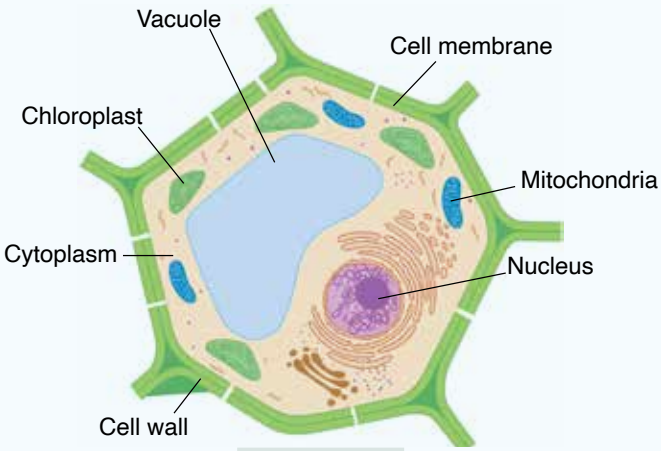
Easy Science 6
Textbook Answer Key

UNIT 1: CELLULAR ORGANISATION

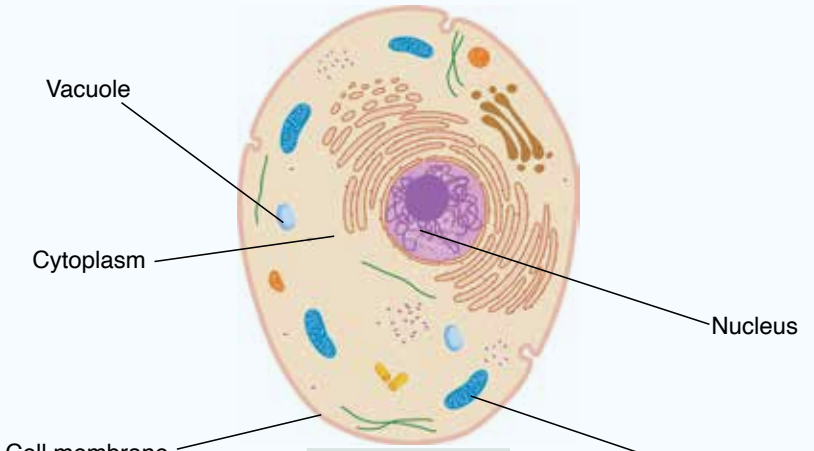
Practice page 3

1. nucleus
2. cytoplasm
3. cell rembrare
4. mitochondria
5. unicellular

Practice page 5



A plant cell



An animal cell

Practice page 7

Red Blood cells	Smooth, cardiac, skeletal,
Epithelial cells	Transport oxygen
Muscle cells	Messages are transmitted through long chains
Nerve cells	Protect by forming a covering on different surfaces

Practice page 9

- Cells → Tissues → Organs → Organ system → Organisms
- Epithelial cells-line part of the lungs
- Circulatory system Blood cells- carry oxygen from lungs and deliver to different parts of our bodies.

  Muscle cells- Allow the lungs to contract and relax as we breathe

  Nerve cells-provide signals when harmful substances enter our bodies.

Exercise

1.

i. a

ii. b

iii. c

iv. d

v. b

2.

a. False

b. True

c. False

d. True

3.

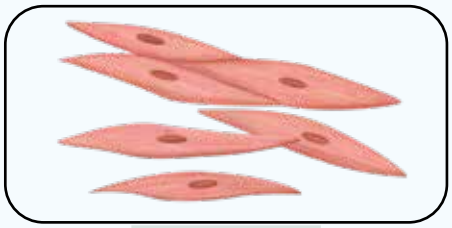
i. a Cells are basic units of life. They are very small and can only be seen through a microscope.

i. **b.** Important parts of a cell are:

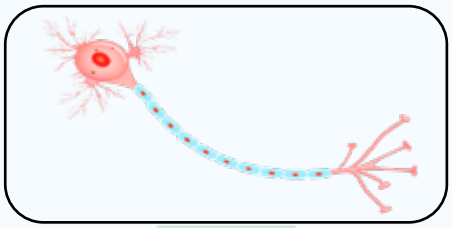
- The nucleus

- The cytoplasm
- The cell membrane
- Mitochondria
- Vacuoles

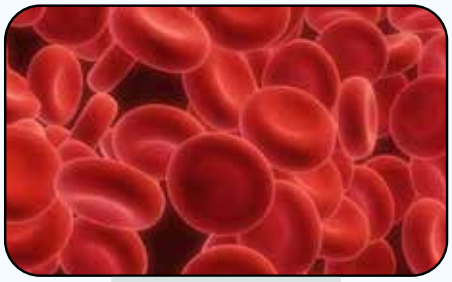
ii.



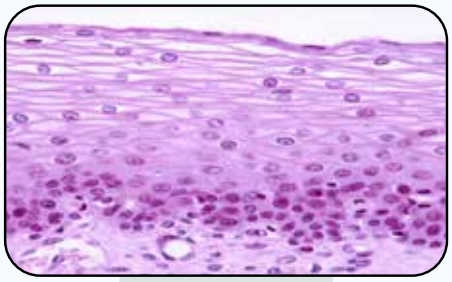
Muscle Cells



Neurons



Red Blood Cells



Epithelial Cells

iii. An organ system is a group of different organs that work together to form organ systems. The organ system works together to perform a specific function in the body.

iv.

Type of cells	Structures found in the cells	Functions
Animal cell	Nucleus	It is the control centre of the cell, contains genetic information. Responsible for growth, protection ,regeneration.
	Cytoplasm	Jelly-like substance in which cell structures are suspended.
Plant cell	Chloroplast	Green substance that takes energy from the sun and changes it into food
	Cell wall	Found outside the cell, made up of cellulose, controls entry and exit. Protects, and makes leaves, stems,etc. strong.

4.i.

a. Neurons are made up of long chains through which messages are transmitted across the neurons, and travel from one part of the body to another.

b. Muscle cells have long and thin bodies with thin pointed ends which allows them to move and slide over each other when a muscle contracts and relaxes.

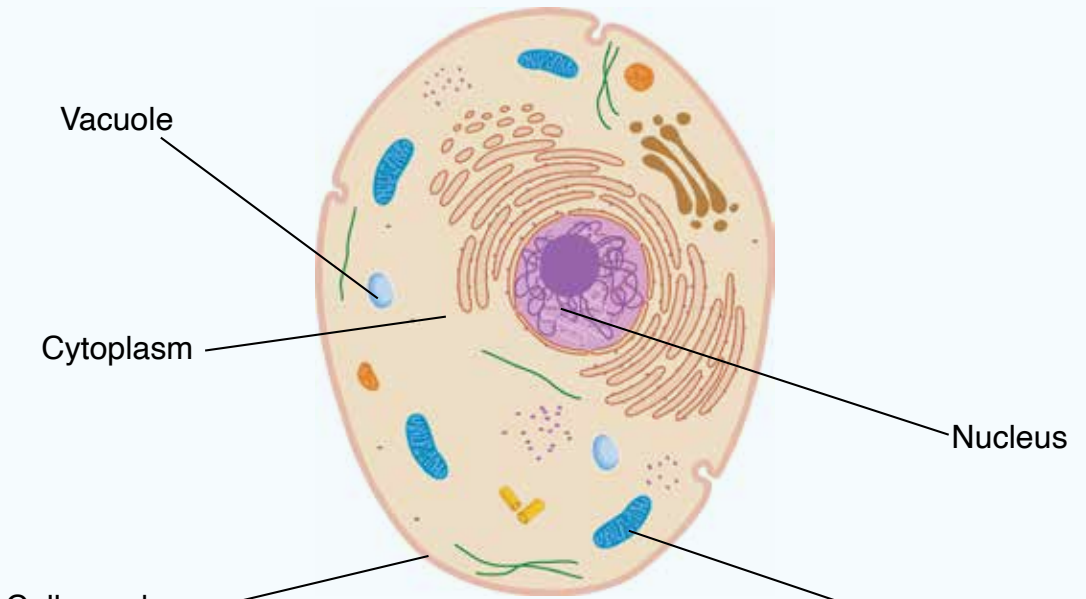
c. Epithelial cells are thin and flat that allows them to lay flat on top of each other and form layers. These cover surfaces of different body structures like skin.

d. Red blood cells carry oxygen in the body. They are flat with an indent in the center that allows them to collect oxygen in a larger quantity and carry it to and from different parts of the body.

ii.

