7. a. i) Hearing impairment is a partial or total inability to hear.

ii) We cannot hear screams of a bat because its frequency of producing sound is much higher than ours.

b. Frequency = $\frac{3000}{5}$ = 600 Hz

c. i) Because in our ordinary surroundings, there are many things which absorb sound waves, so we do not hear echoes.

ii) Frequent oiling and lubricating machines, installing silencers wherever needed, avoiding use of loudspeakers and amplifiers, planting more trees can reduce noise pollution.

d. Quality of sound is the property by which we can distinguish between two sounds of same pitch and loudness. Quality of sound is determined by the factors such as harmonics in the sound, medium used for propagation of sound, technology used for recording and reproduction of sound, etc.

e. Sonograms (i.e baby pictures), non-destructive examination (checking for internal cracks), Sonar (under water detection of obstacles), welding (plastics/metals), cleaning (often jewellery), cutting or slicing (fabrics, etc.), surgery, rock breaking, machining, wire/tube drawing and addictive manufacturing.

8. a. i) It is a simple pendulum.

ii) A – Extreme position B – Mean position C – Extreme position

iii) Mean position is the position of bob when the freely suspended pendulum is at rest.

iv) The pendulum comes to rest in the mean position.

v) The to and fro motion of an object is known as oscillation.

b. i) The sound of electric bell will be heard in presence of air.

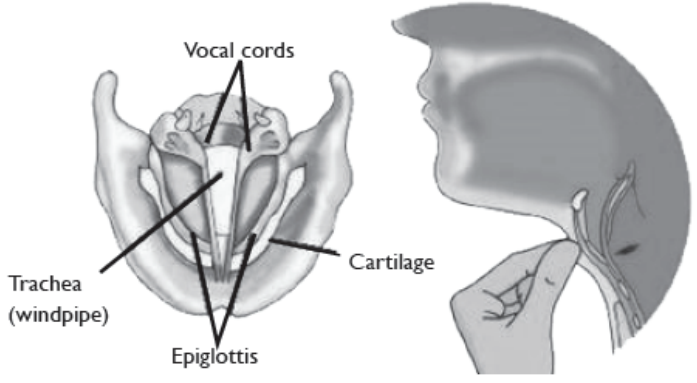
ii) Vacuum will be created.

iii) No, the person will not be able to hear because sound waves need a medium to travel. They cannot travel in vacuum.

iv) This activity proves that sound needs a medium to travel.

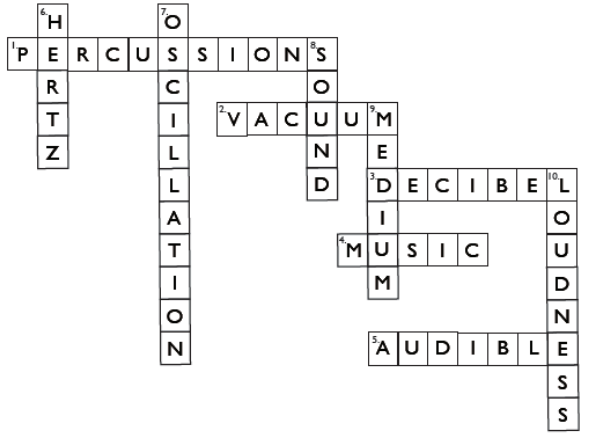
v) Electromagnetic waves can travel in vacuum also.

c. In humans, sound is produced by larynx (voice box). Larynx houses two vocal cords in such a way that it leaves a narrow slit between them for the passage of air. When lungs force air through slit, vocal cords vibrate, producing sound. Muscles attached to the vocal cords can make the cords tight or loose. When vocal cords are tight and thin, the type or quality of voice is different from that when they are loose and thick.



9. Lightning is seen earlier and thunder is heard later because light, which travels much faster than sound, arrives almost instantly.

ACTIVITY ZONE



WORKSHEET–1

1. a. Conductors b. Cell c. electroplating
d. ions e. Chromium

2. a. Because water is a good conductor of electricity and we may get an electric shock if we do so.

b. Because in solid state of salt, ions are fixed and cannot move but when molten or in solution state, ions are free to flow.

c. Because LED glows even when a weak electric current flows through it.

d. It is done to prevent the burners from corrosion due to high heat. Their hardness also increases by giving a coat of chromium.

e. Jewellery makers electroplate silver and gold on less expensive metals. These ornaments have appearance of silver or gold but are much less expensive.

