MOTHER MAJERI PRIMARY SCHOOL.
PRIMARY SEVEN SCIENCE LESSON NOTES 2020.

SKELETAL AND MUSCULAR SYSTEM

- ✓ A skeleton is a body part that forms a supporting structure of an organism
- ✓ A human skeleton is a frame work of bones in the body.

Types of skeletons

- Endo skeleton
- Exoskeleton
- Hydro-static skeleton

An endoskeleton

- ✓ An endoskeleton is a type of skeleton where the bones are found inside the body of an animal.
- ✓ It is a characteristic of vertebrates and sponges.

Examples of animals with an endoskeleton

- Cows
- Dogs
- Goats
- Lions
- Man
- Monkeys
- Fish
- Birds
- Frog
- Crocodiles
- Tortoises
- Salamanders
- Sponges

An exoskeleton

- ✓ An exoskeleton is a type of skeleton found outside the body of an animal.
- ✓ It is a characteristic of arthropods.
- ✓ It is composed of a hard cuticle lying outside the muscles.

Examples of animals with an exoskeleton

- Grasshoppers
- Cockroaches
- House flies
- Lobsters
- Prawns
- Locusts
- Butter flies
- Snails
- Cuttlefish
- Cowries
- Shellfish
- Winkles
- Cockles
- Oysters
- Millipedes

Hydrostatic skeleton

- ✓ This is a type of skeleton where an animal does not have any hard tissue but a fluid filled under pressure.

Examples of animals with a hydro-static skeleton

- Earthworms
- Squids
- Octopus
- Caterpillar
- Leeches
- Slugs
- Hookworms
- Tape worms

- Round worms etc.

Functions of the skeleton
- It aids movement or locomotion.
- It supports the body.
- It gives the body shape.
- It provides surface for muscle attachment.
- It helps in formation of blood cells in the bone marrow.
- It protects delicate body organ such as the brain, lungs, heart, eyes, spinal cord.
- It stores calcium and phosphorus.

Note: The delicate body organs are protected by the following parts of the skeleton;
Brain ---------- skull
Spinal cord----------vertebral column/back bone
Lungs and heart--------- ribcage/ribs
Eyes----------orbit/eye socket

Regions of the human skeleton
The human skeleton is divided into two regions i.e.
I. Axial skeleton
II. Appendicular skeleton.

Axial skeleton
-It is the main longitudinal section of the skeleton in vertebrates.
-It consists of the skull, vertebral column and the rib cage.

Appendicular skeleton
-It is a skeleton made of parts attached to the axial skeleton.
-It consists of the limbs and the limb girdles.

The human skeleton is made up of for main parts i.e.
- The skull
- The back bone/vertebral column
- The limbs
- The limb girdles

-The human skeleton is made up of 206 bones.
-The skull has 22 bones and the back bone has 33 bones.

The limbs
-These are grouped into fore limbs and hind limbs.

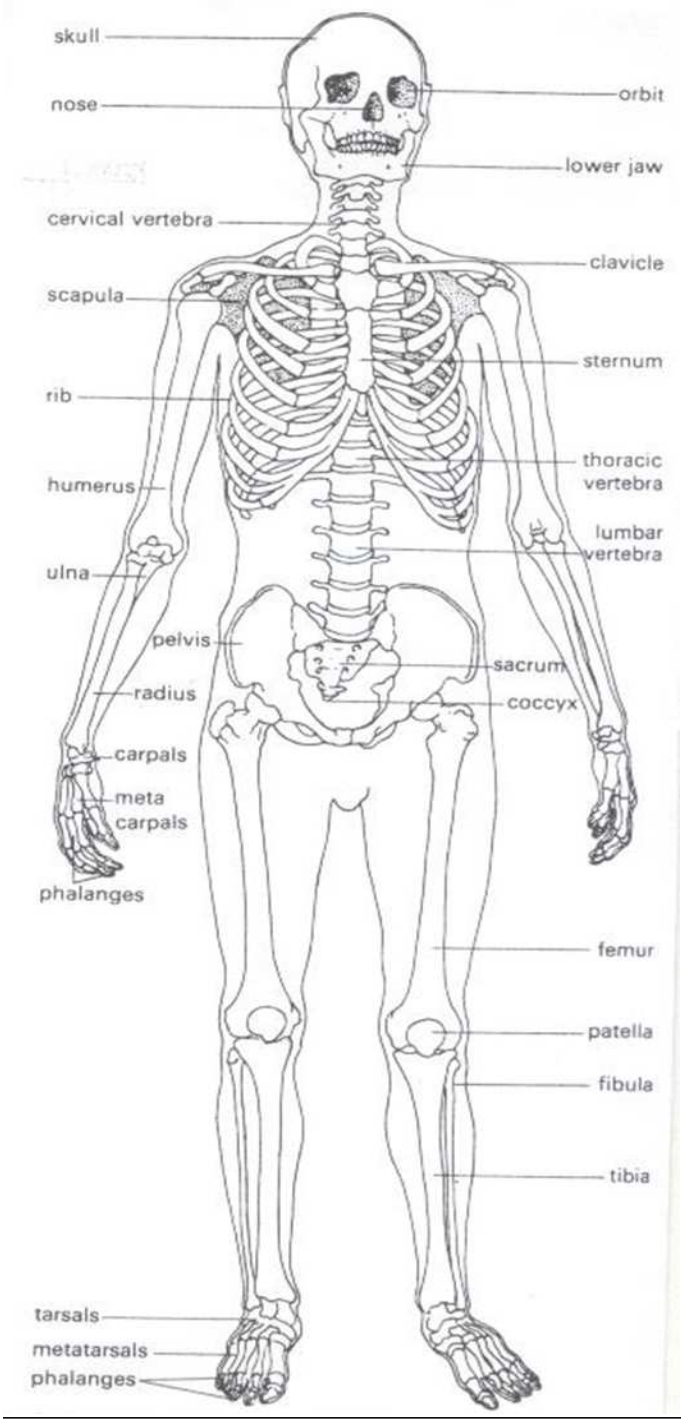
The fore limbs
-These consist of the following bones;
- Humerus carpals
- Radius metacarpals
- Ulna phalanges

Hind limbs
-These consist of the following bones;
- Femur tarsals
- Tibia metatarsals
- Fibula phalanges

Limb girdles

-There are two limb girdles i.e.
-Pectoral or shoulder girdles: - made up of clavicle and scapula.
-Pelvic or hip girdle: - made up of the pelvis.

THE STRUCTURE OF THE HUMAN SKELETON



BONES

A bone is a hard tissue in the body of an animal on which muscles are attached.

Types of bones

1. Long bones
2. Short bones
3. Flat bones

4. Irregular bones

Long bones

Long bones are commonly found on the limbs i.e. hands and legs.

Examples of long bones in the body

- Femur/thigh bone
- Humerus
- Tibia
- Radius
- Ulna
- Fibula

Note; The femur is the longest and the strongest bone in the human body.

Short bones

Short bones are found in the ears, feet and hands.

Examples of short bones in the body

- Ossicles
- Carpals
- Metacarpals
- Phalanges
- Tarsals
- Metatarsals

Flat bones

These are bones that appear flat on the body.

Examples of flat bones in the body

- Skull
- sternum/breast bone
- Collar bone/clavicle
- pelvis
- The jaw bone
- Ribs

Irregular bones

-Irregular bones are found on the back bone or vertebral column.

Examples of irregular bones in the body

- The neck vertebrae
- Thoracic vertebrae
- Lumbar vertebrae
- Patella
- Carpals
- Metacarpals
- Tarsals
- Metatarsals
- sacrum
- phalanges

THE JOINTS

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

Types of joints

-Movable joints
-Immovable joints

Immovable joints

-These are joints which do not allow any movement.

Examples of immovable joints

- Fused joints e.g. sacrum
- Suture joints e.g. between the bones of the skull.

Why are suture joints called fixed joints?

-They do not allow movement.

Movable joints

-Movable joints are joints that allow movement in the body.

Types of movable joints in the body

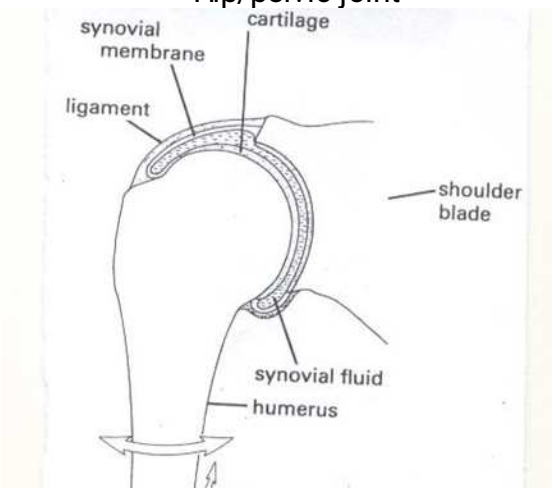
1. Ball and socket joint
2. Hinge joint
3. Gliding/plane joint
4. Pivot joint

Ball and socket joint

-A ball and socket joint is a type of movable joint that allows movement in more than one plane.
-A ball and socket joint is a type of movable joint that allows movement in all directions.
-This kind of movement is called rotational movement.

Examples of ball and socket joint

- Shoulder joint
- Hip/pelvic joint



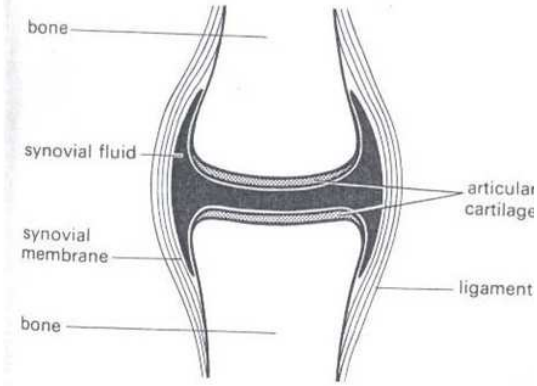
Hinge joint

-A hinge joint is a type of movable joint that allows movement in only one plane.
-This is a type of joint that allows movement in only one direction.
-This type of movement is called unidirectional movement.

Examples of hinge joint in the body

- Elbow joint
- Knee joint
- Knuckles (finger joints)

The hinge joint



Features of a hinge joint

Ligament; is a structure that connects a bone to a bone in the body.
Synovial membrane secretes synovial fluid.
Synovial fluid; the synovial fluid reduces friction in the joint.
Tendon; is a structure that connects a bone to a muscle.
Cartilage; is a cushion-like structure that absorbs shock in a joint.
-It also helps to reduce friction.

Differences between ball and socket joint and a hinge joint

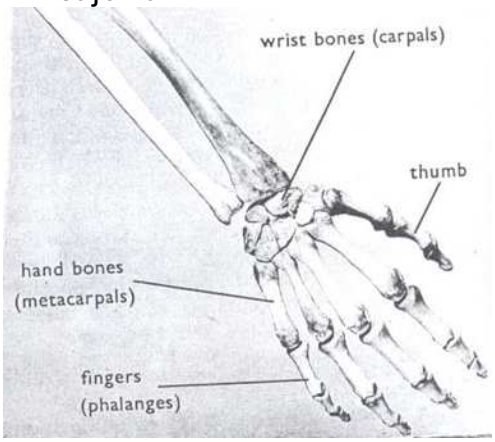
- A ball and socket joint allows movement in more than one plane while a hinge joint allows movement in only one plane.
-A ball and socket joint allows movement in all directions while a hinge joint allows movement in only one direction.
- A ball and socket joint allows rotational movement while a hinge joint allows unidirectional movement.

Gliding/plane joint

-A gliding joint is the type of movable joint where two flat bones slide over each other easily.

Examples of gliding joint

-Ankle joint
-Wrist joint



Pivot joint

-A pivot is a type of movable joint that allows slight movement of the vertebrae.

Example of pivot joint
-Neck joint

Diseases that affect the human joints
- Arthritis
- Synovitis
- Osteo-arthritis
- Bursitis
- Brucellosis

Importance of joints
- Joints allow movement.
- Joints allow flexibility

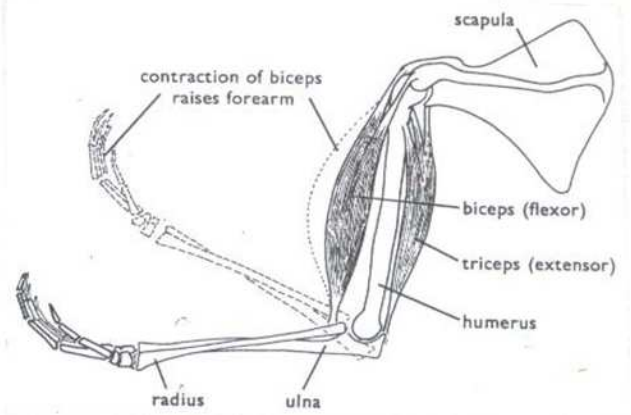
MUSCLES
-A muscle is an elastic fibre in the body of an animal.
-Muscles are connected to bones by the tissues called tendons.

Types of muscles
-Voluntary muscles
-Involuntary muscles

Voluntary muscles
-Voluntary muscles are muscles in the body whose movement can be controlled.
-They are attached to the bones.

Examples of voluntary muscles in the body
- ✓ Biceps
- ✓ Triceps
- ✓ Calf muscles
- ✓ Thigh muscles

A diagram showing voluntary muscles



Why are biceps and triceps called antagonistic muscles?
-They produce opposite movements.
-They oppose each other's movements.

Why are biceps called flexor muscles?
-They cause bending of the arm

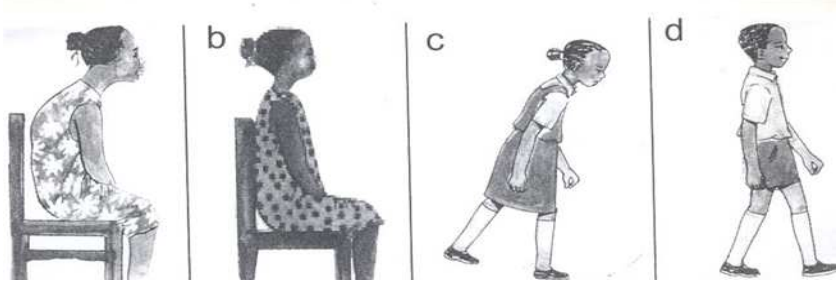
Why are triceps called extensor muscles?
-They cause straightening of the arm

What happens to the following muscles when the arm is bent?
Bicep muscles- they contract.
Triceps muscles- they relax.
What happens to the following muscles when the arm is straightened?
Bicep Muscles-They relax.
Triceps Muscles-They contract.

Involuntary muscles
-Involuntary muscles are muscles in the body whose movement can't be controlled.
Or
-Involuntary muscles are muscles whose movement is automatic.
Examples of involuntary muscles
- Cardiac muscles
- Muscles of the reproductive system
- Muscles of the digestive system
- Muscles of the excretory system

Importance of muscles
-Muscles control body movements.
-Muscles help in joining bones in the body.
-Muscles make up organs of the body like the heart.
-Muscles help in internal respiration.
-Muscles generate heat in the body through shivering.

POSTURE
-Posture is the position of the body in everything we do.
-There is correct posture for standing, sitting, walking, sleeping etc.



Importance of correct body posture
- It helps to strengthen the muscles of the abdomen and diaphragm
- It helps the skeletal system to develop straight and upright.
- It prevents deformation of bones.
- It helps in proper digestion.
- It helps in proper functioning of body organs.

Diseases and disorders of the skeletal and muscular system
- Poliomyelitis/polio
- Tuberculosis
- Leprosy
- Bone cancer
- Tetanus
- Rickets

Polio
-It is caused by virus spread through drinking contaminated water.

Signs and symptoms of polio
-Paralysis of the limbs
-Lameness
-Fever

How can the spread of polio be prevented?
- By immunization of children with polio vaccine
- By boiling water for drinking.
- Through proper disposal of faeces.

Tuberculosis
-It is caused by bacterium called mycobacterium bovis spread through drinking unboiled milk from an infected cow.

Signs and symptoms of tuberculosis
- Long lasting back pain
- Excessive night sweating
- Chronic cough
- Loss of body weight.

Prevention of tuberculosis
- Through immunization of children with BCG vaccine.
- By isolation of infected persons.
- By drinking boiled or pasteurized milk.
- Through early treatment of tuberculosis patients.

Tetanus
-It is caused by bacteria spread through fresh uncovered wounds and cuts.

Signs and symptoms of tetanus
-Stiff muscles
-The baby stops suckling
-Spasms

Prevention of tetanus
- Through immunization with DPT and tetanus toxoid vaccines
- By sterilizing and covering wounds.
- Cutting umbilical cords of newly born babies with sterilized instruments.

Leprosy
-It is caused by a bacteria called bacilli leprae spread through close body contact with an infected person.
-It affects both the human skin and the muscular skeletal system

Signs and symptoms
-Pain in the joints
-Blisters on the skin
-Pale patches on the skin.
-Loss of fingernails and toenails.
-Loss of fingers and toes.
-Loss of sense of feeling.

Prevention of leprosy
-Proper disposal of human waste

-Avoid close body contact with an infected person
-Avoid sharing beddings with an infected person.
-Avoid shaking hands with an infected person.
-Avoid sharing beddings with an infected person.

Rickets
-Rickets is caused by lack of vitamin and calcium

Signs of rickets
-Bow shaped legs
-Weak bones
-Bent bones/knock knee.
How can we prevent rickets in babies?
-By feeding babies on foods rich in vitamin D and calcium

Disorders of the skeletal muscular system
1. Fractures
2. Dislocations
3. Sprains
4. Strains
5. Humps etc.

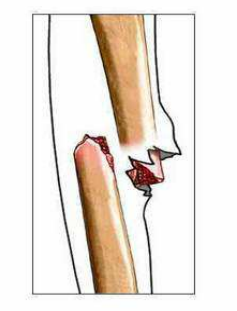
FRACTURES
-A fracture is a broken or cracked bone in the body.
Types of fractures
- simple fracture
- compound fracture
- green stick fracture

Simple fracture
A simple fracture is a type of fracture where the broken bone remains inside the skin or flesh.



Signs and symptoms of a simple fracture.
-The broken bone does not come out of the flesh/skin.
-Swelling of the injured part.
-The injured part appears crooked.
-Difficulty in movement.
-Pain around the injured part.

Compound fracture
-A compound fracture is a type of fracture where the broken bone pierces and comes out of the flesh.



Signs and symptoms of a compound fracture
-The broken bone comes out of the flesh.
-Torn flesh
-Swelling of the injured part.
-Bleeding around the injured part.
-Wounds around the injured part.

Green stick fracture
-A green stick fracture is a type of fracture where the bone does not break or crack but jus bends.
-It is common in babies because they have cartilage-like bones.



First aid for fractures
- Stop any bleeding using a tourniquet.
- Apply splints to keep the fractured bones in position.
- Apply armsling to keep the fracture armin one position.

Why are splints used for giving first aid for fractures?
- To keep the broken bone in one position.
- To immobilize the broken bone.

Note.
-The stretcher is used to carry casualties to the hospital
-The crutches support the person in movement.

A dislocation
-A dislocation is the displacement of a bone fromits normal position.
First aid
-Apply ice blocks on the injured part

Sprains and strains
-A sprain is a torn or an overstretched ligament.
-A strain is a torn or an overstretched muscle or tendon.

First aid for sprains and strain

-Keep the joint in a resting position in case of a sprain.
-Apply ice blocks on the injured part.
-Use a firmbandage to support the affected part.

Ways of maintaining the proper functioning of the skeletal and muscular system

- By having regular physical exercises.
- By eating food rich in a balanced diet.
- By taking children for early immunization against tuberculosis and polio.
- Avoid dangerous games.
- Maintain a good posture.

Importance of having regular physical exercises

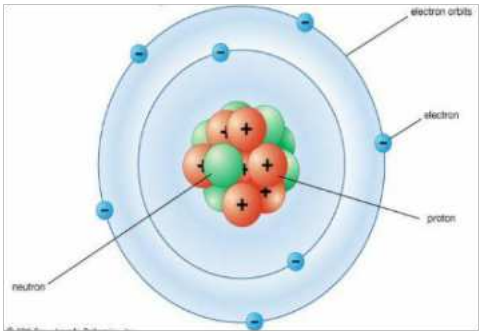
- They help to reduce fats in the body.
- It helps in proper circulation of blood in the body.
- They reduce the risk of heart diseases and disorders.
- They help to strengthen ligaments and tendons.
- They strengthen body muscles.
- They help to make joints more flexible.
- They help to reduce body weight.
- They help to refresh the mind.

ELECTRICITY AND MAGNETISM

1. ELECTRICITY

-Electricity is a formof energy produced by charges.
-Electricity is a formof energy produced by the existence of charged particles.

Structure of an atom



- An atomis the smallest indivisible particle of matter.
- Electrons are negatively charged particles of an atom
- Protons are positively charged particles of an atom
- Neutrons are uncharged particles of an atom

Sources of electricity

- The sun
- Fuel e.g. wall, diesel, coal
- Fast flowing water/ running water
- Dry cells
- Batteries
- Uranium
- Friction
- wind

Electric Current

What is an electric current?
-Is the flow of electric charges through a conductor.
-Electric current is measured using an ammeter.
- Electric current is measured in **Amperes (amps)**

Types of electricity
- current electricity
- static electricity

Current electricity
-Is a type of electricity produced when electrons flow fromthe source to another place through a conductor.
-Is the type of electricity in which electrons flow.
Forms /kinds of current electricity
- Direct current(DC)
- Alternating current(AC)

Direct current (DC)
-Direct current is the formof current electricity in which the electrons flow only in one direction i.e. fromthe source to the appliance.
-It can be stored but not stepped up or down.
Sources of direct current
- Dry cells
- Simple or wet cells
- Batteries or accumulators

Alternating current(AC)
-Is the formof current electricity in which electrons flow in two directions (both) i.e. forward and backward flow.
-It can be stored in formof direct current electricity.
-It can be stepped up and down.

Forms of electricity
- Hydro Electricity
- Thermal electricity
- Atomic electricity
- Bio gas electricity.
- Solar electricity
- Tidal electricity
- Geothermal electricity

1. **Hydro Electricity**
   -Is the formof electricity generated fromfast flowing water which turns the turbines.
   -The turbines are connected to the generator which produces electric energy.
   -The kinetic energy of moving water is changed into electrical energy.
   -It is transmitted by the use of cables, wires or grids.

2. **Thermal electricity**
   -Is the formof electricity got by burning fuels.
   Which formof electricity is produced by burning fuels in a generator?
   -Thermal electricity
   Disadvantages of using thermal electricity

-It is expensive.
-It pollutes the environment.

3. **Atomic electricity**
   - Is the formof electricity produced by burning uranium
   - Uraniumstores chemical energy

4. **Solar electricity**
   - It is the formof electricity got fromthe sun.
   - It is got by using solar panels which trap heat and light energy fromthe sun.