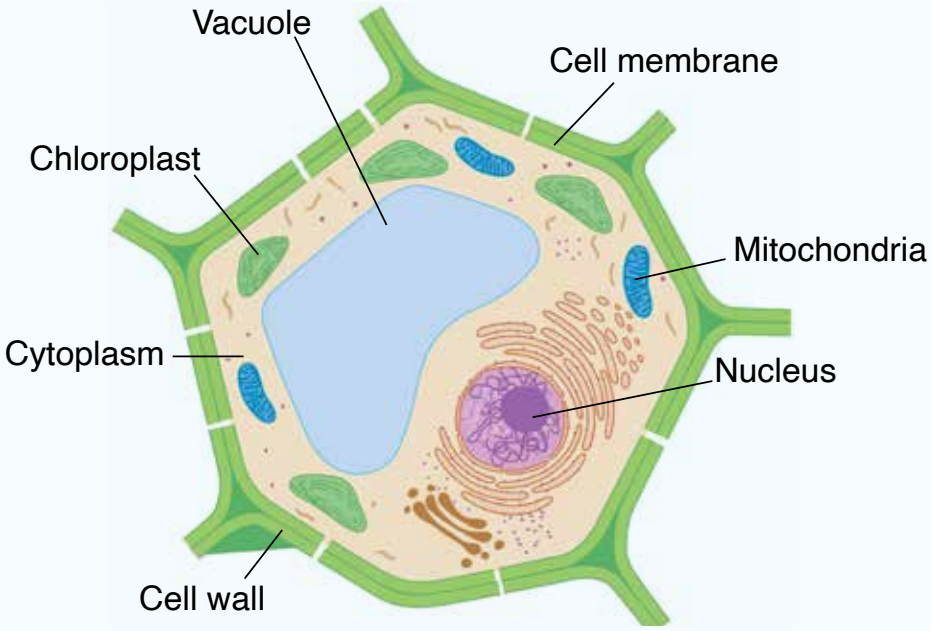
Plant cell	Animal cell
Chloroplast	Do not have chloroplast
Large Sap vacuole	Have small vacuoles
Cell wall	Do not have cell wall

5. a.



An animal cell

5. b.



A plant cell

UNIT 2: REPRODUCTION IN PLANTS

Practice page 15

1.

Features	Sexual Reproduction	Asexual Reproduction
Number of Parents	Two	One
Gametes produced	Two	None
Diversity	The new plant is genetically different than parent plant	The new plant is genetically same
One Advantage	Stronger offspring	Propagation is extensive
One Disadvantage	Requires more time for reproduction	Overcrowding due to production of a large number of plants

Practice page 17

1. Ovules

2. Ovary

3. Protects the bud

4. Nectary

Practice page 19

1. False

2. True

3. False

4. True

Exercise

1.

i. a

ii. b

iii. a

iv. c

v. d (similar plants)

2. i. Pollination

ii. self-pollination

iii. stigma

iv. nectar

3.

Cloning	Another name for asexual reproduction
Bulbs	Potatoes
Tubers	Rose plant
Cutting	Underground swollen bulbs

4.

i.

Asexual Reproduction	Sexual reproduction
Involves one parent plant	Involves two parent plants
No fertlisation takes place.	Fertilisation takes place
The new plant is identical to the parent plant	The new plant is different from the parent plant
Gametes are not formed	Gametes are formed

ii. Reproduction is necessary for all living organisms because it is the process by which living organisms continue their existance on Earth.

iii. Sexual and asexual reproduction

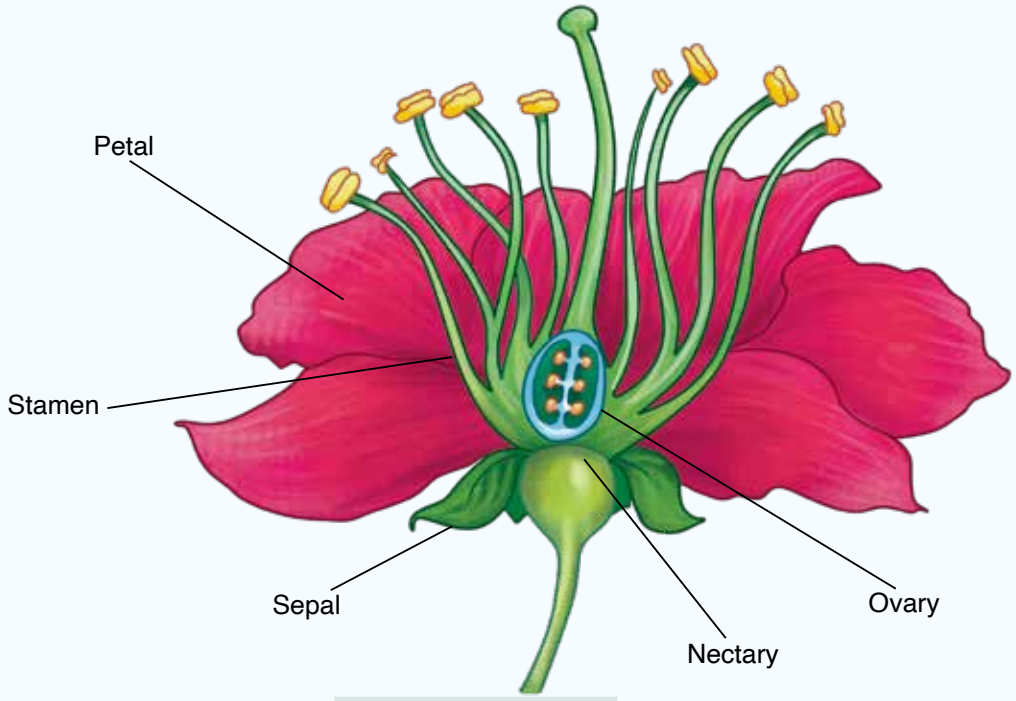
iv. **a.** Sexual reproduction involves two parent plant which undergo a proces known as fertilisation. In this process two male and female gametes of the two plants merge to form a new plant.

b. Gametes are reproductive cells that are produced in flowers. They merge during the process of fertilization.

c. Asexual reproduction involves only one plant as there no fertilization. All plants produced are identical to parent plant.

5.i. Pollination is the transfer of pollen grains from anther to stigma.

Its two types are self-pollination and crosspollination.



Structure of a flower

ii.

Parts of a Flower	Function
Stamen	The male reproductive organ. It produces **pollen grain**, the male gametes.
Carpel	The female reproductive organ. It produces the female gametes, the **ovules** inside an **ovary.**
Petals	Petals are brightly coloured and scented parts of plants, they attract insects.
Sepal	The sepal is a protective organ, which protects the plant in its bud form.
Nectary	A gland in the flower that produces **nectar**, a sugary fluid, that insects use for food.

iii. Its an insect known as honey bee that carry pollen grains from one flower to another. The sticky pollen grains stick to the bodies of insects and are transferred to other plants.

iv. Natural asexual reproduction:

- Runners. New plants grow from the stalk growing horizontally.

- Budding. A part of plant is taken to grow a new plant.
- Bulbs. Are underground stems that also store food.
- Tubers. These are places of food storage and new buds grow from it and develop into new plants.

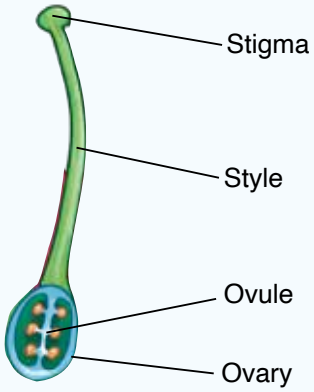
v. The seeds germinate when they fall on the ground, when the conditions are appropriate. For example, presence of water, suitable temperature.

vi. Artificial propagation results in better quality yield due to selection of better quality crops for the purpose by the farmers

They get the same quality of fruits, etc., as the plants are similar to the plants used for propsgstion.

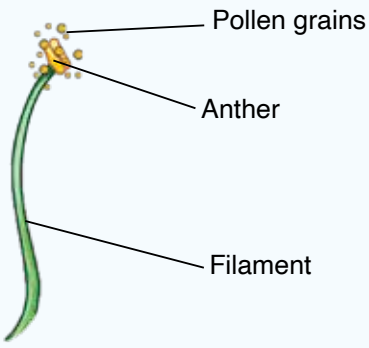
The method is economical because farmers can produce many plants from a single parent plant.

6. a.



Structure of the carpel

b.