3. a. Electrolyte b. Electrode c. Cathode
d. Cathode e. Electroplating

4. a. i) b. i) c. i) d. iii) e. ii)

5. a. To test whether the electric current is flowing or not.

b. LED glows even when a weak electric current flows through it.

c. Yes, they conduct electricity.

d. Electroplating.

6. a. i) Because distilled water has no ions or salts dissolved in it, and conduction of electricity needs swapping of electrons.

ii) By dissolving salt in the distilled water, we can make it a good conductor of electricity.

b. i) Formation of bubbles of a gas on the electrodes, deposition of metal on electrodes, change in colour of solutions are the chemical effects.

ii) Conductors allow the electric current to pass through them, e.g., copper. Insulators do not allow the electric current to pass through them, e.g., wood.

c. When we add kitchen salt (NaCl) to distilled water, it dissolves in water by splitting its molecules in ions.

$H_2O + NaCl \rightarrow H_2O + (Na^+) + (Cl^-)$

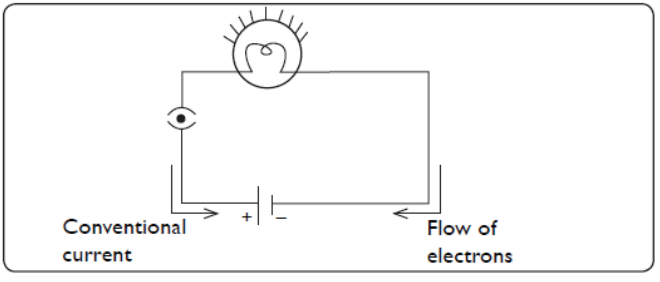
NaCl molecules react to give ions. This happens because NaCl is a strong electrolyte. Thus, salts, acids and bases in solution conduct electricity because they contain dissolved ions.

d. i) An electric current is induced into the coil and the galvanometer shows deflection (say towards left).

ii) An electric current is induced into the coil in an opposite direction. The galvanometer shows deflection in reverse direction (say towards right).

iii) No current is induced into the coil and the galvanometer shows no deflection.

e. i)



ii) Cathode is negatively charged electrode and anode is positively charged electrode. The ions that move towards cathode are positively charged and are called cations while the ones that move towards anode are negatively charged and are called anions.

7. a. i) Car parts, bath taps, kitchen gas burners, bicycle handlebars and wheel rims.

ii) Because chromium has a shining appearance. It does not corrode. It also resists scratches.

iii) No, chromium is expensive and it may not be economical to make the whole object out of chromium. So, the object is made of a cheaper metal and only a coating of chromium over it is deposited.

b. i) **Electroplating:** Take distilled water in a beaker and add two teaspoonfuls of copper sulphate in it. Add a few drops of dilute sulphuric acid to make it more conducting.

Connect a copper strip with positive terminal and an iron spoon with negative terminal of battery and immerse them

in copper sulphate solution. Allow the current to pass for 15 minutes. Now remove copper strip and iron spoon and observe. When electric current is passed, copper sulphate dissociates into copper and sulphate. The free copper is drawn to iron spoon connected to negative terminal of battery, and gets deposited on it. The process of depositing a metal on another metal by means of electricity is called electroplating.

ii) Because gold is less reactive than iron and copper, therefore no reaction will take place.

iii) Copper will not get deposited and the process of electroplating will not take place.

c. Tin cans, used for storing food, are made by electroplating tin onto iron. Tin is less reactive than iron. Thus, food does not come into contact with iron and is protected from getting spoilt.

8. Mercury is a metal and like any other metal, it has sufficient number of free electrons which act like charge-carriers. Therefore, it is a good conductor of electricity.

ACTIVITY ZONE

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

WORKSHEET–2

1. a. ii) b. iii) c. iii) d. ii) e. i)

2. a. False b. True c. True d. True
e. False

3. a. iii) b. v) c. iv) d. ii) e. i)

4. a. good b. ions c. two d. molten
e. deficit

5. a. Cations are the positively charged ions. These are attracted to the cathode in electrolysis.

b. Anions are the negatively charged ions. These are attracted to the anode in electrolysis.

c. Brownlee electrolysis apparatus.

d. Iron is more reactive.

e. $2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$

e. It may cause water pollution and soil pollution. Both surface water and groundwater get polluted. Thus, polluted groundwater becomes the most common route for water-borne diseases. They include cholera, typhoid, polio, meningitis, hepatitis and dysentery.