A solar panel



What is the function of the solar cells?
-They convert solar energy into electricity.
Why are solar cells painted black?
-To absorb more sunlight.
Advantages of solar electricity
-There is no pollution.
-It serves as an alternative energy resource
-It is froma renewable resource.
Disadvantages of solar electricity
-It is weather dependent.
-It is expensive to install.

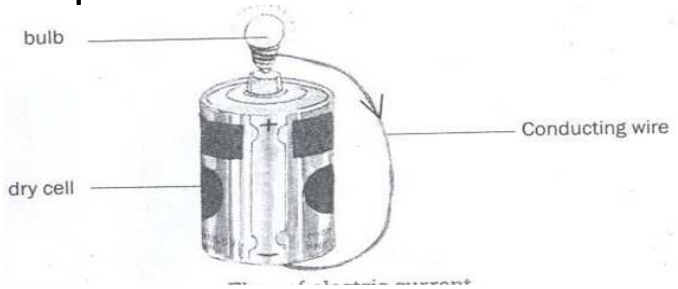
Biogas electricity
-Is the formof electricity got fromthe burning of biogas.
Advantages of using biogas
-It does not pollute the environment as it does not produce smoke
How does the use of bio-gas electricity conserve the environment?
-It does not pollute the environment.
-It reduces the rate of deforestation.

Geothermal electricity
-This is a formof electricity produced fromhot rocks in the earth's crust.

Tidal electricity
-This is a formof electricity produced by the water tides at sea shores.

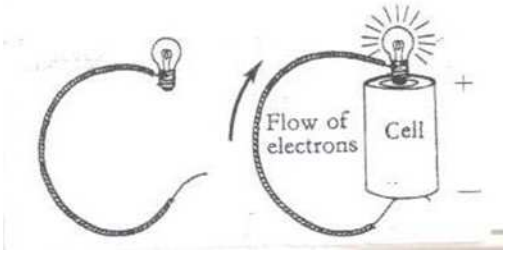
ELECTRIC CIRCUIT
What is an electric circuit?
-This is a path through which electric current flows/passes.

A simple electric circuit



Flow of current

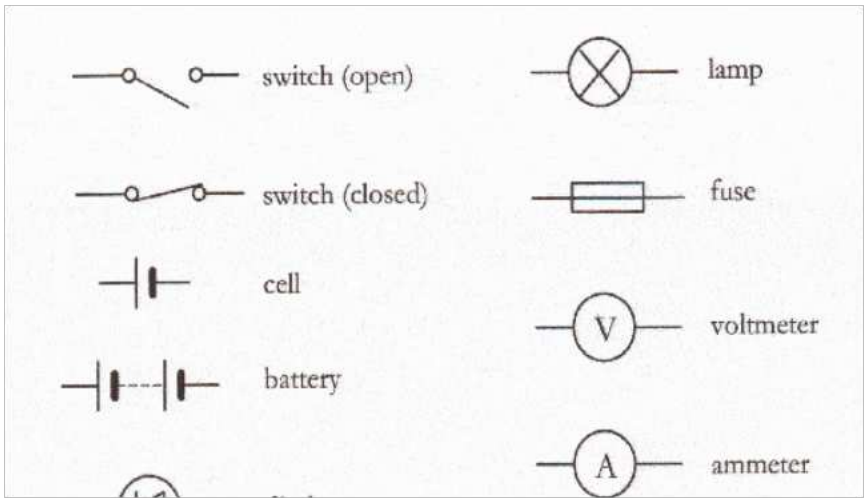
Flow of electrons



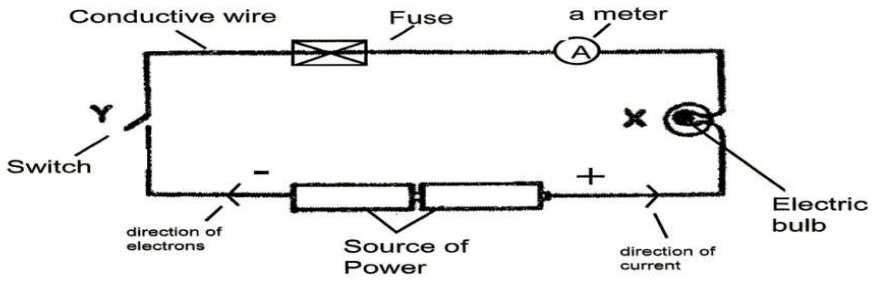
How is the flow of current different fromthat of electrons?
NB: There will be no flow of current if the cells are poorly arranged.

Components/ elements electric circuit
-Battery
-Bulb
-Switch
-Fuse
-Ammeter
-Voltmeter
-Conductor/wire

Symbols used in electricity



SIMPLE ELECTRIC CIRCUIT



a) **Dry cells** are a source of electricity.
   - They store chemical energy which is changed in to electric energy.

What form of energy is stored in a dry cell?
-Chemical energy
What energy change takes place in a dry cell when the switch is closed?
-Chemical energy to electrical energy

b) **A switch** breaks and completes the circuit at one's own will.
c) **Ammeter** is used to measure electric current.
d) **The bulb** produces light when the circuit is complete.

Mention the two forms of energy produced by the bulb.
- Heat energy
- Light energy

Give two energy changes that take place in a bulb.
- Electric energy to heat and light energy
- Heat energy to light energy.

What are some of the possible reasons as to why the bulb can go off?
- When the filament burns out.
- When the dry cells become exhausted

What are some of the possible reasons as to why the bulb may not work?
- When the filament burns out
- When the fuse has blown
- When the dry cells are exhausted
- When the bulb is poorly fixed
- When the dry cells are poorly arranged.

e) A fuse
What is a fuse?
-Is a safety device which breaks the circuit in case of too much flow of current
What is the work of a fuse?
-A fuse breaks the circuit in case of high voltage.
How does a fuse control the over flow of current through a Circuit?
- By melting and breaking the circuit.

Out of what alloy is the fuse made
-Solder
Why?
-Solder has a low melting point.
Why is the fuse made of a thin wire?
-For easy melting
What are the advantages of a fuse?
- It reduces the risks of electric fires in houses
- It helps to protect delicate electrical appliances from damage by breaking the circuit.

What are some of the reasons/ conditions which make the fuse to blow or break?

- Presence of a short circuit
- High voltage

What is the difference between a switch and a fuse?

-A switch breaks and completes the circuit at one's will while a fuse breaks the circuit in case of too much flow of current.

How is a switch similar to a fuse?

-Both break the circuit.

f) A wire / conductor

-It transmits electricity

Electrical resistance

- Is the opposition to the flow of current in an electric circuit.
- It is measured in units called Ohms by an instrument called Ohmmeter.
- The thinner the wire, the greater the resistance hence more heat is produced.
- The longer the wire, the greater the resistance.
- Thinner and longer wires offer greater resistance while thick and shorter wires have less resistance.

_____ More resistance

━━━━━━━━━━━━━━━━━━━━━━ Less resistance

Note;

Filaments of bulbs, water heaters, coils, cookers, ovens, electric flat irons are made of coiled wires to increase electrical resistance.

Electrical pressure (voltage)

-Is the force that drives electricity through the circuit.

-Electrical pressure is measured by an instrument called Voltmeter which gives units as Volts.

Calculations on electric pressure/ electromotive force

1. Calculate the voltage contained by eight dry cells
2. Obama's torch uses two dry cells. How many volts are there?
3. Egwanga has a torch that uses 12 dry cells, how many volts are those?
4. Popo has a radio that uses 15 volts. How many dry cells does he need to use in his radio?

<u>Conductors and insulators</u>

What are conductors?

-These are substances / materials that allow electricity to pass through them

Examples

1. - All metals
   - Copper Zinc
   - Silver Aluminium
   - Nickel Gold
   - Tin Brass
   - Iron Lead
   - Tungsten
2. All salts in solution forme.g. sodiumchloride in water
3. All acids e.g. sulphuric acid, hydrochloric acid
4. Undistilled water

What is the best conductor of electricity?

-Silver

Why is Silver not commonly used yet it's the best conductor of electricity?

-It is expensive

Why are copper and aluminum wires commonly used to carry electricity?

-They are cheap

Why is undistilled water a good conductor of electricity?

-It contains minerals salts which transmit electricity.

What are electrolytes?

-These are liquid substance that conduct electricity

-These are liquid substances that allow electricity to pass through them

Examples.

- Sulphuric acid
- Hydrochloric acid
- Salt solution
- Undistilled water
- Lemon juice
- Orange juice etc.
-

Insulators (Bad conductors)

What are insulators?

-These are substances which don't allow electricity to flow through them

Examples of insulators

- Rubber -Plastic
- Pure water -Dry piece of wood
- Dry cloth -Paper
- Glass

Why are insulators used for covering electric wires?

-To prevent short circuits.

-To prevent electric shocks.

Give the importance of insulators.

-They prevent short circuit.

-They prevent electric shocks.

Short circuit

What is a short circuit?

-Is an electric path with low resistance to the flow of electric current.

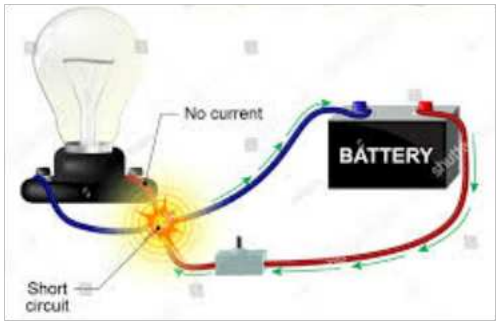
What are the possible causes of short circuits?

- Over loading the circuit
- Faulty appliances
- High voltage
- Two naked wires carrying current getting in contact.
- Poor wiring during electrical installation.

Effects of a short circuit

- It causes electric shocks.
- It can cause electric fires that destroy property such as buildings.
- It can damage electric appliances.
- It can cause electric power blackouts.

Diagram showing a short circuit



Note.
-When the switch is closed, the bulb does not light up.

Ways of preventing short circuits?
- Use trained electricians to install wires in the house.
- Use properly insulated wires
- Use appliances in good conditions.
- Repairing faulty appliances.

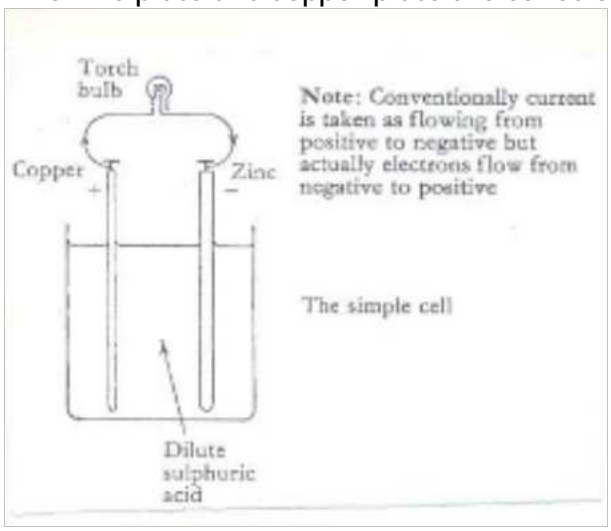
ELECTRIC CELLS
-These are cells that contain chemicals that react to produce electricity.

Types of cells
- Primary cells
- Secondary cells

a) Primary cells
-These are electric cells which cannot be recharged once used.

Examples
- Simple cells or wet cells
- Dry cells

I) Simple cells or wet cells
-It consists of Zinc plate and copper plate dipped in dilute sulphuric acid.
-The zinc plate and copper plate are called electrodes or poles.



Electrodes
-This is a piece of metal placed in an electrolyte to conduct electric current.
- The copper plate or rod is the positive terminal (Anode)
- The zinc plate or rod is the negative terminal (Cathode)
- Wet cells store chemical energy.

What are the factors that affect the efficiency of a wet cell?

- Polarization
- Local action

What is Polarization?

-This is when bubbles of hydrogen gas cover the copper rod and stop the flow of electrons.
-When the bulb is connected across the cells, it begins to give light but after few seconds it becomes dimmer and goes off.

What is local action?

-This is when the bubbles of hydrogen are seen coming off the zinc plate.
-Local action is caused by the presence of impurities in the zinc.

Give examples of fruits that can be used to make a simple cell

-Oranges
-Grapes
-Lemon
-Guavas etc.

Illustation

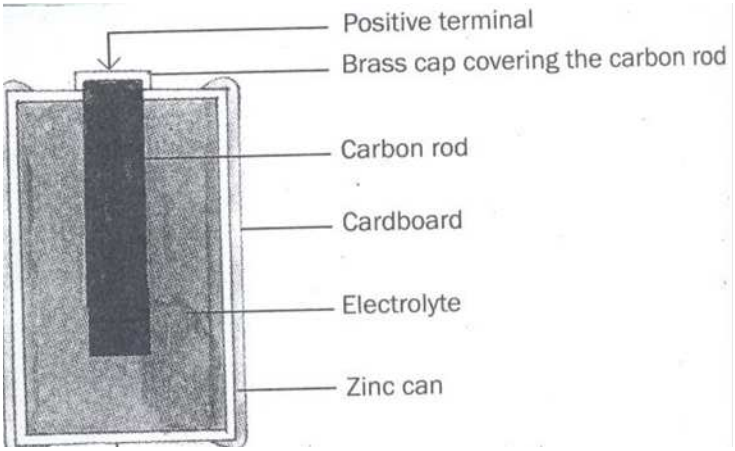


What are some of the disadvantages of a wet or a simple cell?

- It produces electricity for a short time
- It is bulky i.e. not easily carried
- It can only be used in upright position.
- It produces a low voltage.

DRY CELLS

- It has the capacity to produce electric pressure of 1.5 volts when still new.
- It stores chemical energy.



a. Carbon rod

- Is the positive terminal of a dry cell
- Is the non-metallic conductor of electricity
- It is made of carbon.

b. Zinc can

- It acts as the negative element of a dry cell
- It is the container in which the contents of a cell are put.

c. Ammoniumchloride jelly

It helps in the transfer of electrons

d. Pitch/top seal

It prevents ammoniumchloride jelly fromdrying.

e. Electrolyte

Is made up of:-

i) Powdered carbon

ii) Manganese oxide

The powdered carbon provides a partial conductor across the inside of a cell.

What is the importance of powdered carbon?

- Reduces the work of the cell in moving electrons
- Reduces the internal resistance of a cell
- It prevents the buildup of hydrogen gas.

Manganese oxide

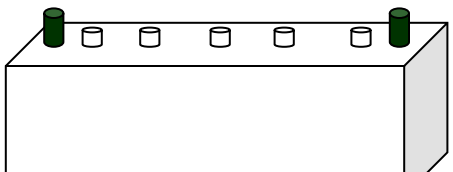
-It prevents the buildup of hydrogen gas around the carbon rod by changing it into water.
-It is a depolarizing agent.

b) Secondary cells

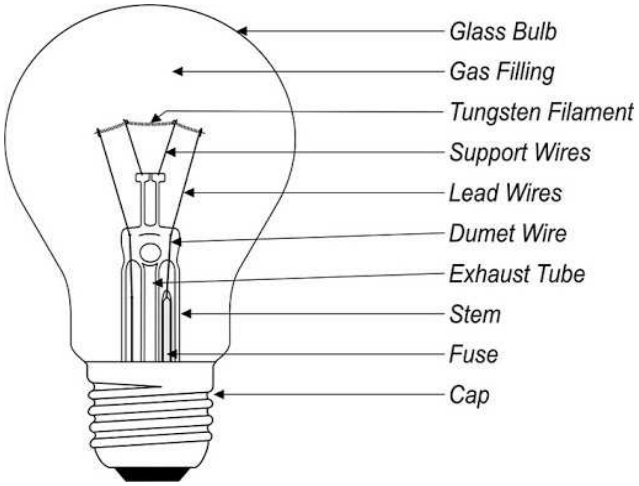
- These are cells that can be recharged by passing an electric current through themfroman alternating current.
- They store electricity in chemical form
- They are also called accumulators.

Examples

- Acid batteries/car batteries
- Solar cell accumulators
- Laptop batteries
- Phone batteries etc



An electric bulb



a. **Glass envelope**
- It holds a mixture of two gases:
  (i) Argon
  (ii) Nitrogen
- It prevents the gases fromescaping

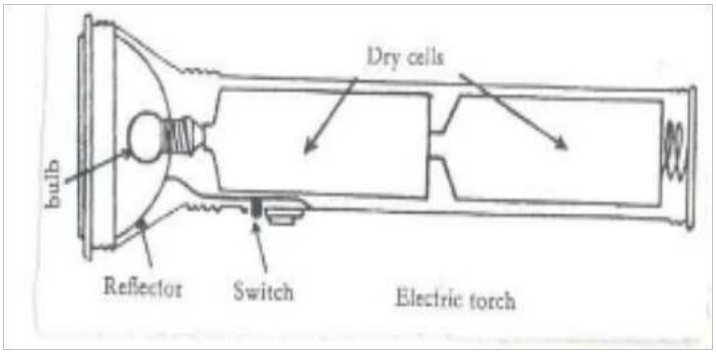
Why are the gases kept in the bulb?
- They prevent the evaporation of tungsten.
- They protect the filament fromburning up.

b. **Brass cap** enables the bulb to be fixed in the bulb holder.
c. **Lead wires** carry electric energy to the filament.
d. **Sealing tube** enables air to be removed fromthe bulb.
   It prevents the combination of oxygen with the filament.
e. **The coiled filament** is made out of tungsten.
   Tungsten is got froma mineral ore called Wolfram

Why is the filament of the bulb coiled?
- To increase electrical resistance.

Which part of a bulb produces light?
-coiled filament.

THE TORCH



On what principle does a torch work?
A torch works on the principle that electricity travels in a complete circuit.

1. **A switch**
   -Breaks and completes the circuit at the user's will.
2. **The bulb**
   -Produces light.
3. **The dry cells**
   -Produce electricityg
4. **The reflector**
   -Directs light into a diverging beam
   -Reflectors are made fromsilver and plastic.
5. **The cover and spring**
   -Keep the dry cell tightly close.
   -It completes the circuit.

What are some of the conditions that make a torch to fail to work?

- When the bulb is not fixed properly
- When the dry cells are not arranged properly
- When the cover is not fixed properly
- Exhausted dry cells
- Blown coiled filament.

Production of electricity

a) Generators

It produces electricity by changing or converting mechanical/kinetic energy into electric energy

How can a generator be made to produce more electricity?

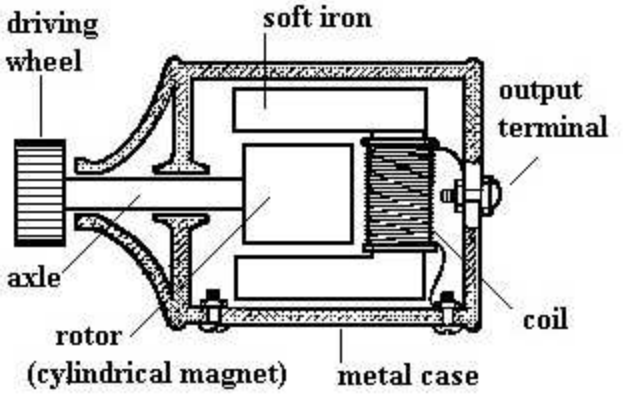
- Increasing the number of turns in the coils
- Increasing the speed of rotation of the electro magnets
- Increasing the magnetic field strength.

Note: Generators change mechanical energy into electric energy.

b) Dynamos

-It produces electricity by changing mechanical energy to electric energy.
-They are found on bicycles and vehicles.
-Those in bicycles help to produce light at night.
-Those in vehicles help in recharging the car battery.

Diagramof a dynamo



c) Electric motors.

-It uses electric energy to produce mechanical energy.
-Electric motors are used to start engines of cars and vehicles to move.
-Electric motors change electric energy to kinetic energy
-They store electric energy.

Give some examples of devices that use electric motors.

- Electric trains
- Electric radio cassettes
- Electric fans
- Electric cars
- Electric sewing machine
- Electric food mixture
- Cranes
- Air conditioners

What are some of the uses of electric motors?

- They start engines of cars/vehicles
- They move trains, buses

What are some of the uses of electricity?

- It is used to provide light in homes
- It is used for cooking
- It is used to operate machines in industries, factories and homes
- It is used for ironing clothes.
- It is used for running machines such as television sets

Mention some advantages of using current electricity

- It's quick to use (saves time)
- It's a clean form of energy (Neat work)
- It easy to use.
- It can easily be transformed to other forms of energy
- It helps to conserve trees by reducing on deforestation.

Why is the government of Uganda encouraging extension of electricity to rural areas?

-To reduce the rate of deforestation.

What are some of the disadvantages of electricity?

- It can shock one to death.
- It causes fires which burn down buildings and property
- Some people can't afford to pay bills.

Safety precautions when using electricity

-Never touch a switch with wet hands.
-Never connect appliances you are not sure of.
-Never use appliances with damaged plugs.
-Never touch broken cables.

-Always switch off electrical appliances when its raining.

Static electricity

What is static or stationary electricity?

-Static electricity is the type of electricity in which electrons don't move?
-It's produced by friction.
-It always happens when insulators are rubbed together.
-One gains electrons and becomes negatively charged while the one which loses electrons becomes positively charged.

Difference between Static and current electricity

	Static		Current
1	Has both protons and electrons active	1	Has only the electrons active
2	The charge does not flow from one point to another	2	The change flows along the conductor
3	It occurs in insulators i.e. plastics	3	It occurs in conductors i.e. metallic cables
4	The charge is on the surface of the insulator	4	The charge is inside the conductor

LIGHTNING

What is lightning?

-Lightning is a formof static electricity caused by charges in clouds.
- The air which expands and contracts produces loud sound known as thunder.
- When a negatively charged cloud meets a positively charged cloud, attraction occurs and a huge spark produced between the two clouds which is passed to the ground.

Forms of energy produced by lightning

- Heat energy
- Light energy
- Electrical energy
- Sound energy

Why is lightning seen before thunder is heard during a rainy day?

-Light travels faster than sound

What are the effects of lightning?

- It can damage the building.
- It can cause death to plants and animals
- It can set things on fire.
- It distorts television and radio signals.

How is lightning an advantage to the soil?

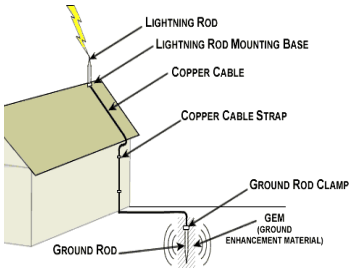
-It helps in nitrogen fixation.

How can we prevent lightning in tall building?

-By the use of a lightning conductor/arrestor
-When lightning strikes the building it passes harmlessly through the rod and into the earth.

What are the components a lightning conductor system?

-spiked rod
-copper rod
-copper plate



How can the people prevent lightning fromstriking them?

- Avoid standing under a tree when it is raining.
- Using lightning arrestors in tall building.
- Avoid walking in rain.
- Always put on shoes as they act as insulators.
- Avoid talking on phone when it's raining.
- Avoid contract with metals when it's raining as they conduct electricity.