Structure of the stamen

UNIT 3: HUMAN DIGESTIVE SYSTEM

Practice page 29

1.

Mouth	Saliva
Salivary glands	Digestion starts here
Oesophagus	A hollow sack made up of muscles
HCl	Kills unwanted bacteria
Stomach	Pathway for food from mouth to stomach

Practice page 30

1. False

2. True

3. False

4. Trues

Exercise

1.

i. b

ii. c

iii. a

iv. b

v. c

2.

i. Carbohydrase

ii. Amylase

iii. Protease

iv. Lypase

3.

i. digestion

ii. Alimentary canal

iii. Jejunum, ileum

iv. Mouth

4. i Jejunum is the lower part of small intestine where food is squeezed into from duodenum. It moves into ileum from here.

ii. Once all the remaining nutrients are absorbed the water and remaining waste material moves into large intestine where water is absorbed and the waste material is stored in the rectum and expelled out of the body through anus.

iii. After digestion, the blood transports absorbed nutrients to the liver and rest of the body's cells.

iv. The undigested food or waste material is expelled out of the body, through a process called as defecation or ejestion.

v.

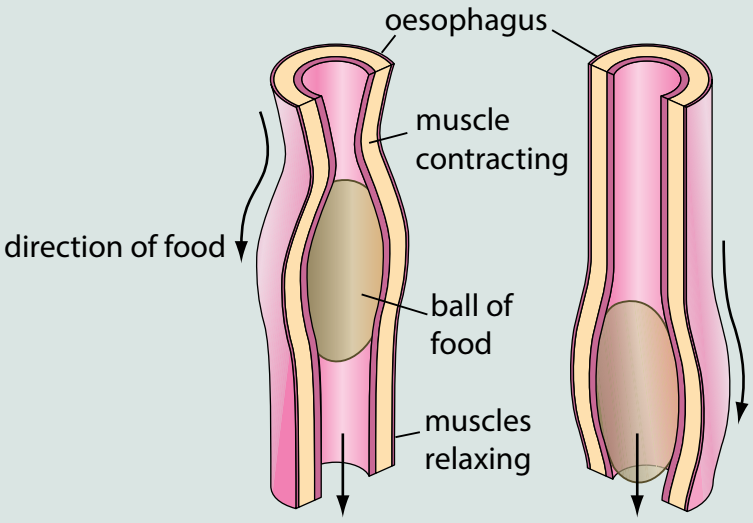
- Protease works on proteins and changes them into amino acids.
- Amylase digests the starch that partially break down in the mouth and converts it into maltose.
- Lipase digests fat into fatty acids and glycerol.

vi. Jejunum is a part of small intestine through which food passes into ileum.

vii. The role of protease and lipase in digestion is lipase digests fats into fatty acids and glycerol while protease breaks down proteins into amino acids.

5. i. The process of digestion starts from the mouth. Food is chewed and broken down into the smaller pieces. This is known as physical digestion. The salivary glands in the mouth produce saliva which lubricates the food that supports easy movement. The chemical digestion is the result of action of enzymes in the mouth that begins to break down carbohydrates in the mouth.

5. ii.



Peristalsis in oesophagus

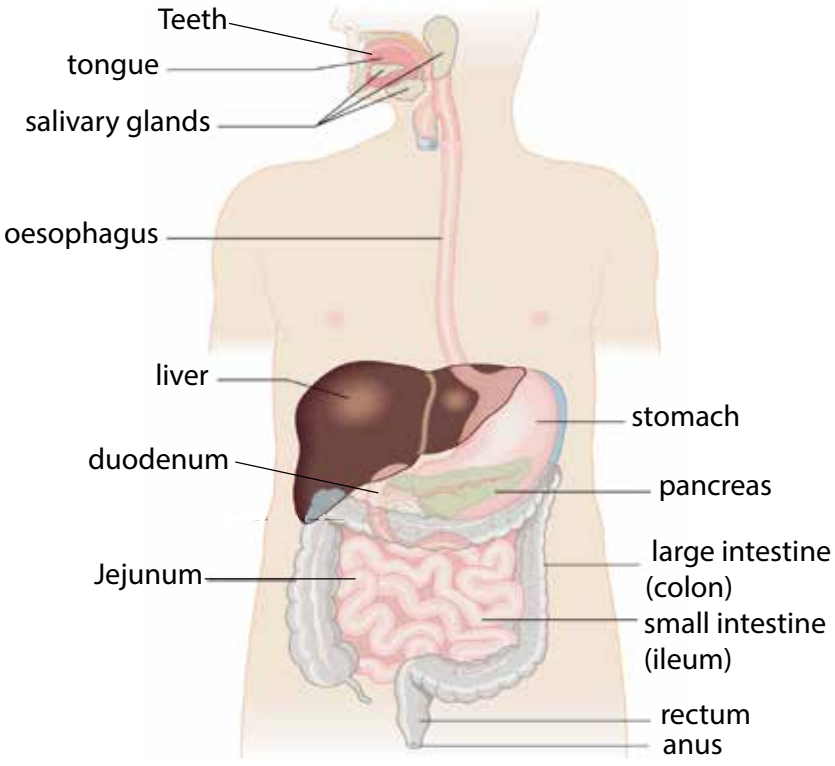
In stomach which is a hollow sack of muscles, both physical and chemical digestion takes place. The food is broken down by peristalsis and mixed with gastric juice. The protease present in gastric juice begins the chemical digestion for proteins and Hydrochloric acid which kills unwanted bacteria. Because of peristalsis a creamy liquid is produced which passes at regular intervals to small intestine.

iii. The small intestine has three parts which are duodenum jejunum and ileum. The enzyme found in the duodenum act on the food (digestive enzymes from liver and bile from pancreas). Bile neutralizes stomach acids and emulsifies fat. Pancreatic juice from the pancreas breaks down fats, sugars and starch. The walls of small intestine also produce intestinal juice which also has different enzymes.

iv. Ileum is the lower part of small intestine where nutrients are absorbed, which is lined with thousands of small finger-like projections known as villi. They have a mesh of capillaries. The nutrients are absorbed through villi into blood stream.

v. In the stomach , both physical and chemical digestion takes place. The food is broken down by peristalsis and mixed with gastric juice. Gastric juice contains proteas enzyme, which begin the chemical digestion of proteins and Hydrochloric acid which kills unwanted bacteria. Because of peristalsis, a creamy liquid is produced, which passes at regular intervals into small intestine.

6.



UNIT 4: BALANCED DIET

Practice page 38

1. False

2. False

3. True

4. True

Three benefits of regular exercise are:

- It prevents chronic diseases.
- It helps in weight control
- It helps in better sleep.

Exercise:

1.

i. b

ii. c

iii. d

iv. acid reflux or Gastroesophageal reflux

v. d

2:

i. discomfort

ii. 8-9 hours

iii. balanced diet

iv. food

3. Food groups

- Proteins
- Sugars
- Starch
- Fiber
- Fats and oils
- Vitamins

4. i.

Food Groups	Examples
Proteins	Wheat, rice, oats and potatoes
Sugars	Meat, eggs and nuts
Starch	Fruits, honey
Fats and oils	Brown rice, spinach, and other green leafy vegetables
Fiber	Vegetable oil, butter, milk, and egg yolk

5

a. 
Starch

b. 
Sugars

c. 
Fats and oils

d. 
Fiber

iii. Water is an important part of our diet. Our body is composed of 50-70 % water. It transports nutrients and wastes and also maintains body temperature. Its daily consumption is vital. A 2.7-3.7 ml of water are recommended.

5 i. Essential nutrients in food groups

Food Groups	Nutrients found in
Carbohydrates Sugars, Starch, Fiber	Milk, fruits, flour, etc.
Proteins	Lentils, red meet eggs, etc.
Fats and oil	Vegetable oil, butter, dairy products
Vitamins	Fish, lemon, carrots
Water	Universal solvent helps in the body

ii.

Nutrition Deficiency Disorders	Causes	Symptoms
Kwashiorkor	Deficiency of proteins	Feet, ankles and belly becomes swollen and growth is stunted
Weak eyesight and defense system	Vitamin A deficiency	Blurred vision, inability of the body to cope with diseases.
Rickets	Vitamin D	Bones necome weak and brittle
Scurvy	Vitamin C	Bleeding gums, loose teeth, poor healing of wounds
Hypocalcemia	Deficiency of calcium	Weak bones and nails
Anaemia	Deficiency of iron	Weakness and body appears pale
Hemorrhoids	Eating foods lacking fiber	Digestive issues like constipation, bleeding

5.iii. Recommendations for healthy life:

- Exercise regularly. Go on walks for 20 minutes everyday . Take part in sports activity.
- Eat a healthy and balanced diet.
- Eat less fried food.
- Take a rest and 8-9 hours of sleep.
- Practice good hygiene.

