KITENDE MODERN NURSERY AND PRIMARY SCHOOL

PRIMARY SEVEN SCIENCE LESSON NOTES TERM ONE- 2023

THEME: HUMAN BODY

TOPIC: SKELETAL AND MUSCULAR SYSTEM

Qn. What is a skeletal system?

- A skeletal system is a system that supports the body of an animal.

Qn. What is a skeleton?

- A skeleton is the structure that supports the body of an animal.

Qn. Mention the types of skeleton.

- Endo skeleton
- Exo skeleton
- Hydrostatic skeleton

End skeleton

Qn. What is an endo skeleton?

- An endo skeleton is a type of skeleton found inside the body of an animal.

Qn. Give examples of animals that have an endo skeleton.

- Human beings / people
- Cows
- Dogs
- Cats
- Goats

- Lions
- Elephants
- Tiger

Exo skeleton

Qn. What is an exo skeleton?

- An exo skeleton is a type of skeleton found outside the body of an animal.

Qn. Give examples of animals with an exo skeleton

- Insects e.g. mosquitoes, houseflies.
- Arachnids e.g. spider, scorpion.
- Myriapods e.g. centipedes, millipedes.
- Crustaceans e.g. crab , lobster

Qn. How do animals with an exo skeleton increase in size or grow?

- By moulting or ecdysis

Qn. What is moulting?

- Moulting is the periodic loss of cuticles from arthropods.

Hydrostatic skeleton

Qn. What is a hydrostatic skeleton?

- A hydrostatic skeleton is a type of skeleton where the body of an animal is filled with fluids under pressure.

Qn. Identify examples of animals with a hydrostatic skeleton.

- Snails
- Slugs
- Worms
- Star fish

- Jelly fish
- Caterpillars
- Sea urchins.

Qn. State the functions of the skeleton.

- The skeleton gives the body shape.
- The skeleton helps in body movement.
- The skeleton protects the delicate body parts.
- The skeleton provides support to the body.
- The skeleton helps in manufacture of blood cells.
- The skeleton provides room for muscle attachment.

Qn. Name the delicate body organs protected by the following parts of the skeleton.

a) skull
- Brain
- Tongue
- Eyes
- Middle and inner ear.

b) Back bone / spine / vertebral column
- Spinal cord

c) Rib cage / Ribs
- Heart
- Lungs

d) Pelvis / Hip girdle
- Reproductive organs

e) Eye Socket / Orbit
- Eyes

Human skeleton

Qn. What is a human skeleton?

- A human skeleton is a frame work of bones in the body.

Note:

- An adult has 206 bones.
- A baby has 300 – 305 bones

Qn. Why are babies said to have more bones than adults?

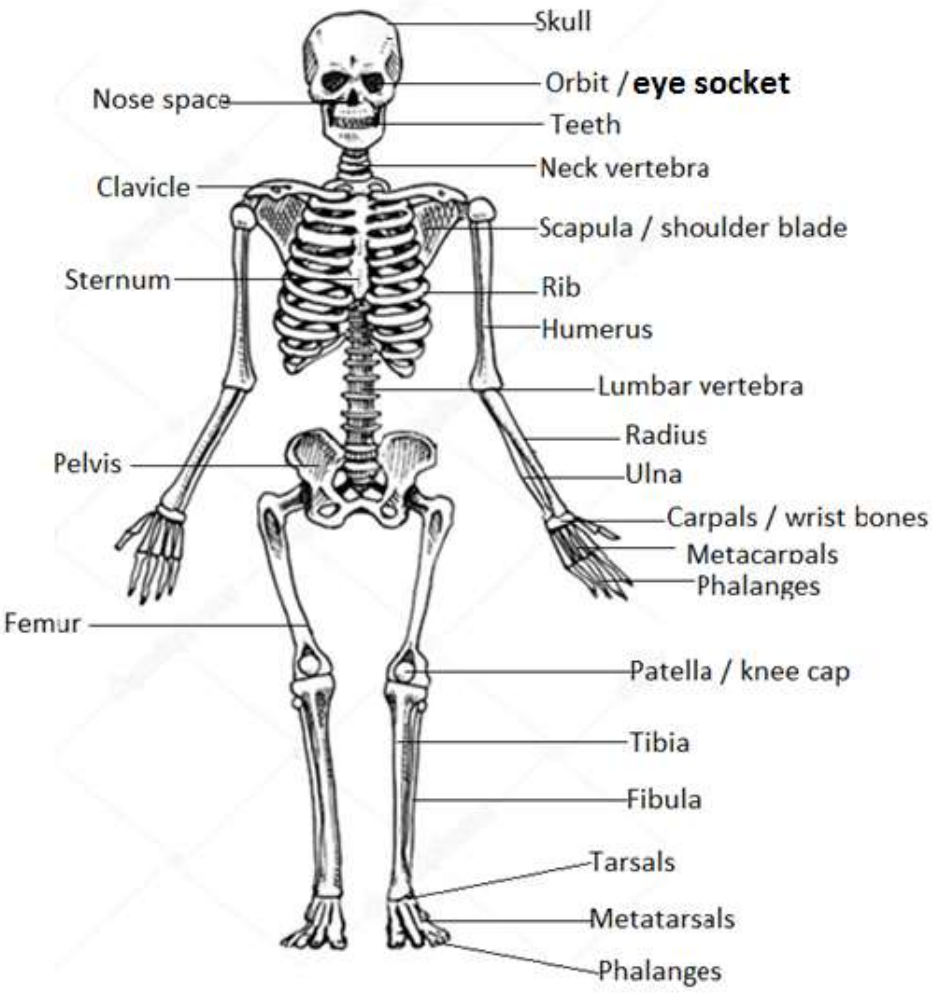
- Babies are born with many cartilages which later join to form bones.

Ossification

Qn. What is ossification?

- Ossification is the process by which cartilages turn into bones.

The structure of the human skeleton



Regions of the skeleton

Qn. Identify the two regions of the skeleton.

- Axial region
- Appendicular region

Axial Region

Qn. Mention the parts of the skeleton that make up the axial region.

- Skull
- Back bone
- Ribs

Appendicular Region

Qn. Name the parts that made up the appendicular region.

- Girdles
- Limbs

Bones

Qn. What is a bone?

- A bone is the hardest tissue found in the body of an animal.

Qn. Identify the different items / substance contained in bones.

- Blood
- Blood cells
- Nerves

Qn. Mention the mineral salts that make bones and teeth strong

- Calcium
- Phosphorous

Cartilage

Qn. What is a cartilage?

- A cartilage is a connective tissue softer than a bone.

Bone marrow

Qn. What is a bone marrow?

- A bone marrow is a soft tissue found in a bone.

Qn. Identify any parts of the body where we find a cartilage.

- Pinna of the ear.
- At the end of the nose
- At the end of every bone.

Qn. State the functions of cartilages in the body.

- A cartilage reduces friction at a joint.
- A cartilage cushions bones.

Types / classes / groups of bones

Qn. Mention the different types of bones

- Long bones
- Short bones
- Flat bones
- Irregular bones

a) Long bones

- Long bones are the bones found mainly in the limbs.

Qn. Give the different examples of long bones

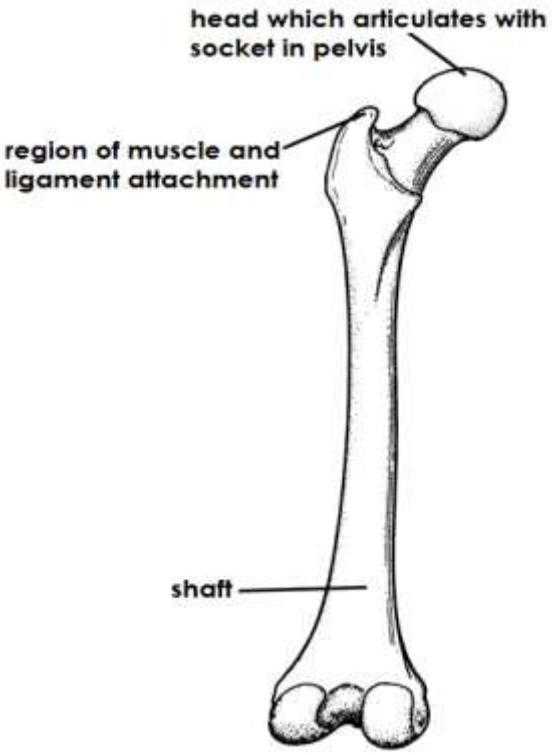
- Tibia
- Femur
- Fibula

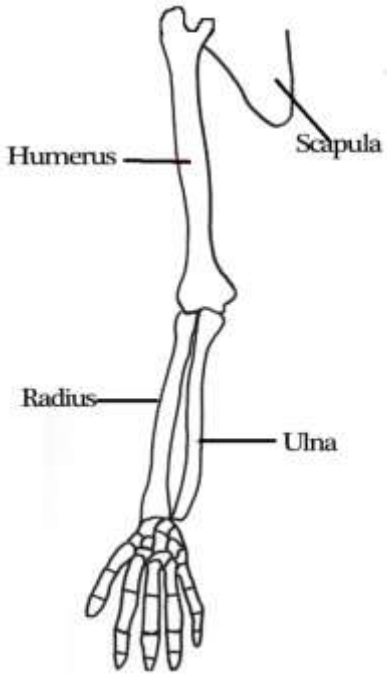
- Humerus
- Radius
- Ulna

Qn. Identify the longest and strongest bone in the body.

- Femur

Diagrams showing the long bones in the body





b) Short bones

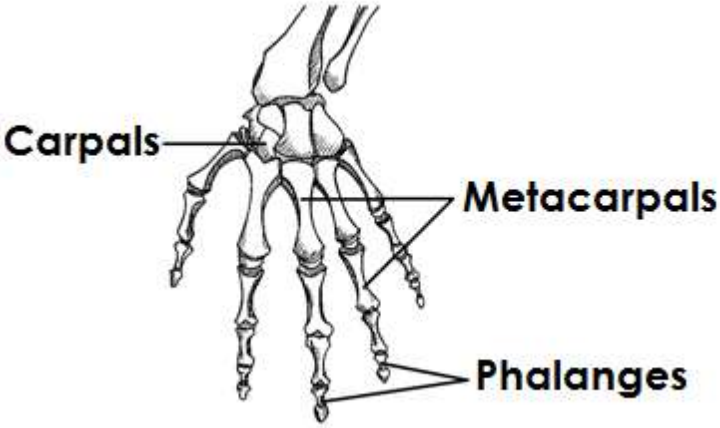
- Short bones are bones found mainly in the feet and hands.

Qn. Give the different examples of short bones

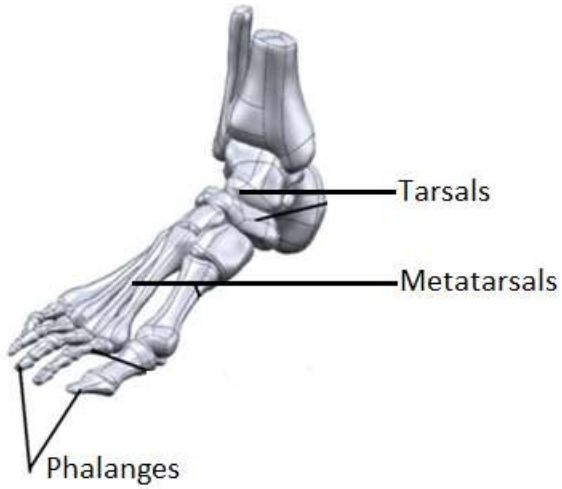
- Carpals
- Tarsals

A diagram showing short bones

i) Hand



ii) Foot

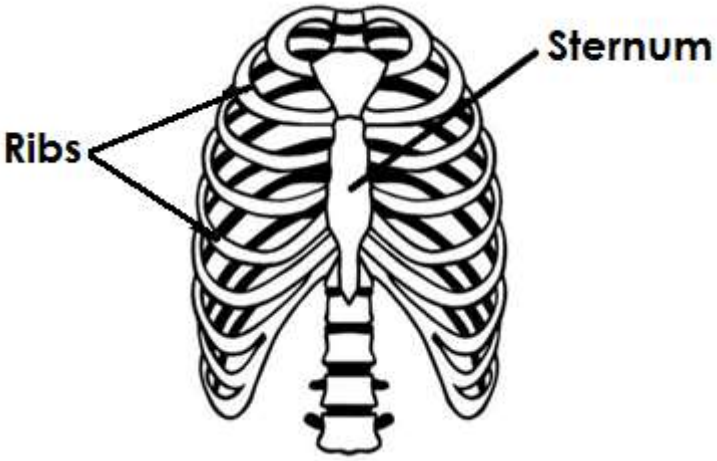


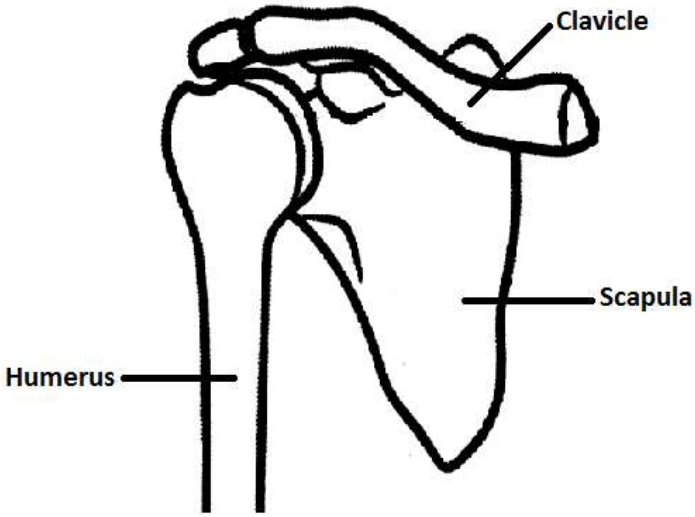
c) Flat bones

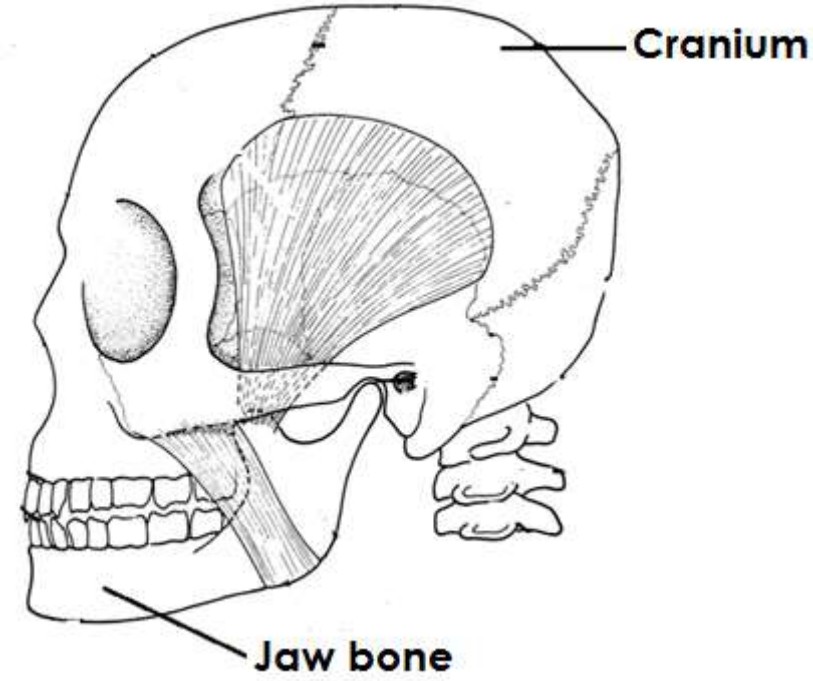
Qn. Identify the examples of flat bones in the body.