MAGNETS

What is a magnet?

-A magnet is a piece of metal which has the ability to attract other magnetic materials.
-A magnet is anything that has two poles and is able to attract magnetic substances.

What are magnetic substances?

-Magnetic substances are materials that can be attracted by a magnet
-These are materials which are capable of being magnetized.

Mention some examples of magnetic materials.

- Iron
- Steel
- Nickel
- Cobalt

Why are the above materials used for making magnets?

- They can be magnetized
- They are magnetic substances

What are non-magnetic substances?

-These are materials which are not attracted by a magnet.
-These are materials that are not capable of being magnetized.

Mention some examples of non-magnetic materials.

- Copper -lead
- Gold -plaster
- Diamond -paper
- Aluminium -Rubber
- Zinc -Glass
- Brass -Wood
- Limestone -Clay

Why the above materials are called non-magnetic materials?

- They can't be magnetized
- They cannot be attracted by a magnet

Magnetism

What is magnetism?

- Magnetismis the force of a magnet that enables it to push or pull magnetic materials
- Magnetismis the property of a magnet which enables it to push or pull magnetic materials

State the law of magnetism?

-Like poles of magnets repel each other while unlike poles attract each other.

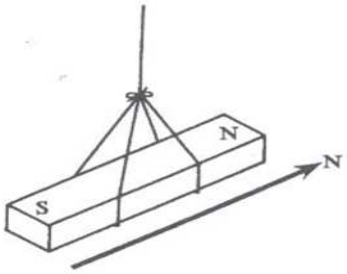
What are the two poles or ends of a magnet?

- The North pole
- The South pole
- Magnetic poles are regions near the ends of a magnet fromwhich the magnetic forces appear to originate.

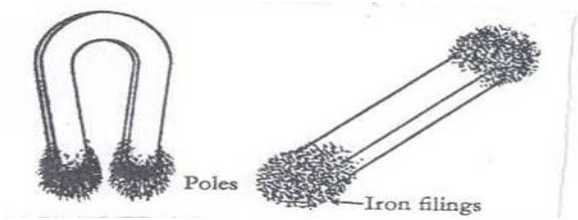
Properties of a magnet

1.-A freely suspended magnet in air always points or rests in North – south direction.

Why: The North pole of a magnet is attracted by the South pole of the earth which is the geographical North and the South pole is attracted by the North pole of the earth which is the geographical South.

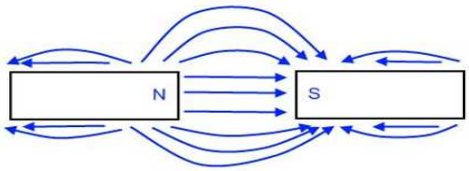


2.Magnetismis more concentrated at the poles of a magnet. The attraction of magnets is greater at the poles.



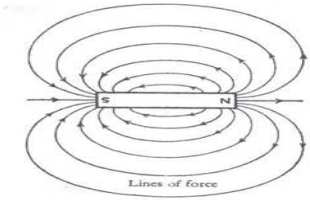
Iron filings

3. The lines of magnetic forces run fromnorth to south pole of a magnet



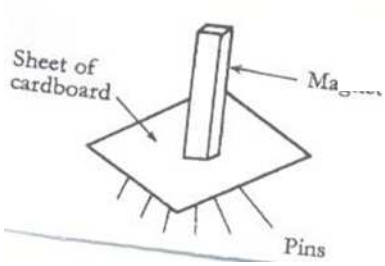
What are magnetic lines of forces?

-These are patterns which show the flow of magnetism



4.Magnetismcan pass through non-magnetic materials but can't pass through non- magnetic

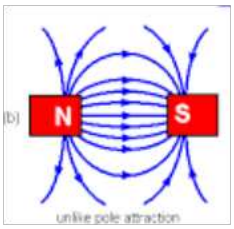
materials.

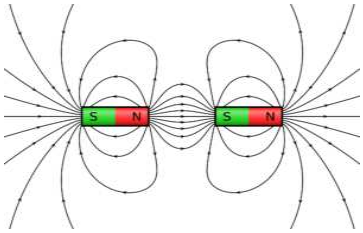


-Magnetism cannot pass through a magnetic material because the magnetic substance absorbs the magnetic lines of force

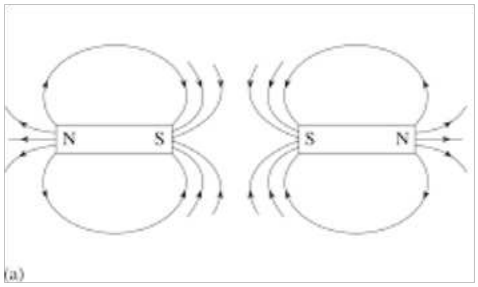
5.Like poles of magnets repel each other while unlike poles attract each other.

Unlike poles attracting each other





Like poles repelling each other

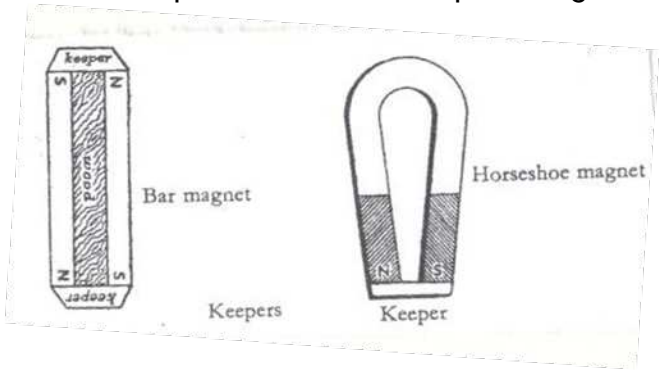


6.Magnets become weaker with age.

Ways of preserving magnetism

- Storing them with iron keeper.
- Keep magnets facing North-South direction.
- Keeping magnets in dry places.

The iron keepers are used to keep the magnetism of a magnet.



How?

- By absorbing the magnetic lines of forces from a magnet
- By completing the magnetic circuit.

Of what value of wood during the storage of magnets?

-Wood prevents the magnets from breaking.

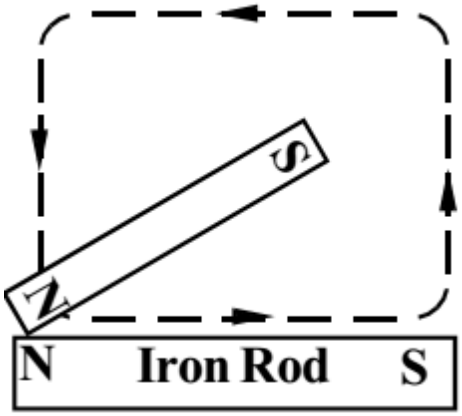
Methods of making magnets

- Stroking method
- Induction method
- Electrical method

1. Stroking (touch) method

a. Single stroking (touch) method

-This is done by stroking magnetic material with magnet in the same direction with the same pole of a magnet.



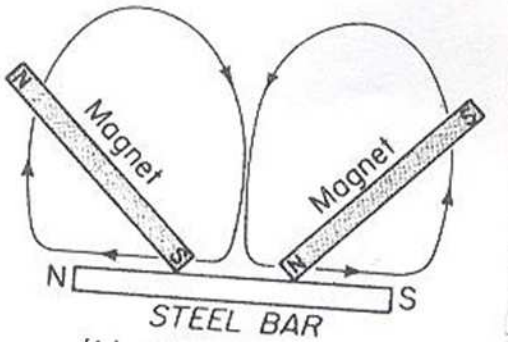
How to determine the poles of a new magnet formed.

-The end of the steel bar stroked first acquires the same pole as that of the permanent magnet used while the opposite end stroked last acquires opposite pole to that of the magnet used.

b. Double stroking (double touch) method

-Is done by stroking using two bar magnets.

-During stroking, opposite poles and directions must be kept and followed.



2. Induction method

-This is done by attaching or placing near a magnetic material onto a permanent magnet

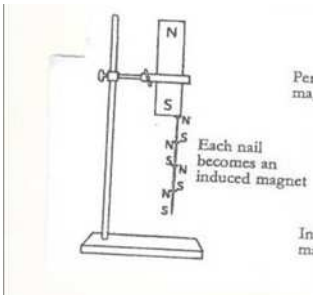
-The magnetic material becomes magnetized by induction

-Unlike poles are immediately formed at the ends of a new magnet.

-The magnet made using this method is called an **induced magnet.**

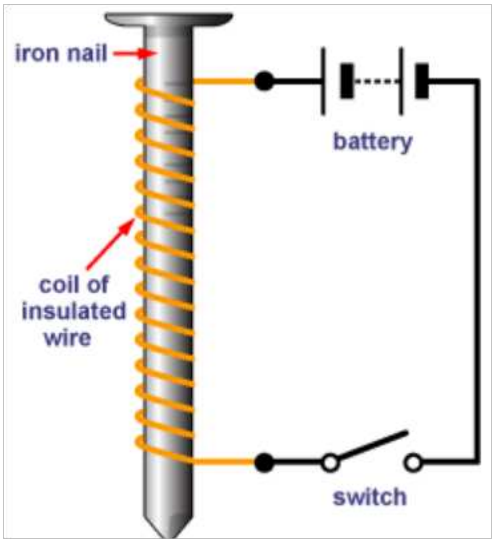
-The pole of the induced magnet nearest to the pole of the inducing magnet acquires an opposite pole of the inducing magnet.

Illustration



3. Electrical method

This is done by placing steel or iron bar in a coil of wire (solenoid) and electric current passed through the coil



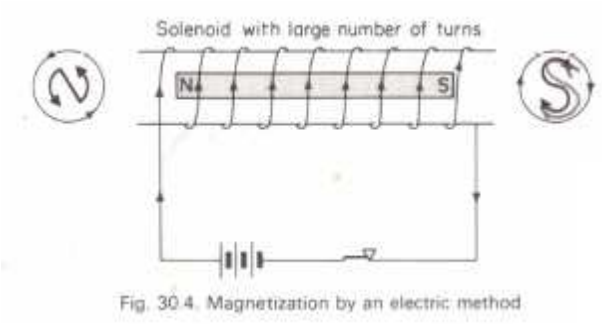


Fig. 30.4. Magnetization by an electric method

How to determine the poles of an electromagnet?

-Using the direction of the flow of current

-If one looks at the end of bar and current is flowing in a clockwise direction, that end will be South pole, -if current is flowing anticlockwise it will be the North pole.

Using the hand grip rule.

-If the solenoid is grasped with the right hand and the thumb is pointing in the direction of current, the thumb points to the North Pole.

-If the solenoid is grasped with the left hand with the thumb pointing to the direction of current, the thumb points to the South Pole.

What name is given to magnets made using the electrical method?

-Electromagnets.

What is an electromagnet?

-An electromagnet is a magnet in which the magnetic field is produced by an electric current.

How can one make an electro magnet strong?

- By increasing the number of turns in the coils
- By increasing the voltage in the source of electric current.

Mention some uses of electro magnets

- They are used in electric bells
- They are used in cranes to lift scrap and steel
- They are used in hospitals to remove tiny bits of iron fromthe eyes.
- They are used in motors

- They are used to generate electricity in generators
- They are used on telegraphs and ear pieces of the telephone for communication.

Devices that use electromagnets

- Electric bells
- Cranes
- The circuit breaker
- The reed switch
- Buzzers
- Headphones etc.

Types of magnets

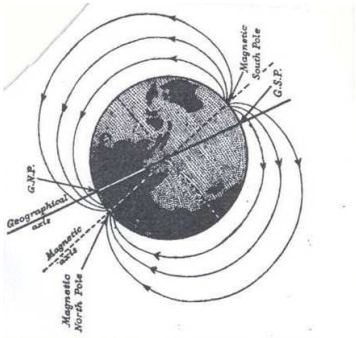
-Natural magnet
-Artificial magnets

Natural Magnets

-These are magnets which exist by nature.

Examples of natural magnets

- Lodestone/magnetite
- Earth



- Lodestone is a magnetic ore which occurs naturally on earth.

Why is the earth called a magnet?

- The earth is the natural magnet because it has the north and South Pole

Artificial magnets

-These are magnets which are made by man

- Bar magnets
- Horse shoe magnets
- Magnetic needles/ compass needle.
- Electromagnets

Groups of artificial magnets

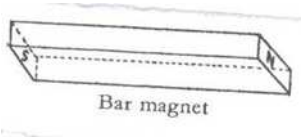
- Permanent magnets
- Temporary magnets

1. **Permanent magnets**

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

   - They are made from steel and other strong magnetic alloys.
   - They are mainly made from steel

   Examples of permanent magnets



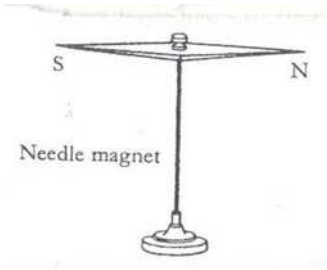
Rectangular bar magnet



cylindrical bar magnet



Horse shoe magnet



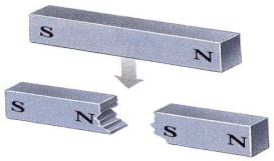
Compass needle

2. Temporary magnets

- These magnets that lose their magnetismvery easily.
- They lose their magnetismas electricity used to magnetize themis withdrawn
- They are mainly made fromiron
- Electromagnet is an example of artificial temporary magnet

Breaking a magnet

-When a magnet is broken, each broken piece becomes a separate magnet with both poles.

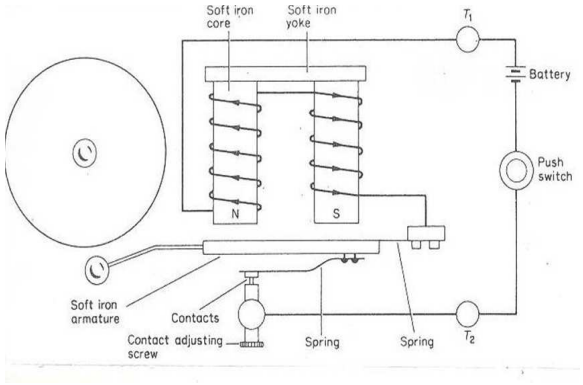


Electric bell

-It consists of the following;

- Batteries
- Switch
- Soft iron pieces
- Hammer
- Gong
- Contact screw
- An electromagnet
- Metal strip
- Soft iron bar

Structure of electric bell



Functions of each part.

Switch

-It breaks and completes the circuit

Battery

-It produces electricity

Hammer

-It hits the gong.

Gong

-It produces sound.

How an electric bell works.

-When the switch is closed, the circuit is completed.

-The soft iron piece becomes magnetized and attracts the support for the hammer.

-The hammer hits the gong to produce sound.

-As the hammer is attracted, it leaves the contact and creates a gap in the circuit. This breaks the circuit making the electromagnet go back to the contact.

-The circuit is completed again and the process repeats its self.

List some devices which use both magnets and electricity

-Refrigerators -Electric bells

-Television sets -Telephones

-Radios

Mention some of the use of magnets to man

- They are used in electric bells to produce sound.
- They are used in telephone receivers.
- They are used in loudspeakers and microphones to change electrical signals into sound.
- They are used in generators in the production of electricity.
- They help in keeping the doors of refrigerators closed.
- They are used in compasses to show direction.
- They are used in hospitals to remove iron pieces fromeyes after an operation.
- They are used in industries to pick up heavy loads of iron.

Demagnetization

What is demagnetization?

- Is the way of making a magnet lose its magnetism
- Is a way of removing magnetismfroma magnetic material.

Mention some ways of demagnetizing or destroying or weakening magnets

- Heating magnets to redness
- Constant dropping of magnets on the ground
- Keeping like poles of a magnets together for a long time

- Keeping magnets in East – West direction for a long time
- Leaving a magnet to rust.
- Passing alternating current through a magnet.

How does rusting cause demagnetization?
-It leads to corrosion.

THEME: THE COMMUNITY POPULATION AND FAMLY LIFE

TOPIC: POPULATION AND HEALTH CONCERNS

-Population refers to the total number of organisms in an area.

-Health is a state of complete physical, mental and social well-being.

Population and Health concerns.
-These are factors that affect the wellbeing of people in a community.
-They include: -
-Poor sanitation,
- Anti-social behaviours
- Poor water supply and
-Inadequate food

Poor Sanitation:
-Sanitation is the general cleanliness of the environment.
-Poor sanitation is mostly brought about by poor disposal of wastes.
-To control poor sanitation, human wastes (urine &faeces) should be disposed off in latrines.
-These if not properly disposed off are a source of many diseases.

Signs of poor sanitation
-Presence of houseflies
-Presence of stagnant water
-Rubbish in the compound
-Tall grass in the compound.
-Faeces in the compound.
-Dirty houses
Diseases that break out due to poor sanitation.
-Diarrhoea
-Cholera
-Polio
-Typhoid
-Dysentery
-Malaria
-Yellow fever
-Dengue fever etc

Anti social behaviours:
-These are acts or habits that are not acceptable in society are called anti-social behaviours.
These include;
-smoking - alcoholism
-drug abuse - stealing
-bullying - telling lies
-arson (setting property on fire)
-fighting - murder (killing)
-wandering - truancy

-prostitution - raping
-defilement

JUVENILE DELINQUENCY

Juvenile

-A juvenile is a young person under the age of 18years.

Delinquency

-Delinquency is an anti-social behaviour that is punishable by law.

A delinquent

-A delinquent is a young person who commits an antisocial act punishable by law.

Juvenile delinquency

-Juvenile is the behaviour of a young person who commits an antisocial act punishable by law.

Who is a criminal?

-A criminal is an adult person who commits an antisocial act punishable by law.

Causes of anti- social behaviours

- Poor social environment
- Poverty
- Poor home atmosphere
- Bad peer pressure
- Pampering of children by parents
- Drug abuse such as use of cocaine, marijuana etc.
- Adolescence
- Mental sickness
- High expectations from parents and teachers.
- Uncensored exposure to pornographic films and literature.
- Over strictness by parents and teachers.

Effects of anti-social behaviours

- Sexual offences can lead to contraction of STDs such as HIV AIDS.
- Drug abuse can lead to drug addiction.
- They can cause pain, injury and death.
- They cause shame to the parents and the community
- The family and the community can disown children.
- It can lead to school dropout.
- They lead to imprisonment.
- They lead to conflict among parents and teachers.

Ways of preventing anti-social behaviours

- By guiding and counseling children.
- Treating children equally.
- Children should join good peer groups.
- They should join good clubs e.g. sports clubs.
- Take delinquents to reformatory schools.
- People should be educated about the dangers of antisocial behaviours.
- Praise and reward good behaviours.

Sex deviations

-These are abnormal and unaccepted sexual practices in the community.

Examples of sexual deviation

1. Lesbianism; is sex between two females.
2. Incest; is sex between close relatives.
3. Homosexuality; is sex between two males.

4. Masturbation is the stimulation of sexual organs using the hands or plastics to satisfy one's sexual desires.
5. Oral sex; is the use of the mouth to stimulate sexual organs.
6. Rape is forced sex
7. Bestiality; is sex between man and an animal.
8. Fetishism; is the act of getting sexual pleasure from an object.
9. Fornication; Is sex between un married persons.
10. Pedophilia; Is the condition of being sexually attracted to babies.
11. Defilement; sex between an adult and a minor.
12. Prostitution; is the act of offering one's body for sexual intercourse for favour, food, employment and money

Causes of sex deviations.

- Lust
- Revenge
- drug abuse.
- Mental disturbance
- Poverty
- Lack of self-control.
- Use of drugs and alcohol.
- Lack of sexual satisfaction in marriage.
- Uncensored exposure to pornographic films.
- Adolescence
- Peer pressure.
- Poverty
- Poor social environment.
- Unfulfilled expectations etc.

Dangers of sex deviations

- It leads to STDs.
- It leads to unwanted pregnancies.
- It is a crime against humanity.
- It reduces the girl's dignity in public.

Ways of controlling sexual deviations

- Through guidance and counseling.
- Through setting and enforcing strict laws against sexual deviations.
- Banning pornographic films and literature.
- Avoid drug abuse.

Violence

-Violence is an aggressive and destructive behavior that can cause harm, injury and death.

Types of violence

1. Masochism; is an extreme aggressive motive to inflict pain upon oneself.
2. Sadism; is an extreme aggressive motive to harm others.

Poor water supply

-This is when there is lack of enough safe water in the community.

Causes of poor water supply

-Lack of enough water sources.
-Sharing water sources with domestic animals.

-Poor disposal of human waste.

How to improve on the water supply.

-Protecting water sources.
-Drilling more boreholes

Types of water associated diseases

- Water borne diseases
- Water vector habitat diseases
- Water cleaned diseases
- Water contact diseases

Water borne diseases

-These are diseases spread through drinking contaminated water.

Examples of water borne diseases

- Typhoid
- Cholera
- Bilharzias is
- Hepatitis E
- Polio
- Dysentery
- Diarrhea

Ways of controlling water borne diseases

- By boiling drinking water.
- By chlorination of water.
- Through proper disposal of human waste.

Water habitat vector diseases

-These are diseases spread by vectors that spend part of their life cycle in water.

Examples of water habitat vector diseases

- Malaria -bilharzias is
- Yellow fever -elephantiasis
- River blindness -dengue fever
- West Nile fever -sleeping sickness

Water cleaned diseases

-These are diseases spread due to lack of enough water to keep clean.

Examples of water cleaned diseases

- Trachoma - Cholera
- Conjunctivitis -Diarrhea
- Dysentery -Impetigo
- Scabies -Ring worm

Water contact diseases

-These are diseases spread through body contact with contaminated water.

Examples of water contact diseases

- Bilharziasis
- Swimmers' itch
- Ear, eye and nose infection

Inadequate Food (food insecurity)

-This is a situation in which a family or community members lack enough food.
-Food security is having food throughout the year.

Inadequate food supply may be caused by:

- Pests that destroy crops
- Bad weather like drought, storms etc
- Wars where people are not able to grow enough food
- Over population
- Poverty

- Ignorance
- Landslides and mudslides
- Poor farming methods
- Laziness

Note.
-Lack of enough food supply leads to malnutrition diseases like kwashiorkor, marasmus etc.

Solutions to inadequate food supply
- Use of modern technology in farming.
- Introduction of irrigation schemes to dry areas.
- Start young farmers' clubs in schools.
- Grow resistant varieties of crops.
- Use of family planning to control population growth.
- Use of modern storage facilities.

Causes of common sicknesses
1. Poor sanitation
2. Poor water supply
3. Poor feeding
4. Poor personal hygiene
5. Bad social habits e. g smoking and prostitution
6. Lack of enough rest and sleep.
7. Lack of physical exercises etc.

Types of sicknesses or diseases
- Infectious diseases (communicable diseases)
- Non-infectious diseases (non- communicable diseases)

Communicable diseases
-These are diseases that can be spread fromone person to another.
Or.
- These are diseases that are caused by germs.