6.

UNIT 5: MATTER AS PARTICLES

Practice page 43

1. False

2. False

3. True

4. False

Practice page 45

I. Sublimation is a process where some solids directly convert into gas. e.g., dry ice changes into gas.

2. Freezing is the process when a liquid is cooled down and its particles loose energy and come close to each other. The liquid changes into solid form. E.g., liquid water into ice.

3. Condensation When gases are cooled down they turn into liquids. e.g., water droplets on a glass of cold water.

Exercise

1.

i. d.

ii. b.

iii. d

iv. b

v. b

2.

i. mass

ii. Matter

iii. Solids

iv. Gas

3.

Atoms	When two or more atoms combine
Molecules	The smallest particle
Solids	Particles are close but not fixed at one position
Liquids	Closely packed particles

4.

i. When heat is applied to a substance it melt. For example, solids melts into liquids when heated.

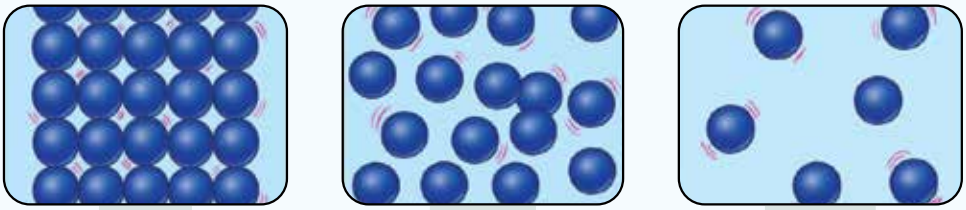
ii. At particle level, the particles of a liquid lose energy and move closer to each other, due to cooling. This is known as freezing.

iii. When evaporation occurs the liquids acquire more energy and move away from each other. This is gaseous state.

iv. Sublimation is a process where solids change into gas. For example, if we take out ice (dry ice) from freezer and leave it at room temperature, it changes into gas which is visible to us.

v. Condensation occurs when gases are cooled down. The liquid is formed. Particles of gas are cooled down hence losse energy and are now more closely packed.

vi.



The ice cube has closely packed molecules of water. When we start heating the molecules gain energy and move faster and show more gap. This is the liquid water. When heated further they change into gas as they have more energy and are vibrating at more distance.

5.

i. Particle theory of matter: It is based on following three points:

- Matter is made up of small particles which are always in motion.
- These particles are attracted to each other when they are close to each other.
- Heating the particles effects their movement.

ii. Movement and arrangement of particles in the three states of matter:

Solids: There is strong forces of attraction between atoms of solids. This force holds the atoms together in a fixed position. These particles are able to vibrate at their position but cannot move freely. Therefore, solids have definite shape and volume.

Liquids: The atoms of liquids are close to each other, but they are not fixed at one position.

Gases: The atoms of gases very far from each other. They are easily compressed due to gaps in between the atoms. The particles ,ove very fast and have neglible

force of attraction between. That is why the gases soread out to fill all the available space taking the shape of the ccontainer.

ii. The solids do not change shape while liquids do, in a container. Based on the particle theory of matter, the solid particles are closely packed together and vibrate in these spaces so they volume and shape. In case of liquids, the particles move in the spaces due to more energy they vibrate. So the liquids take shape of the container (have volume but not shape).However when the particles acquire more energy they vibrate faster hence the gases have no volume and do not take shape of the container. iii. Gases and liquids flow easily because their particles vibrate faster due to more energy.

iv. Particles exist as matter.

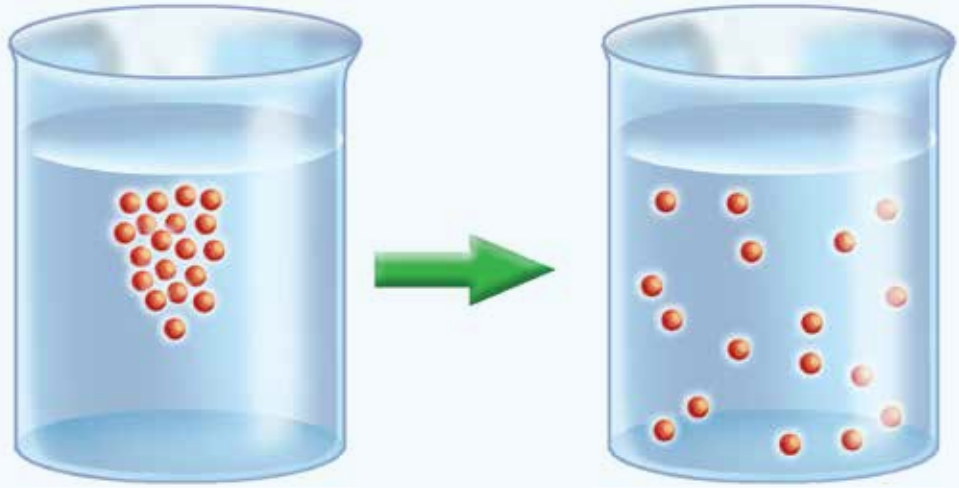
a. Adding sugar in water. When you stir sugar in water, the sugar seems to disappear. In reality it dissolves. The sugar particles mix with water particles. This process shows that both are matter.

b. To expand a basketball. When air is pumped in basketball, the ball gets bigger and becomes firm. This happens because air is made up of tiny particles and that spread out and fill the space inside the ball. As more air particles are added, they push against the inside wall of the basketball, causing it to expand.

c. Compressing air in a syringe. If we take a syringe and block the nozzle and then push the plunger, we feel resistance. This is because the air particles inside the syringe are being compressed. The air particles come closer and make it harder to press the plunger

d. Evaporating salt water. If we keep a dish containing salt water in the sunlight, the water gets evaporated and salt remains. This shows that the particles exist as matter.

6. In the following diagram we can see some particles are added in a liquid. Over a period of time, the process of diffusion will take place. The particle of one substance have spread out in another.



UNIT 6: ELEMENTS AND COMPOUNDS

Practice page 50

1. Atoms

2. Atoms

3. Microscope

4. Atom

Exercise 1:

1.

i. b

ii. b

iii. d

iv. b

v. a, b

2:

Element	Symbol
Hydrogen	H
Helium	He
Carbon	C
Oxygen	O

3.

i. The particles electrons, protons and neutrons.

ii. A molecule is formed when two or more atoms chemically join together to form a substance. For example an NaCl.

iii. The molecule of water H2O has two different elements which are Hydrogen and Oxygen. It is a compound.

Carbon dioxide is also a compound with one Carbon and two atoms of Oxygen.

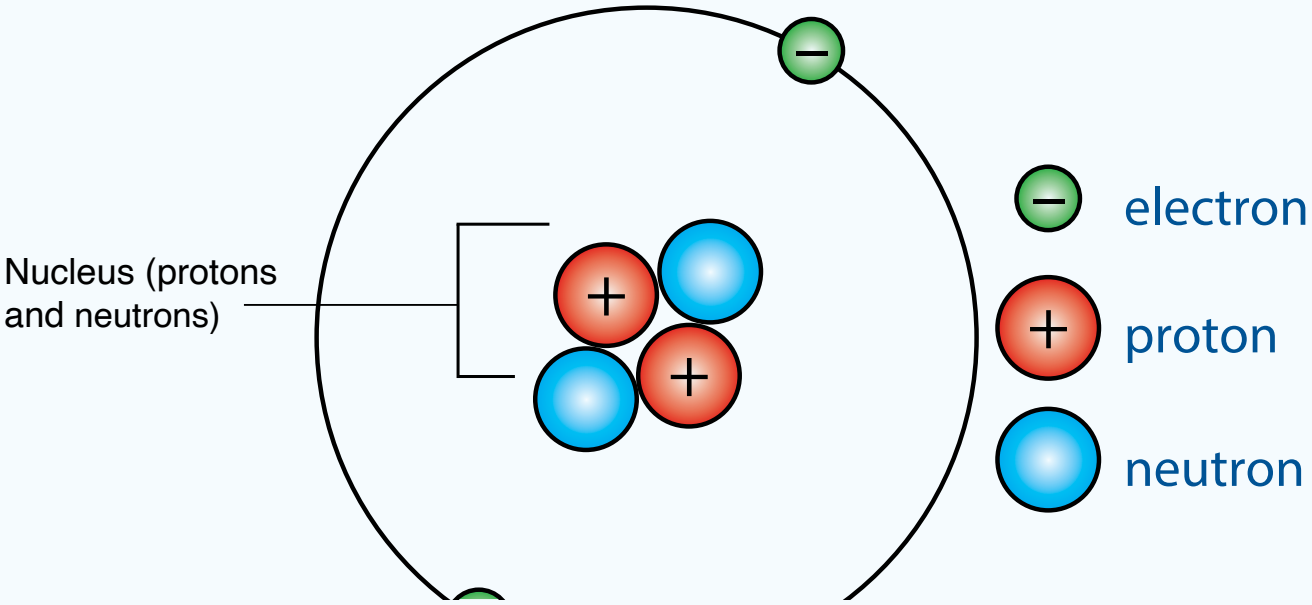
iv. A compound is formed when molecules of two or more elements join together with a strong bond. For example iron and Sulphur join together to form Iron Sulphide.