- Bones of the skull
- Scapula / shoulder blade
- Jaw bones
- Sternum / breast bones
- Ribs

A diagram showing flat bones





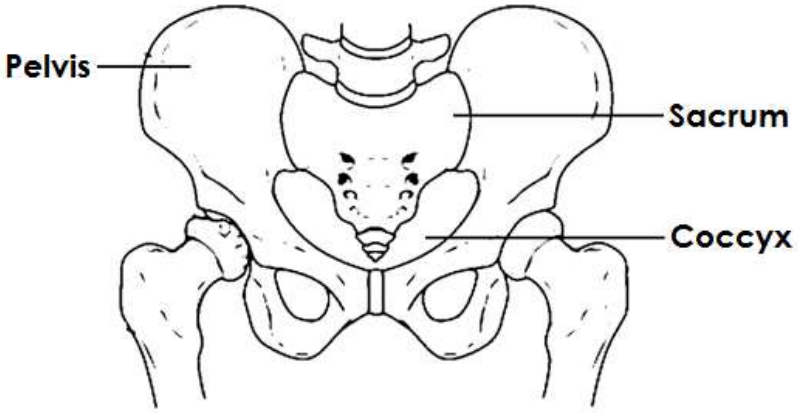


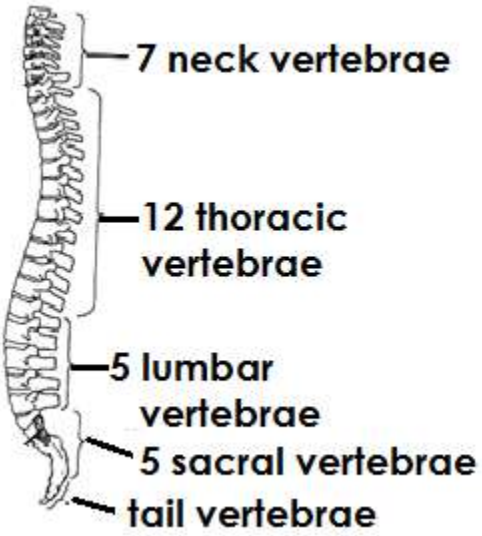
d) Irregular bones

Qn. Give the examples of irregular bones in the body.

- Vertebrae
- Pelvis

An illustration showing irregular bones





JOINTS

Qn. What is a joint?

- A joint is a place where two or more bones meet in the body.

Types of joints

Qn. Name the two types of joints.

- Movable joints
- Immovable joints

Movable joints

Qn. What is a movable joint?

- A movable joint is a joint that allows movement in the body.

Qn. Identify the parts of a movable joint and their functions.

a) Ligament

- A ligament is tough elastic fibre that joins a bone to a bone.

b) Tendon

- A tendon is tough elastic fibre that joins a bone to a muscle/tendon.

c) Cartilage

- A cartilage cushions bones in a joint.
- A cartilage reduces friction at a joint.

d) Synovial membrane

- Synovial membrane produces synovial fluid.

e) Synovial fluid

- Synovial fluid reduces friction at a joint.

Qn. Identify the types / examples of movable joints.

- Ball and socket joint.
- Hinge joint
- Pivot joint
- Gliding joint / plane joint.

1. Ball and socket joint

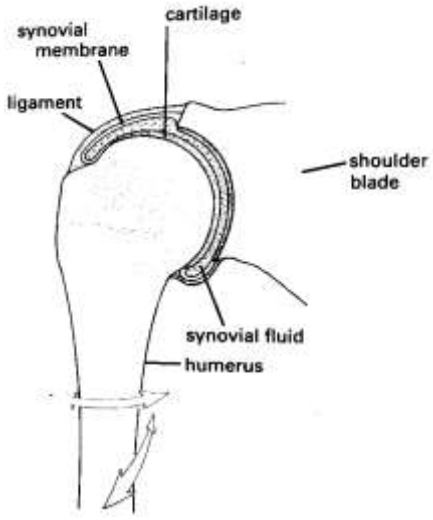
Qn. What is a ball and socket joint?

- A ball and socket joint is a joint that allows movement in all directions.

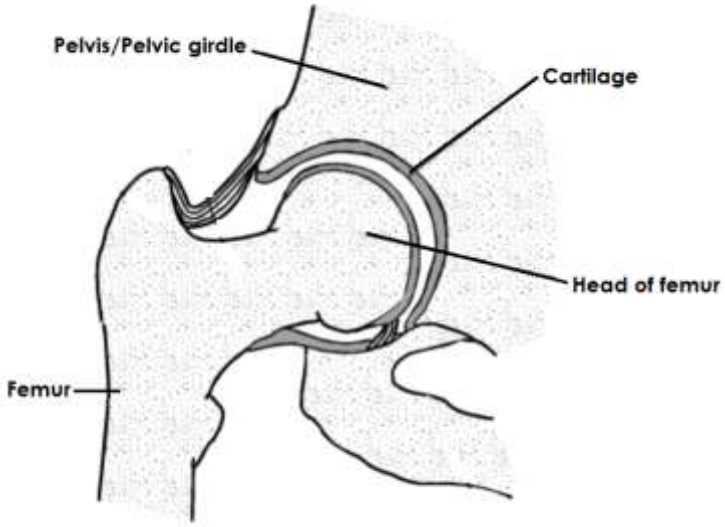
Qn. Give the examples of the ball and socket joints in the body.

- Shoulder joint
- Hip joint

An illustration showing the ball and socket joint at the shoulder



An illustration showing the ball and socket joint at the hip



2. Hinge joint

Qn. What is a hinge joint?

- A hinge joint is a joint that allows movement in only one direction.

Qn. Identify the different examples of hinge joints in the body.

- Knee joint
- Elbow joint
- Knuckle joints

A diagram showing a hinge joint at the knee.

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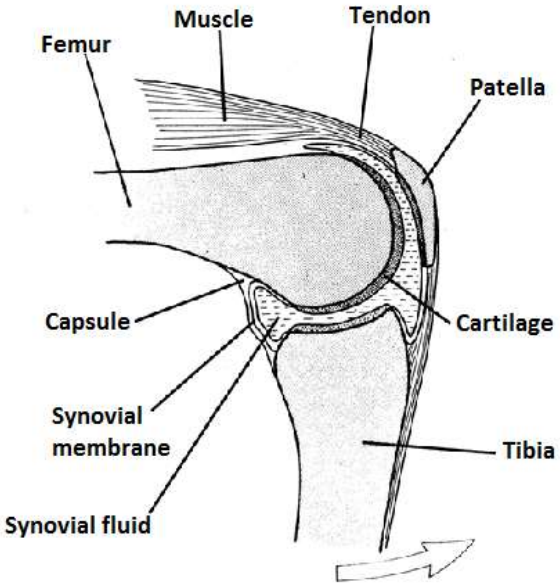
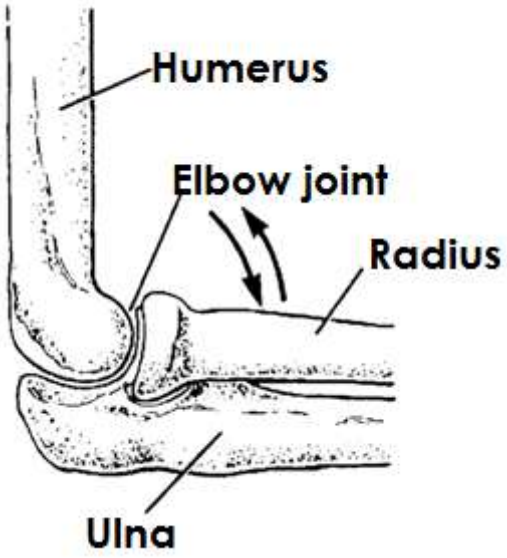


A diagram showing a hinge joint at the elbow



3. Pivot joint

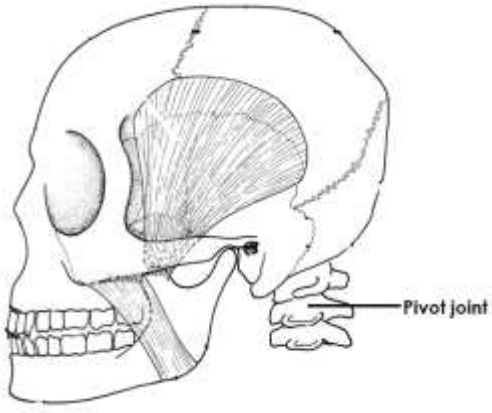
Qn. What is a pivot joint?

- A pivot joint is a joint that allows rotation of certain parts of the body on other parts.

Qn. Identify examples of pivot joint in the body.

- Neck vertebrae

A diagram showing the pivot joints at the neck



4. Gliding joint / Plane joints

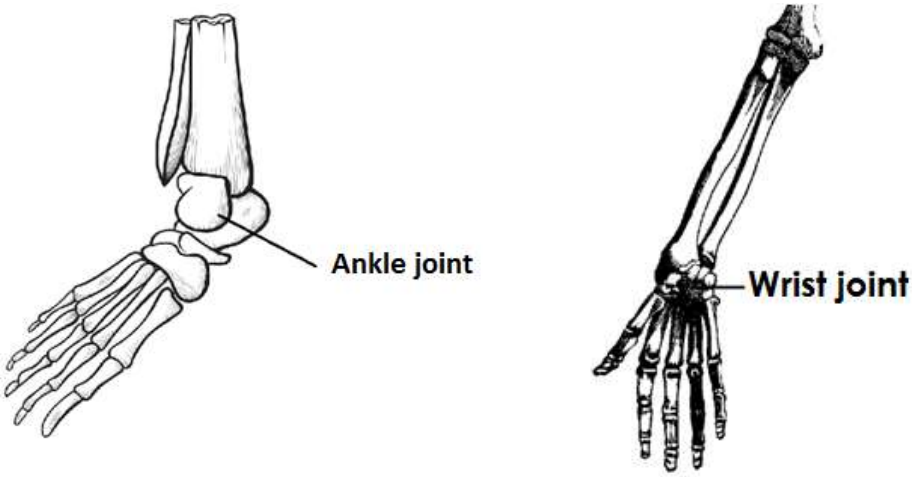
Qn. What are gliding joints?

- Gliding joints are joints which allow bones to slide over each other.

Qn. Identify the examples of gliding joint in the body.

- Wrist joint
- Ankle joint

A diagram showing gliding joints



Immovable joints / fixed joints

Qn. What are immovable joints?

- Immovable joints are joints which do not allow movement in the body.

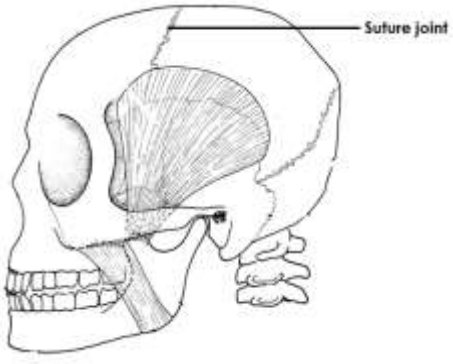
Note:

- Immovable joints do not allow movement because the bones are fixed together.

Qn. Identify the examples of immovable joints in the body.

- Suture joints.

A diagram showing the suture joints



Qn. State the functions of joints in the body.

- Joints allow directional movement in the body.
- Joints allow non-directional movement in the body.

Muscular system

Qn. What is a muscular system?

- A muscular system is a system of the body consisting of muscle cells having contractile elements.

Muscles

Qn. What are muscles?

- Muscles are bundles of elastic substances found in the body of an animal.

Types of muscles

Qn. Name the two types of muscles.

- Voluntary muscles / skeletal muscles / striped muscles.
- Involuntary muscles / smooth muscles.

a) Voluntary muscles

Qn. What are voluntary muscles?

- Voluntary muscles are muscles whose movement can be controlled.

Or

- Voluntary muscles are muscles whose movement is under one's will.

Qn. State the characteristics of voluntary muscles.

- Voluntary muscles are fibrous.
- Voluntary muscles get tired quickly.
- Movement of voluntary muscles is under one's will.

Qn. Identify the examples of voluntary muscles.

- Biceps muscles (flexor muscles)
- Triceps muscles (Extensor muscles)
- Thigh muscles
- Quadriceps

Note:

- The biceps and triceps muscles are regarded as **antagonistic muscles.**

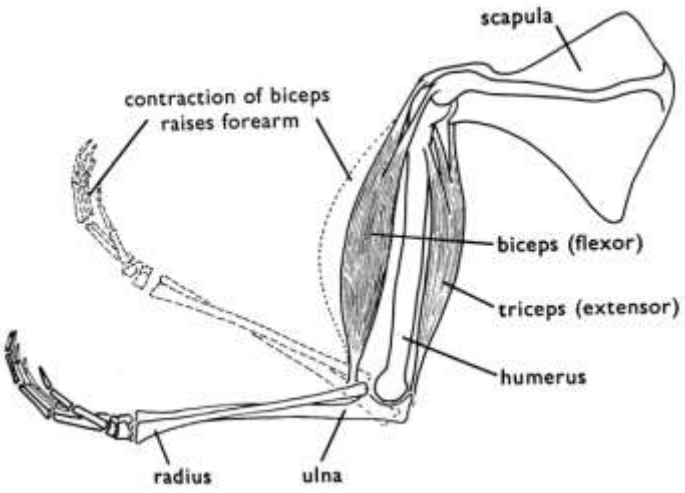
Qn.What are antagonistic muscles?

- Antagonistic muscles are muscles that work in pairs and have opposite effect on each other.

Qn. Why are the triceps and biceps regarded as antagonistic muscles?

- Biceps and triceps muscles work in pairs and have opposite effect on each other.

A diagram showing the biceps and triceps muscles



Qn. State what happens to the following muscles when the arm is straight.

a) Biceps

- The biceps relaxes.

b) Triceps

- The triceps contacts.

Qn. State what happens to the following muscles when the arm is bent.

a) The biceps

- The biceps contracts.

b) Triceps

- The triceps relaxes.

<u>Note:</u>

- Biceps muscles are called flexor muscles because they bend the arm / leg.
- Triceps are called extensor muscles because they extend /stretch the arm / leg.

b) Involuntary muscles.

Qn. What are involuntary muscles?

- Involuntary muscles are muscles whose movement is not under our will.
- Involuntary muscles are muscles whose movement cannot be controlled.

Qn. State any characteristics of involuntary muscles.

- Involuntary muscles work continuously.
- Involuntary muscles do not get tired quickly.

- Movement of involuntary muscles cannot be controlled.

Qn. Give the examples of involuntary muscles in the body.

- Muscles of the heart (cardiac muscles)
- Muscles of the diaphragm.
- Muscles of the stomach.
- Muscles of the intestines.
- Muscles of the eyelids
- Muscles of the excretory system
- Muscles of the reproductive system.

Qn. Identify the ways how contraction of muscles is important in the body.

- Contraction of muscles leads to the pumping of blood by the heart.
- Contraction of muscles leads to the exchange of gases in the body.
- Contraction of muscle causes movement of food in the alimentary canal.

Qn. State the functions of muscles in the body.

- Muscles join bones in the body.
- Muscles help in body movement.
- Muscles enable people to perform heavy activities.
- Muscles protect the organs they surround.

Posture

Qn. What is posture?

- Posture is the position of the body in every thing we do.

Qn. In four statements, describe a good sitting posture.

- Sit upright.

- Do not tighten the ankle / knees.
- Place both feet on the floor
- Sit on both buttocks.

Qn. State the advantages of good posture.

- Good posture promotes the proper growth of bones.
- Good posture promotes proper working of body organs.
- Good posture strengthens the muscles of the stomach , intestines and diaphragm.

Qn. Identify the dangers of bad posture

- Bad posture leads to growth of deformed bones.
- Bad posture leads to indigestion.
- Bad posture leads to backaches.

Diseases of the skeletal system

Qn. Mention the different diseases that affect the skeletal system.

- Polio
- Rickets
- Bone cancer
- Leprosy
- Osteomylitis
- Achondroplasia

a) Polio

qn. Name the germ that causes polio.

- Virus

Qn. State the different ways how polio spreads

- Through drinking contaminated water.
- Through eating contaminated food.

Qn. Give the signs / symptoms of polio

- Fever
- Paralysis

Qn. Identify the different ways of preventing the spread of polio.