6. a. When electric current is passed in water, hydrogen ions (H^+) move towards cathode and get collected over it. Hydroxyl ions (OH^-) move towards the anode and oxygen is collected over it.

b. This is because water is a good conductor of electricity and if it is thrown, person may get an electric shock, which may lead to his death.

c. An LED may be used in place of an electric bulb. LED glows even when a weak electric current flows through it. There are two wires (called leads) attached to an LED. One lead is slightly longer than the other. While connecting to a circuit, longer lead is connected to positive terminal of battery and shorter lead is connected to negative terminal of battery.

d. On electrolysis of acidulated water, we get hydrogen gas and oxygen gas.

e. i) Glows Glows Does not glow Does not glow

ii) Characteristics of chemical changes brought about by the chemical effects of electric current are as follows:

– When electric current is passed through water, it dissociates into hydrogen and oxygen. Hydrogen is deposited over negative pole and oxygen is deposited over positive pole. Deposition of hydrogen and oxygen is visible in the form of bubbles.

– When electric current is passed through the solution of a metal salt, like solution of copper sulphate, metal gets

deposited at the negative pole, because metal is positively charged.

– Sometimes, the colour of solution also changes when electric current is passed through it.

f. From the other electrode, a copper plate, an equal amount of copper gets dissolved in the solution. Thus, the loss of copper from the solution is restored and the process continues.

7. a. i) The aim of the experiment is to show the chemical effects of electric current, in which electric current is passed in water to decompose it into hydrogen and oxygen.

ii) Chemical formula of water is H_2O. The reaction is:

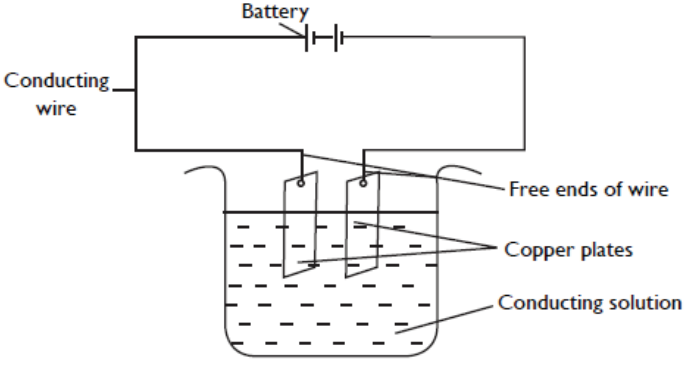
$2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$

iii) Hydrogen and oxygen.

iv) Hydrogen at cathode and oxygen at anode.

v) Cathode is connected to negative terminal while anode is connected to the positive terminal of the battery.

b. i)



Electroplating of copper

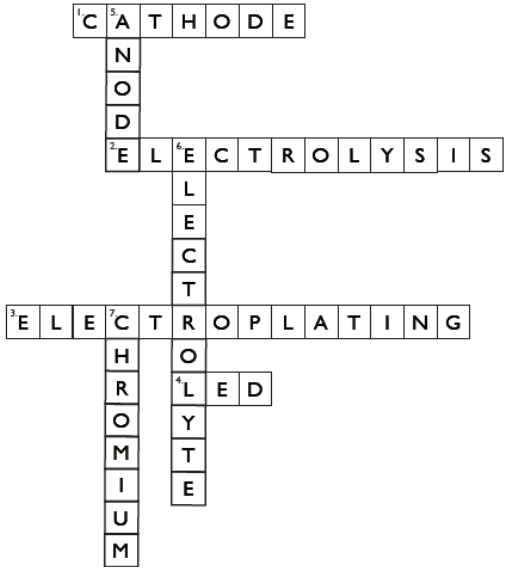
ii) The main objective of electroplating is to increase the resistance to corrosion of the coated metal and to improve the hardness and physical appearance of article.