4. i. Some substances are made of a single atoms while some compounds are made up of compounds of the same elements. The element like Hydrogen has different properties when it exists as gas or a single element but when it joins Oxygen through a chemical bond with Oxygen it forms water. Water is a different substance with different physical and chemical properties.

ii.

H hydrogen	A colourless, odourless, tasteless gas. It is the lightest gas and is insoluble in water. **Melting point:** –259.1 ºC; **Boiling point:** –252.9 ºC
He helium	A colourless, odourless gas. Its boiling point, density, and solubility are low. It has high thermal conductivity. **Melting point:** –272.2 °C; **Boiling point:** –269 °C
Li lithium	A soft, silvery solid. It is the least dense solid and is a highly reactive metal. **Melting point:** 180.5 °C; **Boiling point:** 1342 °C
Be beryllium	A solid, silvery white metal. It is soft and has low density. **Melting point** = 1287 °C; **Boiling point** = 2469 °C
B boron	A solid, black, lustrous, non-metal. It is a semiconductor. **Melting point** = 1414 °C; **Boiling point** = 3265 °C
C carbon	A solid, soft and dull grey or black non-metal. It can occur in many forms. **Melting point** = 3,550 °C; **Boiling point** = 4,827 °C
N nitrogen	A colourless, odourless, and tasteless gas. It also exists in liquid and solid form. **Melting point** = –210 °C; **Boiling point** = –196 °C
O oxygen	A colourless, tasteless, and odourless gas. It is a very poor conductor of electricity and heat. **Melting point** = –219 °C; **Boiling point** = –183 °C
F fluorine	A pale yellow gas that is dangerous to inhale. It is the most electronegative element. **Melting point** = –219.6 °C; **Boiling point** = –188 °C
Ne neon	A colourless, odourless, and tasteless gas that is unreactive and is lighter than air. **Melting point** = –249 °C; **Boiling point** = –246 °C

iii.



A helium atom with 2 electrons, 2 protons, and 2 neutrons

iv. Word equation:

a Water Hydrogen + Oxygen → Water

b. Iron sulphide Iron+sulphur → Iron sulphide

c. Sodium chloride Sodium+ chlorine → Sodium chloride

Elements	Compounds
They are pure substances, have only one type of elements	They are made up of more than one atoms , which could be of same or different constituent elements
They cannot be broken down chemically	They can be broken down chemically
They can exist as atoms or molecules	They can only exist as molecules

5.

a.

Water (H_2O)
It is a compound of hydrogen and oxygen. It covers more than 70% of the Earth's surface and 60% of human body.

b.

Glucose ($C_6H_{12}O_6$)
It is the simplest form of sugar. It is made from three elements, Carbon (C), Hydrogen (H) and Oxygen (O). It provides humans and plants with energy.

c.

Aluminum (Al)
It is used in the construction of aeroplanes. It is a strong and light-weight metal that is ideal for the body of the aeroplane!

UNIT 7: MIXTURES

Practice page 61

Match

Pure substance	Made by mixing of two or more substances
Mixture	Uniform
Gold	Can be separated by using simple methods
Salt water	Cannot be separated easily
Fruit salad	Heterogeneous mixtures

Practice page 62

1. Soil—Heterogeneous
2. Air—Heterogeneous
3. Smoke—Heterogeneous
4. Sugar water—Not heterogeneous
5. Salt and sugar water—Not heterogeneous

Practice page 68

1. Filtration
2. Sieve
3. Magnetic separation
4. Evaporation
5. Condensation

Exercise

1.

i. a

ii. c

iii. a

iv. a and b both

v. c

2.

i. Solution

ii. mixture

iii. emulsion(do not mix properly)

iv. condensation

3.

I. False

ii. True

iii. True

iv. True

4.

I. Sieving is used to separate the components of different particle sizes in a solid mixture such as a mixture of gravel and sand. It is done using a sieve which is a container with holes in it. Sieving is a method used to separate fine sand from gravel.

ii. We can separate a mixture of sand and water by filtration. It is a useful method to separate sand from water. In this process the mixture is passed through filter paper , the pores allow the water to pass through it which is known as the filtrate. The solid particle left behind are known as the residue.

iii. Iron fillings can be separated from sulphur by magnetic separation. By bringing magnet close to the mixture it pulls out the iron fillings separating them from mixture(powder).

iv. Evaporation is a useful method to separate salt from a salt solution. We can boil it until all the water evaporates.

v. Sublimation is a process in which some solid substances when heated turn directly into gas without going through the liquid state.

5

i. A mixture is formed when two or more substances are put together, but they do not join together to form something new. They just stay side by side and keep their own shape, colour and feel.

The two types of mixtures are:

a. Homogeneous

b. Heterogeneous

ii.

Pure substance	Mixture
Made of only one kind of particle	Made by mixing of two or more substances
Same throughout-uniform	Can be the same or different in different parts
Has a fixed composition	Composition can change
Water, gold, oxygen	Air, salt water, fruit, salad

iii. An alloy is made when two or more elements are mixed, and at least one of them is a metal.Pure metals are often too soft to be useful. But when they are mixed with other elements they become stronger and better for different functions.

iv. Air is considered a mixture of gases as it is made up of different gases. The gas that makes up the largest part of air is nitrogen, about 78%. Next is oxygen which makes up around 21% of the air. There is also some carbon dioxide although that makes up only about 0.04% of air. Some other gases are also there but in a very small amount called noble gases.

v. Ther are various methods for separation of components of a mixures.

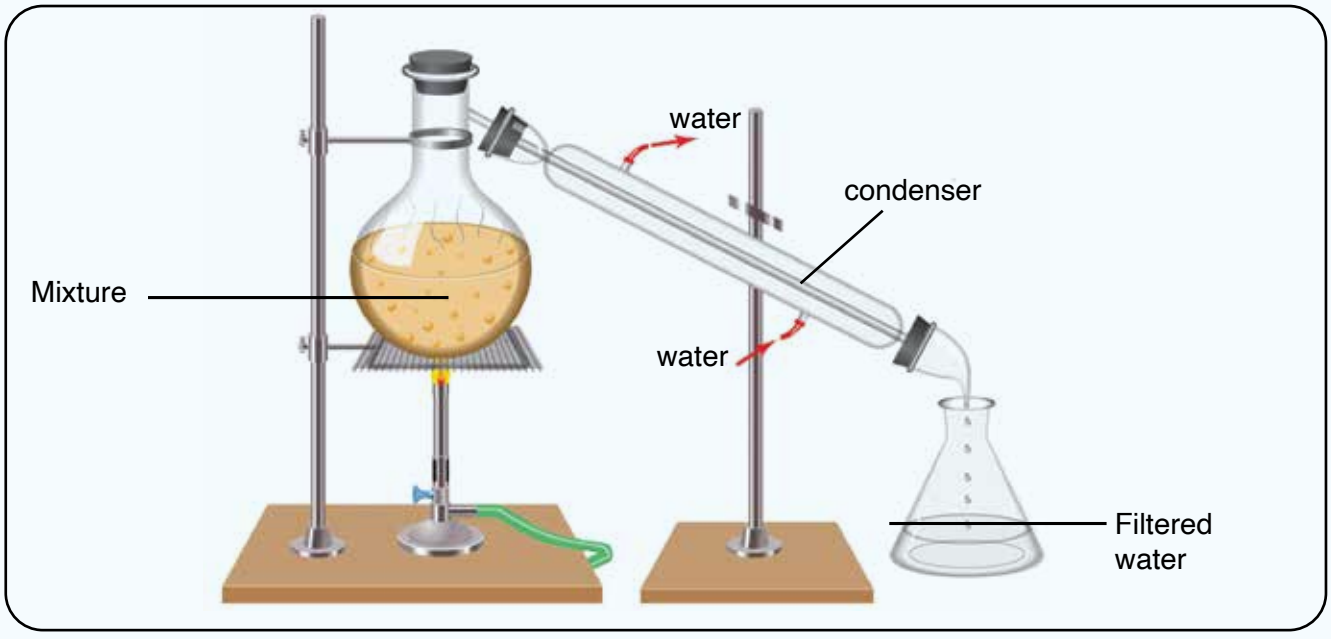
Following are some separation methods for mixtures:

- Sieving. For separation of gravel and sand
- Filtraion. Separation of sand from water
- Magnetic separation. Separation of iron fillings from sulphur
- Evaporation. Separation of salt from ocean water
- Sublimation. Iodine
- Distillation. Distillation of wter from any mixture
- Condensation. Condensation of seawater

vi.