Types of communicable diseases
- Air borne diseases
- Contagious diseases
- Water borne diseases
- Water habitat vector diseases
- Water cleaned diseases
- Water contact diseases

Airborne diseases
-Air borne diseases are diseases that spread through contaminated air.

Examples of air borne diseases
- Influenza(flu)
- Tuberculosis
- Whooping cough
- Chicken pox
- Diphtheria
- Pneumonia

- Haemophilus influenza B

Contagious diseases

-These are diseases which spread through close body contact with an infected person.

Examples of contagious diseases

- Syphilis -Ebola
- HIV AIDS -Gonorrhea
- Marburg - Leprosy
- Candidiasis - Genital warts
- Genital herpes

Non communicable diseases

-These are diseases that cannot be spread fromone person to another.

Groups of non-communicable diseases.

-Deficiency diseases
-Self inflicted diseases.
-Hereditary diseases

Deficiency diseases

-Deficiency diseases are diseases caused to due to lack of certain food values in the body.

Examples

-Marasmus
-Kwashiorkor
-Night blindness
-Rickets
-Beriberi
-Scurvy
-Goitre
-Anaemia etc

Hereditary diseases

-Hereditary diseases are diseases that are passed from parents to their offsprings from one generation to another.

Examples

-sickle cell anaemia
-Asthma
-Haemophilia

Self-inflicted diseases

-These are diseases which people get due to poor health lifestyles. E.g. Smoking, alcoholism, over eating, lack of physical exercises, prostitution etc

Examples

-Obesity
- Lung cancer
-Emphysema.
-Sexually Transmitted Infections

Sexually Transmitted Diseases

-These are diseases spread through having unprotected sex with an infected person.

Examples.

-AIDS
-Gonorrhoea
-Syphilis

-Candidiasis
-Trichomoniasis etc.

Causes of sicknesses in the home and community
-Poor sanitation
-Poor personal hygiene
-Poor food hygiene
-Poor feeding
-Poor social habits.
-Lack of physical exercises. etc.

Activities that address health concerns.
The population should ensure that it performs activities that will address health concerns. Such activities include: -
- care for homes
- taking health surveys
- carry out primary health care activities

Care for homes.
-This involves setting up a system and structures which will ensure that the home will be kept clean.
Structures that can be set up are: -
- Latrines that should be 10m from a living house and 30m from water source.
- Rubbish pits; these should be burnt regularly.
- Proper housing structures where living houses are separate from animals.

Health Surveys
-This is the way of gathering information about people's health.
Activities done during a health survey
- Observing and recording the health of members.
- interviewing or asking questions to members concerning health
- recording all health problems observed in the community during visits
- Providing questionnaires for people to answer.

Information collected during a health survey
-Housing information
-Immunisation coverage
-Education levels
-Feeding habits
-Birth rates
-Death rates
-Water supply coverage
-Latrine coverage.

Importance of carrying out a health survey
-Helps the government to plan for the people's health needs
-Helps the government to monitor the health programmes
-Creates awareness about health problems.
-Helps the government to mobilise funds for health programmes.

Carrying out PHC activities.
-These are activities which involve all the community members to ensure good health.
-They include: -

- ✓ immunizing people to prevent infections
- ✓ enforcing proper sanitation in an area
- ✓ ensuring that there is enough and proper water supply
- ✓ vector control

All these will go a long way in ensuring health by reducing infections.

Health Education.

-This is a means of sharing information about health to increase awareness.

Health education enables a member to be aware of: -

- causes of diseases
- mode of spread of a disease
- ways of preventing the spread of a disease
- how to use the available health facilities.

How health education is carried out.

-Through using posters
-Through songs
-Through newspapers
-Through radios
-Through storytelling
-Through films
-Through drama and plays.
- Through meetings.

Importance of health education

-Helps people to know how diseases are spread, controlled and prevented
-Helps people to know how to feed well.
-Helps people to know the importance of immunization. etc

Collecting information on human population.

-The collection of information on human population can be done by government.
-Information includes; demography, housing information, immunization and available health services.

The information collected is used for: -

- ✓ identifying the common problems in communities
- ✓ the population increase and compare it with the available facilities to see whether they are enough
- ✓ planning to see how they can improve upon the health of the people and their standards of living.

Demography

-This is the scientific study of changes in the number of births, deaths, marriages and disease infections in a particular area.
-Demography is the scientific study of the factors that affect the population of an area.

Information collected during demography.

- Health information
- Housing information
- Education information
- Occupation information
- Health education

Places where information about demography is collected

- Hospitals
- Schools
- Homes

Importance of demography.

- Helps to know the birth rates and death rates
- Helps to find out the common diseases that affect the community.
- Helps to know the population of an area.
- Helps the government to buy more drugs.
- Helps the government to provide enough safe water sources.
- Helps the government to plan for the people's health needs.

Housing information.

The data collected involves;

- the number of houses, their sizes compared to the population
- the type of houses built; permanent or temporary
- ventilation of the houses
- Animal housing i.e. do animals stay in the same house with people?

Importance of housing information

-Housing information helps to know the living conditions of the people.

Immunization information:

The information collected may include;

- the number of children and their ages
- the number of immunized children in an area
- the diseases they have been immunized against
- problems that affect the immunization process

Importance of immunization information

-It helps to recognize whether there is need for more immunization in an area
-Helps to know if all children have been immunized.

Available Health services.

This involves information on: -

- distribution of health centres
- number of private and public health centers
- the services given by each health Centre
- number of health workers available and their qualifications
- number of ambulances
- number of people who use the health Centre.

These help to plan for adequate health services to the people.

THEME; MATTER AND ENERGY
TOPIC; LIGHT ENERGY

-Light is a form of energy that enables animals to see.
-Energy is the ability to do work.
Light is a form of energy because it helps us to see.

SOURCES OF LIGHT:

-These are things that give off light.

Groups of sources of light

-Natural sources of light

-Artificial sources of light.

Natural Sources of Light:

-These are sources that exist without peoples influence or control.

Examples of natural sources of light

- sun,
- stars,
-fire flies,
-glow worms,
-volcanic eruptions
-lightning.

Note

-The sun is the main source of light on earth.

-The moon is not regarded as a source of light because it does not produce light of its own but reflects it fromthe sun.

Artificial Sources of Light

-These are source of light that are made by people.

Examples of artificial sources of light

- **Fire** **torches**
- electric bulbs lantern lamps
- paraffin lamps electric lamps
- candles fire
- Pressure lamps fluorescent tubes etc

Types of sources of light

-Luminous objects

-Non luminous objects

Luminous objects

-These are objects that give off their own light.

Types of luminous objects

- Incandescent objects
- Fluorescent objects

What are incandescent objects?

-These are objects that become red hot while producing light.

Examples of incandescent objects

- The sun - erupting volcanoes
- Stars - burning charcoal
- Electric bulb - electric hot plates etc.

What are fluorescent objects?

-These are objects that do not become hot when producing light.

Examples of fluorescent objects

-Torches
- Glow worms
-Fluorescent tubes
-Fire flies

Non luminous objects.

-These are objects that do not produce their own light.
-They reflect light falling on them from other sources.

Examples of non-luminous objects

- Moon
- Planets
- Plane mirrors

Why is the moon not regarded as a source of light?

-The moon does not produce its own light.
-It just reflects light from the sun.

USES OF LIGHT

1. Light can be used in the following ways: -
   a) Sunlight is used by plants to make their own food
   b) Light enables animals to see.
   c) Our skins use light from the sun to make vitamin D.
2. Light from artificial sources like electric bulbs, candles is used to see at night.
3. It is used for protection to scare away enemies or wild animals.
4. Light is used in photography.

Properties of light

-Light travels in a straight line from the source.
-Light travels in all directions from the source.
-Light can be reflected
-Light can be refracted.

Speed of light

The speed of light in normal air is 300,000km/sec
-The speed of light changes depending on the density through which is travelling.
-Light travels faster than sound.

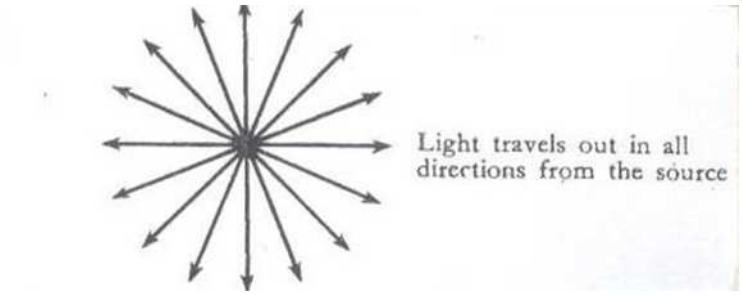
Examples.

-We see lightning before hearing thunder.
- An aeroplane is seen before hearing its sound.
-An axe is seen hitting the piece of wood before its sound is heard. etc

HOW LIGHT TRAVELS

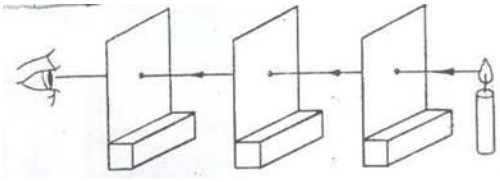
Light travels in two ways:

1 Light travels along a straight line.
2 In all directions from the source.



EXPERIMENTS TO SHOW THAT LIGHT TRAVELS IN A STRAIGHT LINE

Requirements
-Cardboards
-Candle



Steps.
-Cut three square cardboards of the same size.
-Make holes in each cardboard
-Arrange the holes of the cardboard in a straight line.
-Place a source of light in front of cardboard 1 and observe it through cardboard 3.
- ❖ You will be able to see light.

-Move one of the cardboards slightly out of the line.
- ❖ You will not see light.

Conclusion;
-Light travels in a straight line.

Facts to prove that light travels in a straight line

1. We cannot see around corners because light travels in a straight line.
2. Shadows are formed because light travels in a straight line.
3. Light from the setting sun is always seen to travel in a straight line especially when the sky is cloudy.

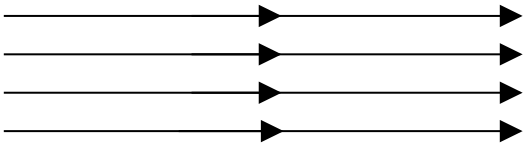
RAYS AND BEAMS OF LIGHT

A ray.
-A ray is a straight line along which light travels.
Illustration ⟶

A beam
-A beam is a group of light rays.
-A beam is a collection of light rays.

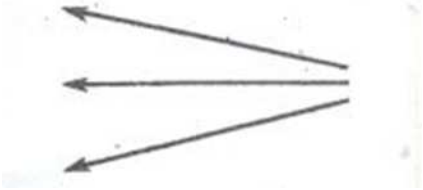
Types of beams
-Parallel beams,
-Convergent beams
- Divergent beam

(a) **Parallel beams**: It is where light rays from the source do not meet.



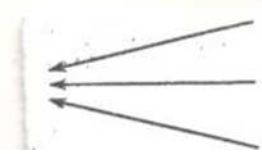
A parallel beam

b) **Diverging beams**: It is a group of rays moving in different directions fromone source.



Torches and car head lamps give off diverging beams.

(c) **Converging Beam** It is a group of rays moving towards one point fromdifferent directions.

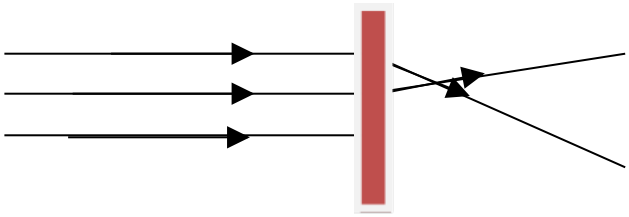


Converging Beam

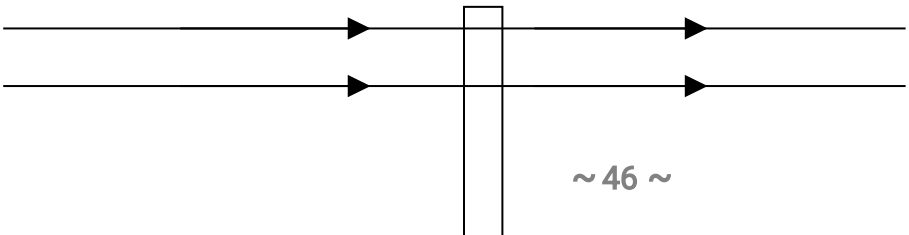
Effects of different materials on light:

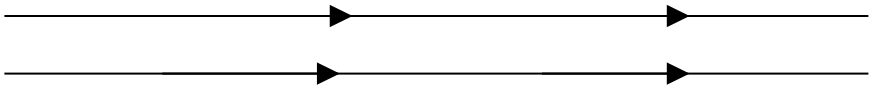
Translucent Objects:
-These are objects that allow only little light to go through them
-When light meets a translucent material it is scattered.
-The scattering of light is known as **diffusion.**

Examples of translucent materials are;
- Frosted glass
- Waxed or oiled paper,
- thin cloth, and coloured water.
  - ❖ We are not able to see clearly through translucent objects because they scatter the light passing through them



Transparent Objects:
1. These are objects that allow all the light to go through them
   Examples are clear glass, air, clear polythene papers and clear water.





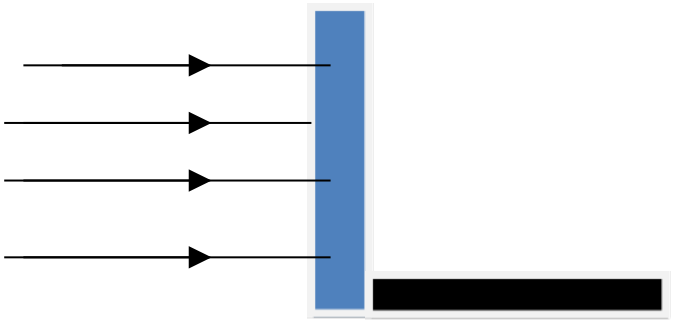
Opaque Objects:

-These are materials that do not allow any light to go through them

Examples

- stones
-wood
-bodies of animals,
- concrete
-soil etc.

- ✓ When light meets an opaque object, it is blocked or stopped.
- ✓ Some of the light is absorbed and some is bounced.
- ✓ The bouncing of light rays is called reflection of light.



Effects of light when it meets opaque objects:

1. When light meets an opaque object it is obstructed.
2. Once light is obstructed a shadow is formed to the opposite of the source of light.

A SHADOW

-A shadow is a region of darkness formed by obstruction of light by an opaque object.

An illustration of formation of a shadow





-When light rays from the sun are obstructed by an opaque object, a region of darkness is formed.

Parts of a shadow

- Umbra
- Penumbra

Umbra

-It is the darker part of a shadow formed when light from a small source is obstructed by a small obstacle.

Penumbra

-Penumbra is the lighter part of a shadow formed when light from a big source is obstructed by a small obstacle. The penumbra shadow is formed around an umbra shadow.

- ❖ The size of the shadow depends on the angle of the source of light in relation to the object and screen.
- Shadows caused by sunlight are longest in the morning at sun rise and at evening at sun set because of the angle of the sun and the objects.
- They are shortest at noon.
- ❖ The size of the shadows also depends on the distance of the object from the source and distance from the screen.

Importance of shadows to man

- Shadows help to show direction.
- Shadows help to provide shade to man.
- Shadows help to tell time.

Dangers of shadows to man

- Shadows can cause fear to people.
- They are hiding places for dangerous animals such as snakes.
- Shadows are hiding places for thieves, rapists and other wrongdoers.

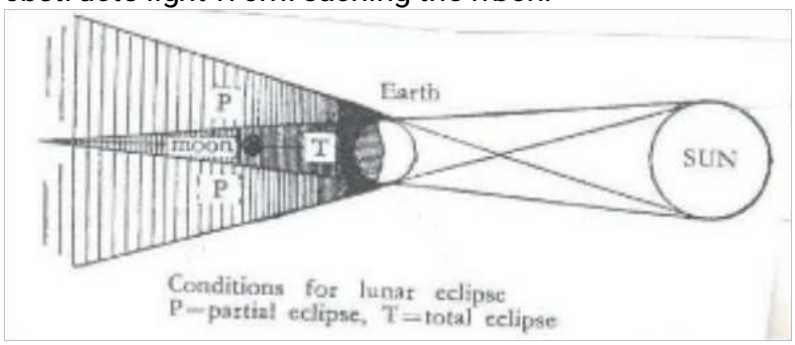
ECLIPSES

-An eclipse is a natural shadow formed by obstruction of light from the sun by either the earth or the moon.
-Eclipses are also shadows.
- The word Eclipse means **cut off**.
-Eclipses are formed when the moon or earth obstructs light from the sun.
-There are two types of Eclipses, namely;

I) Lunar Eclipse (Eclipse of the moon)
II) Solar Eclipse (Eclipse of the sun)

Lunar Eclipse (Eclipse of the moon)

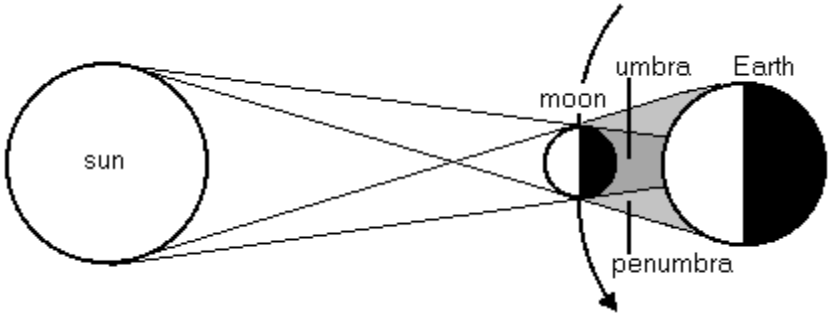
-Lunar Eclipse takes place when the Earth comes between the moon and the sun. The Earth obstructs light from reaching the moon.



Conditions for lunar eclipse
P—partial eclipse, T—total eclipse

Solar Eclipse (Eclipse of the sun)

-Solar Eclipse takes place when the moon comes between the sun and the Earth.
-The moon obstructs light from reaching some parts of the earth.
-The parts which receive Umbra shadow get **total darkness** and those which get penumbra shadow receive **partial darkness**.



REFLECTION OF LIGHT:

-Reflection is the bouncing of light.

Types of reflections

-Regular reflection

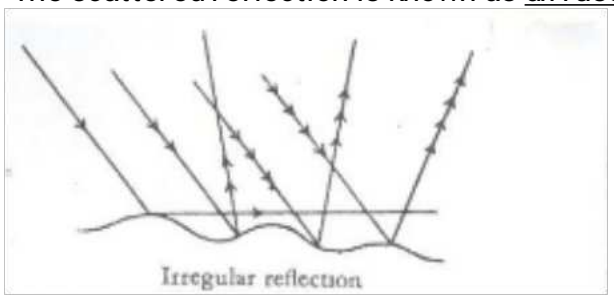
-Irregular reflection

IRREGULAR REFECTION:

-This is a type of reflection formed on shiny rough unpolished surfaces such as iron sheets.

- When a parallel beammeets a rough object the rays are reflected when they are scattered.

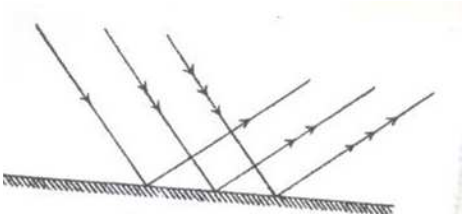
-The scattered reflection is known as diffuse reflection.



REGULAR REFLECTION:

-This is a type of reflection that takes place on a smooth shiny polished surface.eg on plane mirrors

-It takes place when a parallel beammeets a smooth and shiny surface and is reflected as a parallel beam



Rays of light on a smooth shiny surface:

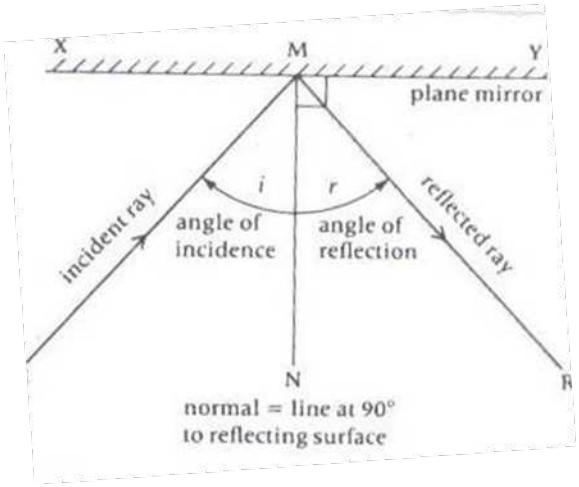
REFLECTION ON A SMOOTH SURFACE.

-The ray of light fromthe source of light to the smooth surface is known as an incident Ray.

-The ray of light bounced off fromthe reflecting surface is known as reflected ray

-The angle between the normal and the incident ray is called angle of incidence

-The angle between the normal and reflected ray is known as angle of Reflection.



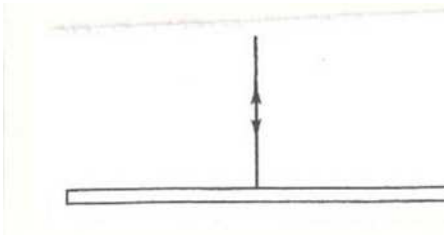
LAWS OF REFLECTION:

The laws of reflection state that:

(i) The incident ray, the reflected ray and the normal at the point of incidence all lie on the same plane.

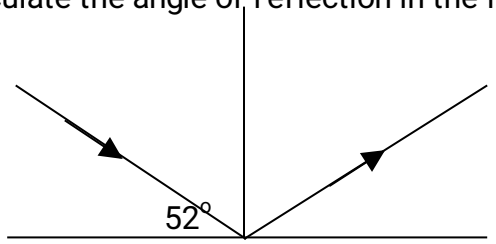
(ii) The angle of incidence is equal to the angle of reflection.

Note; The ray that strikes the plane mirror on the normal line is reflected on the same line.

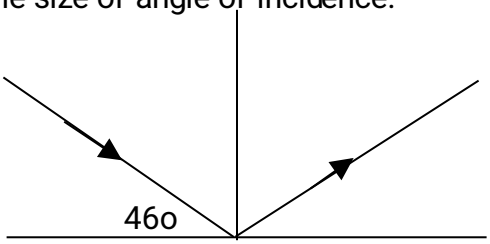


APPLICATION OF THE LAWS OF REFLECTION

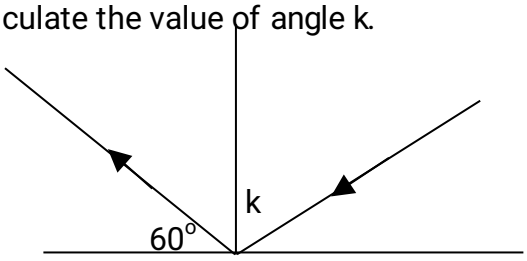
Calculate the angle of reflection in the figure below.