Process: Take distilled water in a beaker and add 2 spoonfuls of $CuSO_4$ and a few drops of dilute H_2SO_4 in it. Connect copper plates to the terminals of battery, immerse them in solution and pass electric current for 15 minutes. Now remove copper plates (electrodes) from solution. When electric current is passed,

CuSO4 dissociates into Cu and SO4. The free Cu gets drawn to the electrode connected to the negative terminal of battery and gets deposited on it.

8. Applications of chemical effects of electric current in our daily life are as follows:
   - Electroplating – Gold plating and silver plating of jewellery and silverware to improve appearance and value of items, chromium plating to improve appearance of articles, zinc or tin coating for corrosion resistance.
   - Electrolysis of water to produce hydrogen which is a fuel for combustion engines or electrical motors.
   - Electrolysis is used for extraction and purification of metals.

ACTIVITY ZONE



Chapter – 12. Some Natural Phenomena

WORKSHEET–1

1. a. Lightning conductor b. Seismic waves c. Magma
d. Seismograph e. Richter scale

2. a. iii) b. v) c. iv) d. ii) e. i)

3. a. iii) b. iv) c. i) d. iv) e. ii)

4. a. attract b. conduction c. same
d. seismic e. seismograph

5. a. Movement of earth's plates and volcanic eruption.

b. Earthquake and lightning.

c. Yes, it is a cause of an earthquake.

d. A kite made of silk, hemp string, silk string, house key, Leyden jar, a sharp length of wire.

e. Tsunamis.

6. a. i) Earthing is the process of transferring charge from a charged object to the earth. It is provided in buildings to protect us from electrical shocks due to any leakage of electric current.

ii) Because the straws are negatively charged and like charges repel each other.

b. i) Because glass is an insulator and a car is a metal shell, in which no electric field can exist. So if lightning strikes, it will only pass through metal parts of car and not strike anyone inside.

iii) Like charges repel and unlike charges attract each other.

c. In such a case, ocean floor moves back and forth or up and down or the plates of earth's crust can stack on top of one another. When earthquake happens underwater, it can result in a tsunami wave.

d. During lightning, the air which is normally a poor conductor of electricity, is no longer able to resist the flow of accumulated charges in atmosphere. In this case, air conducts electrical charges.

e. During the development of thunderstom, air currents move upward, while water droplets move downward. These vigorous movements cause separation of charges. When magnitude of accumulated charges becomes very large, air is no longer able to resist their flow. Negative and positive charges meet, producing streaks of bright light and sound. We see streaks as lightning and the process is called electrical discharge.

7. a. i) The figure shows the accumulation of positive charges near the upper edges and of negative charges near the lower edges of clouds which leads to lightning.

ii) Yes, they get transferred.

iii) If there is no lightning conductor, it can harm buildings.

iv) Lightning conductor.

b. i) It is a simple electroscope.

ii) An empty jam bottle, cardboard, a metal wire, two strips of aluminium foil, a refill.

iii) Aluminium foil strips receive same charge from refill through metal wire. Strips repel each other. This device can be used to test whether an object is carrying a charge or not.

iv) The instrument should be uncharged initially.

c. If in a car or bus, shut windows. If in a forest, take shelter under shorter trees. Stay away from tall trees, poles or other metal objects. Do not lie on the ground. Instead, squat low on the ground. Place your hands on your knees with your head between hands. If inside a house, avoid contact with telephone cords, electrical wires and metal pipes. It is safer to use mobile and cordless phones. Bathing should be avoided to avoid contact with running water. Electrical appliances like TV, computers should be unplugged. Electrical lights can remain on.

8. It is device used to protect buildings from the effect of lightning. A metallic rod, taller than building, is installed in the walls of building during construction. One end of rod is in air while the other end is buried deep in the ground. The rod provides easy route for the transfer of electrical discharge to the ground.

ACTIVITY ZONE

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

WORKSHEET–2

1. a. Because when a sweater is taken off, the woollen sweater gets charged due to the friction between the sweater and the body.

b. Because when we touch a charged object, our body conducts its charges to the earth.

c. Since nature of charges present on the surface of charged balloons is similar and like charges repel each other.

d. Since iron rod or iron handle can conduct electricity and we may get an electric shock.

e. It happens because speed of light is much more than the speed of sound.