Elements	Mixtures	Compounds
They are the building blocks of everything that Earth is made up of. They can be assembled in many different ways.They are made up of atoms and each element contain only one kind of atom.	A mixture s made when two or more subatances are mixed together but they do not join to form a new substance. They just stay side by side and keep their own colour, shape and feel.	When two or more elements are mixed together and they form chemical bonds. new substances are produced. They are known as compounds. They have their own properties which are different from the substances that formed these compounds

6. Distillation is used to separate and collect the solvent from the solute. This process is commonly used to purify water.



UNIT 8: ENERGY

Practice page 71

1. Energy
2. Sunlight
3. Photosynthesis
4. Kilojoules or calories

Practice page 73

1. Sunlight
2. Joules
3. Kinetic
4. Photosynthesis

Practice page 77

Energy is typically converted from one form to another through the energy converter. In a television, the electric energy is converted into light and sound energy. Some heat is also produced.

Practice page 80

List.

- There is endless supply of these resources and they will not runout like non-renewable resources.
- Renewable resources are better for environment and release carbon dioxidee.
- These are also best for people's health as they do not pollute the environment , resulting in cleaner air and water.

Exercise

1.

i. b

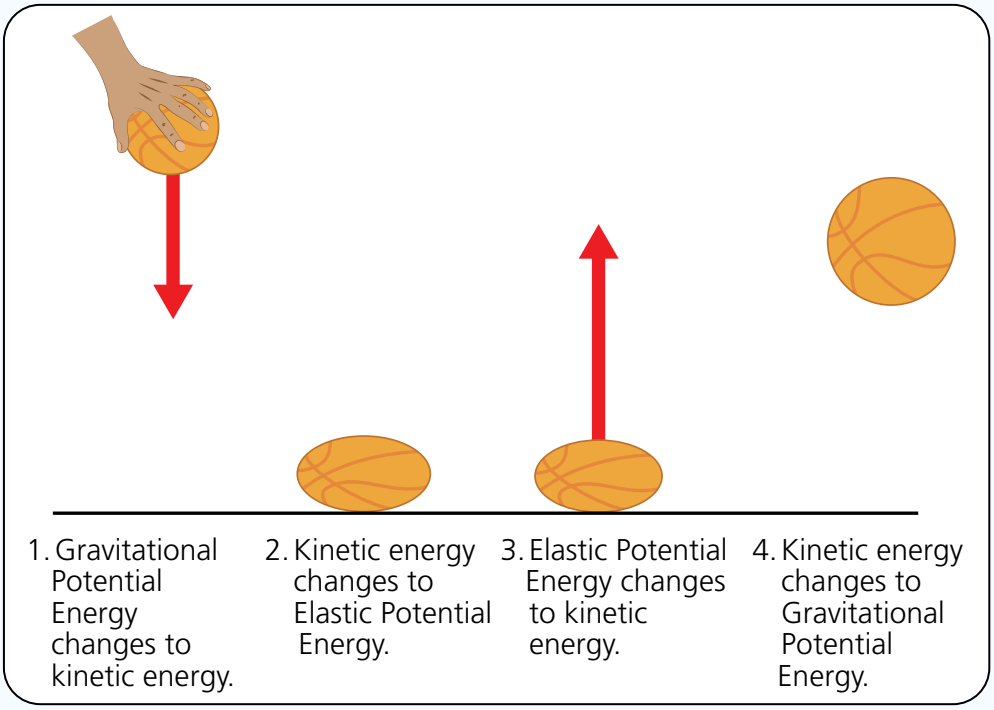
ii. b

iii. c

iv. c

2.

i. Basket ball when dropped from a height its gravitational potential energy gets converted into kinetic energy. When the ball bounces changes into elastic potential energy as the basket ball changes shape.



ii. Toaster. Here the conversion is from electrical energy to heat energy(thermal)

iii. Motorbike. Petrol which has chemical energy is burned as fuel.

Chemical energy ⟶ thermal energy

3.

i. False

ii. True

iii. True

iv. False

4.

i. Energy is the ability to do work.

ii. Kinetic energy and potential energies are two different forms of energy.

The kinetic energy is the energy due to mottion and potential energy is energy due to position. A stationary object has potential energy which changes into kinetic energy when object starts to move.

iii.

- Wind power
- Hydroelectric power
- Solar energy
- Geothermal energy

iv. The non-renewable resources are the thermal energy from the Earth comes from burning of fossil fuels. They are natural resources of the energy and they are coal, crude oil, matural gas.

v. Renewable energy resources are wind, solar, hydropower, geothermal.

vi.

a. 

Kinetic Energy

b. 

Lightning has light, sound and electric energy

c. 

Light and heat energy

5.

Energy transfer is the movement of energy from one place to another (or object) to another. Examples are heat and light , sound from thunder cloud, heat moving from a stove to a cooking pan.

i. Football when kicked, the kinetic energy is transferred from from the playerto the ball. Thus it starts to move.

ii. The law of conservation of mass states that the total number of amount of energy in energy chains , remains the same . One form may convert to another.

iii.

Renewable energy	Non-renewable energy
Supply energy for a long period of time without sources running out	Supply energy till the source is there. Once consumed they are depleted much fater
They are readily available in nature	They took millions of years to form
They are available	They are depleted much faster
Water, gold, oxygen	Air, salt water, fruit, salad

iv. Advantages.

- Available over a long period of time.
- They are readily available in nature and are not easily depleted/

v. The release of greenhouse gases due to human activity has risen the global warming. As the fossil fuels are running out and other factors have also contributed like deforestation, industrial emissions have contributed as well.

6.

Air, Wind energy

Water, hydroelectric Power

Coal, thermal energy

Solar energy, Power solar panels

UNIT 9: ELECTRICITY

Practice page 85

Static electricity	Due to static electricity in the atmosphere
Lightning	Flow of charges
Electrons	Is a charge builder
Electricity	Negative charge

Practice page 86

1. False
2. True
3. True
4. True

Practice page 89

Series circuit	Parallel circuit
All components are connected end to end forming a single path for current to flow	The components are connected in branches.
The current flow stops if a component is disconnected, the circuit is broken and all the components are working	The current is allowed to flow and then combine again.
The current has one path to flow	The current has many parts to flow
It does not provide consistent and stable voltage	Devices are provided consistent and stable voltage, so the damage is minimum
The devices are overloaded as there is no protection and they may receive little power	Parallel circuits are more useful as they help conserve battery life in our devices.
It does not help conserve enrgy	It helps conserve energy

Exercise

1.

i. d

ii. d

iii. d

iv. c

v. b

2.

i. series

ii. no

iii. neutral

iv. positive

v. parallel

3.

i. Atoms make up everything. They are the basic building block of life. They are the smallest knnown particles have electrons, protons and neutrons.

ii. Static electricity is the build up of charges in/on an object. It occurs because of the imbalance of electrical charges.

iii. The circuit needs to be closed to work as there is uninterrupted flow of current. If circuit is open, it means that there is a gap somewhere in the path so current cannot flow.

iv. When lightning strikes it is a result of static electricity in the atmosphere. It is caused by particles of water vapour in the clouds rubbing together and becoming electically charged. Lightning occurs when negatively charges are attracted to the positive charges on the ground.

v. Whenever we switch on an electric device sch as televisionor a table lamp, there is a flow of charges (electrons) along the wires.This is known as electricity.