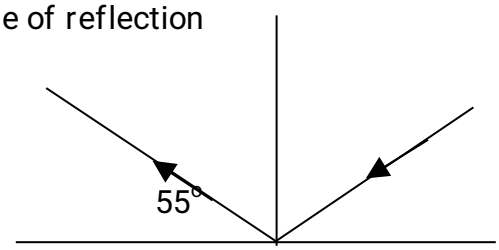
Find the size of angle of incidence.



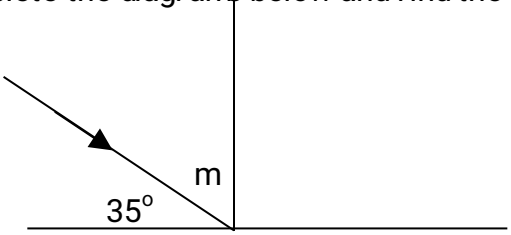
Calculate the value of angle k.

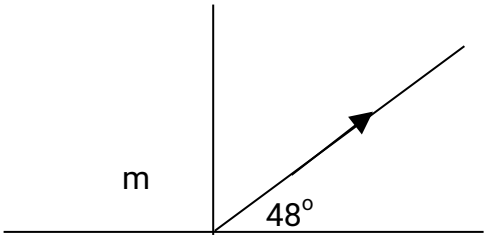


Find the size of angle of reflection



Complete the diagrams below and find the given unknown angles.





IMPORTANCES OF REFLECTION

-Reflection helps us to view objects. This is so because in order to view objects, light has to be reflected from the object to our eyes.
-Reflection helps us to use mirrors to view our images and other images either behind or above us.
-Helps in the functioning of solar cookers.
-Reflection is useful in reflectors of car headlamps and torches to help to form a diverging beam
-Helps in the formation of diverging beams from some sources of light like car headlamps and torches.

IMAGES AND OBJECTS

What is an image?

-An image is a light picture formed by reflection of light.

How is an image formed?

-It is formed by reflection of light.

How is an image similar to an echo?

-Both are formed by reflection.

Types of images

-Real images
-Virtual images

What are real images?

-Real images are images formed on the screen.

What are virtual images?

-Virtual images are images that are not cast on the screen.
-They are only seen

Mrrors:

-A mirror is a silvered glass surface that reflects light.

Types of mirrors

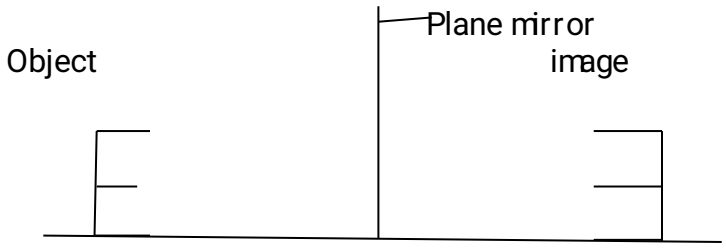
-Plane mirrors
-Curved mirrors/curved mirrors

Plane mirrors

-This is a flat opaque smooth shiny piece of glass.

Characteristics of images formed by plane mirrors

i) They are virtual.
ii) They are laterally inverted
iii) The image distance behind the plane mirror is equal to the object distance in front of the mirror.
iv) The image is upright or erect.
v) The image size is the same as the object size.



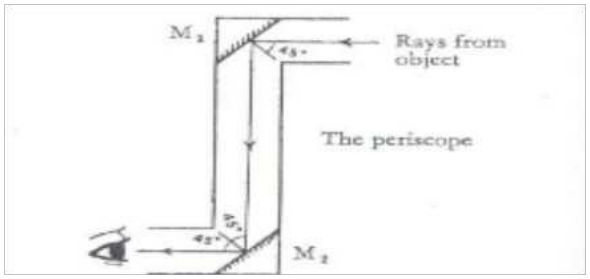
Uses of plane mirrors:

1. They are used by people as dressing mirrors.

2. They are used in periscopes to view objects above the viewer's level.
3. Plane mirrors are used to see parts of the body that we cannot see directly with our eyes.

Periscopes

A periscope is a device consisting of a tube with a set of two mirrors used to view objects that are out of sight.



How a periscope works.

-It consists of two mirrors fixed inside a tube parallel to each other at an angle of 45^0

-A ray of light from the object observed strikes mirror M_1 and is turned through 90

-It again strikes mirror M_2 at 45 and is once more turned through a right angle and thus the eye is able to see the object.

Under what principle does a periscope work?

-Light travels in a straight line.

Of what importance are plane mirrors in a periscope?

-Plane mirrors reflect light.

Why are mirrors in a periscope placed at 45^0?

-For light to be easily reflected from one mirror to the other.

State the importance of periscopes to man.

- Periscopes are used in submarines when under water to view ships on the water surface.
- They are also used by soldiers hidden in trenches to view their enemies without exposing themselves.
- They are used by short or hidden spectators in stadiums to watch matches.
- They are used by soldiers in war tankers to view their enemies.

CURVED MRRORS

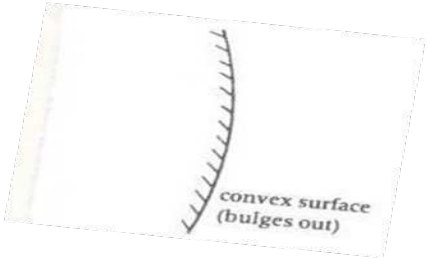
-Curved mirrors are mirrors that have curved surfaces.

Types of curved mirrors

- Convex mirrors
- Concave mirrors

Convex mirrors

-Convex Mrrors are curved outwards and silvered inwards.



Uses of convex mirrors

-They are used as driving mirrors to view traffic behind.

-They are used in supermarkets they are used to monitor the activities in the building (room).

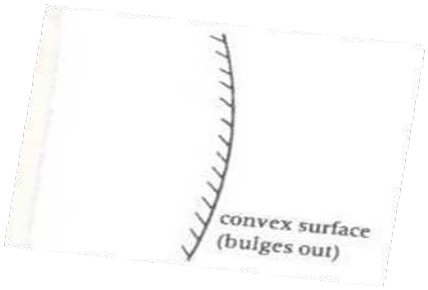
-They are used by security people use them to view dangerous objects hidden under cars.

Note.

-Convex Mrrors are used for the above uses because they show a large area compared to plane mirrors.

Concave Mrrors:

-These are curved inwards and silvered outwards.



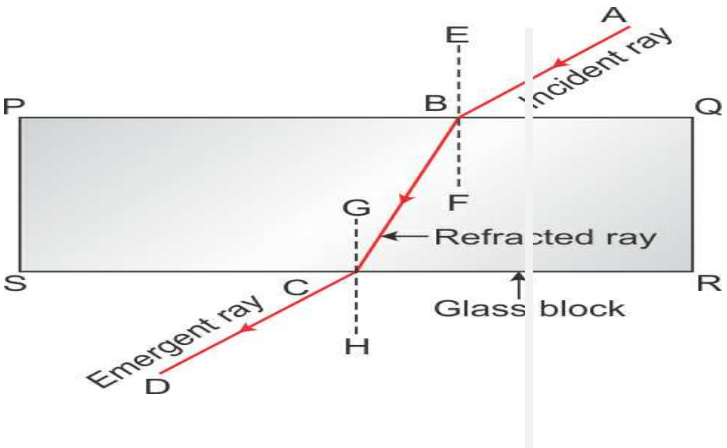
Uses of concave mirrors

(i) They are used as reflectors of car head lamps, touches, bicycle and motor cycle lights.
(ii) They are also used by dentists to view bad teeth in people's mouth.
(iii) They are used as shaving mirrors to view more details when shaving.
(iv) They are used to in solar cookers to focus sunlight on one spot.

REFRACTION OF LIGHT

-This is the bending of light rays as they pass from one transparent medium to another e.g. from glass to water.

Refraction through a rectangular glass prism

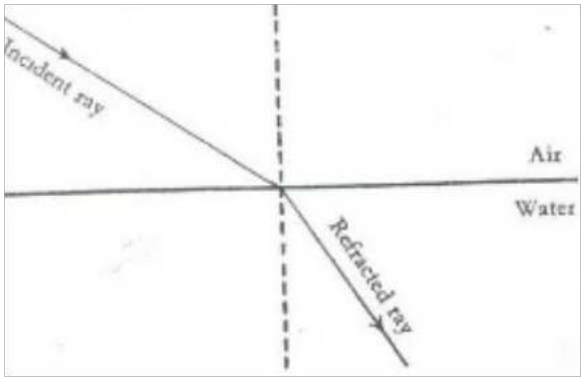


State the possible causes of refraction of light.

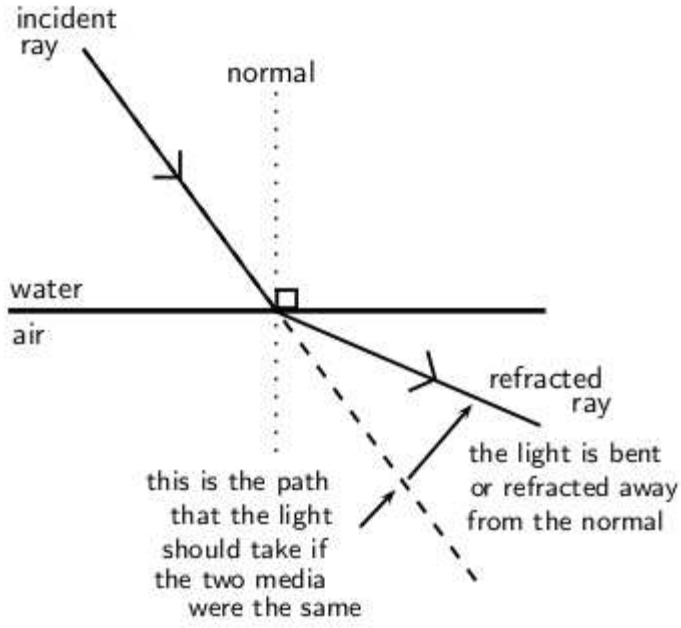
- Difference in optical densities.
- Change in speed of light.

Note

-Light rays bend towards the normal line when moving from a less dense medium to a more dense mediume.g. from air to water.



-Light rays bend away from the normal line when moving from a denser medium to a less dense mediume.g. fromwater to air.

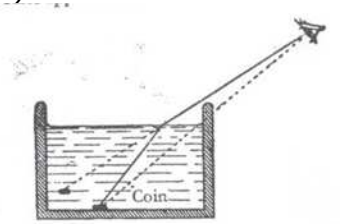


The law of refraction.

-It states that the incident ray and the refracted ray are on the opposite sides of the normal at the point of incidence and all lie in the same plane.

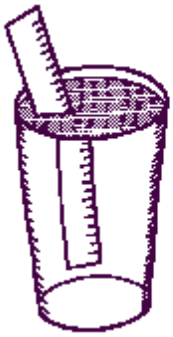
EFFECTS OF REFRACTION

-It makes pools of water appear shallower than they are.(Refraction causes real and apparent depth.)



-Refraction makes fish in water ponds to appear nearer to the surface.

-It makes a stick placed in a glass of water appear bent and shorter.



-It causes mirages.
-It produces colour.
-It causes words written on a piece of paper and placed under a rectangular glass block to appear raised and on a different line.

Advantages of Refraction:

i) It enables the camera to focus images on the film
ii) Enables optical instruments like microscopes, telescopes to function.
iii) Enables eyes to focus images onto the retina.

Disadvantages:

i) It causes road accidents.
ii) It leads to drowning and near drowning

LENSES:

-Lenses are transparent curved pieces of glass or plastic that can refract light.

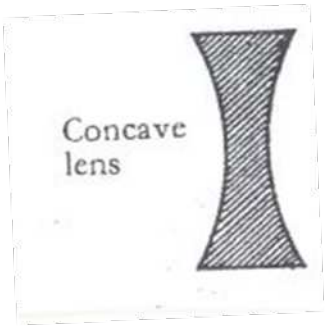
Types of lenses

-Concave lens
-Convex lens

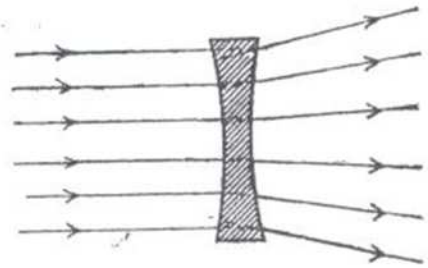
Note.

-When rays are passing through lenses they bend towards the thicker surfaces.
-Rays passing through the centre of the lens are not refracted.

CONCAVE LENSES:



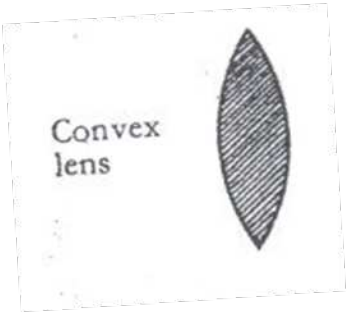
-This is a lens curved inwards. It is thinner in the centre and thicker at the outside edges.
- When curved on only one side it is called a plano concave when curved on both sides it's a biconcave.
-When light rays fall on the concave lens, they pass through when they are spread outwards.
-A concave lens forms a diverging beam. It is also called a diverging lens because it makes the rays to diverge as they pass through it.
-When viewed through concave lenses make things appear smaller.



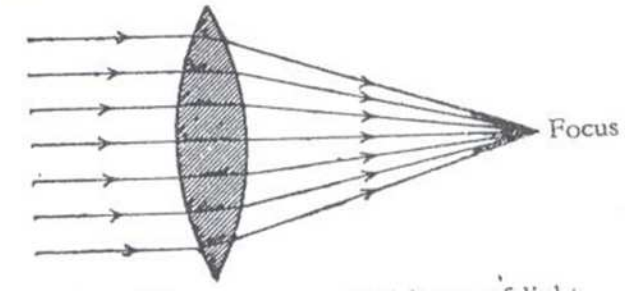
Characteristics of images formed in diverging lenses.

- The image is virtual.
- The image is erect or upright.
- The image is diminished.
- The image is in between the object and the lens.

CONVEX LENSES:



-Convex lenses are transparent materials curved outwards.
-Convex lenses are thicker in the centre and thinner at the outside edges.
-When curved one side it is known as a Plano Convex. When curved on both sided it is known as a biconvex.
- When light rays fall on a concave lens, they converge as they pass through.
-They form a converging beam. That why it is also called a converging lens.
- The point at which rays meet is known as focal point.
-The focal point of a convex lens is real while that of a concave lens is virtual.



USES OF LENSES:

Lenses are used in the following optical instruments: -

(i) They are used in the eyes. (Convex lenses) to focus light onto the retina.
(ii) They are used in cameras to focus light into the film.
(iii) Spectacles use lenses to correct eye defects.
(iv) Microscopes and magnifying glasses use lenses to make objects appear bigger so that details are viewed properly.

(v) Projectors use lenses to magnify images fromthe film
(vi) Telescopes and binoculars use lenses to view distant objects by making themappear nearer.

IMAGES FORMED BY LENSES:
i) Convex lenses formreal images which are upside down and smaller than the objects.
ii) Real images are those that can be formed onto the screen.

OPTICAL INSTRUMENTS
-Optical instruments are instruments that make use of light.
Examples of optical instruments
- Lens cameras - lens spectacles
- Binoculars - contact lenses
- Telescopes -microscopes
- Human eyes - magnifying lenses
- Epivisors
- Pinhole camera
- projector
- Periscopes etc.



A PIN-HOLE CAMERA:
-A pin-hole camera is a simple camera made of a box or cardboard and a tracing paper.

Requirements for making a pin hole camera.
-Tracing paper/greased paper
-Dull coloured pieces of paper.
-Tin
Steps.
-Make a small hole at the centre of the base of the tin.
-Cover the open end of the tin with a tracing paper and tie it firmly on the tin.
-Wrap the tin in an opaque dull coloured piece of paper on the side of the tracing paper.
-Observe an object under light froma shade or room
-A small image is seen on the tracing paper.

Under what principle does a pin-hole camera work?
-Light travels in a straight line.

Characteristics of an image formed by a pin hole camera
-It is real.
-It is diminished.
-It is upside down or inverted.
Factors that affect the size of the image formed by a pin-hole camera.
- Object distance fromthe pin-hole camera.
- The size of the pin-hole.

Why is the image formed by a pin-hole camera inverted?
-The image is inverted because light travels in a straight line.

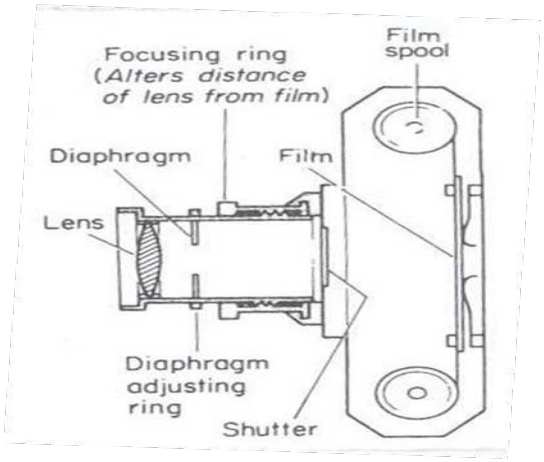
Why is the image formed by the pin-hole camera diminished?
-The image is diminished because some of the light is blocked fromentering the pin-hole camera.
Uses of a pin hole camera

-It is used to take photos
-It is used for viewing eclipses.

A LENS CAMERA (PHOTOGRAPHIC CAMERA)

-A lens camera is an optical instrument used for taking photographs

DIAGRAMOF A LENS CAMERA



The Diaphragm

-It is made of opaque materials with a hole in the centre called aperture.
-The diaphragmregulates the amount of light entering the camera.
-This is done by changing the size of the aperture.

The Aperture

-It allows light into the camera.

The Lens

-This is a convex lens made of glass.
-Its function is to focus images onto the film

The Shutter

-It prevents light fromentering the camera when not in use.

The Film

-It is where images are formed.

Focusing Ring

-This is the material that adjusts the distance of the lens fromthe film
-It does this by moving the lens either forward or backwards nearer the film

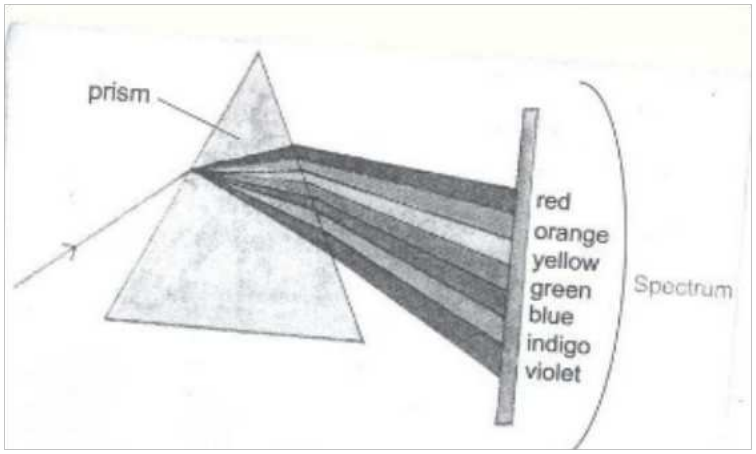
Characteristic of images formed in a lens camera

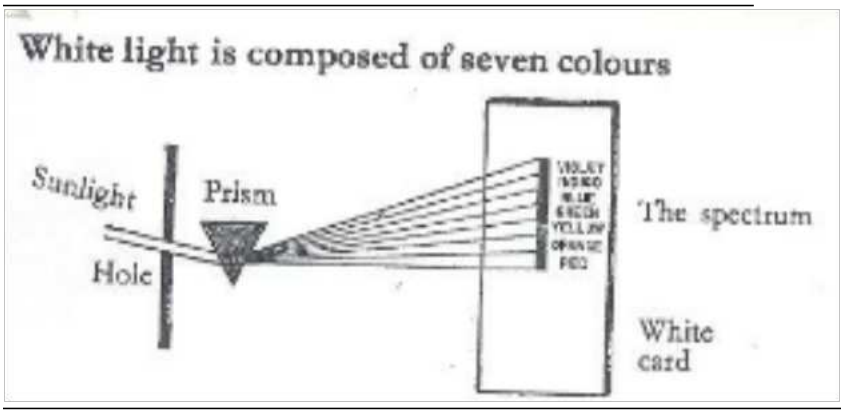
-They are real
-They are diminished
-They are inverted

Dispersion of light

-Dispersion of light is the splitting of the white light into a spectrum
-A spectrumis a band of seven colours
-When light passes through a triangular glass prism, it is refracted and it splits into seven colours

DIAGRAMSHOWING A LIGHT SPECRUM

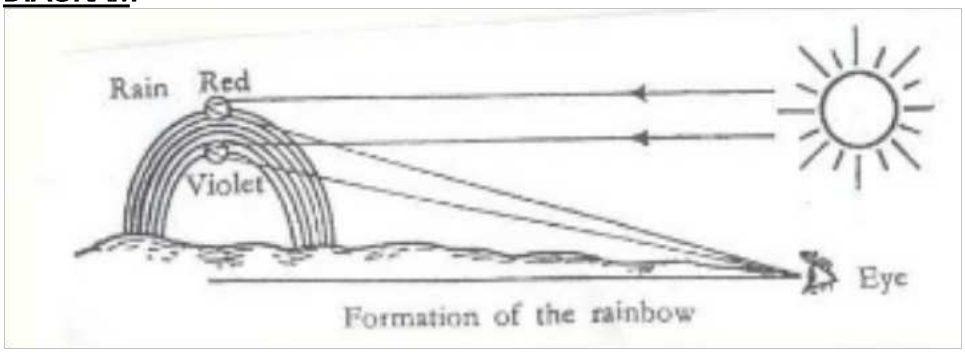




Why are colours bent at different angles?
-They have different wavelengths.
-They travel at different speeds.
Why is red refracted the least?
-It has the longest wavelength.
Why is violet bent the most?
-It has the shortest wavelength.

Spectrumcan also be formed in the following ways.
(i) Putting a glass with water in the morning at the window sill so that the rays go through it.
(ii) Reflecting sun light with a mirror partly dipped in a basin of water.

DIAGRAM



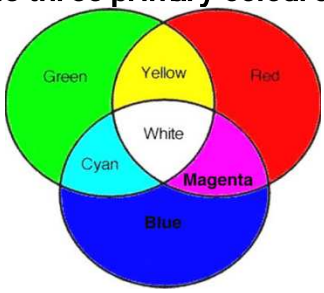
A RAIN BOW:
1. A rainbow is a natural spectrumformed when the sunlight is refracted by raindrops.
2. The rain drops act as a prismand split the sunlight into seven colours i.e.

Red, Orange, Yellow, Green, Blue, Indigo and Violet.