2. a. True b. True c. True d. True

e. True

3. a. ozone b. transfer c. faults d. diverges

e. equal

4. a. i) b. iv) c. i) d. iv) e. ii)

5. a. The glass rod will acquire positive charge.

b. Benjamin Franklin

c. Meteoroid

d. Flow of free electrons from one atom to another.

e. Positive

6. a. Static electricity is caused by the build up of electrical charges on the surface of objects, while electric current is a phenomenon from the flow of electrons along a conductor.

b. During an earthquake, the plates in earth's crust brush past one another, or one plate goes under another due to collision, causing disturbance in the earth's crust.

c. This is the process in which a charged object is brought near but not touched to a neutral conducting object. It will force (or induce) electrons within the conductor to move. The body acquires the opposite charge from the object being used.

d. Primary effects are ground shaking, ground rupture, landslides, tsunamis and liquefaction. An earthquake can cause damage to human life and property on a huge scale.

e. Outdoors: Find a clear spot, away from buildings, trees and overhead power lines. Drop to the ground. If you are in a car or bus, do not come out till the tremors stop.

Indoors: Take shelter under a table and stay there till the shaking stops. Stay away from tall and heavy objects that may fall on you. If you are in a bed, do not get up. Protect your head with a pillow.

7. a. i) The picture shows the structure of the earth.

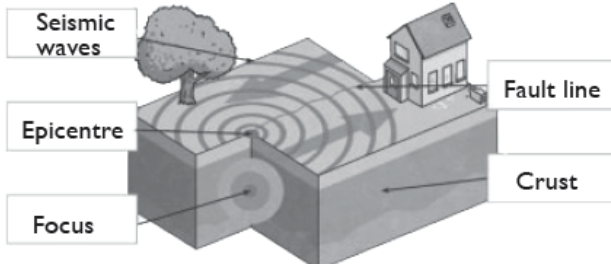
ii) A – Crust B – Mantle C – Outer core D – Inner core

iii) Crust is the outermost and first layer of earth. It is the hardened part. Mantle sits on top of the outer core and is the second layer of earth. It is the densest layer of earth. The outer core is liquid and is composed of iron and nickel. The inner core is solid and is the second thinnest layer of earth. It is farthest from the earth surface.

iv) Crust.

b. When a charged body is placed on metal disc, the charge travels through the metal rod to the gold leaves. Since like charges repel, the charge travels up to the leaves and gold leaves diverge as both leaves have like charges.

c. i)

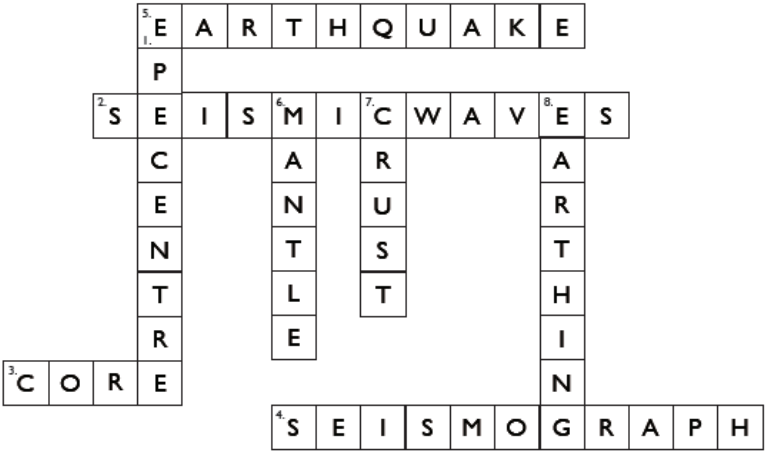


ii) Seismograph

iii) Earth's plates are in continual motion. They brush past one another or one plate goes under another due to collision. These movements cause disturbance in the earth's crust.

8. A volcano is a rupture in the earth's crust that allows hot lava, volcanic ash and gases to escape from the magma chamber below surface. Yes, it is a cause of earthquake. It happens when magma exerts pressure on the rocks until it cracks the rock. Every time the rock crakes, it makes a small earthquake.