4.

i. The electric current flows due to negatively charged electrons. When we turn on an electric device , the negatively charged electrons move and current flows and the device starts to function. The circuit is closed at this time.

ii. As seen in the picture of the baby, the ballon being rubbed at the head results in the production of static electricity. The hair stand on end and stick to the balloon.

iii.

Open circuits	Closed circuits
It is an incomplete circuit	It is a complete circuit
This shows there is a gap in the path so current cannot flow	There is no gap in the path so current can flow
The flow of current is zero	The flow of current is as per voltage

iv. Parallel circuits

- The components are connected in branches.
- The current splits into branchesand allows flow of current and then combine again.
- If one component stops working the other component still works.
- Used commonly for lighting and and electrical outlets so that individual devices can be controlled independently.

Series circuits

- All components are connected end to end forming a single path for current to flow.
- If a components are disconnected, the circuit is broken and all the components stop working.
- The current has only one path to flow. So, if one bulb fuses, all the bulb in the series do not light up.

v. The factors that effect the brightness of bulbs in a circuit are:

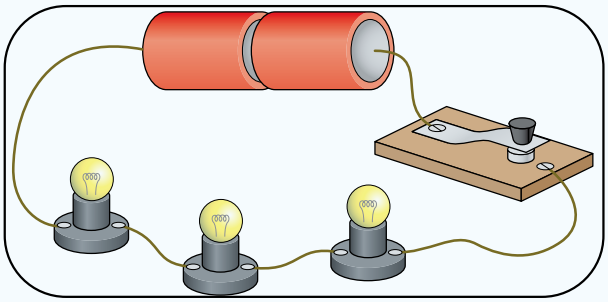
Number of batteries

- Increasing the number of batteries, increases the power of the circuit, because more energy is now available to push the curent through the circuit.
- Number of connections (series or parallel)
- In a series circuit, adding more bulbs means the avilable energy has to be shared among bulbs. This make each bulb dimmer. Opposite happens in case of a parallel circuit.
- Type of wire

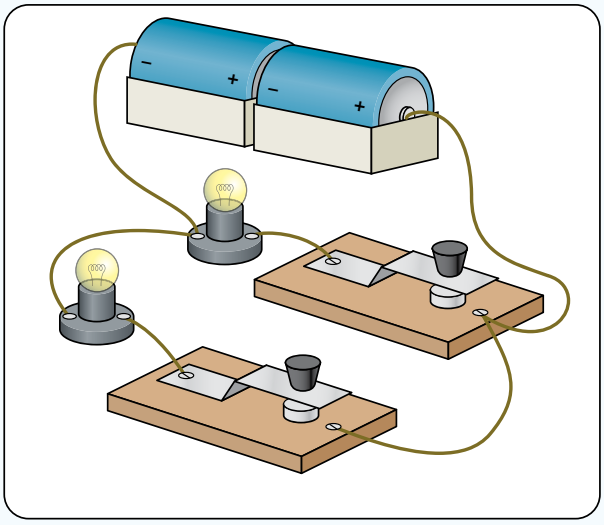
  The material of wire makes the difference . In case of a good conductor, like copper the current flows easily and bulbs shine bright. However, if the wire is made up of poor conductors like iron or steel, the flow of current will be dificult. Therefore the bulbs may become dimmer.
- Thickness of wire

  The thick wires make bulbs brighter baecause ihas less resistance to flow of electicity. Comaratively yhe thin wire show more resistance.

5.



A simple series circuit.



A simple parallel circuit

UNIT 10: MAGNETISM

Practice page 94

Magnets	Are affected by the Earth's magnetic field
Like poles	Repel each other
Needle of the compass	Comes to rest in line with the line with the magnetic field
Unlike poles	Attract each other

Practice page 95

1. Magnetic field
2. Compass (magnetic field of Earth)
3. Magnet
4. Poles

Exercise

1.

i. d

ii. d

iii. a

iv. b

v. a

2.

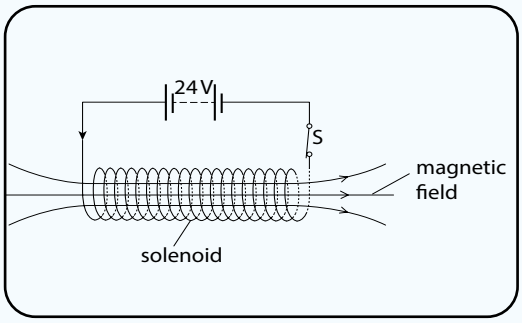
i. True

ii. False

iii. False

iv. True

3.



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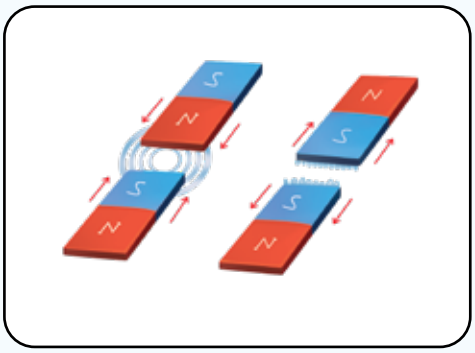


Like poles repel, unlike poles attract.

i. Magnetism is a force that exoists between magnets and certain other materials, like iron, nickel

ii. Unlike poless of a magnet attract each other and like poles repel each other.(like N-S, S-S, and N-N) N-N and S_S push other apart. The closer the two magnets are to each other the greater the magnetic force between them.

iii. Iron and nickel

iv. Aluminium, copper, brass, silver, gold, zinc, are some of the metallic substances which are non-magnetic.

v. A cirucit breaker is a safety device used in homes. It stops the flow of ,ectricity if the current gets too high. It works by using an electromagnet that becomed strongerwhen the current increases. If the current is too high, the lectromagnet pulls a metal bar, releasing a catch and allowing a spring to break the circuit and cutting off the electricity.

vi. A relay is a type of switch that uses an electromagnet to turn on another circuit. It allows a small current to control a much larger one.

vii. Some iron-rich minerals are naturally occuring magnets.e.g., pyrrhotite.

5.

i. The electric current has a magnetic field. The compass helps detect magnetic field, as the electric current causes a compass needle to deflect /move due to an external magnetic field, like that of a current

ii. A free moving compass comes to rest pointing in a North-South direstion, because Earth acts like a giant magnet creating a magnetic field. The lines of this field run from pole to pole. The compass's magnet aligns itself with these lines, with its North-seeking end.

iii. Construction of an electromagnet is possible when an electric current is passed through a metal.and its applications include working of Maglev train, electric bells, etc.

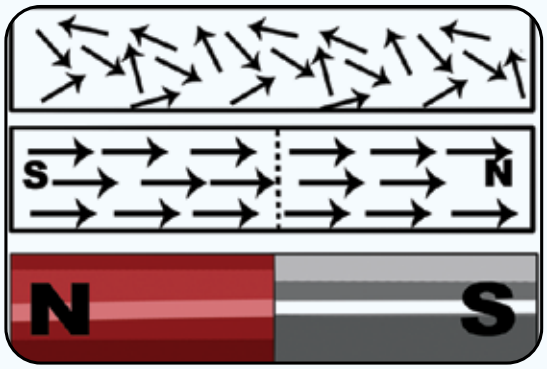
iv. A magnetic material becomes magnitised for a short period of time, when they come into contact with a strong magnetic field, such as paper clips, stop being magnetic once removed from magnetic field.

v. A temporary electromagnet can be demagnetised if it is struck by a hammer. The magnet can also be heated up and then quickly cooled down in water.

vi.

Permanent magnets	Temporary magnets	Electromagnets
Found in nature	Magnetism is induced	Magnetism is due to passing of electric current only
They always behave as magnets	They behave as magnets for a short time	They show magnetic characteristics only when current is passed

6



An iron rod that has been demagnetized has a North pole at one end and South pole at the other. If we break the rod in half each piece becomes a smaller magnet with its own North and South pole. This happens because magnetic materials like iron or steel are made up of tiny molecular magnets. These tiny magnets group together in areas known as domains, as shown in the diagrams.

UNIT 11: THE SOLAR SYSTEM

Practice page 105

1. False
2. False
3. True
4. False (solar winds are supersonic

Practice 107

1. Steroids
2. Asteroids
3. Asteroids, comets, and meteoroids

Practice page 108

1. The Sun
2. Dust (and gases)
3. Edmond Halley
4. Oval
5. Natural satellites

Practice page 109

Geostationary	Organization uses GPS for space exploration
GPS	Geostationary satellites help broadcast
NASA	Type of satellite appears stationary from Earth
Television	System which is used for navigation and mapping

Exercise

1.

i. a

ii. a

iii. c

iv. a

v. c

2.

i. 8

ii. Star/Sun

iii. Star

iv. Hydrogen and Helium

3.