- Immunizing children using polio vaccine.
- Always drink boiled water.
- Wash hands with clean water before eating food.
- Proper disposal of faeces

c) Tuberculosis

- Tuberculosis is caused by a bacterium called **mycobacterium.**

Qn. How is tuberculosis spread?

- By droplet infection through air.
- By drinking unboiled milk from a cow having tuberculosis.

Qn. State the signs of tuberculosis.

- Persistent cough
- A lump grows on the spine.
- Failure to walk.

Qn. State the symptoms of tuberculosis.

- Long lasting backache.
- Paralysis in the bones.
- Pain in the backbone.

Qn. Identify the different ways of controlling and preventing tuberculosis.

- Immunizing children at birth using BCG vaccine on the right upper arm.
- Isolating infected people.
- Treating infected people.

d) Rickets

- Rickets is a deficiency disease causes by lack of vitamin D in the diet.

Qn. State the different signs of rickets.

- Oxbow legs
- Knock knee legs

Qn. Give the best way of preventing rickets.

- Eating foods rich in vitamin D.

Disorders of the skeletal system

Qn. Mention the examples of disorders to the skeletal system.

- Dislocation
- Fracture
- Skull deformity
- Osteoporosis (weak bones)

a) Dislocation

Qn. What is dislocation?

- Dislocation is the displacement of bones at a joint.

Qn. State the signs and symptoms of dislocation.

- Swelling of the affected part.
- Pain around the injured part.
- Difficulty in moving the injured part / limb.

Qn. State the first aid given to a dislocation.

- Apply RICE (Raise the injured part, ice the injured part, compress the injured part and Elevate the injured part.)

b) Fractures.

Qn. What is a fracture?

- A fracture is a cracked or broken bone in the body.

Qn. Identify the different types of fractures.

- Simple fracture (closed fracture)
- Compound fracture (open fracture
- Green stick fracture
- Comminuted fracture

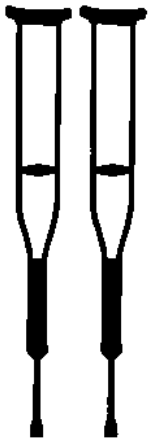
Qn. Give the signs and symptoms of a fracture.

- Swelling of the injured part.
- Bleeding of the injured part.
- Pain around the injured part.
- The broken bone tears the flesh incase of a compound fracture.

Qn. State the first aid given for a fracture.

- Tie splints around the injured part.
- Provide crutches for the victim to move.
- Use a stretcher to carry the victim to hospital.

A diagram showing crutches



A diagram showing a stretcher

Diseases of the muscular system

Qn. Mention the different diseases of the muscular system.

- Polio
- Tetanus

Tetanus

- Tetanus is caused by bacterium called **clostridium tetani**

Qn. State the signs and symptoms of tetanus.

- Stiff muscles all over the body.
- Spasm when touched.
- The baby stops suckling the mother's breasts.

Qn. Identify one way how tetanus germs enter the body.

- Through open cuts and wounds on the body.

Qn. Give the different ways of preventing /controlling tetanus.

- Immunize children using DPT vaccine at 6, 10 and 14 weeks on the left upper thigh.
- Always cover open wounds using sterilized bandages.

Qn. Mention the disorders of the muscular system.

- Sprain
- Strain

- Muscle cramps
- Cuts
- Wounds

Sprains

Qn. What is a sprain?

- A sprain is a torn or stretched ligament.

Strains

Qn. What is a strain?

- A strain is a torn or overstretched muscle.

Qn. State the signs and symptoms of sprains and strains.

- Pain around the injured part.
- Swelling around the injured part.
- Difficulty when moving the injured part.

Qn. What first aid is given for a sprain or strain?

- Apply an ice pack or a cold compress around the injured part.

Qn. Identify the different ways of maintaining the proper functioning of the skeletal muscular system.

- Have regular physical exercises.
- Feed on a balanced diet.
- Immunize children against killer diseases.
- Maintaining proper body posture.
- Having enough rest and sleep.

Qn. State the advantages / importance of having regular physical exercises.

- Physical exercises promote the proper functioning of the body organs.
- Physical exercises make the heart muscles to grow stronger.
- Physical exercises enable the joint to become flexible.
- Physical exercises reduce the amount of fats in the body.
- Physical exercises reduce risks of heart diseases.
- Physical exercises enable digestion of food to be carried out smoothly.
- Physical exercises make ligaments and tendons strong.

THEME: MATTER AND ENERGY

TOPIC 2: ELECTRICITY AND MAGNETISM

Qn. What is a magnet?

- A magnet is a substance which has the ability to attract other magnetic substances.

Magnetism

Qn. What is magnetism?

- Magnetism is the force of attraction contained in a magnet.

Magnetic and non-magnetic substances

Qn. What are magnetic substances?

- Magnetic substances are substances that can be attracted by a magnet.

Qn. Give four examples of magnetic materials

- Steel
- Iron
- Nickel
- Cobalt

Qn. What are non-magnetic substances?

- Non-magnetic substances are substances that cannot be attracted by a magnet.

Qn. Mention the examples of non-magnetic substances.

- Rubber
- Glass
- Wood
- Plastic
- Clothes
- Aluminium
- Copper
- Zinc

Types of magnets

Qn. Mention the two types of magnets.

a) Natural magnet
b) Artificial magnets

a) Natural magnets

Qn. What are natural magnets?

- Natural magnets are magnets that exist on their own.

Qn. Identify two examples of natural magnets.

- The earth
- Lode stone (magnetite)

Qn. Give a reason why the earth is called a magnet.

- The earth has the North and South Pole.

b) Artificial magnets.

Qn. What are artificial magnets?

- Artificial magnets are magnets made by people.

Qn. Identify the two groups of artificial magnets.

- Artificial temporary magnets.
- Artificial permanent magnets.

Artificial temporary magnets.

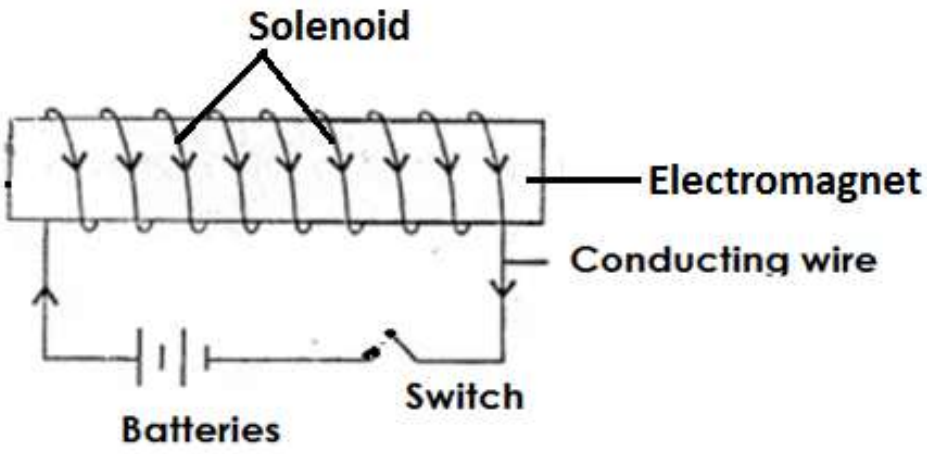
Qn. What are artificial temporary magnets?

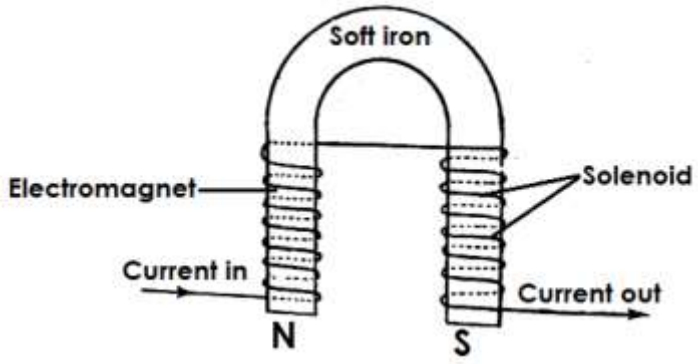
- Artificial temporary magnets are magnets that keep their magnetism for a short time.

Qn. Give the examples of artificial temporary magnets.

- Electro magnet.

A diagram of an electro magnet.





Artificial permanent magnets

Qn. What are artificial permanent magnets?

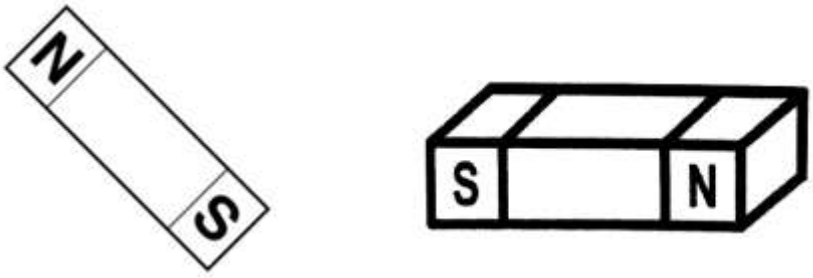
- Artificial permanent magnets are magnets that keep their magnetism for a long time.

Qn. Give the examples of permanent magnets.

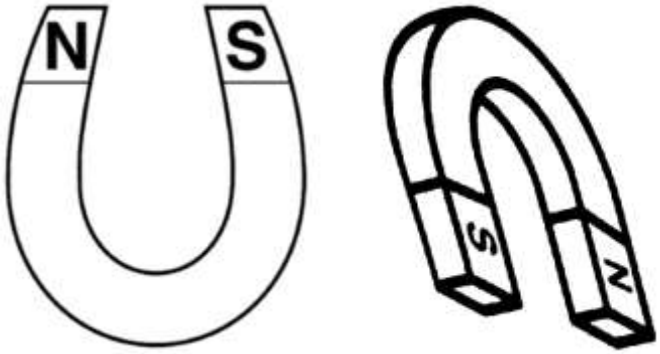
- Bar magnet
- Horse shoe magnet.
- Cylindrical magnet
- Needle magnet

Illustrations

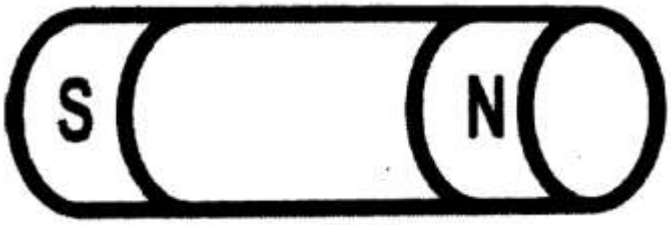
a) Bar magnet



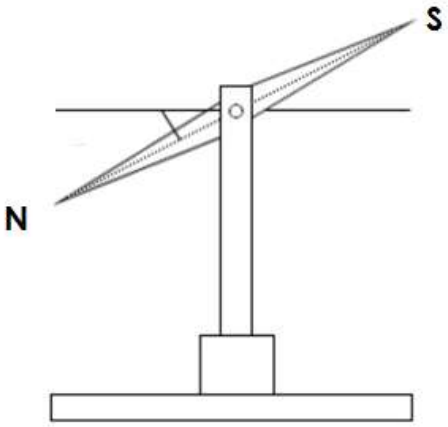
b) Horse shoe magnet



c) Cylindrical magnet



d) Needle magnets

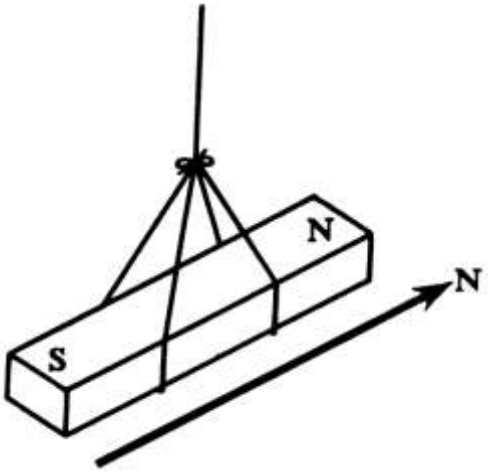


Properties of magnets

Qn. Identify the different properties of magnets.

a) A freely suspended bar magnet will always rest with its poles facing in the north-south direction.

An illustration

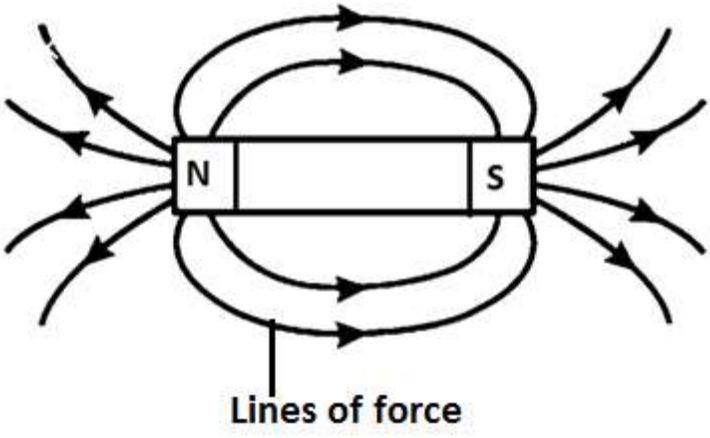


Note:

- It points to the north – south direction because it is influenced by the magnetic forces of the earth.

b) Magnetic lines of force in a magnetic field run from North pole to South pole.

An illustration

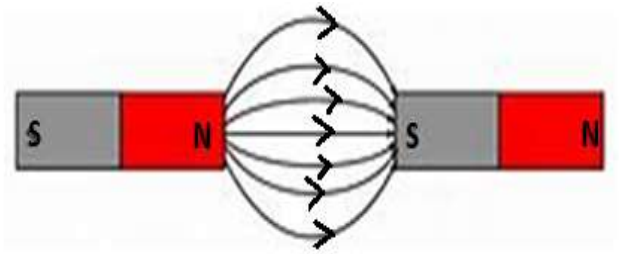


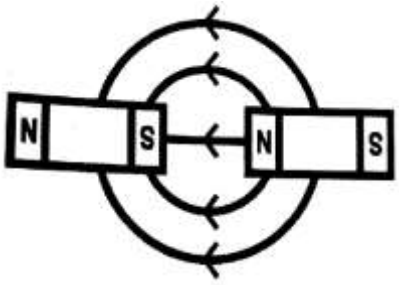
Qn. What is a magnetic field?

- A magnetic field is an area around a magnet where forces of magnetism act.

c) Unlike poles of a magnet attract each other.

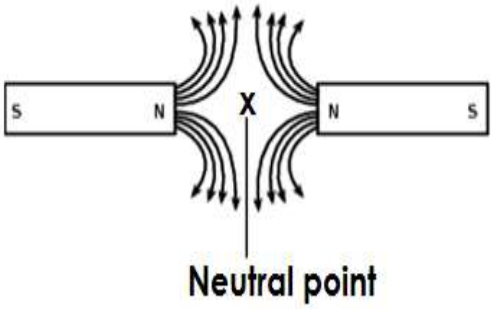
Illustrations

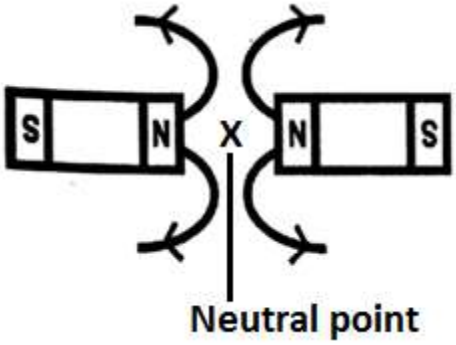




d) Like poles of a magnet repel each other.