ACTIVITY ZONE



Chapter – 13. Light

WORKSHEET–1

1. a. iv) b. ii) c. iii) d. iii) e. i)

2. a. Regular b. seven c. expands d. $\frac{1}{16}$ th
e. 25 cm

3. a. Because in bright light, the size of pupil of our eyes is small. When we enter a dark room, due to small size of pupil, very little light enters our eye.

b. When we move into brightly lighted area from comparatively darker area, the pupil is expanded and a large amount of light enters our eyes. So, we feel glare and shrink our eyes.

c. It is because of dispersion of sunlight by the tiny water droplets of rain present in the atmosphere. The raindrops act like small prisms and sunlight is refracted, dispersed and reflected in them and we see a rainbow in sky.

d. We can see an object only when light reflected by it reaches our eyes. In a dark room objects would not reflect any light that may enter our eyes since there is no light. So, we cannot see objects in a dark room.

e. Because rubbing eyes with dirty hands can cause excessive growth of bacteria which increases the risk of inflammation of eyes, known as conjunctivitis (pink eye).

4. a. ii) b. v) c. i) d. iv) e. iii)

5. a. A mirror is a surface, typically of glass coated with a metal amalgam, which reflects a clear image.

b. Iris

c. Concave mirrors can produce both real and virtual images which can be inverted or upright.

d. Blind spot

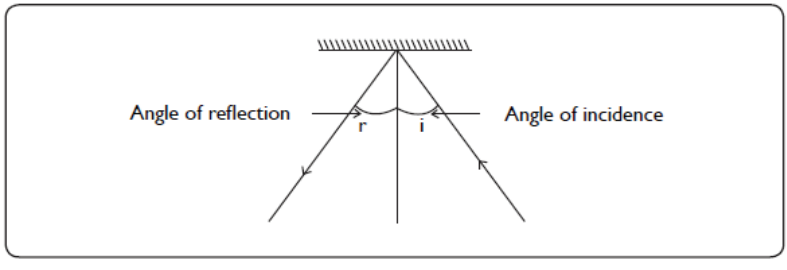
e. Light cannot pass through opaque objects.

6. a. i) **Laws of Reflection**:

– The angle of incidence is equal to the angle of reflection.

– Incident ray, reflected ray and the normal drawn at the point of incidence to the reflecting surface, lie in the same plane.

ii)



b. Braille system is the most popular resource for visually challenged people to read. Braille system has 63 dot patterns, which represent letters, words, signs, etc. These patterns when embossed on Braille sheets, help visually impaired persons to recognise words by touching. To make them easier to touch, dots are raised slightly.

c. The student is suffering from far sightedness or hypermetropia, in which a person can see far objects clearly but cannot see nearby objects clearly. This defect can be corrected by using spectacles made of convex lens.

d. Converging lens is convex lens which is thicker at the centre but thinner at its ends. It has a negative focal length. On the other hand, diverging lens is concave lens which is thinner at the centre but thicker at its ends. It has a positive focal length.

e. Characteristics of the image formed by a plane mirror are as follows:

i) The size of image is same as that of object.

ii) The image is virtual and erect.

iii) The image is laterally inverted, that is, the left of object appears as right of image and vice versa.

iv) The distance between object and mirror is same as the distance between image and mirror.

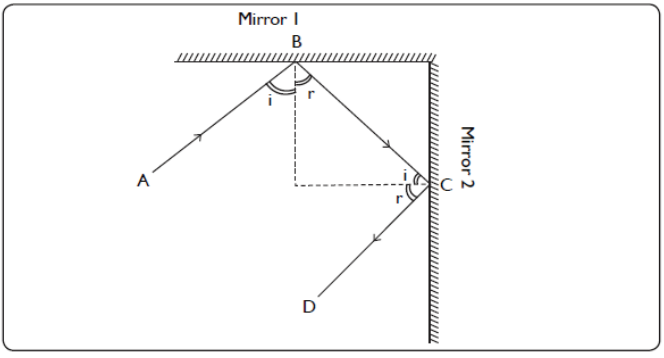
7. a. i) It is a human eye.

ii) A – Cornea B – Retina C – Aqueous humour
D – Optic nerve E – Iris F – Lens

iii) **Near-sightedness (Myopia):** In this defect, a person can see nearby objects clearly but cannot see far-off objects. This defect is caused by thickness of eye lens. It can be corrected by using spectacles made of concave lens.