Eight	At a very high temperature Hydrogen atoms fuse to form Helium
Sun	Planets in the solar system
149 million Km	The Sun was formed
Hydrogen and Helium	Start of the solar system
4.6 billion years ago	The distance between the Earth and the Sun

4.

i. A solar system has 8 planets which circle around the sun including, moons, asteroids. Comets, dwarf planets , clouds and dust.

ii. The following are the planets of the system:

1. Mercury
2. Venus
3. Earth
4. Mars
5. Jupiter
6. Saturn
7. Uranus
8. Neptune

iii. The planets, dwarf planets, moons, asteroids, comets, and gas and dust are other celestial bodies found in our solar system.

iv. The Sun is the star of the solar system. All the planets, moons, dwarf planets, asteroids, comets, orbit around the Sun. It is the gravity of the Sun that pulls these celestial bodies towards it and they stay in the orbit around the Sun.

v.

5.

- Outer planets
- Inner planets

6.

Important features of first four planets;

First four planets are also known as inner planets:

Mercury

It is the smallest planet in the solar systemin the he nearest to the Sun. it does not have a Moon. Mercury's temperatures are extremely hot and cold. The temperature during the daytime can reach as high as 430°C as it is close to the Sun. At night time it can go as close as. 180°C. Mercury travels faster around the Sun than other planets. It completes one orbit around the Sun in 88 days.

Venus

It is the second planet from the Sun. It is the closest planet to the Earth. Venus spins closely in the opposite side from most planets. It is the hottest planets in the solar system. Its surface also has volcanoes similar to Mercury. Venus does not have any Moon.

Earth

It is the third planet from the Sun. It is the only known planet to have life in the solar system. Most of its surface is covered with water. It also has volcanoes, canyons, etc. It has a favourable atmosphere for life. It is the only planet which has one Moon.

Mars

It is the fourth planet from the Sun. It is a cold planet covered with deserts. Mars is also known as the red planet because of the orange red colour. This colour is due to rusty orange found in the soil, dirt and rocks. Scientists are searching for life which may have existed because they believe that it was once covered with water and was warmer.

iii.

a. Asteroids

These are the rocks which orbit the Sun. These come in in different shapes and sizes. These are the remains from the formation of our solar system 4.6 billions of years ago.

b. Meteorites

If a meteoroid enters the atmosphere of a planet and hits the ground, it is known as a meteorite.

c. Comets

These are bodies of frozen gases, rocks and dust that orbit the Sun, When a comets orbit brings it closer to the Sun, it heats up and ejects dusts and gases into a giant glowing head. The dust and gas form a tail that stretches away from the Sun. There are likely billions of comets orbiting our Sun.

vi. Outer planets' names and characteristics.

Jupiter

It is the largest planet in the solar system. It is also the oldest planet in the solar system. Its atmosphere is made up of hydrogen and helium. It is also very coldand windy. The winds are twenty five times stronger than the winds on the Earth. Jupiter is also famous for its giant red spot which is a storm the size of the Earth. It has been storming for hundreds of years. Jupiter also has bright and colourful rings that can be seen with a telescope. Although they are notas big or visible as Saturns'. Jupiter has 95 Moons.

Saturn

It is the fifth planet from the Sun. It has 7 rings which are believed to be made up of ice, rocks, and dust. Saturn does not have a hard surface. It is mostly made up of hydrogen and helium. It has 146 Moons.

Uranus

It is the seventh planet from the Sun. It is cold and windy planet. Uranus also has rings but they are faint and narrow. Uranus has 28 Moons. It was the first planet found with the help of a telescope. Uranus has a thick atmosphere made up of methane, hydrogen and helium.

Neptune

It is the eighth and farthest planet from the Sun. It also has rings. Neptune has 16 Moons. It has the strongest winds in the solar system which even exceed the speed of sound. These winds are are known as supersonic sound. These are known as supersonic winds.

6

Planets	Dwarf planets
They are larger in size	They are smaller in size
Planets orbits are clear of debris	They are round but their orbits are not clear of debris
They are larger in size	They are significantly smaller in size
Sufficient gravity that keeps them in the orbits	The gravity is insufficient to dominate its orbital path

UNIT 12: TECHNOLOGY IN EVERYDAY LIFE

Exercise

1.

i. c

ii. c

iii. b

iv. c

v. c

vi. c

2.

i. Fertilizers help in faster growth of the crops and produce is bigger in size. This results in higher yield of crops.

ii. Microorganisms are beneficial for us in many ways. Many microorgsnisms live in our intestine to help in digestion. They also decompose dead organisms and make soil nutrient rich. They are also used in the production of yoghurt and cheese.

iii. In an electric bell the electromagnet is powered and generates a magnetic field that attracts the electric strip towards it.

iv. The Aluminium foil acts as a reflecting surface for the sunlight . It redirects and concentrates the sunlight in the area where the food is being placed for cooking.

3.

i. If milk is not heated to 80oC, when making yoghurt , the pathogens will not be killed resulting in various (food-borne) illnesses due to food.

ii. The fertilizer experiment carried out in class will be repeated with different fertilizers available in the local market and the growth of plants will be,monitored for their speed and size.

Some fertilizers are:

- Nitrogen based(like urea)
- Phosphate based (like DAP)
- Potassium based (Like MOP)

Reference

iii. If white paper is used instead of black when making a solar oven, the absorption ofheat and light will be much less. Thus affecting solar ovens working.(heat production)

- 2 clay plant pots
- Seeds (bean, sunflower, pea, or radish seeds)
- Soil
- Common fertiliser
- Water
- Ruler

Procedure

1. Fill each pot with soil.
2. Label one pot A and the other B.
3. Plant seeds in both pots.
4. Add fertiliser in pot A.
5. Water both pots regularly and provide them with sufficient sunlight.
6. After a month, measure the height of both plants and record your observation in the observation table and write down the result of this investigation.

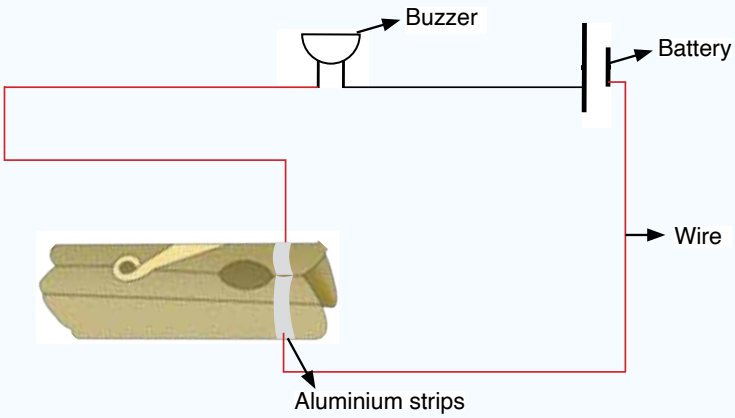
4

Following is the method for making of simple trip wire security system

Assemble and Operate a Trip Wire Security Alarm System Using Simple Items

Materials:

1. 1 buzzer or small speaker
2. 1 AA or 9V battery with holder
3. Aluminium strips
4. Clothespin or paperclip
5. Thin string or thread (trip wire)
6. Small piece of cardboard or plastic
7. Electrical tape
8. Scissors
9. Optional: LED light for visual alert



Steps

1. **Create the Trigger Mechanism:**
    - Tie the trip wire (string or thread) across a doorway or hallway at ankle height.
    - Attach the string to a clothespin or paperclip that holds a small piece of cardboard between two contacts (acting as a switch).
2. **Build the Circuit:**
    - Connect the battery, buzzer, and switch (clothespin mechanism) in a series circuit.
    - When the cardboard is in place, the circuit is open (no current flows).
    - When someone trips the wire, the cardboard is pulled out, closing the circuit and activating the buzzer.
3. **Secure the Setup:**
    - Use electrical tape to hold wires in place.
    - Hide the components behind a box or under a table for a realistic effect.
4. **Test the System:**
    - Walk through the trip wire to see if the buzzer sounds.
    - Adjust the tension of the string or the position of the contacts if needed.
5. **Discuss**
    - What would happen if the wire was too loose or too tight?
    - How could you improve the design to make it more sensitive or louder?
    - Can you think of other ways to trigger the alarm?