Illustrations



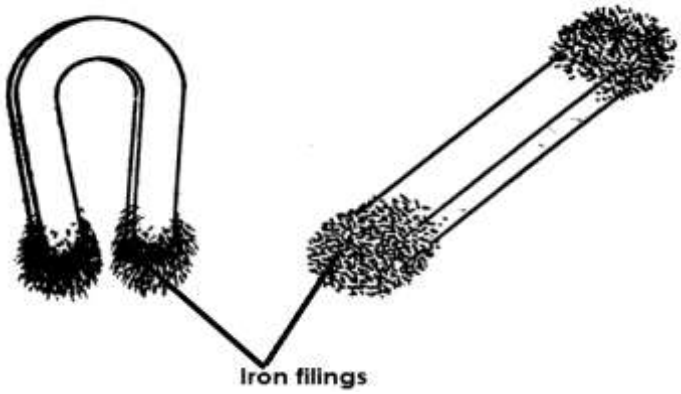


Qn. What is a neutral Point?

- A neutral point is a point where magnetic force due to two magnets is zero.

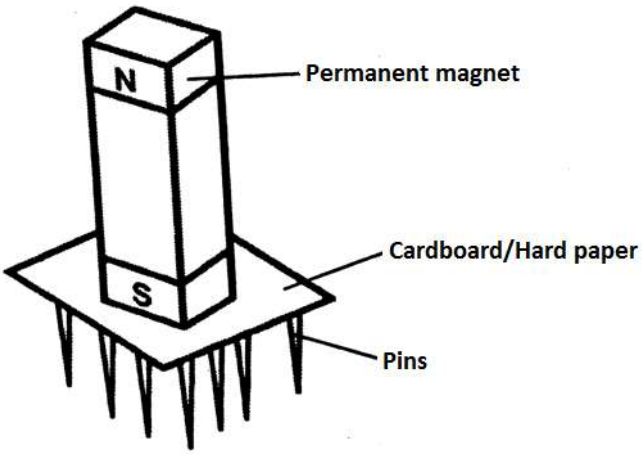
e) Magnetism is strongest at the poles.

Illustration



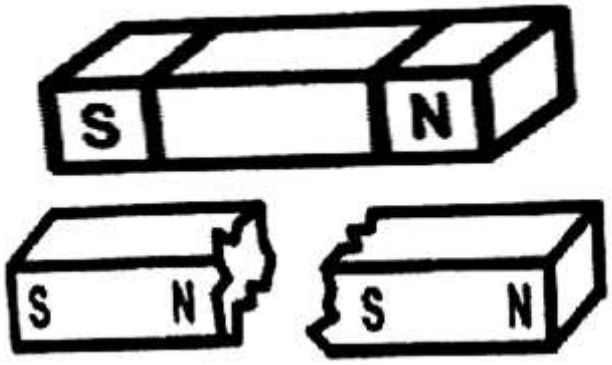
e) Magnetism can pass through non-magnetic materials.

Illustration



f) When a bar magnet is broken, each piece becomes an independent magnet.

Illustration



h) Magnets become weaker with age.

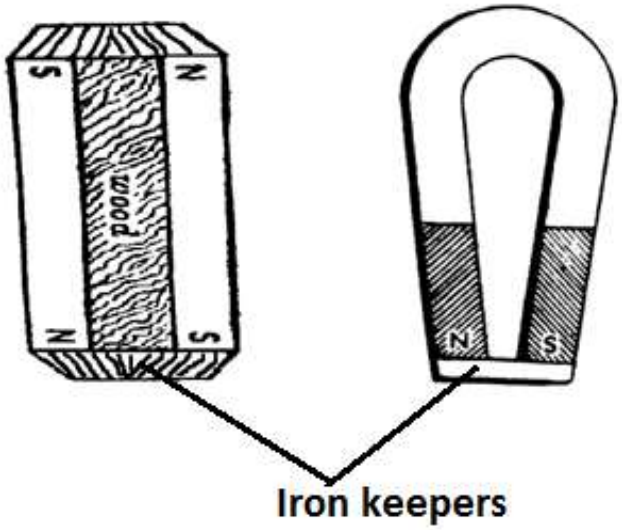
Note:

- This can be prevented by keeping magnets in iron keepers.

Qn. State why magnets are kept in iron keepers.

- To prevent magnets from losing their magnetism.

An illustration showing magnets in iron keepers



Qn. How do iron keepers prevent magnets from losing their magnetism?

- Iron keepers absorb magnetism.

Qn. State the law of magnetism.

- Like poles of a magnet repel while unlike poles of a magnet attract each other.

Qn. State the laws of a magnetic field.

- Magnetic lines of force run from the North Pole to the South Pole.
- Magnetic lines of force do not intersect within each other.
- There is no line of force within the magnet itself.

Qn. State the differences between iron and steel as magnetic materials.

- Iron gains magnetism easily while steel takes long to gain magnetism.
- Iron loses magnetism easily while steel takes long to lose magnetism.
- Iron is used to make temporary magnets while steel is used to make permanent magnets.

Magnetisation

Qn. What is magnetisation?

- Magnetisation is the way of making a magnet.

Qn. State the methods of making magnets.

- Stroking or touch method
- Induction method
- Electrical method

1. Stroking method

Qn. What is stroking method?

- Stroking method is a method of making a magnet where a permanent magnet is used to stroke a magnetic material.

Qn. State the two groups of stroking method.

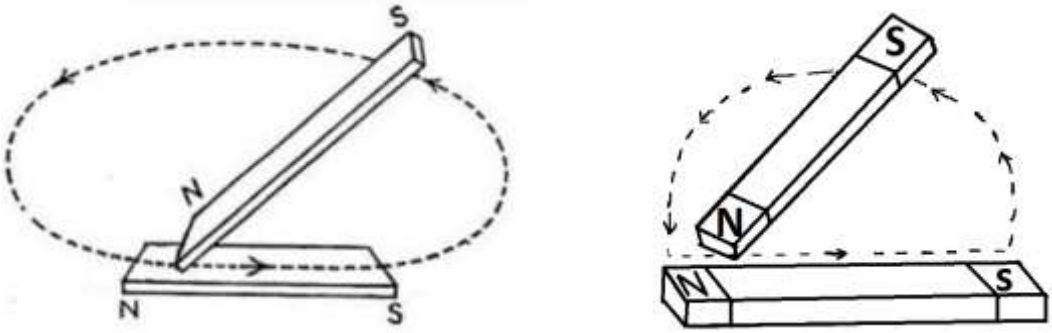
- Single touch method.
- Double touch method.

a) Single touch method

Qn. What is single touch method?

- Single touch method is a method of making a magnet where one permanent magnet is used to stroke a magnetic substance.

An illustration showing the single touch method

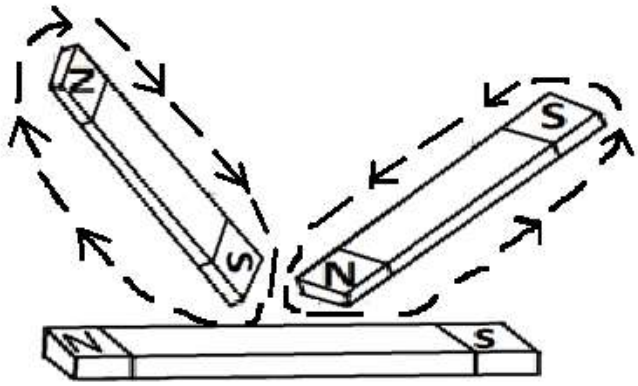


b) Double touch method.

Qn. What is double touch method?

- Double touch method is a method of making a magnet where two permanent magnets are used to stroke a magnetic substance.

An illustration showing double touch method

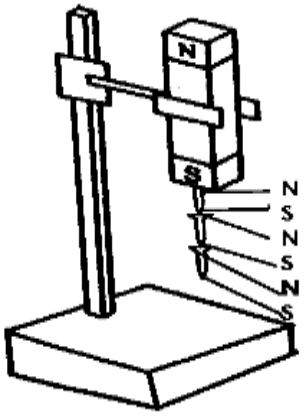


2. Induction method.

Qn. What is induction method?

- Induction method is a method of making a magnet where a magnetic substance is attached on a permanent magnet and left to stay for some time.

A diagram showing the induction method



Qn. Name the magnet made by the induction method.

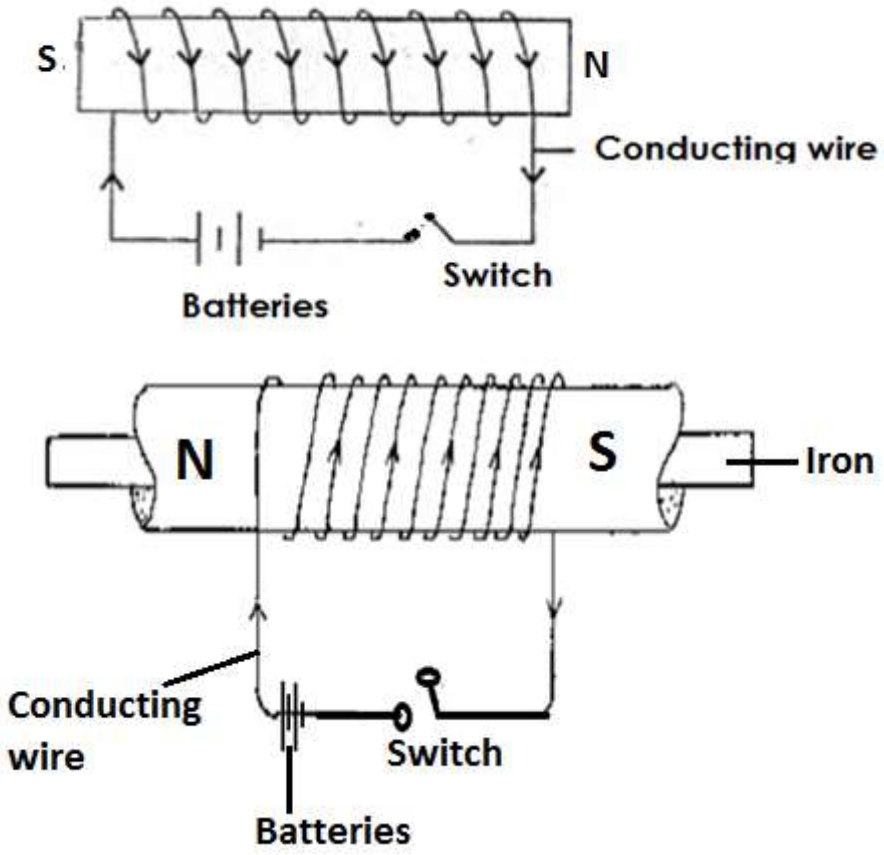
- Induced magnet.

3. Electrical method.

Qn. What is electrical method?

- Electrical method is a method of making a magnet using electricity.

An illustration showing the electrical method.



Qn. Name the magnet made by using the electrical method.

- Electro magnet

Qn. State the factors that determine the strength of an electro magnet.

- The amount of current used.
- The number of turns in a coil.
- The magnetic substance used.

Qn. Give any two ways of increasing the strength of an electro magnet.

- By increasing the voltage.
- By increasing the number of turns in a coil.

Qn. State the use of electro magnets.

- Electro magnets are used in electric bells.
- Electro magnets are used in cranes to lift metal scrap.

Demagnetisation

Qn. What is demagnetisation?

- Demagnetisation is a way of making a magnet lose its magnetism.

Qn. Write down the different ways of demagnetising a magnet.

- By hammering a magnet.
- By heating a magnet.
- By leaving a magnet to rust.
- By keeping a magnet with like poles near each other for a long time.
- By keeping a magnet while facing in the East to West direction.
- By passing alternating currents through a magnet.
- By boiling a magnet in water.

Qn. State the ways of keeping a magnet safe.

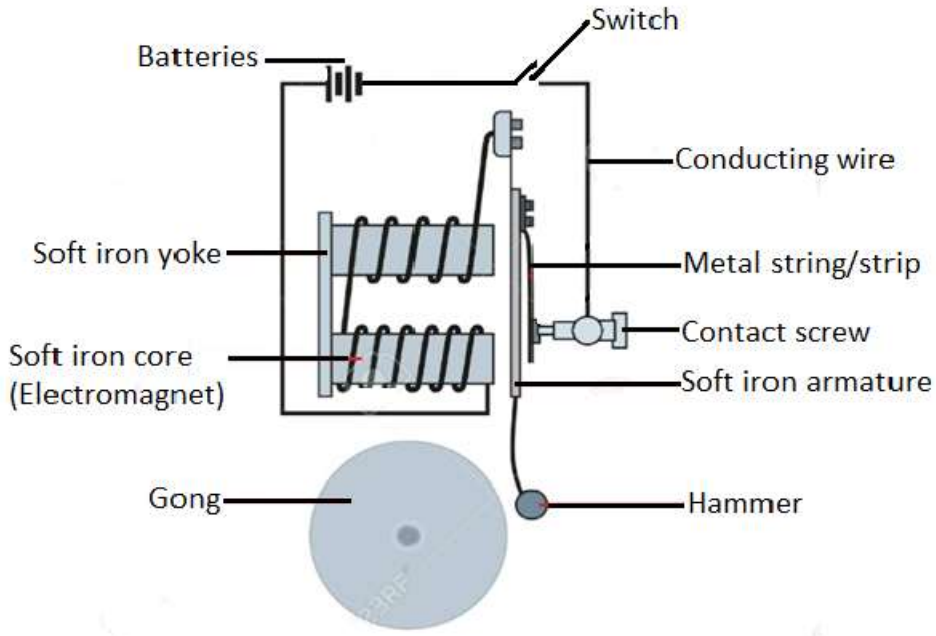
- Keeping magnets in iron keepers.
- Painting magnets
- Storing magnets with their poles facing in the North – South direction.

Qn. Give the uses of magnets

- Magnets are used in radios.
- Magnets are used in microphones.
- Magnets are used in loudspeakers.
- Magnets are used in generators to produce electricity.
- Magnets are used in dynamos to produce electricity.

- Magnets are used by doctors to remove magnetic substances from delicate body organs.
- Magnets are used by watch repairers to hold tiny nails.
- Magnets are used in doors of refrigerators.
- Magnets are used in cranes to list scrap.
- Magnets are used to hold cutlery on walls.
- Magnets are used in electric bells.

An Electric Bell



Qn. How does an electric bell work?

- When the switch is pressed, current starts flowing and the soft iron core gains magnetism.
- When the soft iron core gains magnetism, it attracts the soft iron armature.
- The hammer attached to the soft iron armature hits the gong and sound is produced.
- The metal strip is pulled away from the contact screw and the electro magnet becomes demagnetise

Qn. Name the appliances that use both magnets and electricity.

- Radios
- Electric bells
- Loud speakers
- Electric motors
- Refrigerators
- Television sets.

Qn. Give examples of appliances that use magnets only

- Magnetic compasses.
- Magnetic tapes

ELECTRICITY

Qn. What is electricity?

- Electricity is the form of energy that involves electric charges.

Qn. What is a molecule?

- A molecule is the smallest part of a substance that can take part in a chemical reaction.

Note:

- Molecules are made up of **atoms**.

Qn. What is an atom?

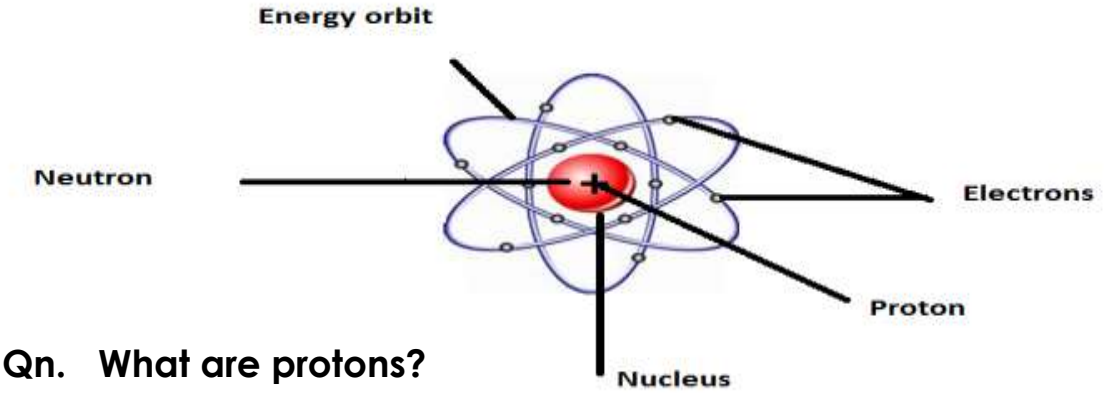
- An atom is the smallest indivisible particle of matter.