Far-sightedness (Hypermetropia): In this defect, a person can see far-off objects clearly but cannot see nearby objects with clarity. This defect is caused by the thinness of eye lens. It can be corrected by using spectacles made of convex lens.

b. i)



ii) Yes, they will be the same. It is because angles of incidence and reflection are same for mirror 1 and reflected ray of mirror 1 will act as incident ray for mirror 2, forming equal angles of incidence and reflection for mirror 2.

c. The number of images formed by two plane mirrors placed at angle = $\frac{360}{x}$

(x = angle formed by two mirrors)

When the mirrors are placed parallel to each other, x = 0

Therefore, the number of images formed = $\frac{360}{0}$ or infinite

Thus, infinite number of images will be formed.

8. Some ways by which we can take care of our eyes are as follows:

i) Use suitable spectacles if advised.

ii) Avoid too much or too little light. Both are not good for eyes.

iii) Never rub your eyes. If particles of dust go inside your eyes, wash them with clean water.

iv) Always read at the normal distance for vision.

v) Do not look at the sun or a powerful light directly.

ACTIVITY ZONE

1. BEND
2. IMAGE
3. RAYS
4. SUNLIGHT
5. REFLECTION
6. BOUNCE
7. SPECTRUM
8. SHADOW
9. PRISM
10. RAINBOW

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

WORKSHEET–2

1. a. Incident ray b. Plane mirror c. Concave
d. Nerve cells e. Cornea

2. a. iii) b. iv) c. i) d. v) e. ii)

3. a. reflection b. 2 m c. less d. Concave
e. strain f. multiple reflection

4. a. i) b. iv) c. ii) d. ii) e. ii)

5. a. Angle of incidence $= \frac{60^\circ}{2} = 30^\circ$

b. Distance between mirror and object $= \frac{24}{2} = 12$ cm

c. Myopia

d. Green

e. It prevents our eyes from many eye diseases like night blindness.

6. a. When an object in front of our eyes is removed, impression of its image does not vanish immediately from the retina. It stays their for 1/16th of a second. This phenomenon is called persistence of vision.

b. The size of the image does not depend on the size of mirror. So, images in both the mirrors will be of the same size.

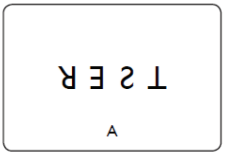
c. It is so because bats use ultrasonic waves and due to less obstacles at night, they can see better at night than during the day.

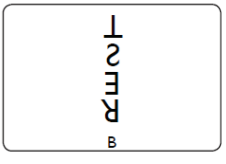
d. i) a. Regular reflection

b. Diffused reflection

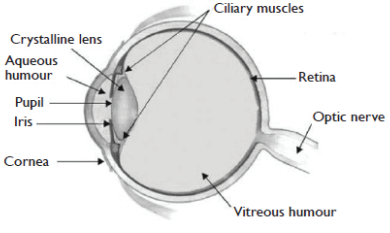
ii) The process by which the ciliary muscles change the focal length of an eye lens to focus distant or near objects clearly on the retina is called power of accommodation of the eye.

e.





7. a. i)



Human eye

ii) a. **Cornea:** It allows light to enter the eye. It protects the eye and helps in focusing the light.

b. **Pupil:** It determines the amount of light that enters the eye.

c. **Ciliary muscles:** These muscles hold the lens in position. Also, they change the focal length of the eye lens by expanding or contracting.

d. **Iris:** It controls the amount of light entering the eye by increasing or decreasing the size of pupil. It also gives the distinctive colour to the eye.

e. **Optic nerve:** These nerves carry messages or stimulus from the retina to the brain.

b. Kaleidoscope is a simple device which is based on the principle of multiple reflection. Multiple images are formed when mirrors are kept at an angle to each other. This device creates beautiful patterns visible from one end of the device. Designers of wallpapers, fabrics, tapestry, rugs and carpets and artists use kaleidoscopes to get ideas for new patterns.

c. i) Lens in our eyes is a convex lens. It forms image of an object on retina.

ii) In cataract, the eye lens becomes cloudy and the person cannot see clearly. This problem is corrected by surgically removing the lens and replacing it with an artificial one. Modern technology has made this procedure simpler and safer.

8. The impression of an image does not vanish immediately from retina of our eye. It persists there for about 1/16th of a second. This is called persistence of vision. So, if still images of a moving object are flashed on the eye at a rate faster than 16 per second, the eye perceives this object as moving. This process enables us to perceive the motion in a cartoon film.

ACTIVITY ZONE