PRIMARY AND SECONDARY COLOURED LIGHTS

What are primary colours?
-These are colours we cannot get by mixing any two colours.
Examples.
-Red
-Green
-Blue
What are secondary colours?
-These are colours got by mixing two primary colours.
Examples.
-Cyan
-Magenta
-Yellow
.When all colours are mixed you get **White**.

Mxture of the three primary coloured lights



Colour of objects in light

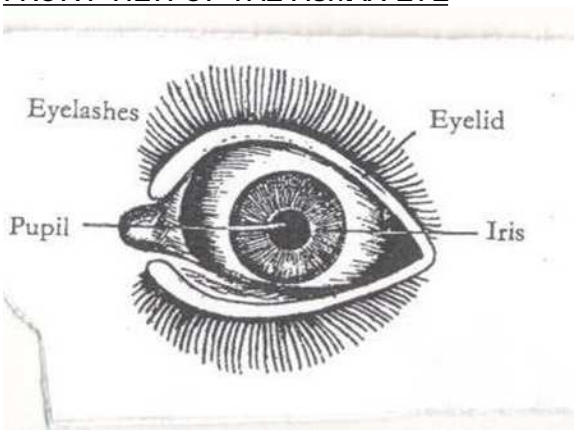
Objects appear to be of certain colours because they absorb other colours and reflect only that colour.
(i) Objects appear blue because they absorb all the other colours and reflect Blue
(ii) Objects appear red because they absorb other colours and reflect Red.
(iii) Objects appear white because they reflect all the colours and absorb none.
(iv) Black objects absorb all the other colours and reflect none that is why they appear Black.
(v) Dull and Black colours absorb more light and heat than they reflect.

NOTE
i) Bright and White colours reflect more light than they absorb.
ii) Cars and buildings are painted bright colours to reflect off the heat and light.

THE HUMAN EYE

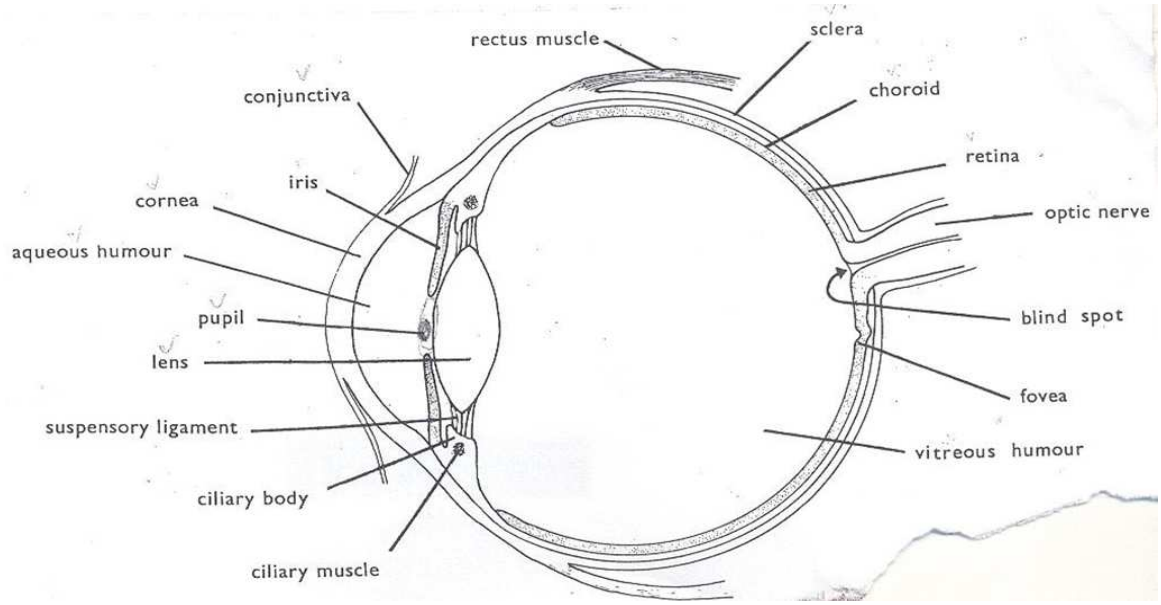
-An eye is the organ that uses light in order to function.
- It is shaped like a ball and it is enclosed in a part of the skull called eye **socket.**

FRONT VIEW OF THE HUMAN EYE



Part and Its Function	
Eye Lids	These are tough coats that protect the eye by covering it. The closing can be voluntary or reflex action. (done without the will and consultation of the brain)
Conjunctiva	A thin layer covering the front part of the eye.
Eye Lashes	These trap foreign bodies fromentering the eye easily.
Eye Brows	These prevent sweat fromflowing into the eye.

THE INNER PARTS OF THE EYE



The function of the parts of the human eye

Iris

-It regulates the amount of light entering the eye.

How.

-By regulating the size of the pupil

Pupil

-It allows light into the eye

Convex lens

-It refracts the light entering the eye so that it is focused on the retina

Aqueous and vitreous humour

-These are jellies in the eye that are responsible for keeping the shape of the eye.
-They also refract light so that it is refracted onto the retina.

Sclera

-It is a tough outer coat of the eye in which all the contents of the eye are found.
-It is seen as the white part of the eye.
-It is covered by the conjunctiva.

Choroid

-It prevents internal reflection of light in the eye.

Retina

-It is where images are formed.
-It is the light sensitive part of the eye.
-It is made up of two types of cells, the cones and rods.
-The cones help in colour vision while the rods help in dimlight and night vision.

Optic nerves

-They send nerve impulses fromthe eye to the brain for interpretation

Characteristics of images formed in the eye

-They are real
-They are diminished
-They are inverted

NOTE;

-The tear glands are found under the top layer of the eye lids. They produce tears.
Function of tears

- Help to lubricate the eye ball.
- Help to wash off foreign bodies fromthe eyes.
- Help to kill some bacteria that go to the eyes.

Comparing parts of the eye with those of a camera.

Human eye	Camera
Convex lens	Convex lens
Iris	Diaphragm
Eyelid	Shutter
Retina	Film
Pupil	Aperture

Choroid	Black point

Comparison of the human eye and pin hole camera:

Human Eye	Pin hole Camera
- Pupil changes size to control light entering	- Hole remains the same size
- Has a convex lens - Focuses the light by changing the shape of the lens - Has eyelids to close the eye - Images is upside down - Images formed on the retina (Real Images) - Images are smaller than the object	- Has no lens - Focuses the light by changing the distance of the camera from the object. - Opening always open - Image upside down - Image formed on the screen (Real Images) - Images are smaller than the object

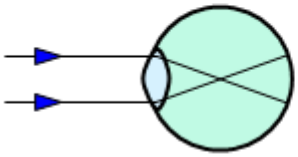
Accommodation
-This is the ability of the eye to see near and far objects clearly.

Eye Defects/disorders
-Eye defects are abnormalities in the eyes which prevent someone from seeing properly.

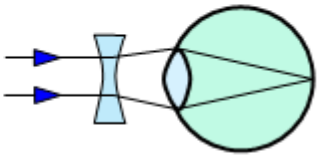
Examples of eye defects
-Shortsightedness (myopia)
-Long sightedness (hypermetropia)
-Astigmatism
-Old age sight. (presbyopia) iv.

Short sightedness:
-This is the ability to see near objects more clearly than distant objects.
Causes of short sightedness
-Too long eyeball
-Too thick eye lens

Short sighted eye

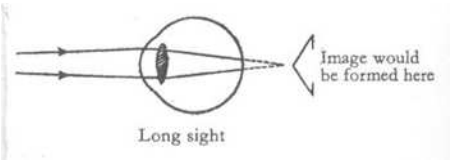


Correction with a concave lens



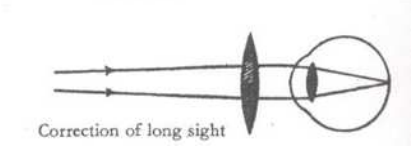
-The correction for short sight is wearing spectacles with concave lenses.
-Concave lenses are used because they first diverge the rays before they enter the eyes.

Long sightedness.
-This is the ability to see distant objects more clearly than nearby objects.
Causes of long sightedness
-Too short eyeball
-Too thin eye lens.



Note.
Images fromnear are formed behind the retina in a long sighted people.

Correction of Long sightedness.



-A convex lens is used to correct long sightedness.
-A convex lens is used because it converges the rays before they enter the eyes.

Astigmatism
-This is the inability of the eye to focus both near and distant objects clearly.
Cause.
-Rough cornea
- Astigmatismcan be corrected by wearing spectacles with cylindrical lenses.

Presbyopia(old age sight)
-This occurs in people of above 60years.
-It is caused by loss of elasticity of the eye lenses making it unable to change its shape easily and suitable for only distant vision.
-It is corrected by wearing reading glasses fitted with convex lenses.

Eye diseases.
Examples of eye diseases
-Trachoma
-River blindness
-Conjunctivitis

-Glaucoma
- Cataracts
-Night blindness

Night blindness
-This is a deficiency disease caused by lack of enough vitamin A in the diet
-it can be prevented by eating foods rich in vitamin A.

Trachoma
-It is caused by bacteria called chlamydia spread by houseflies.
-It is spread by houseflies after landing on the eyes of an infected person then to the eyes of a healthy person.

Signs and symptoms
-Red eyes
-Swollen eye lids
-white watery discharge fromthe eyes
-Itching and scratching of the eyes
-Pain in the eyes while looking at light.

How it is spread
-Through shaking hands with an infected person.
-Through sharing handkerchiefs with an infected person.
-Through sharing basins with an infected person.
-Through houseflies landing on the eyes of an infected person then to the eyes of a healthy person.

Prevention and control
-Avoid shaking hand with an infected person
-Avoid sharing handkerchiefs with an infected person.
-Avoid sharing basins with an infected person.
-Washing hands, face and eyes with clean water and soap.
-Seeking early treatment.

Conjunctivitis
-This is an infectious eye disease caused by bacteria.
-It is common in babies

Signs and symptoms
-Red eyes
-burning sensation in the eyes
-pus in the eyes
-Eye lids often stick together after sleep.

How it is spread
-Through shaking hands with an infected person.
-Through sharing handkerchiefs with an infected person.
-Through sharing basins with an infected person.
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Prevention and control
-Avoid shaking hand with an infected person
-Avoid sharing handkerchiefs with an infected person.
-Avoid sharing basins with an infected person.
-Washing hands, face and eyes with clean water and soap.
-Seeking early treatment

River blindness
-It is an infectious eye disease caused by filarial worm called onchocerca volvulus spread by a blackfly /simulium fly.
-Black flies breed in fast flowing water.
Signs and symptoms
-Pink eyes/pinkish eyes
-Severe body itching
-Tough rough skin
-Nodules on the skin on the buttocks.
Prevention and control
-Spraying chemicals to kill blackflies
-Wearing insect repellants

Glaucoma.
-It is caused by too much pressure in the eyes.
-It is mainly experienced at the age of 40.
-It is a common cause of blurred vision.
Forms of glaucoma
-Acute glaucoma
-Chronic glaucoma

Acute glaucoma
-This causes severe pain in the eyes.
-The eyeballs feel hard to touch like marble.
-vomiting
-The pupil of the bad eye is bigger than that of a good eye.

Chronic glaucoma
-Pressure in the eyes rises slowly.
-No pain is experienced
-Lost vision starting slowly from the side
Prevention of glaucoma
-People about 40 years should have their eye pressure checked once a year.

Cataracts
-The lens becomes cloudy, making the pupil look gray or white when you shine a light into it.
-Cataracts are common in older persons but also occur rarely in babies.
-Surgery is recommended if the person is to see again.
Ways of caring for the human Eyes.
-Clean the eyes with plenty of clean water and soap. When eyes are not properly washed with plenty of water, one gets water cleaned diseases. Like: trachoma
-Avoid sharing face towels and handkerchiefs with eye infected people. This spreads eye diseases.

-Use proper lighting when reading. Flickering lights and dim lights can destroy eyes when used for reading. Very bright light damages the retina.
-Avoid rubbing the eye when a foreign body goes onto it. Avoid using a sharp object to remove the foreign body as it may scratch the eye.
- Treat eye infections immediately.
-Use of sunglasses to protect eyes from direct sunlight and foreign bodies.

Accommodation
-This is the ability of the eye to see near and far objects clearly.

TOPIC: ENERGY RESOURCES IN THE ENVIRONMENT

-Energy is the ability to do work.

What is a resource?
-A resource is something that satisfies man's needs.
-Energy resources are things in the environment which provide useful energy to man.

Types of energy resources

I) Renewable energy resources
II) Non-renewable energy resources

Renewable energy resources
-These are energy resources which can be replaced naturally when used.

Examples of renewable energy resources

- Sun
- Wind/air
- Water
- Plants
- Animals
- Land soil

Characteristics of renewable resources.

- They can be replaced naturally when used.
- They exist in large amount.

Forms of energy got from the sun

- Light energy
- Heat energy

Importance of the sun as an energy resource

- It provides heat which dries our clothes.
- It provides heat which dries harvested crops.
- It provides energy used to generate solar electricity.
- It provides light which helps us to see.
- Sunlight energy enables plants to make their own food.

Importance of the sun in the rain cycle

- The sun provides heat which evaporates water in water bodies.
- It also provides heat which enables plants to transpire.

Processes involved in the rain cycle

- Evaporation
- Transpiration
- Condensation

Energy got from water

- Hydro electricity
- Steamenergy
- Tidal energy
- Geothermal energy

-Hydroelectricity is generated by fast running water.
-Steamis formed when water is heated and it evaporates.
-Steamis vapour formed when water is heated.

How steamis used as an energy resource

- It is used to cook food
- It is used to drive steamengines.
- It is used to drive propellers.

Tidal energy

-A tide is a regular rise and fall of the level of water in the sea or ocean.
-Tidal energy is the kinetic energy of moving waves in seas or oceans. It is used to produce electricity.
-Moving waves of water drive turbines connected to a generator hence producing electricity.

Geothermal energy

-This is heat energy got fromsteamfromhot rocks or springs deep in the earth's crust.
-The word geothermal comes fromthe word geo meaning the earth and thermal meaning heat.
-In some areas, the earth's surface and underlying rocks are hot. This heats up the underground water which comes out as steam
-The steamis used to generate electricity.

Uses of geothermal energy

-It is used to heat water.
-It is used to produce electricity.

Energy fromair/wind

-Air is a mixture of gases.
-Wind is air in motion.

Components of air

-Nitrogen- 78%
-Oxygen- 21%
-Rare gases- 0.97%
-Carbon dioxide- 0.03%

Uses of air/ wind as a resource

- Wind is used in winnowing cereals.
- Wind drives boats and dhows.
- Wind helps to dry our clothes after washing
- Wind runs wind mills.

A diagramof a wind mill



Uses of wind mills

-They are used to generate electricity
-They are used to grind cereals
-They are used to pump water from underground.

Advantages of using wind as an energy resource.

- It is a renewable resource.
- It is an alternative energy resource.

ANIMALS AS ENERGY RESOURCES

1. Animals like oxen provide labour (ploughing).
2. Some animals are used for transport e.g. camel, horses etc.

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PLANTS AS ENERGY RESOURCES

Energy resources got from plants.
-wood fuel (firewood, saw dust and charcoal)

Fuels are substances that burn with oxygen to produce energy.

Types of fuels

- Solid fuels such as wood.
- Liquid fuels such as petrol.
- Gas fuels such as natural gas.

Wood fuel is any plant product which burns with oxygen to produce heat energy.

Uses of plants as energy resources

1. They provide fire wood.
2. They provide charcoal

Uses of wood fuel

- Wood fuel is used for cooking.
- For heating water.
- It is used in factories to bake bread and cakes.
- It is used to burn bricks.

NOTE;

Charcoal is made by burning wood under limited supply of oxygen.

Ways of conserving wood fuel

1. Afforestation
2. Re-afforestation
3. Using energy saving charcoal stoves.
4. Enforcing strict lands against deforestation
5. Using alternative energy resources.
6. Creating awareness about the importance of forest.

Environmental conservation is the management and sustainable use of the environment.

OR

This is the protection and maintenance of the environment.

Advantages of using improved clay made stoves

- They use less charcoal.
- They reduce pressure on forests.
- They retain heat for a long time.

Plants and animal wastes as energy resources

Biogas

-Biogas is fuel got after fermenting organic matter in the absence of oxygen.
-It is a gaseous fuel mainly methane produced by fermentation of organic matter.
-The fermentation process takes place in a container buried underground.
-The container is called a biogas digester.
-Anaerobic bacteria are used in the production of biogas because they can live without oxygen.

-Biomass is the amount of animal and plant matter in an area.
-Biomass can be used to produce biogas in a biogas digester.

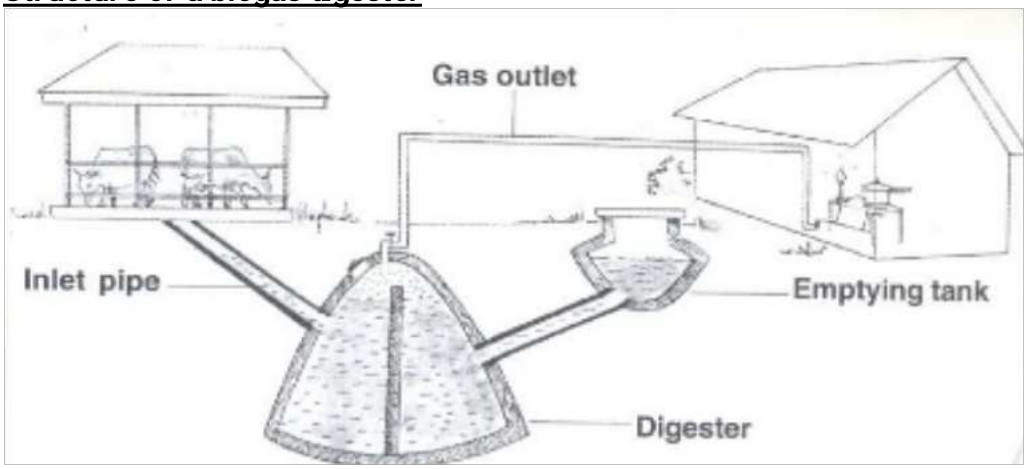
Materials used in the production of biogas

-Cow dung - banana peelings
-Chicken droppings -molasses
-Coffee husks -water
-Rice husks -urine
-potato peelings

Note.

-Water softens the materials for easy fermentation.
-The biogas digester is buried underground to cut off oxygen supply and to allow quick fermentation.

Structure of a biogas digester



Uses of biogas

-It is used for cooking.
- It is used for lighting in the house.
- It produces electricity for domestic use.

Advantages of biogas

- It does not pollute the environment.
- It reduces the rate of deforestation.

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NON-RENEWABLE ENERGY RESOURCES

-These are energy resources which cannot be replaced naturally when used.

Characteristics of non-renewable resources

-They cannot be naturally replaced when used
-They exist in limited amounts
-They can get exhausted

Examples of non-renewable energy resources

-Uranium
-Coal
-Petroleum
- Natural gas.

Fossil fuels
-Fossil fuels are fuels formed from the remains of dead plants and animals that were buried underground many years ago.
Examples of fossil fuels
-Coal
-Petroleum
-Natural gas
Coal
-It is a hard black substance found underground.
-It is formed from remains of dead plants that were covered with soil.
-The pressure and heat underground convert the remains of dead plants into coal.
Products got from coal
-Coal gas
-Coke
-Tar for surfacing roads

Uses of coal as an energy resource
- It is used for cooking.
- It is used to generate electricity.

Natural gas
-It is a gas formed between rocks on top of oil (petroleum).
Components of natural gas
-Propane gas
-Butane gas
Uses of natural gas
-It is used in cooking.
-It is used for lighting in our homes.
-It is used to produce heat energy in industries and at power stations.

Petroleum/crude oil
-It is a non-renewable energy resource dug from underground.
How is petroleum formed?
-It is formed from remains of dead animals that settled at the bottom of the sea, ocean or swamp.
-The pressure and heat underground converted remains into oil (petroleum)
-Crude oil is oil mined from underground with a lot of impurities.
-It is oil which contains other substances.
How is petroleum separated from other substances?
-By refining using fractional distillation.
-Refining is the separation of impurities and other substances from petroleum
Fractional distillation is used because fuels boil at different temperatures.
Products got from petroleum
- Diesel
- Petrol
- Kerosene/paraffin
- Jet fuel/aviation fuel
- Lubricating oil etc

Other products made from chemicals got from petroleum
- Polythene - dyes
- Plastic - cosmetics
- Polish - paint
- tooth paste - insecticides
- Vaseline
- Fertilizers - ink

Uses of paraffin
-For lighting lamps.
-For cooking.
-For heating water.

Uses of petrol and diesel
- They are used in generators to produce thermal electricity.
- They are used to run car or vehicle engines.

Uranium
-Uranium is the source of nuclear energy.
-It releases a lot of heat when atoms within are broken down in a nuclear reactor.
-Atomic energy is obtained by splitting uranium
-The energy is obtained at a nuclear power station.

Uses of uranium
- It is used to produce atomic or nuclear electricity.
- It is used to make atomic bombs and other nuclear weapons.
- It helps in production of stems which runs turbines connected to generators to produce electricity.

Ways of conserving petroleum and other minerals
-Using alternative energy resources e.g. running water, wind, biogas and solar energy.
-By using petroleum products sparingly.

TOPIC: INTERDEPENDENCE OF THINGS IN THE ENVIRONMENT
-Interdependence is the way living things depend on each other to get their needs.
-Environment is man and his surroundings.

Types of environment
There are two types of environment namely:
1. Biotic environment: this consists of living things e.g. plants and animals. (Bio-diversity)
2. Abiotic environment: this consists of non-living things e.g. mountains, lakes, rocks, soil, water, temperature and air.

Ways in which animals depend on plants.
1. They get food from plants.
2. They get oxygen from plants.
3. They get shade from plants.
4. They get herbal medicine from plants.
5. Birds build their nests in trees.
6. We get timber and fire wood from plants.
7. We get fibre like sisal, linen, jute, cotton from plants.

Ways plants depends on animals
-Some plants feed on certain insects e.g.
- Pitcher plants
- Venus fly trap
- Sun dew
- Butter cap
- Butter wart
  - ❖ These plants are called insectivorous plants.

-Plants get carbon dioxide from animals.
-Plants get manure from animals.
-Some plants depend on animals for pollination

-Some plants depend on animals for seed dispersal.

Ways animals depend on each other.

- Some animals feed on other animals e.g. carnivores and omnivores.
- Some animals depend on others for protection and shelter e.g. parasites
- Some animals depend on other for transport.
- Some animals provide security e.g. dogs.
- Some animals depend on others for shelter.

Ways plants depend on other plants

- Plants with weak stems climb others for support.
- Some plants grow and live on other plants (epiphytes) e.g. lichens, mosses and algae.
- Some plants get shade from other plants.
- Plants depend on each other for humus/ manure.