Qn. Name the particles of an atom.

- Protons
- Electrons

- Neutrons

The structure of an atom



Qn. What are protons?

- Protons are positively charged particles found in a nucleus of an atom.

Qn. What are neutrons?

- Neutrons are uncharged particles found in the nucleus of an atom.

Qn. What are electrons?

- Electrons are negatively charged particles orbiting around an atom.

Types of electricity

Qn. Mention the two types of electricity.

- Current Electricity
- Static electricity

Current electricity

Qn. What is current electricity?

- Current electricity is the type of electricity formed when electrons flow from one source to another through a conductor.

Qn. Mention the two groups of current electricity.

- Direct current Electricity. (D.C)
- Alternating current electricity (A.C)

Qn. What is Direct Current Electricity?

- Direct current electricity is a type of electricity that flows in one direction.

Qn. Name the sources of direct current electricity.

- Dry cells
- Simple cells / wet cells
- Car batteries.

Note:

- Direct current electricity cannot be **stepped up** or **stepped down.**

Alternating Current Electricity

Qn. What is alternating current electricity?

- Alternating current electricity is the type of current electricity that flows in both directions i.e. forward and backwards.

Note:

- Alternating current electricity can be **stepped up** or **stepped down**.

Qn. Name the sources of alternating current electricity.

- Fast running water.
- Hot springs
- Fossil fuels
- The sun
- Uranium

Qn. Give the examples of current electricity.

- Hydro electricity.
- Geothermal electricity
- Thermal electricity
- Solar electricity
- Atomic or Nuclear electricity
- Chemical electricity.

a) Hydro Electricity

Qn. What is hydro electricity?

- Hydro electricity is electricity produced by fast running water.

Qn. Name the common dams where hydro electricity is generated.

- Nalubaale dam (Owen falls dam)
- Bujjagali dam

Qn. Mention the type of energy possessed by water in the reservoir.

- Potential energy.

Qn. Mention the type of energy possessed by falling water that turns turbines at a water fall.

- Kinetic energy.

Qn. What are turbines?

- Turbines are big wheel like structures which rotate when hit by water.

<u>Note</u>

- Turbines are connected to generators which turn mechanical energy into electric energy.

Qn. How does electricity generated from power stations reach other places?

- Through conducting wires
- Through transmission wires/lines.

b) Geothermal Electricity

Qn. What is geothermal electricity?

- Geothermal electricity is the type of electricity got from hot springs.

c) Thermal Electricity

Qn. What is thermal electricity?

- Thermal electricity is the type of electricity got by burning fossil fuels.

Qn. Give examples of fossil fuels that can be burnt to produce electricity

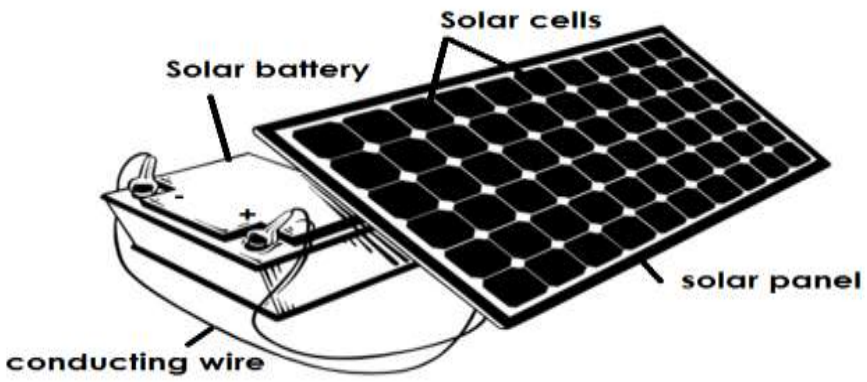
- Coal
- Petrol
- Diesel

d) Solar Electricity

Qn. What is solar electricity?

- Solar electricity is the type of electricity got from the sun.

A diagram showing the different parts of a solar panel



Qn. State the function of the following parts of a solar panel.

i) Solar panel

- The solar panel traps sunlight.

ii) Solar cells

- Solar cells charge sunlight energy into solar electricity.

iii) Solar batteries

- Solar batteries store solar electricity.

Qn. Why is the solar panel painted black?

- To absorb sunlight.

Qn. Why is the solar panel put on the top of a building?

- To trap sunlight.

e) Atomic or Nuclear Electricity

Qn. What is nuclear electricity?

- Nuclear electricity is the type of electricity got by burning uranium.

f) Chemical Electricity

Qn. What is chemical Electricity?

- Chemical electricity is the type of electricity produced by batteries (dry cells and wet cells)

Qn. State the different ways in which mechanical energy is produced.

- By wind turning wind mills.
- By using machines to turn dynamos.

A table showing the examples of alternating current electricity and the sources

Type of electricity	Source of energy
• Hydro electricity	• Fast running water
• Thermal electricity	• Fossil fuels
• Geothermal electricity	• Hot springs • Geothermal heat.
• Mechanical electricity	• Wind • Machines
• Atomic electricity	• Uranium
	• Nuclear power
• Chemical electricity (chemo electricity	• Batteries (wet cells and dry cells • Chemicals

Electric current

Qn. What is electric current?

- Electric current is the flow of electrons.

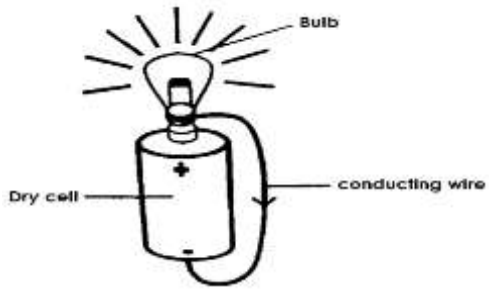
Qn. Name the instrument used to measure electric current.

- Ammeter

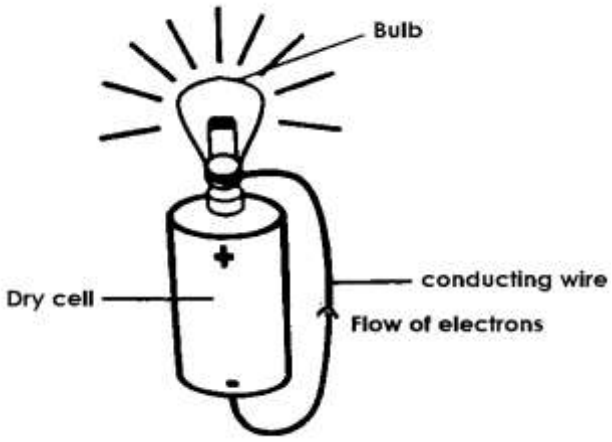
Qn. In which units is electric current measured?

- Amperes / amps

Diagram showing the flow of current



A diagram showing the flow of electrons



Electric circuit

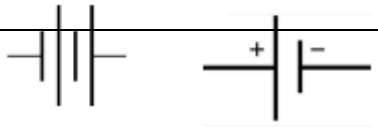
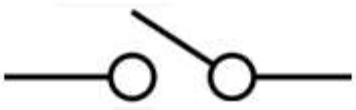
Qn. What is an electric circuit?

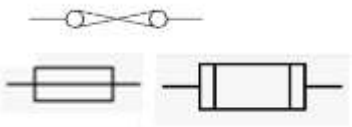
- An electric circuit is the path followed by electricity.

OR

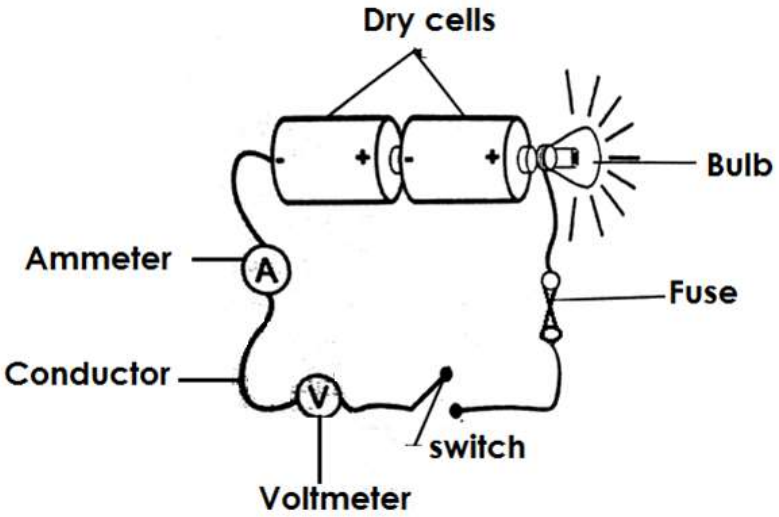
- An electric current is a path taken by electricity.

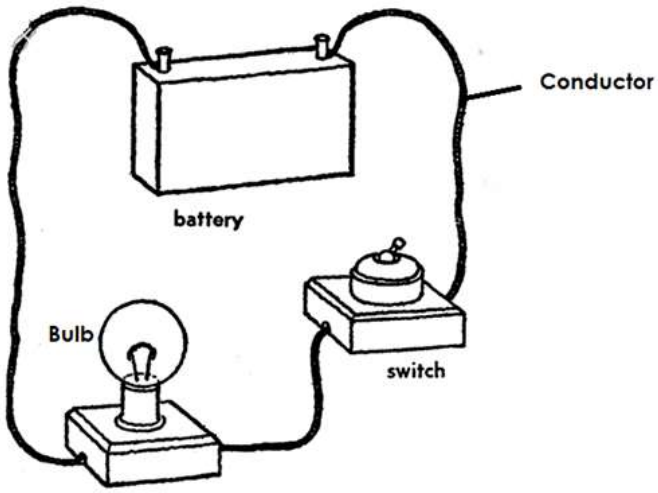
Components of an electric circuit and their symbols

Components	**Symbols**
Dry cell	
Switch	
Bulb (load)	

A fuse	
Ammeter	
Voltmeter	
Conductors connected	
Conductor crossing	

A diagram showing an electric circuit





Qn. State the function of each of the parts of an electric circuit.

a) Switch

- The switch breaks and completes the circuit at the user's will.

b) Ammeter

- The ammeter measures electric current.

c) Conductor

- The conductor transmits electricity through the circuit.

d) Dry cells

- The dry cells produce electricity for the appliance.

Qn. Name the form of energy stored in a dry cell.

- Chemical energy

Qn. What energy charge takes place when the circuit is complete?

- Chemical energy changes to electric energy.

e) Bulb

- The bulb gives light.

Qn. Identify the form of energy stored in an electric bulb,

- Electric energy.

Qn. State the energy change that takes place in an electric bulb when the circuit is complete.

- Electric energy changes to light energy.

Qn. Identify the two forms of energy produced by an electric bulb when the circuit is complete.

- Heat energy
- Light energy

Qn. State two cases that can make a bulb fail to give out light in a circuit when the switch is pressed.

- Poor arrangement of dry cells.
- When the conductor is not connected properly.
- When the bulb is not fixed properly.

Qn. Identify the instances / factors that can make a bulb to stop giving light even when the circuit is complete.

- When the dry cells are used up.
- When the filament burns out.
- When the fuse blows.

f) Fuse

- A fuse breaks the circuit incase of too much flow of current.

Qn. How does the fuse work?

- By melting and breaking the circuit incase of too much flow of current.

Qn. How is a fuse adapted to its function?

- A fuse has a low melting point.

Qn. Give the factors that can make a fuse wire to blow.

- When the fuse is too old.

- When there is a short circuit.
- Over loading of the circuit
- A fuse is made up of an alloy of tin and lead which has a low melting point.

Electric resistance

Qn. What is electric resistance?

- Electric resistance is the opposition to the flow of current in a circuit.

Qn. Which instrument is used to measure electric resistance?

- Ohmmeter

Qn. In which units is electric resistance measured?

- Ohms

Electric pressure or electromotive force (e.m.f)

- Electric pressure is the force that drives current through the resistance of the circuit.

Qn. Name the instrument that measures electric pressure.

- Voltmeter

Qn. In which units is electric pressure measured?

- Volts

Qn. Why are most electric heaters coiled?

- To increase the electric resistance.

Qn. Write e.m.f in full.

- Electromotive force.

Conductors and insulators

Qn. What are conductors?

- Conductors are materials that allow electricity to pass through them.

Qn. Give the different examples of conductors of electricity.

- Silver
- Aluminium
- Tin
- Lead
- Tungsten
- Copper
- Iron
- Wet wood.
- Salt solution
- Acids e.g. hydrochloric acid
- Undistilled water / water containing mineral salts.
- Carbon rod.

Qn. Name the non-metallic conductor of electricity.

- Carbon rod

Qn. Give a reason why distilled water does not conduct electricity.

- Distilled water lacks mineral salts

Note:

- Silver is the best conductor of electricity.

Qn. Why are most overhead conductors of electricity made of copper and not silver?

- Copper is cheaper than silver.

- Copper is readily available while silver is rare.
- Copper is light while silver is heavy.

Qn. State the uses of conductors

- Conductors are used to make electric circuits.
- Conductors are used to make electric wires.

Qn. What are insulators?

- Insulators are substances that do not allow electricity to pass through them.

Qn. Give examples of insulators.

- Rubber
- Plastics
- Clothes
- Dry wood
- Dry paper
- Porcelain
- Distilled water

Qn. Give reasons why electric wires are covered with rubber during electrical installation.

- To prevent short circuits

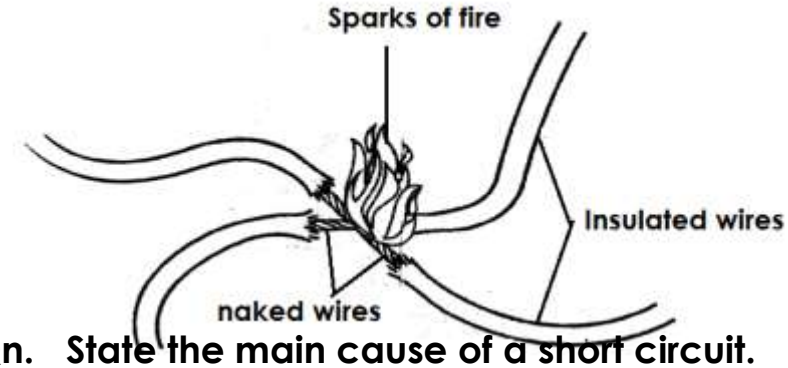
Qn. State the uses of insulators

- Insulators are used to cover electric wires during electrical installation.
- Insulators are used to cover handles of electric irons / flat irons.

Short circuit

Qn. What is a short circuit?

- A short circuit is an electric path with low resistance to the flow of current
- **An illustration of a short circuit**



Qn. State the main cause of a short circuit.

- A short circuit is mainly caused when two naked wires carrying current meet.

Qn. Give the other causes of short circuit.

- Improper connection of electric wire.
- Overloading of circuit.
- Pushing metallic objects into electric circuits.
- Pouring water in electric appliances.
- Damage done by rat to the insulating wires.
- Bad weather conditions that may lead to damage of electric poles.

Qn. State the dangers of short circuits.

- Short circuits lead to destruction of electric appliances.
- Short circuits lead to destruction of buildings.
- Short circuits lead to death of people and animals.

Qn. Identity the ways of preventing short circuit.

- Electric wires should be well insulated.
- Installation of electricity should be done by experts.
- Repair of electric appliances should be done by experts.

- Old electric wires should be replaced by new ones.
- Avoid overloading of circuits.
- Avoid pushing metallic objects into sockets.

Electric cells

Qn. What is an electric cell?

- An electric cell is a device that stores and produces electricity due to a chemical reaction.

Qn. Identify the two types of electric cells

- Primary cells
- Secondary cells

a) Primary cells

Qn. What are primary cells?

- Primary cells are cells that cannot be recharged when used up.

Qn. Give the examples of primary cells

- Dry cells
- Wet cells / simple cells

Dry cell

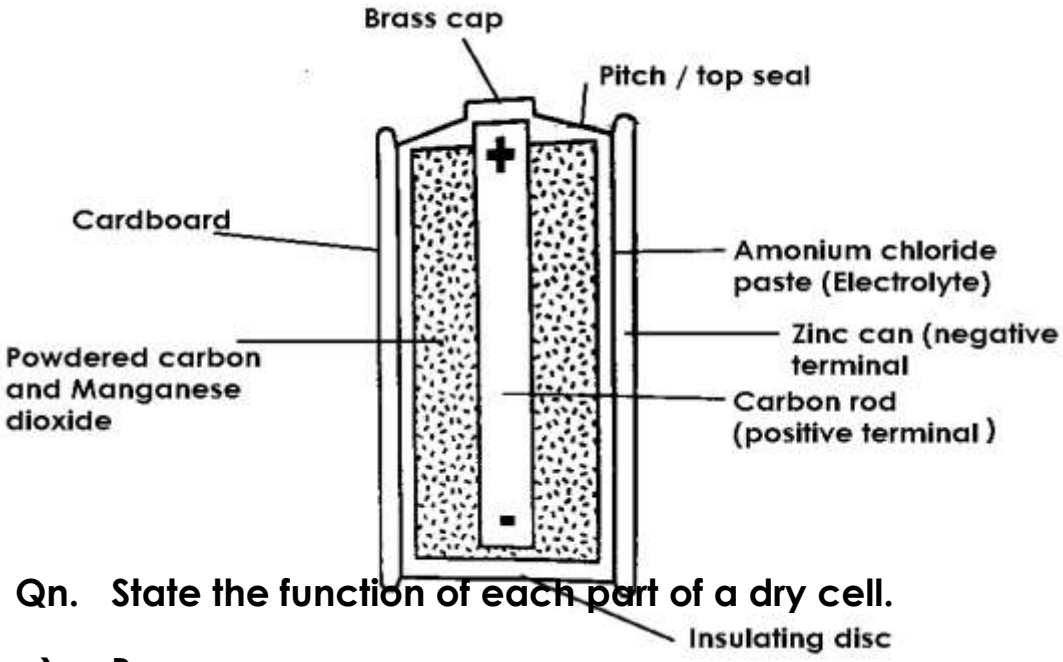
Qn. How does a dry cell produce electricity?

- A dry cell produces electricity by changing chemical energy to electric energy.

Note:

- A dry cell produces an electromotive force of 1.5 volts.

A diagram of a dry cell



Qn. State the function of each part of a dry cell.

a) Brass cap

- A brass cap is the contact to the positive terminal.

b) Pitch / Top seal

- The pitch prevents the electrolyte from drying up.

c) Insulating cardboard

- The insulating cardboard protects the inside parts of a dry cell.

d) Zinc can

- The zinc can act as the negative terminal.

e) Electrolyte (Ammonium chloride paste)

- Electrolyte helps in the transfer of electrons.

f) Powdered carbon and manganese dioxide.

- Powdered carbon and manganese dioxide act as a depolarizing agent.

OR

- Powdered carbon and manganese dioxide prevent bubbles of hydrogen gas from building up around the carbon rod.

g) Carbon rod

- The carbon rod acts as a positive terminal.

- The carbon rod is a non-metallic conductor of electricity found in a dry cell.
- The carbon rod is made from **graphite.**

Qn. What is depolarization?

- Depolarization is when hydrogen gas bubbles are prevented from building up around the carbon rod.

Qn. State the advantages of using dry cells.

- Dry cells are portable (easy to carry).
- Dry cells are affordable (cheap to buy)
- Dry cells can be used in any position.

Qn. Give the disadvantages of using dry cells.

- Dry cells cannot be recharged.
- Dry cells produce electricity for a short time.
- Dry cells produce less current that cannot run big machines.
- Used up dry cells can spoil devices.

Simple cells / wet cells

Qn. What is a simple cell?

- A simple cell is a cell that consists of a copper plate (positive) and zinc plate (negative) dipped into dilute sulphuric acid.
- Dilute sulphuric acid acts as the **electrolyte**.
- The zinc plate and copper plate act as **electrodes.**

Qn. What is an electrode?

- An electrode is a piece of metal which allows electric current to enter and leave a cell when dipped in an electrolyte.
  Or
- An electrode is a piece of metal that conducts electricity.

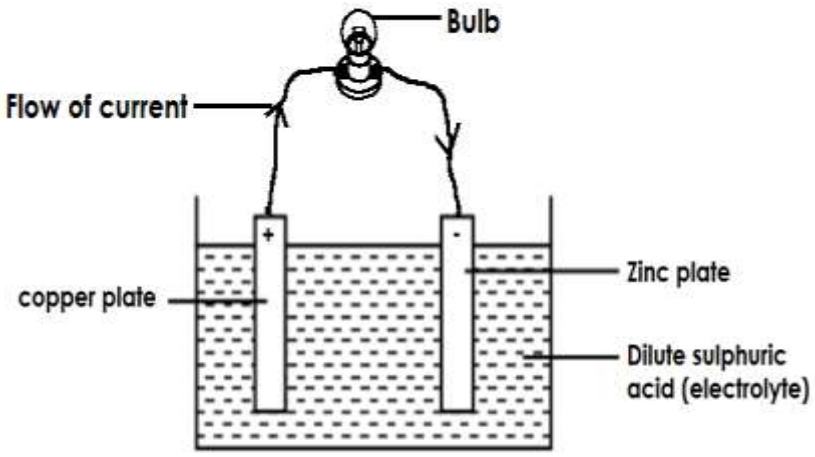
Qn. What is an electrolyte?

- An electrolyte is a liquid that conducts electricity.

Qn. Give examples of electrolytes.

- Lemon juice
- Urine
- Undistilled water
- Salt solution
- Dilute sulphuric acid
- Dilute hydrochloric acid

The structure of a wet / simple cell



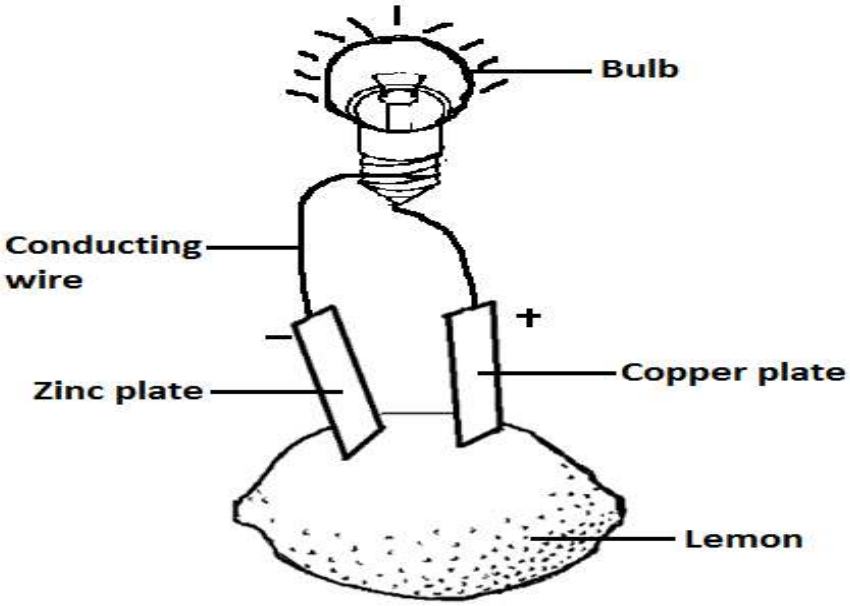
Qn. Identify the form of energy stored in a wet cell.

- Chemical energy

<u>Note</u>

- Chemical energy stored in a wet cell is converted to electric energy.

The structure of a home made wet cell.



Qn. State the factors that affect the efficiency of a wet / simple cell.

- Polarization
- Local action

Qn. What is polarization?

- Polarization is the formation of hydrogen gas bubbles on a copper plate of a simple cell.

Note:

- When hydrogen bubbles cover the copper plate, they reduce the e.m.f of the cell and the bulb will stop giving light.

Local action

Qn. What is local action?

- Local action is when hydrogen bubbles are seen coming off from the zinc plate.

Qn. Identify the disadvantages of using wet cells.

- Simple cell produce electricity for a short time.
- Simple cells are bulky (not easily carried).
- Simple cells are only used in an upright position.

b) Secondary cells

Qn. What are secondary cells?

- Secondary cells are cells that can be recharged once used up.

Note:

- Recharging is the process of replacing lost energy in a cell.

Qn. Give the examples of secondary cells.

- Car batteries / lead acid batteries / accumulates.
- Phone batteries / mobile phone batteries.

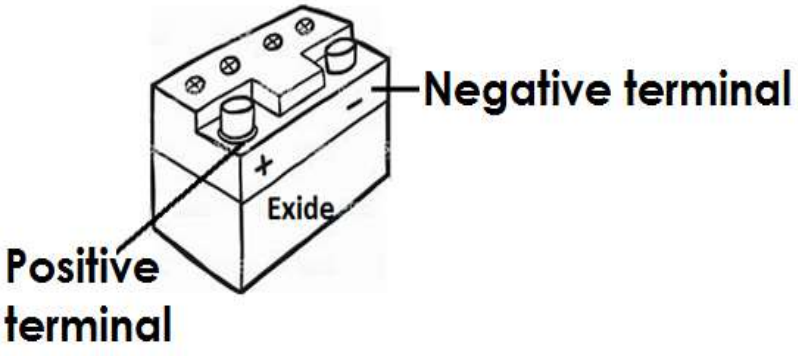
Qn. State the advantages of using secondary cells.

- Secondary cells can be recharged.
- Secondary cells have a high voltage.
- Secondary cells can be used in running heavy / strong machines.

Qn. State the disadvantages of using secondary cells.

- Secondary cells are expensive.
- Secondary cells are bulky.
- Secondary cells are not easy to maintain.

A car battery

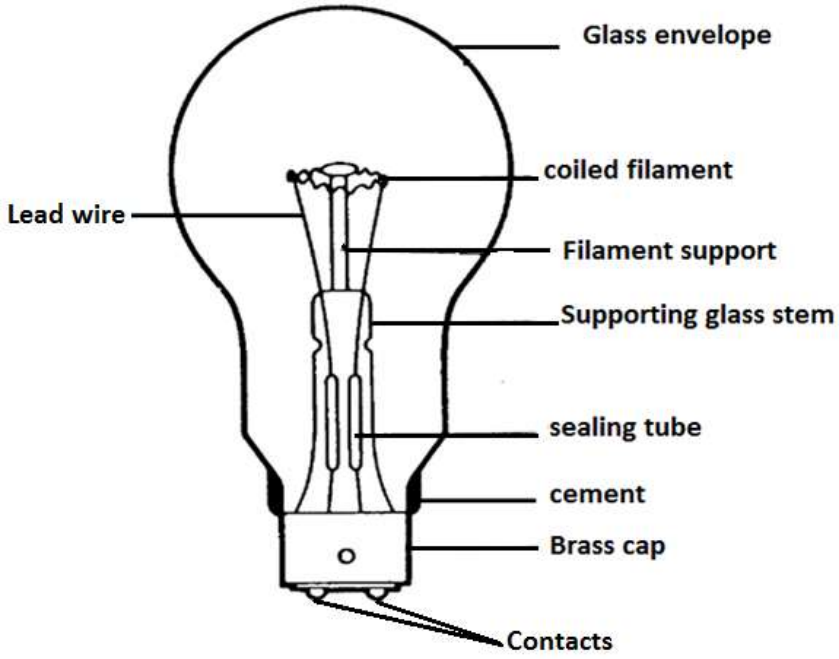


An electric bulb

Qn. What is an electric bulb?

- An electric bulb is a device that changes electric energy into heat and light energy.

A diagram of an electric bulb



Qn. State the energy change that takes place in a bulb?

- Electric energy is converted to heat and light energy.

Qn. State the function of each part of a bulb.

a) Glass envelope

- The glass envelope protects the inside parts of the bulb.
- The glass envelope prevents nitrogen and organ gases from escaping.

<u>Note:</u>

- The glass envelope is transparent.

Qn. Why is the glass envelope transparent?

- To allow light to pass through.

Qn. Why is argon and nitrogen used in bulbs?

- To prevent evaporation of tungsten.
- To prevent oxygen from mixing with the coiled filament.
- To enable the filament burn at a high temperature with out blowing.

Note:

- Oxygen cannot be used in an electric bulb because it leads to melting and blowing of the filament.

b) Brass cap

- The brass cap enables the bulb to be fixed properly in the lamp holder.

c) Coiled filament

- The coiled filament produces light.

Qn. Why is the filament coiled?

- To increase electric resistance.

Qn. From which metal is a coiled filament made?

- Tungsten

Qn. Why is the coiled filament made of tungsten?

- Tungsten has a high melting point.

Qn. Name the mineral from which tungsten is made?

- Wolfram

d) Supporting glass stem and filament support.

- The supporting glass stem and filament support hold the filament in position.

g) Lead wire

- Lead wires conduct electricity from the contact to the filament.

h) Sealing tube

- The sealing tube enables air to be removed from the bulb.

i) Contacts

- The contacts transmit electricity from the lamp holder to the bulb.

OR

- The contacts connect the bulb to the source of electricity from the lamp holder.

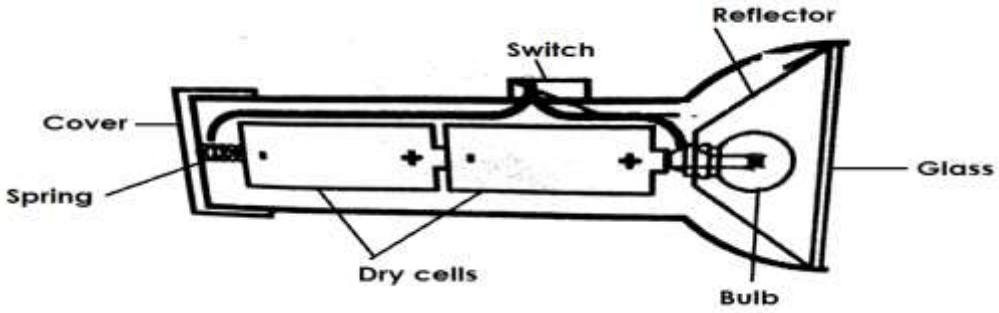
j) Cement

- The cement provides support to the inside parts of the bulb.

A torch

- A torch is a device that uses dry cells in series arrangement to produce light.

A diagram of a torch



Qn. State the functions of the parts of a torch.

a) Bulb

- The bulb gives out light.

b) Switch

- The switch breaks and completes the circuit at one's will or wish.

c) Dry cells

- Dry cells produce electricity.

d) Reflector

- The reflector directs light into diverging beam.

e) Glass

- The glass protects the reflector and bulb from damage.

f) Cover and spring

- The cover and spring keep the dry cells tightly fixed and closed.
- The cover and spring complete the circuit.

Qn. Give the factors that can make a torch fail to give out light.

- Poor arrangement of dry cells.
- When the cover is not fixed properly.
- When the bulb is not fixed properly.
- When some parts of a torch are spoilt / rusted.
- When the switch is faulty.

Qn. Identify the factors that can make a torch stop giving out light.

- When the dry cells get used up.
- When the filament in the bulb burns out.

Types of electric circuit cells arrangement.

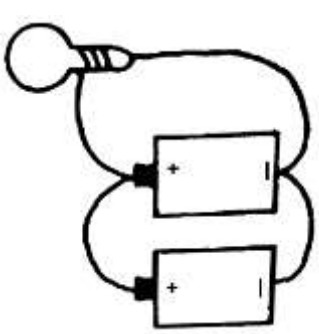
Qn. State the two types of electric circuit cells arrangement.