FOOD CHAIN

-This is the relationship in the way organisms get their food.
-It is a list of plants and animals showing how they feed.

An example of a food chain

Grass ⟶ grasshopper ⟶ hen ⟶ hawk

Components of a food chain

-Producers
-Primary consumers
-Secondary consumers
-Tertiary consumers

Producers

-These are organisms that make their own food.
-All plants are producers.
-Plants use light energy from the sun to make food.

Consumers

-These are organisms that feed on others.

Levels of feeding

- Primary consumers
- Secondary consumers
- Tertiary consumers

Primary consumers

-These are organisms that feed on producers.
-They are mainly herbivores.

Examples.

- Goats
- Cows
- Sheep
- Antelope
- zebras
- Insects
- Elephants etc

Secondary consumers

-These are organisms that feed on primary consumers.

-They are mainly carnivores and omnivores

Tertiary consumers

-These are organisms that feed on secondary consumers.
-They are mostly scavengers.

Decomposers

-These are organisms that breakdown dead plants and animals.
-Decomposers include bacteria and fungi.

NOTE.

-A food web is a series of interconnected food chain.
*-An ecosystem*is the interaction of living organisms and the non-living things in environment.
-A habitat is a natural home of living things.

How living things depend on non-living things

Air/wind

-They use oxygen to respire.
- Carbon dioxide is used to put out fire.
- Wind is used to winnow cereals.
- Oxygen supports burning
- Wind helps in dispersal and pollination.
- Carbon dioxide is used to preserve drinks.

Water

1. Used for drinking.
2. Used to water plants.
3. Used for transport.
4. Used to generate HEP
5. Used for washing clothes.
6. Used for cooking.

Soil

1. It is a habitat for some animals.
2. Used for growing crops.
3. Used to construct houses.
4. It is used for modeling.

AGROFORESTRY

-This is the growing of crops together with trees on the same piece of land.

Importance of agroforestry

1. Trees provide shade to crops and animals.
2. Trees control soil erosion.
3. Trees help in rain formation.
4. Trees act as wind breaks on the farm
5. It improves on soil fertility.
6. Trees provide herbal medicine.
7. Trees provide wood fuel.

8. Trees use carbon dioxide in the atmosphere, so they reduce global warming.
9. Trees can be used as fences around the garden
10. Some trees fix nitrogen into the soil
11. A farmer gets both tree and crop products at the same time.
12. Trees provide support to weak plants.

Advantages of growing crops, trees and keeping animals on the same piece of land.
-Animals are able to use leaves and the remains of crops after harvesting as food.
-The wastes from animals recycle nutrients which improves on soil fertility.
-The farmer is able to get three different kinds of products from his land at the same time.

Selection of tree species for growing
-They should have a deep root system
-They should be early maturing
-They be able to do well in poor soils.
-They should be easy to propagate.
-They should have small leaves that can decompose easily.
-They should be able to fix nitrogen into the soil.
-They should be able to provide a variety of products.
-They should not be thorny to allow a farmer to work.
-They should be drought resistant.

Tree growing practices.
-Collecting and selecting seeds
-Starting tree nurseries
-Caring for trees

Collecting and selecting seeds
The method of collecting of tree seeds include;
Picking or cutting
- We can take seeds from a tree by hand if the branches are low enough to reach.
Spreading a cloth under a tree
-We can spread a cloth under a tree and hit the branches with a long stick.
-This makes the seeds to fall on the clothes and then we collect them

Qualities of good tree seeds for planting
-They should be mature.
-They should be free from diseases.
-They should be well dried.
-They should be free from holes.

SETTING UP A TREE NURSERY

-A tree nursery is a place where young trees are grown before being transplanted to the main garden.

-A seed bed is a well prepared piece of land used for planting seeds or seedlings.

Types of nurseries

-Seed boxes; wooden boxes filled with soil.

-Soil blocks; soil put in polythene bags or sacks.

-Nursery beds; rose on the ground.

Importance of a nursery bed

1. Seedlings are protected from direct sunshine.
2. It helps in proper seed selection.
3. It is used to provide proper care to seedlings.
4. It helps in water infiltration in the soil.
5. It gives a farmer time to prepare the main garden.
6. Seedlings are protected from direct raindrops.

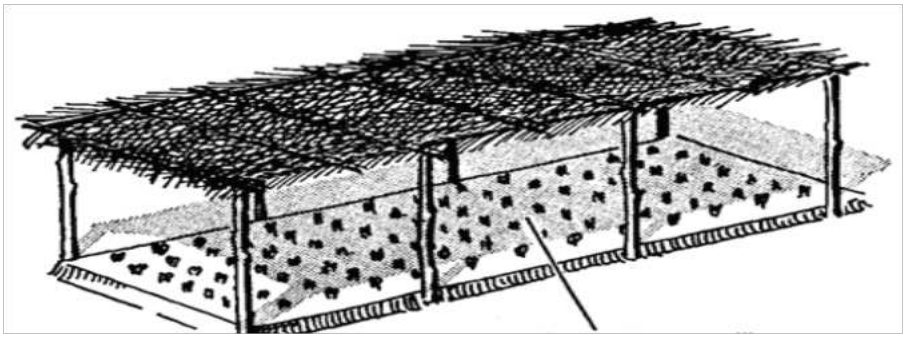
Factors to consider when choosing a site for a tree nursery

-It should be in an open place
-It should have fertile soils
-It should be well drained
-It should be near a water source
-It should not be exposed to strong winds as it can damage the seedlings.

How to make a nursery bed

1. Clear the place of weeds.
2. Dig into the soil deeply.
3. Break the soil lumps and make the surface smooth and fine.
4. Apply manure and mix it in the soil.
5. Scatter or make furrows in which the seeds are to be planted.
6. Cover the seeds very lightly with soil.
7. Apply some mulches.
8. Construct a shade about one meter high.

A NURSERY BED



Caring for seedlings in a nursery bed

- Watering
- Weeding
- Spraying with pesticides
- Thinning

Hardening off.

-Hardening off is the way of making seedlings get used to the conditions they are going to meet in the main garden.

Activities done during hardening off

- Removing the shelter (shade)
- Watering is reduced
- Spraying.

Transplanting

-It is the transfer of seedlings from a nursery bed to the main garden.

-The tools used in transplanting are trowel and wheel barrow.
-Transplanting should be done in the evening because the rate of transpiration is low.

Steps of transplanting seedlings

-Dig a wide hole in the ground
-Add manure to the hole
-Place the seedling in the hole
-Put soil back into the hole
-Make soil around the seedling firm
-Construct a fence around the seedling

Note.

-Dry grass should be put around the fence to provide shade for the seedling.
-This protects the seedling against wilting.

Pruning

-This is the cutting off of excess branches and leaves from a plant.

Tools used in pruning

- Secateurs
- Pruning saw
- Shears
- Panga

Advantages of pruning

- It helps in easy plant management.
- Reduces competition among plants for sunlight and space.
- It controls pests.
- It controls the rate of transpiration in banana suckers when planting.
- It reduces the weight of plants.
- It improves on plant /crop yields.
- It makes harvesting of fruits easy.

Thinning

-This is the removal of excess and poorly growing seedlings in the garden.

Advantages of thinning

- It controls pests.
- It reduces competition for nutrients, sunlight and space.
- It avoids overcrowding of plants.
- It improves on the crop yields.
- It controls the spread of diseases.
- It reduces competition for sunlight
- It reduces competition for water.

Crop spacing

-This is the planting of crops leaving some spaces or gaps between individual plants.

Advantages of crop spacing

- Plants get enough sunlight.
- It eases harvesting.
- It eases weeding.
- It eases spraying to control pests.
- It improves on air circulation between crops.
- It improves on crop yields.

PLANT TRAINING

-This is a way of making plants grow in a certain direction and shape.
There are three ways of plant training namely:

1. Staking
2. trellising
3. propping

Staking

-This is provision of support to plants with weak stems using sticks.

Examples of plants that are staked.

- Tomatoes
- Vanilla
- Garden peas
- Some varieties of beans.
- White yams
- Cucumber

Trellising

-This is the practice of providing support to crops with vines and weak stemusing a string or a wire held between poles.
-It is done to crops like passion fruits and oil nuts.

Propping

-This is the practice of providing support to crops like banana with heavy bunches using forked stakes, poles or props.

Advantages of plant training

- All parts of the plant receive enough sunlight.
- Plants are helped to grow above the ground.
- Clean fruits are harvested.
- It makes pruning easy.
- It improves on crop yields.
- It makes weeding easier.
- It makes spraying easy.
- It prevents fruits fromrotting
- It protects fruits frompests.

Weeds

-These are plants that grow where they are not wanted.

Importance of weeds

1. Some weeds are used as vegetables e.g. amaranthus.
2. Weeds can be dried and used as mulches.
3. Some weeds are used to feed livestock.
4. Weeds are used to make organic manure.
5. Some helps to control soil erosion.
6. Some weeds are used for thatching houses.
7. Some weeds are used to make herbal medicine.
8. Some weeds add nitrogen to the soil.

Dangers of weeds

1. Weeds compete with crops for sunlight, space and nutrients.
2. They lower the quality of crop harvest.
3. Some weeds are poisonous to livestock.
4. Weeds hide pests.
5. Weeds make harvesting difficult.
6. Weeds are costly to control.

Ways of controlling weeds in the garden.

- By regular weeding.
- By uprooting.

- By mulching.
- By use of herbicides
- By slashing.

Weeding

-This is the removal of unwanted plants from the garden.

It is done through the following;

- Digging the weeds.
- Slashing or mowing
- Uprooting
- Use of herbicides

Examples of weeds

- Star grass - sword grass
- Couch grass - Spear grass
- Wandering Jew - Elephant grass
- Black jack - Oxalis
- Tick berry - Amarathus
- pig weed

Mulching

-This is the covering of top soil with dry plant materials.

Advantages of mulching

1. Mulching controls soil erosion.
2. Mulching improves on soil fertility.
3. Mulching controls the growth of weeds.
4. Mulching keeps the soil moist.

Dangers of using mulches

- Mulches can be fire hazards.
- Mulches hide pests.

CROP PESTS

-These are organisms which destroy crops and trees.

-Some pests spread diseases while others destroy the leaves, roots and stems.

-There are storage and field pests.

Examples of crop pests.

PEST	CROPS ATTACKED	DAMAGE.
Mealy bug	Pineapples, coffee	Leaves turn yellow or pink.
Aphids	Oranges, coffee, cabbages etc	Wilting back of terminal bud.
Banana weevils	Bananas	Leaves turn yellow Bananas fall easily.
Codling moth.	Citrus fruits like oranges and mangoes	Fruits fall off.

Thrips	Bananas	Premature ripening of bananas Banana fruits burst.
Moles, rats, squirrels, mice, cane rats.	Cereals	Direct consumption of seeds an stems.
Citrus black fly.	Citrus fruits	The flies suck sap from leaves and tender shoots.
Leaf miners	Coffee, cocoa, pineapples, aloevera, sisal	Plant's ability to make sugar is reduced.
Cut worms	Vegetables	Leaves are destroyed.
Locusts	All crops	Leaves are destroyed.
Army worms	Cereals and grasses	Leaves are destroyed.
Maize stalk borer	Maize	The stem and the cob are destroyed.
Boll worm	Cotton	They destroy the fruit.
Game animals e.g. monkeys	Oranges, mangoes	Fruits are destroyed.
Birds.	Maize, sorghum	Destroy the grains.

Methods of controlling pests.

- Early planting.
- Spraying with pesticides.
- Use of birds to eat lady birds. (Biological method)
- Crop rotation.
- Regular Weeding
- Plant clean materials.

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Crop diseases.

DISEASE	CROP	CAUSE	SIGN	CONTROL
Panama disease	Bananas	Fungi	Plant Banana Wilts	Burn entire stock Plant healthy suckers
Cigar End rot	Banana	Bacteria	Banana tips resembles burning cigar	Burn infected crops.
Banana	Banana	Bacteria	Banana stem rots and	Burn entire stock

bacterial wilt			falls down	Plant healthy suckers
Powdery mildew.	Mangoes	Fungi	Powdery patches on leaves	Spray with fungicides
Green mould	Citrus fruits	Fungi	The stem dries with a green powder	Spray with fungicides.
Stem pitting	Citrus fruits	Fungi	Dry patches on the stem	Spray with fungicides.
Tomato blight	Tomatoes, potatoes	Fungi	Yellow leaves	Spray with fungicides.
Crown gall	Fruits	Bacteria	Leaves shrink	Planting resistant varieties.
Rust fungus	Cereals	Fungi	Black spot on leaves	Spray with fungicides
Root rot	Tea plants	Fungi	-Leaves wilt -Roots change colour	Spray with fungicides
Coffee berry diseases(CBD)	Coffee	Fungi	Brown spots appear on berries.	Spray with fungicides

Control of pests and diseases

1. Spraying using chemicals e.g. pesticides and fungicides.
2. Plant early before pests and diseases multiply.
3. Practice crop rotation.
4. Prune infected parts.
5. Remove and burn infected parts and plants.
6. Crop stores should be dusted with chemicals.
7. Use of scare crows.
8. Use predator insects to destroy other insects like lady birds can clear aphids.

Types of trees

-Indigenous trees
-Exotic trees

Indigenous trees

-These are trees that have been growing in Uganda for many years.

Examples include.

- Musizi
- mutuba
- Acacia
- African walnut
- Mvule
- ebony
- Mahogany
- Candle nut

- Ficus
- Baobab

Characteristics of indigenous trees;
- Produce hard wood.
- Take long to mature.

Exotic trees:
-These are trees that have been brought into the country fromother countries.
-They include;
- Cypress,
- Pine,
- Cedar,
- Mango,
- Black wattle,
- Eucalyptus,
- Jack fruit tree
- Jacaranda
- Avocado
- Pawpaw
- Neemtree etc

Characteristics of exotic trees
- They produce soft wood.
- They mature faster than the indigenous trees.

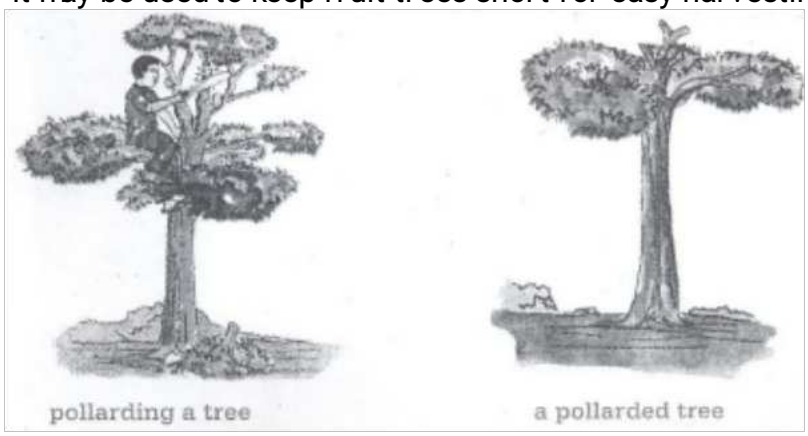
METHODS OF HARVESTING WOOD
There are three methods of harvesting trees namely:
1. Coppicing
2. pollarding
3. lopping
4. Selective felling.

Coppicing
-The tree is cut at the base close to the ground.
-Some new shoot grows fromthe base on the sides of the trunk.
-These shoots can be harvested when they are big enough for use.
-The wood can be used for fire wood, making fences and timber.
-Eucalyptus is sometimes harvested in this way.



Pollarding

-This is cutting of branches fromthe top of a tree to encourage thicker growth in the lower branches.
-This method is used in trees which die when most of the branches are cut.
-It may be used to keep fruit trees short for easy harvesting.



Lopping

-This is the cutting of side branches of a tree.
-Branches are cut down leaving the terminal bud to grow.
-Pollarding and lopping are used to provide fire wood and charcoal.
-Coppicing is used to provide timber for furniture and other products.



Selective felling

-This is done by felling only trees that are fully grown.
-Young ones are allowed to grow properly before they are felled.
-In modern times a power saw is used to cut trees.

Storage of wood

-After harvesting, fire wood is dried properly and kept in a dry place.
-Wood for timber should be properly dried and carefully stored.
-Insects such as beetles and carpenter bees can easily destroy wood.

Seasoning of wood

-This is the drying of wood for timber under a shade.

Why is wood for timber dried under a shade?

-To prevent it fromwarping/bending
-To prevent it fromcracking

Importance of seasoning

- It makes wood last longer.
- It makes other methods of wood treatment more effective.

A woodlot

-A woodlot is a piece of land with a tree growing project.

Factors to consider when starting a woodlot

-Land
-Labour
-Capital
- Management
-Market
-nearness to the water source
-Fertility of the soil
-The tree species
-Drainage of the soil.

Importance of starting a tree and crop growing project

- You get food fromit.
- You get money when you sell the produce.
- You practice the science you learn in class.
- Trees provide shade, fruits and wood fuel.

- **Maintaining a tree and crop growing project**
- Watering the crops
- Applying manure
- Mulching
- Pruning
- Weeding

TOPIC: MACHINES

Qn: What is a machine?

-A machine is any tool/device that makes man's work easier.
-A machine is any device on which force is applied to do work.

Qn: what are the two types of machines?

- simple machines
- complex machines

Qn; What are some of the advantages of machines?

1. They make force needed to do a certain job less.
2. They increase the speed of doing work.
3. They help to apply force more easily / They help to change the direction of force used.

Qn: How can a machine simplify work?

- By changing the direction of force.
- By making the force needed to do work less.
- By increasing the speed of working.

.

Qn: what is work?

Work is the product of force and distance in the direction of force.

Qn: what are the units of measuring the following?

Work = joules / newton metres.
In symbols,
1J = 1Nm

Distance- metres
Force- Newton
1kg = 10N, 2kg = (2x10) = 20N

Examples

1. A boy pushes a trolley in the supermarket. If he exerts a force of 30N on the trolley and moves it a distance of 5min the direction of force. Calculate the work done by the boy.

Solution
Force (f) =30N
Distance moved in the direction of force = 5m
let work done by the boy be W.
W = f X d
W = 30 X 5
W = 150joules

Activity

1. Find the work done by a girl who pushes a wheel barrow using a force of 90N through a distance of 8m
2. Find out the work done by Alfred who pushes a bicycle with the load of 80kg through a distance of 18m
3. Calculate the work done by Deo who pushes a wagon of 70Nthrough a distance of 15metres.
4. If a man used 70kg to push a wagon through a distance of 25m Find the work done.

Qn: what are simple machines?

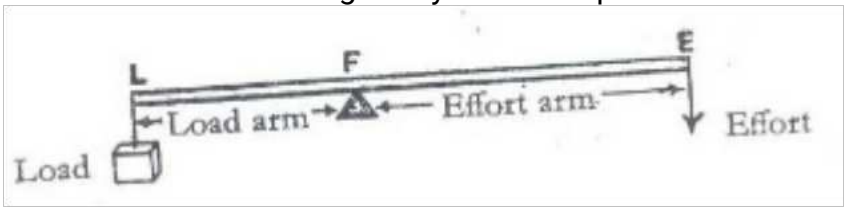
-These are machines that have fewer parts and are easy to use.
-These are machines that don't require technology or technical skills to use them

TYPES OF MACHINES/Classes of simple machines

1. Levers
2. slopes/ inclined planes
3. wedges
4. screws
5. wheel and axle
6. pulleys

LEVERS

-A lever is a rigid rod containing a fixed turning point called fulcrum(pivot).
- A lever is a stiff rod turning freely on a fixed point called fulcrum/pivot or turning point.



-Effort is the force to be exerted on a machine to overcome the load.
-The load is the force the machine overcomes.
-The pivot/fulcrumis the fixed turning point of a machine.
-The effort armis the distance between the effort and the pivot.
-The load armis the distance between the load and pivot.

Note:

-The longer the effort arm, the less effort is required.

Classes of levers

- first class lever
- second class lever
- third class lever

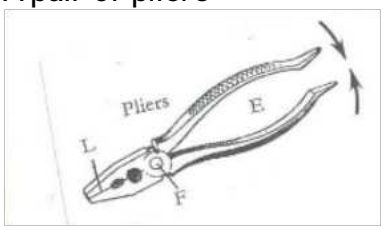
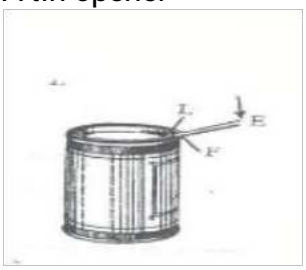
Note: **The classes of lever can be memorized using a formula PLE / FLE.**

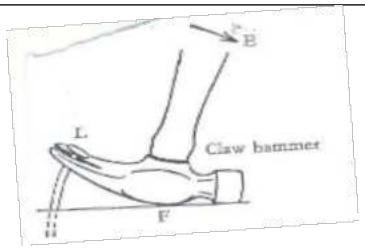
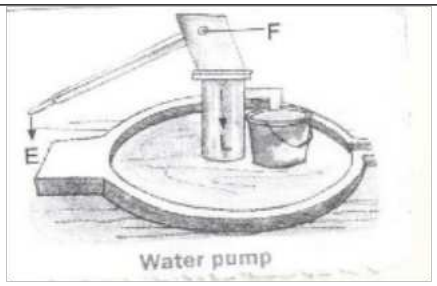
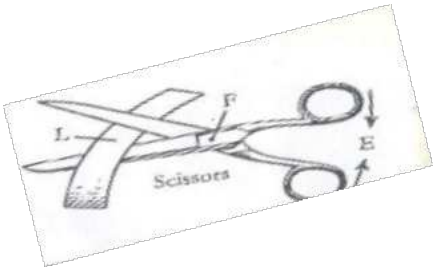
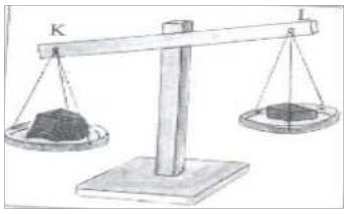
First class levers

-It is a class of lever with the pivot between the effort and the load

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Examples of first class lever

A pair of pliers 	A tin opener 

3	Claw hammer	7	Bore hole
			
4	Scissors	8	Lid opener
			
9	Scales		
			

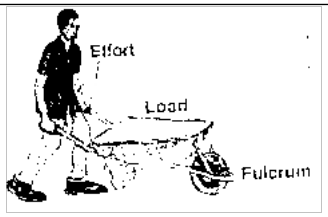
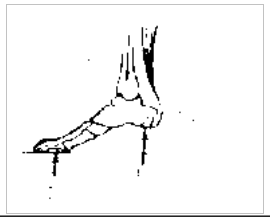
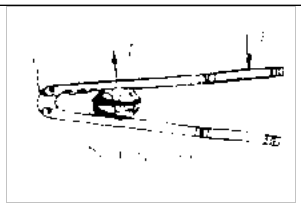
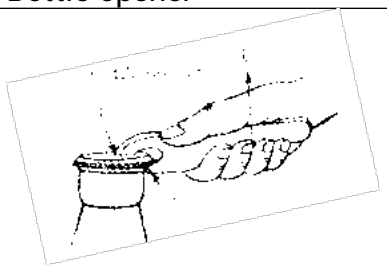
Advantage of first class levers.