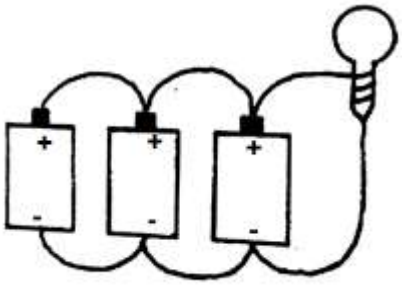
- Series electric circuit cells arrangement.
- Parallel electric circuit cells arrangement.

Parallel electric circuit cells arrangement

- Parallel electric circuit cells arrangement is the type of arrangement where all positive terminals of cells are connected together by one conductor and all the negative terminals to another.

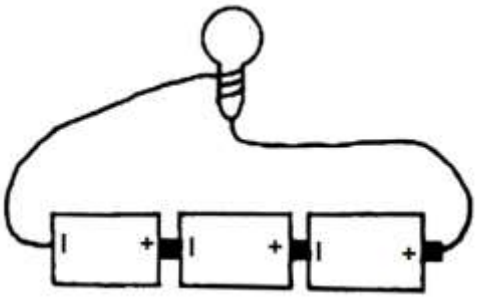
An illustration





Series electric circuit cells arrangement

- Series electric circuit cells arrangement is the type of arrangement where the positive terminal of one cell is connected to the negative terminal of another cell.



Plugs

Qn. What is a plug?

- A plug is a device that connects an electric appliance to the main source of electricity.

Qn. Mention the types of plugs.

- Two pin plug
- Three pin plug

A two pin plug

- A two pin plug consists of two wires.

i) Neutral wire

ii) Live wire

Qn. State the uses of the following wires in a plug.

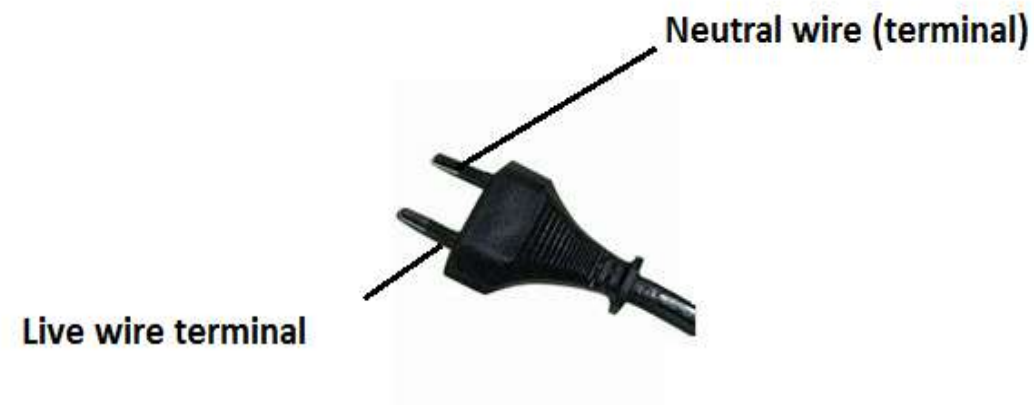
a) Neutral wire (Blue or Black)

- The neutral wire takes back current to the source.

b) Live wire (Red or brown)

- The live wire brings current from the source to the appliance.

An illustration of a two pin plug.



Qn. Give examples of devices that use a two pin plug.

- DVD players
- Telephones
- Electric fans
- Televisions
- Electric radios

A three pin plug

- A three pin plug consists of three wires i.e.

I. Neutral wire.
II. Live wire
III. Earth wire

Qn. State the importance of the following wires in a three pin plug.

i) Neutral wire (Black Blue)

- The neutral wire takes current from the appliance back to the source.

ii) Live wire (Red Brown)

- The live wire brings current from the source to the appliance.

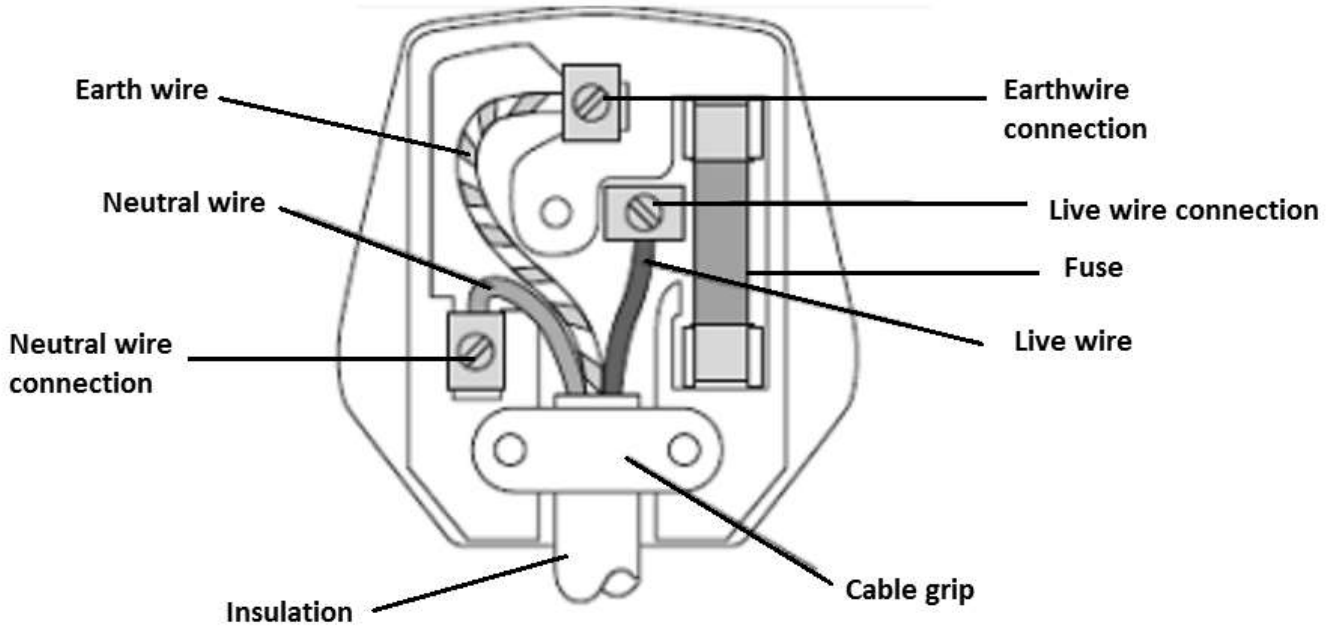
iv) Earth wire (Yellow or Green)

- The earth wire takes current in the soil incase of two much flow.
- The earth wire prevents electric shock.

Note

- The cable grip holds the wires together.

An illustration of a three pin plug.



Qn. Give examples of devices that use a three pin plug.

- Electric flat iron
- Electric kettle
- Water heater
- Refrigerator
- Electric cooker
- Hot plates

Domestic electricity

- The electricity we use in our homes is connected to an electric meter with both the live and neutral wires.

Qn. State the function of the electric meter.

- The electric meter measures electricity used in a house / building.

Qn. In which units is electricity measured?

- Kilowatt hours (KWH).

Devices connected to electricity

Qn. Mention the devices connected to electricity.

- Generator
- Transformer
- Dynamo
- Electric motor

a) Generator

- A generator is a device that produces electricity by changing mechanical energy to electric energy.

Qn. How is a generator able to produce electricity?

- By rotating coils of wires in a magnetic field.

Qn. Identify the types of generators.

- Alternating current generator (A.C Generator)
- Direct Current Generator (D. C. Generator)

Qn. How can a generator be made to produce more electricity?

- By increasing the number of turns in a coil.
- By increasing the magnetic field.
- By increasing the speed of rotation.

b) Dynamo

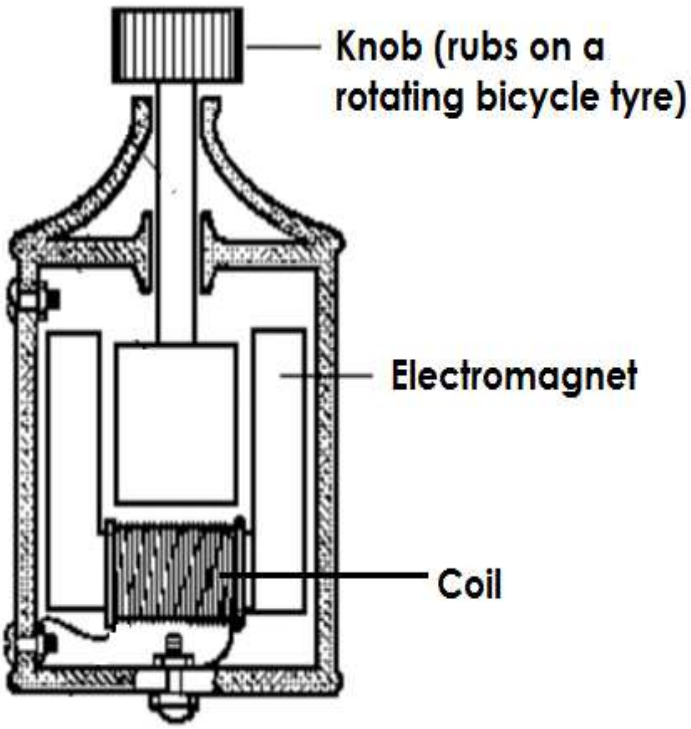
Qn. How does a dynamo produce electricity?

- By changing mechanical energy to electric energy.

Qn. Give examples of devices that use dynamos.

- Bicycle
- Vehicles

An illustration of a dynamo



Qn. How does a dynamo work?

- A dynamo works by changing mechanical energy in form of kinetic energy to electric energy.

Qn. State how electric current of a dynamo can be increased.

- By increasing the speed of pedaling.

Qn. State the importance of dynamos.

- Dynamos in vehicles are used to charge batteries.
- Dynamos are used to produce electricity for lighting.

c) Transformer

- A transformer is a device that steps up or steps down voltage of electricity produced.

Qn. Identify the types of transformers.

- Step up transformers.
- Step down transformers.

d) Electric motor

- An electric motor is a device that changes electric energy to mechanical energy.

Qn. State the uses of electric motors

- Electric motors are used to start car engines.
- Electric motors are used in radios.
- Electric motors are used in sewing machines.
- Electric motors are used in fans.

Electricity transmission in Uganda

Qn. Name the organization that supervises electricity in Uganda.

- Electricity Regulator Authority (ERA).
- E.R.A replaced Uganda Electricity Board (U.E.B)

Qn. Mention the three companies of E.R.A

- Uganda Electricity Generation Company Limited (UEGCL)
- Uganda Electricity Transmission Company Limited (UETCL)
- Uganda Electricity Distribution Company Limited (UEDCL)

Qn. State the role of UEGCL

- To generate electricity from power station.

Qn. State the roles of UETCL

- To transmit electricity from the power station to different parts of Uganda.
- To buy electricity from generation companies to distribution companies.
- UETCL constructs and maintains sub-stations in Uganda.
- UETCL is responsible for importing and exporting electricity in Uganda.

Qn. State the roles of UEDCL (UMEME)

- UMEME connects and distributes electricity to customers from pole (grid).
- UMEME disconnects electricity from electricity defaulters.

Qn. Identify the problems faced by UMEME.

- Corruption by UMEME workers.
- Illegal connection by customers.
- Bush burning that may lead to destruction of poles.
- Delayed payments by customers.
- Stealing of electric poles and wires.
- Siphoning of oil from transformers.

  Qn: **State the roles of ERA**
- ERA gives licences to the companies that may wish to generate electricity.

- ERA supervises and monitors the generation transmission and distribution companies.
- ERA controls the quality of electricity in Uganda.

Qn. How does electricity generated from power stations reach the consumer?

- Through transmission lines / wires/cables.

Rural Electrification

Qn. What is rural electrification?

- Rural electrification is the extending of electricity to rural areas.

Qn. Why is the government carrying out rural electrification?

- To control the massive cutting down of trees for wood fuel.

Static electricity

Qn. What is static electricity?

- Static electricity is the type of electricity which does not involve the flow of electrons.

Note:

- Static electricity involves stationary charges.

Qn. Identify the charges of static electricity.

- Positive charges
- Negative charges

Qn. How is static electricity produced?

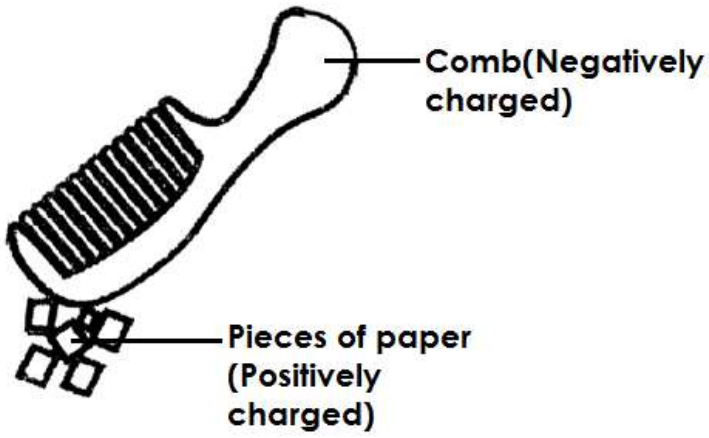
- Static electricity is produced by friction after rubbing two insulators together.

Qn. State the different ways of creating static electricity in daily life.

- By rubbing a ball point pen with hair.
- By rubbing a plastic ruler against a cloth or hair.

- By rubbing polythene against cloth / hair.
- By rubbing a plastic comb against hair.

An illustration



Note:

- Static electricity is produced under the law of electrostatics.

Qn. State the law of electrostatics

- Like charges repel each other and unlike charges attract each other.

Qn. State the difference between static electricity and current electricity.

Static Electricity	**Current Electricity**
• Does not involve the flow of electrons.	• Involves the flow of electrons
• Occurs in insulators.	• Occurs in conductors.
• The charges are on the surface of the insulator.	• The charges are inside the conductor

Lightning

Qn. What is lightning?

- Lightning is a huge light seen when positively charged clouds meet the negatively charged clouds during a storm.

Note:

- Lightning is a form of static electricity in nature.

Qn. Why is lightning said to be electricity?

- Lightning involves electric charges.

Qn. What causes lightning?

- Lightning is caused by charges of static electricity in clouds.

Thunder

Qn. What is thunder?

- Thunder is the sound that is suddenly produced when surrounding air becomes strongly heated expands and contracts during lightning.

Qn. How is thunder caused?

- Thunder is caused by the sudden expansion and contraction of air between opposite charged clouds.

Note:

- The continuous noise or sound heard during thunder is due to echoes.

Qn. Why is lightning seen before thunder is heard?

- Light travels faster than sound.

Qn. How is lightning useful in the environment?

- Lightning fixes nitrogen in the soil.

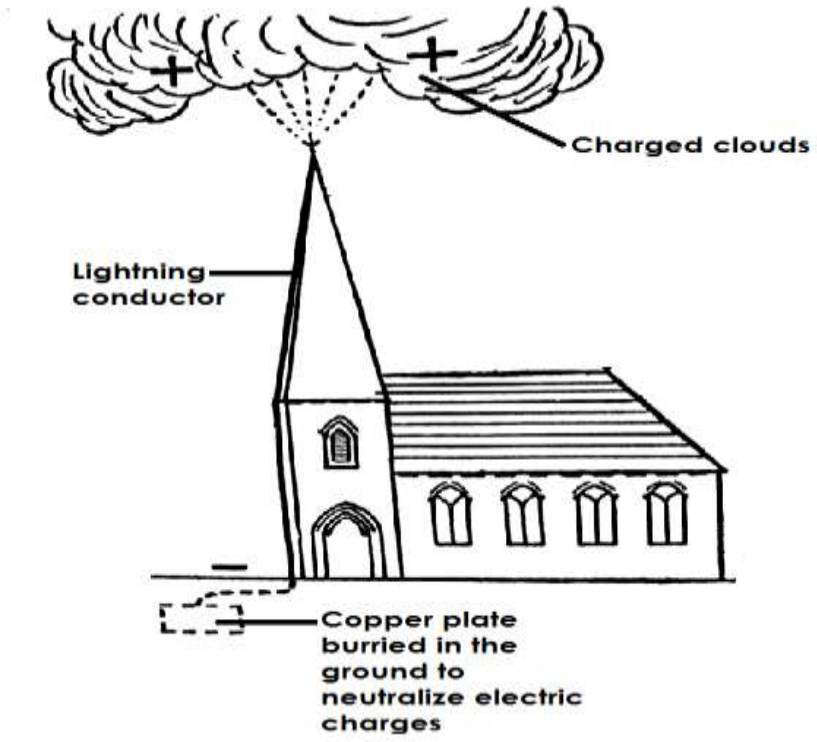
Qn. State the dangers of lightning.

- Lightning strikes people and animals to death.
- Lightning sets buildings on fire.
- Lightning can lead to forest fires.
- Lightning can damage people's property.

Qn. State ways of preventing dangers of lightning.

- Putting lightning conductors on tall buildings.
- Never stand under trees when it is raining.
- Switch off electric appliance when it is raining.
- Always wear rubber shoes when it is raining.
- Avoid swimming in open water when it is raining.
- Never stand in open places when it is raining.

A diagram showing a lightning conductor



Qn. How does a lightning conductor control lightning?

- A lightning conductor directs electric charges to the metal strip in the ground without damaging the building.

Qn. State the uses of electricity.

- Electricity is used for cooking.
- Electricity is used for ironing clothes.
- Electricity is used for lightning bulbs.
- Electricity is used for washing.
- Electricity is used to run some machines.

Qn. Give the advantages of using electricity.

- Electricity is quick.
- Electricity provides clean work.
- Electricity controls the cutting of trees.
- Electricity does not pollute the environment.

Qn. State the dangers of electricity.

- Electricity shocks and kills people.
- Electricity can burn buildings.

Qn. Identify the safety precautions when handling electricity.

- Never touch an electric socket with wet hands.
- Never push metallic objects in electric sockets.
- Switch off electric appliances when it is raining.
- Never repair electric appliances if you are not an expert.
- Never through objects on electric wires.
- Never touch electric wires that have fallen down.
- Avoid over loading the circuit.

THEME: ENVIRONMENT

TOPIC: ENERGY RESOURCES IN THE ENVIRONMENT

Qn. What is energy?

- Energy is the ability to do work.

Qn. What is a resource?

- A resource is anything people use to meet their needs.

OR

- A resource is the component of the environment used to satisfy people's needs.

Qn. Mention the two types of resources.

- Renewable resources.
- Non-renewable resources.

Qn. What are renewable resources?

- Renewable resources are components of the environment that can be replaced naturally when used up.

Qn. Give the examples of renewable resources.

- Animals
- Plants
- Soil
- Water
- Air / wind
- Sun

Qn. What are non – renewable resources?

- Non – renewable resources are things that cannot be replaced naturally once used up.

Qn. Give the examples of non-renewable resources.

- Minerals
- Rocks
- Fossil fuels

Energy resources

Qn. What are energy resources?

- Energy resources are things that provide people with useful energy.

Qn. Identify the examples of energy resources.

- Plants
- Animals
- Wind
- Sun
- Minerals
- Fossil fuels

Qn. Name the two types of energy resources.

- Renewable energy resources.
- Non-renewable energy resources.

Renewable energy resources.

Qn. What are renewable energy resources?

- Renewable energy resources are things that provide useful energy and can be replaced naturally once used up.

Qn. Give the examples of renewable energy resources.

- Plants
- Animals
- Wind

- Water
- The sun

Qn. What are non-renewable energy resources?

- Non- renewable energy resources are things that provide useful energy to people and cannot be replaced naturally when used up.

Qn. State the examples of non-renewable energy resources.

- Minerals
- Fossil fuels

Animals are energy resource

Qn. How are animals used as energy resources?

- Some animals are used for transport.
- Some animals are used for ploughing.
- Animal wastes are used in the production of biogas.

Qn. What are beasts of burden?

- Beasts of burden are animals that provide us with cheap labour.

Qn. Give the examples of beasts of burden.

- Oxen
- Donkeys
- Camels

Qn. Identify the different ways of conserving animals.

- Proper feeding of animals.
- Treating sick animals
- Vaccinating animals
- Gazetting animals in game parks.
- Banning illegal hunting of animals.

Qn. How can animals be replaced naturally once used up.

- Through reproduction.

Plants as energy resources

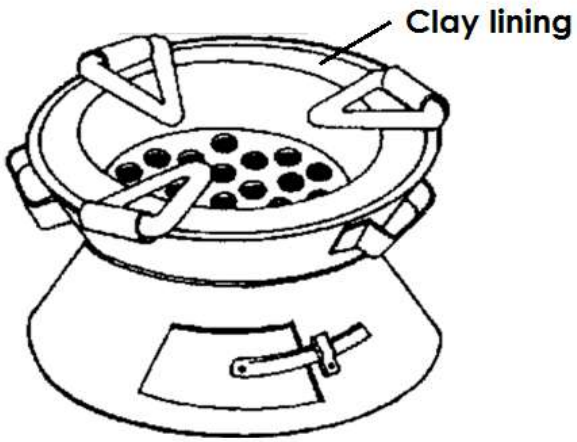
Qn. How are plants used as energy resources?

- Plants provide us with wood fuel.
- Some plants wastes are used in the production of biogas.

Qn. State the different ways of conserving plants.

- Afforestation.
- Re-afforestation.
- Agro – forestry.
- Using energy saving stoves.
- Using other alternative sources of energy e.g. biogas instead of wood fuel

A diagram showing an energy saving stove.



Qn. How do energy saving stoves conserve the environment?

- Energy saving stoves use less charcoal.

Qn. Why does energy saving stoves use less charcoal?

- Energy saving stoves keep heat for a long time.

Qn. State the importance of the clay lining found on a charcoal saving stove.

- The clay lining keeps heat for a long time.

Qn. Give at least two examples of wood fuel.

- Firewood
- Charcoal
- Wood shavings
- Saw dust
- Briquettes

Qn. Mention the form of energy stored in charcoal.

- Chemical energy.

Qn. State the energy change that takes when wood burns to ash.

- Chemical energy changes to heat energy.

The sun as an energy resource.

- The sun is the main source of heat and light energy as forms of energy on earth.

Qn. How is the sun used as an energy resource?

- The sun provides us with light that enables us to see.
- Heat from the sun dries washed clothes.
- Heat from the sun helps to generate solar electricity.
- Head from the sun helps to dry harvested crops.
- Light from the sun is used for photography.
- Light from the sun enables plants to make food.

Qn. In which way is solar electricity friendly to the environment?

- Solar electricity reduces the cutting down of trees for wood fuel.
- Solar electricity does hot pollute the environment.

Water as an energy resource.

Qn. How is water used as an energy resource?

- Fast running water helps to generate hydro electricity.
- Steam from hot springs is used to generate geothermal electricity.
- Tides are used to generate tidal electricity.

Qn. Give the examples of useful energy resources got from water.

- Hydro electricity.
- Geothermal electricity
- Tidal electricity

Qn. What is a tide?

- A tide is a regular rise and fall of water in the sea or ocean.

Qn. What causes a tide?

- A tide is caused by the attraction of the moon and earth.

Wind as energy resource

Qn. What is air?

- Air is a mixture of gases.

Qn. What is wind?

- Wind is air in motion or moving air.

Note:

- Wind possesses kinetic energy that makes things move.

Qn. State the ways how wind is used as an energy resource.

- Wind is used in winnowing.
- Wind is used to sail boats.
- Wind is used to turn wind mills.

- Wind is used to fly kites.
- Wind helps to dry washed clothes.
- Wind helps in seed dispersal.

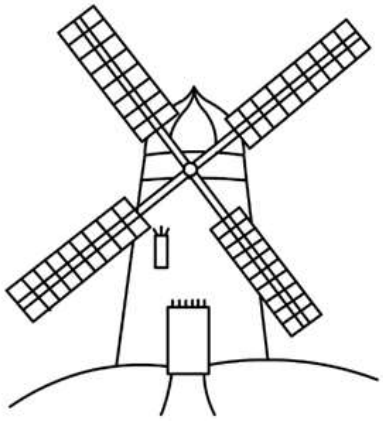
Qn. State the dangers of wind.

- Strong wind destroys crops.
- Strong wind destroys buildings.
- Strong wind capsizes boats.

Qn. How does wind help to dry clothes?

- By speeding up the evaporation process.

A diagram of a windmill.



Qn. Give the uses of a windmill

- A wind mill is used to generate electricity.
- A wind mill is used to pump water from underground.
- A wind mill is used to grind grains.

Qn. How is wind formed?

- Wind is formed when air in a certain area is heated faster than air in another area.

Qn. Write down different ways of conserving renewable resources.

- Afforastation.
- Re-afforestation
- Agro forestry
- Using energy saving stoves.
- Using other alternative sources of energy e.g. biogas instead of wood fuel.
- Proper feeding of animals.
- Treating animals when they are sick
- Gazetting animals in games reserves
- Banning illegal hunting of animals.

Energy resources from fossil fuels

Qn. What are fossils?

- Fossils are remains of plants and animals that lived thousands of years ago.

Qn. What are fossil fuels?

- Fossil fuels are fuels that were formed from the remains of plants and animals that lived thousands of years ago.

Qn. Give the examples of fossil fuels.

- Petroleum
- Coal

Petroleum / crude oil

Qn. What is petroleum?

- Petroleum is a fossil fuel that was formed from the remains of animals that died many years go.

Qn. Give the examples of products of petroleum.

- Petrol

- Diesel
- Jet fuel
- Paraffin / kerosene
- Natural gas

Qn. State the importance of petroleum products.

- Petroleum products can generate power that can run big machines.
- Petroleum products are burnt to produce heat and light.

Qn. Identify the process by which petroleum products or crude oil is separated.

- Fractional distillation.

Coal as an energy resource.

Qn. What is coal?

- Coal is a hard black material formed from the remains of plants that lived thousands of years ago.

Qn. State the importance of coal.

- Coal is used to generate thermal electricity.
- Coal is used to make tar for surfacing roads.
- Coal is used as fuel in steam engines.

Qn. Give the other products from petroleum.

- Plastics
- Polythenes
- Dye
- Vaseline
- Paint

- Fertilizers

Qn. Give the other products from coal.

- Paint
- Perfumes
- Fertilizers

Minerals as energy resources (uranium)

Qn. How are minerals (uranium) used as an energy resource?

- Uranium is burnt to produce atomic electricity.
- Uranium is used as fuel in nuclear powered sub-marines.
- Uranium is used to make atomic bombs.

Qn. State the ways of conserving non-renewable energy resources.

- By having controlled mining of minerals.
- By using other alternative sources of fuel e.g. biogas instead of petroleum.
- By walking distances which are not too long to conserve petroleum products.
- By riding bicycles in short distances than driving cars to save fuel.
- By repairing vehicles which are under dangerous mechanical conditions in order to save fuel.

Biogas production

Qn. What is biogas?

- Biogas is a methane that is produced from rotting organic matter.

Qn. What is biomass?

- Biomass is the amount of living matter found in an area.

Qn. Identify the materials used to produce biogas.

a) Plant materials

- Banana peelings
- Sweet potato peelings
- Seed residues

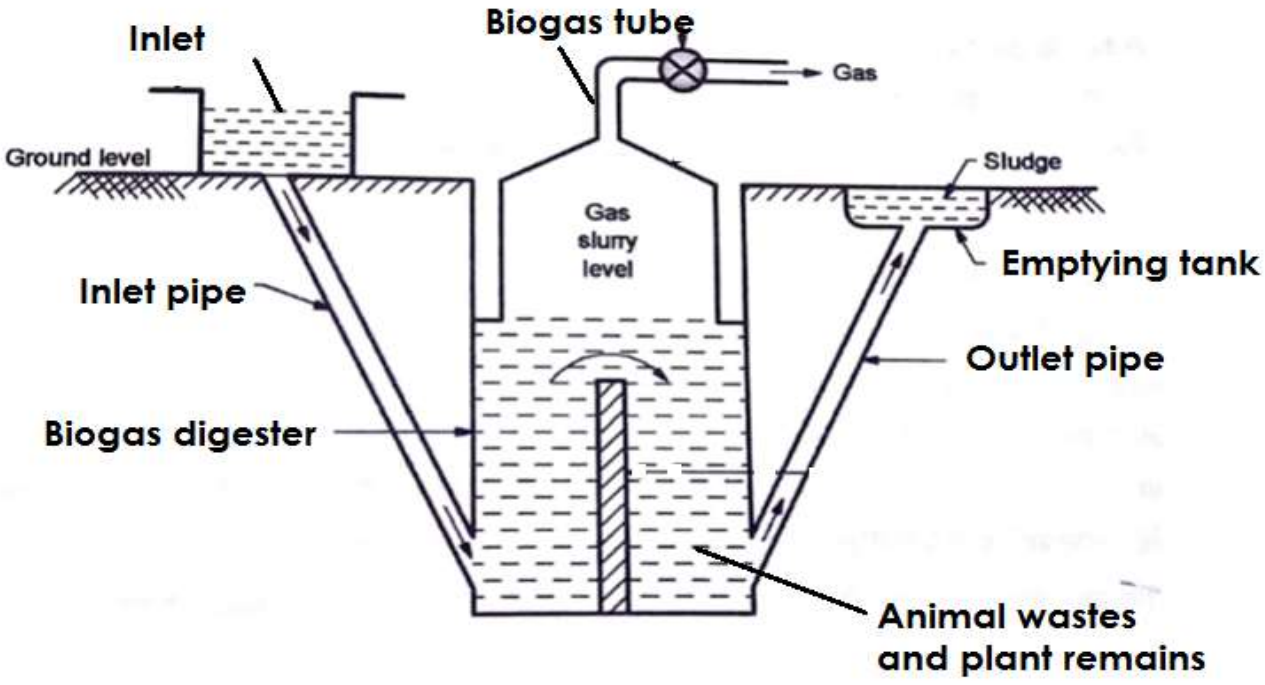
b) Animal materials

- Cow dung
- Urine
- Chicken droppings
- Human faeces
- Goat droppings

Qn. How is biogas produced?

- Biogas is produced by putting animal and plant materials in a proper sealed container called biogas digester which is buried underground.
- Plant and animal waste in the biogas digester are broken down by anaerobic bacteria during the process of fermentation.
- During fermentation, methane gas called biogas is produced.

A diagram showing biogas digester.



Qn. State the uses of the parts of a biogas digester.

i) Inlet

- The inlet is used for putting in plant and animal matter.

ii) Inlet pipe

- The inlet pipe allows plant and animal matter into the digester.

iii) Outlet

- The outlet is used for removing old or used up matter from the digester.

v) Emptying tank

- The emptying tank is where used up matter is collected before it is taken to the garden as manure.

vi) Biogas tube

- The biogas tube traps and takes biogas to the heating or lightning equipment.

vii) Biogas digester.

- A biogas digester is where animals and plants waste are put to ferment.

Qn. Why is the biogas digester tightly sealed?

- To prevent the entry of oxygen.

Qn. State the uses of biogas.

- For cooking
- For lighting
- For heating

Qn. Give the advantages of using biogas

- Biogas is cheap.
- Biogas does not pollute the environment.

- Materials for making biogas are readily available.

Qn. State the disadvantages of using biogas.

- Biogas may not be efficient.
- Biogas contains impurities.

Qn. What is an effluent?

- An effluent is a liquid substance obtained after production of biogas.

Qn. What is sludge?

- Sludge are waste materials removed from a biogas digester.

Qn. What is slurry?

- Slurry is a mixture of dung and water that enters a biogas plant in a semi liquid form.

Environmental conservation

Qn. What is environmental conservation?

- Environmental conservation is the protection and preservation of resources in the environment.

Qn. Give reasons for conserving resources.

- For future use.
- To prevent extinction of resources.