-They reduce the effort needed to do work. This is because the effort armis longer than the load arm

Second class levers

-These are levers with the load in between the fulcrum and the effort

Examples of second class levers

1	Wheel barrow	3	Human Foot
			
2	Nut cracker	4	Bottle opener
			

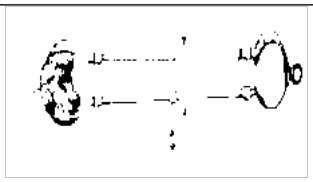
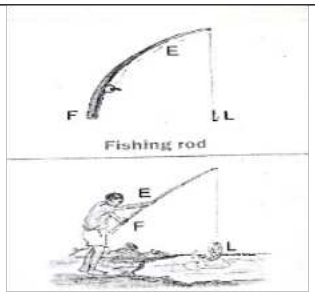
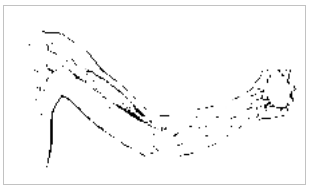
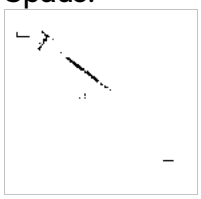
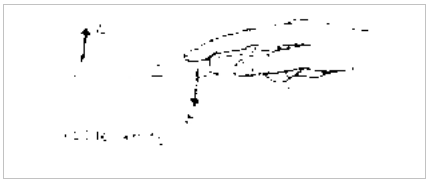
Advantage of second class lever

-It reduces the effort needed to do work.

Third class levers

This is a type of lever where the effort is in between the load and the pivo

Examples of third class levers.

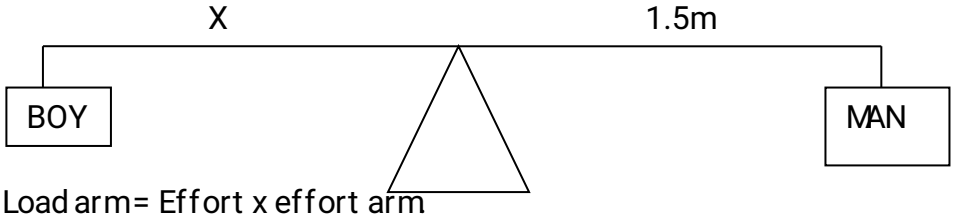
1	Sugar tongs	3	Fishing rod.
			
2	Human arm	4	Spade.
			
5	Table knife		6. Tweezers
			

LAW OF MOMENTS/LEVERS

- The principle of moments states that when the body is in equilibrium, the sum of clockwise moments is equal to the anti-clockwise moments at any point.
- It states that the load multiplied by the load arm is equal to the effort multiplied by the effort arm.

Examples

1. A man weighs 60 kgf. He sits 1.5 metres from the fulcrum of the see saw. How far from the fulcrum will the boy whose weight is 30 kgf sit in order to balance the man.
   Let the man be the effort and the boy be the load.
   Let the load be x metres.



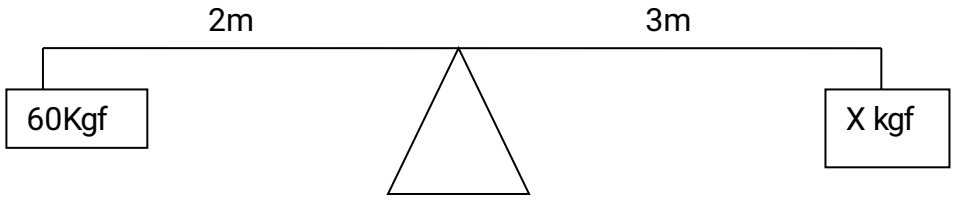
Load x Load arm = Effort x effort arm
30Kgf x X = 60kgf x 1.5m

$$\frac{30x}{30} = \frac{90}{30}$$

$x = 3$ m

2. A boy weighing 60kgf sits 2 metres away from the fulcrum of the see saw.

A girl sits on the other side at a distance of 3 metres fromthe fulcrumin order to balance the see saw. Find the weight of the girl.



Let the boy be the effort and the girl the load.
Let the girl's weight be y
Then, Load x Load arm=Effort x Effort arm

y x 3m =60Kgf x 2m

$\frac{3y}{3} = \frac{120}{3}$

y = 40kgf

3. A weight of 120 grams at a distance 3cmfromthe fulcrumis balanced by a weight of 30g on the other side. Find the distance fromthe 30kg weight to the fulcrum

Take 120kgf as the effort and 30kg as the load.
Let y be the distance of the load fromthe fulcrum
Then Load x load arm=Effort x Effort arm

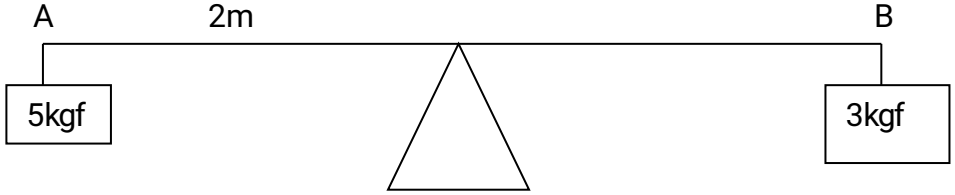
30 x y =120gf x 3cm

$\frac{30y}{30} = \frac{360}{30}$

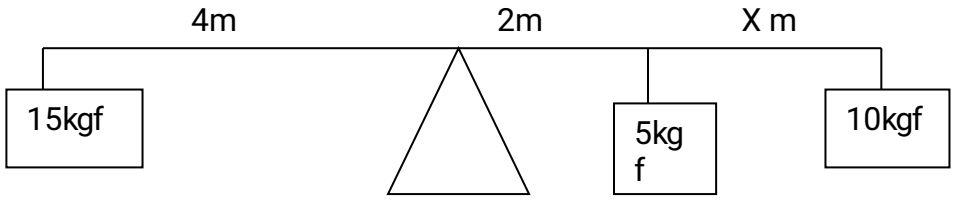
y =12cm

ACTIVITY

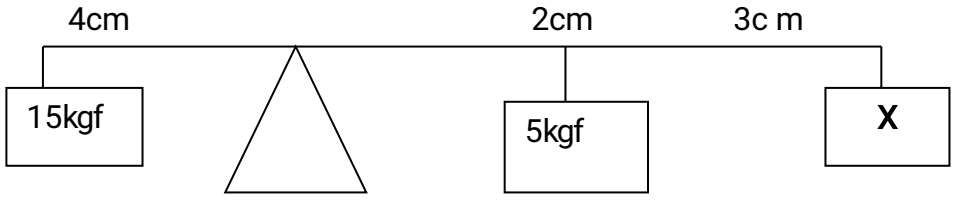
Using a see-saw shown below, find the length of the wooden plank AB.



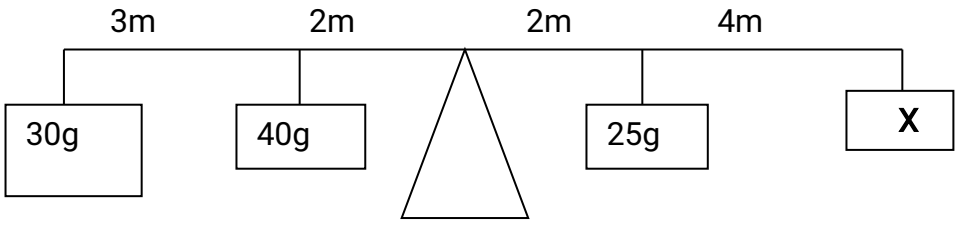
Find the value of X



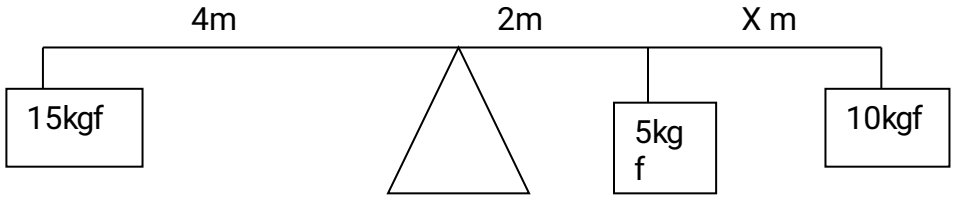
Find the weight at X



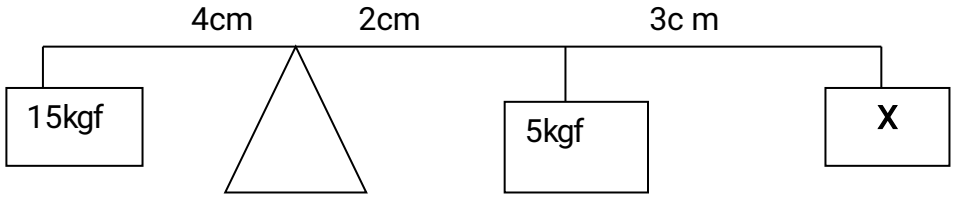
Find the weight at X



Find the value of X



Find the weight at X



A boy weighing 90kg sits 2m from the fulcrum of a seesaw. A girl sits on the other side at a distance of 3m from the fulcrum in order to balance the seesaw.
A) Draw a diagram to show the information above.
b) Calculate the weight of the girl.

MECHANICAL ADVANTAGE
-MA is a ratio of the load to effort.

Mechanical advantage = load / Effort
MA can also be got by dividing the distance moved by the effort by the distance moved by the load.
MA = effort distance / Load distance

-A machine has MA when it can move a load with an effort which is less than the load.
-If the mechanical advantage of a machine is less than one then the machine uses greater effort to overcome the small load.
-If the MA of a machine is greater than one then the machine uses less effort to overcome the load.

1. *Calculate the MA of a machine which carries a load of 900N with an effort of 150N.*
2. *What would be the load if the MA of a machine is 2.5 and uses the effort of 30N?*
3. *Calculate the MA of a machine lifting the load of 60N using an effort of 60N*

Note: The lever has a MA greater than 1 if: -

- The effort applied is less than the load.
- The effort arm is longer than then load arm

Efficiency of a machine

-The efficiency of a machine is the relationship between the work output and work input.

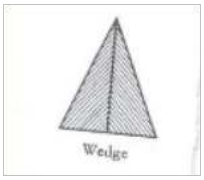
Forces that affect the efficiency of a machine

1. frictional force
2. gravitational force
3. Tension force.

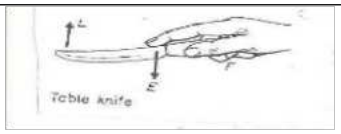
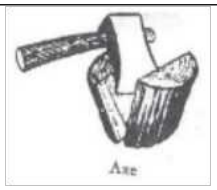
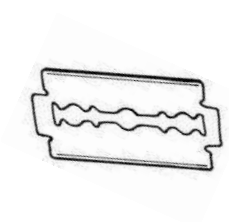
WEDGES/DOUBLE SLOPES/DOUBLE INCLINED PLANES

-A wedge is a tool used for cutting, piercing or splitting with a narrow point which gradually widens.

Illustration



Examples of wedges

1	Knife edge.	**5**	Axe blade
			
2	Hoe	**6**	Razor blade
			
3	Nail.	**7**	Needle.
			

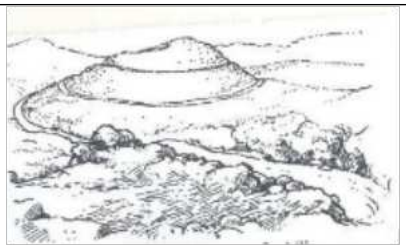
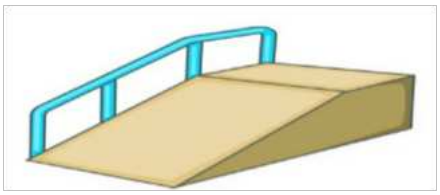
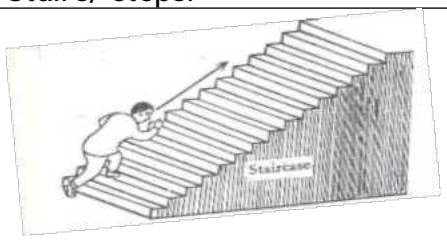
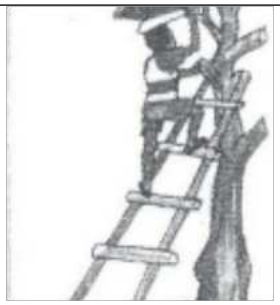
Uses of wedges to man

- They are used to split wood.
- They are used for piercing.
- They are used for cutting

SLOPES/INCLINED PLANES

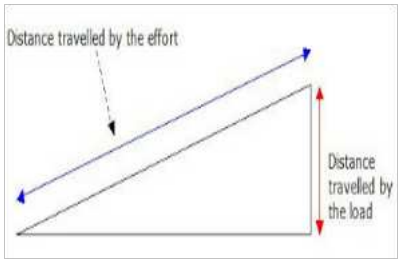
-An inclined plane is a slanting surface that connects the lower level to the higher level.

Examples of inclined planes

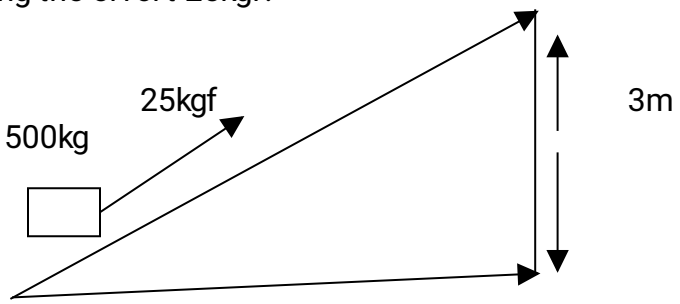
1	Winding road	3	Ramp/plunk
			
2	Stairs/ steps.	4	Ladders
			

Distance moved by the load and the effort on an inclined plane.

-The length of the slope is equal to the distance moved by the effort.
-The height through which the load is lifted is the load distance.
-The effort distance is longer than the load distance.



The diagram below shows a simple machine used to lift 500kg using the effort 25kgf.



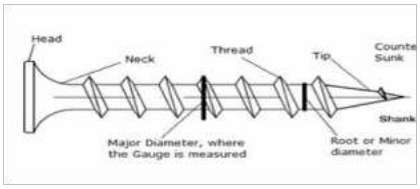
a) Name the simple machine above.
b) What distance does the load move?
c) How can Mr. Ojuka use less than 50kgf to lift the load up?
d) Calculate the mechanical advantage of the machine.

Uses of slopes

-They are used to move building materials during construction of flats.
-They are used to load and off load heavy goods into trains, cars, ships etc.
-They enable us to move up and down the flat.

SCREWS

A screw is a metal rod that has a thread winding around it.
It works in the same way as in inclined planes.

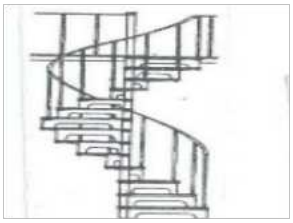
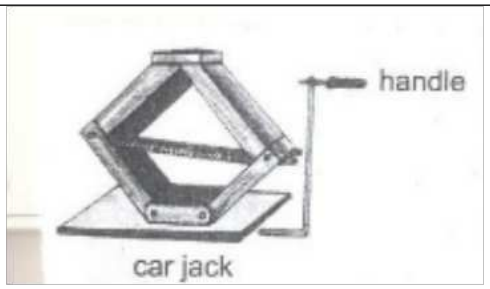


-The distance between the threads is called a pitch.

Uses of screws

- They are used to hold things to wood.
- They are used to hold metals together.
- They are used to lift cars.
- They are used to drill holes in wood and walls.

Examples of screws

1	Spiral staircase	3	Screw jack
			
2	Screw nails 		**Bottle top** 

WHEEL AND AXLE

-This is a combination of two wheels fixed together.
-In the wheel and axle, effort is applied at the large wheel to overcome the load.
-The small one is called the axle or shaft while the big one is the wheel.
-A strong thread is wound tightly around the axle.
-An axle is a rod on which the wheel turns.
-The thread coming out of the wheel leads to the effort area and the one coming out of the axle leads to the load area.

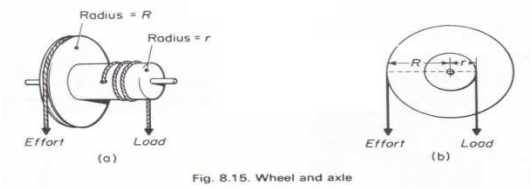
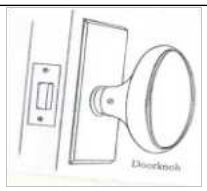
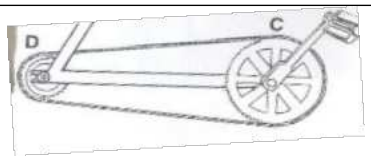
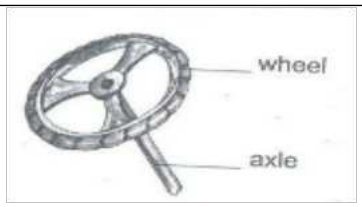
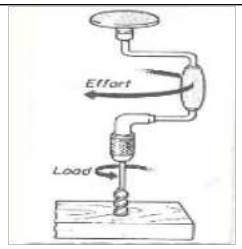
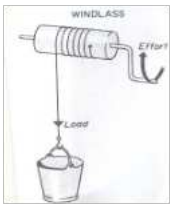


Fig. 8.15. Wheel and axle

R- Is the radius of the wheel.
r- Is the radius of the axle.

Examples of wheel and axle

1	Door Knobs	5	Pedal wheels
			
2	steering wheel	6	Egg beaters
			
3	Screw drivers	7	Brace
			
4	Windlass		Handles of a bicycle.
			

Uses of the wheel and axle

- They are used for drawing water from deep wells.
- They are used for drilling holes in objects.
- They are used in riding bicycles.
- They help to change direction of cars.

GEAR WHEELS

-Gear wheels are a formof wheel and axle that have teeth all around the edge of the wheel.
-Gear wheels are always connected to each other.

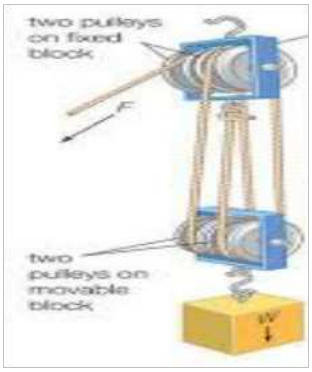
Uses of gear and belts to man.

- They multiply the speed in vehicles and cars.
- They help to change direction of rotation in vehicles.
- They multiply the effort.
- Belt drives help in factories and industries to transport manufactured goods.

PULLEYS

-A pulley is a freely rotating wheel with a grooved rim
-The groove holds a string or rope
-A rimprevents the rope fromslipping off.
-When a force is applied at one end of the string, it causes a pulley to rotate.

Major parts of a pulley



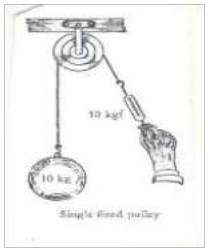
A frame which holds the pulley is called the block.

Types of pulleys

1. Single fixed pulleys
2. Single movable pulleys
3. Block and tackle pulleys / fixed movable pulleys

Single fixed pulleys

-It is said to be single because it is only one.
-It is also said to be fixed because it keeps rotating fromone point.
-It has the advantage of change of direction of force.
-It has a MA of 1.



Characteristics of a single fixed pulley.

-Effort is applied downwards as the load moves upwards i.e. the two move in opposite directions.
-The effort used is equal to the size of the load.

Advantages of a single fixed pulley

-It changes the direction of force
-It increases the speed of doing work

Disadvantage of a single fixed pulley

-It does not reduce the effort needed to do work.

Qn: why is the MA of a single fixed pulley one?

-The load is equal to the effort.

Qn: find the effort used to lift the following loads using a single fixed pulley:

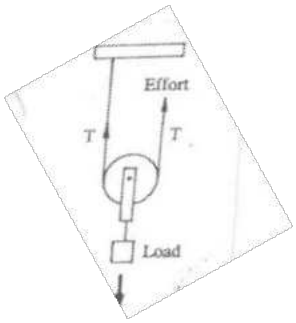
a) 42kg
b) 99kg
c) 82kg
d) 1000kg
e) 909N

Qn. Calculate the load to be lifted using a single fixed pulley with the efforts below:

a) 66kgf
b) 41kgf
c) 900kgf
d) 42N
e) 9009kgf

Single movable pulley

-A single movable pulley keeps moving up and down together with the load.
- It does not change the direction of force.
-It has two sections of the rope which support the pulley.
-It has a MA of 2.



Characteristics of a single movable pulley

-Both the load and the effort move upwards. i.e. the two move in the same direction.
-The effort is a half the size of the load.

Advantage of a single movable pulley

-It reduces the effort needed to do work

Disadvantages of a single movable pulley

-It does not change the direction of force.
-Work is slow

Why is the MA of a single movable pulley two?

-The effort is half the load.

Qn: workout the load that can be carried using a single movable pulley having the following efforts.

a) 90kgf
b) 51kgf
c) 32kgf

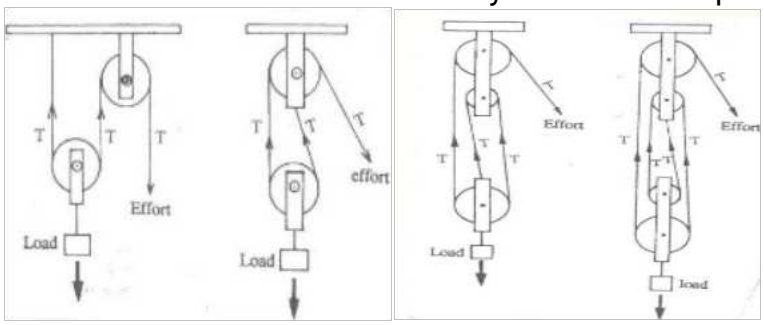
Qn: Find the effort used to for lifting the following loads using a single movable pulley.

a) 88kg
b) 7kg

c) 100kg
d) 81kg

BLOCK AND TACKLE SYSTEM

-It does work more easily because it is a combination of both fixed and movable pulleys.
-It changes direction of force.
-It reduces effort needed.
-The ratio of load to Effort is determined by the number of pulleys.



Importance of pulley systems

1. They are used in the raising of flags.
2. They are used in break down vehicles for towing those with mechanical problems.
3. They are used in lifts and elevators in tall buildings.
4. They are used in digging pit latrines.
5. They are used in carrying materials during construction of tall buildings.
6. They are used for loading dustbins in vehicles.

FRICTION

-Friction is the force that opposes motion.

Types of friction

- Static friction/limiting friction- friction between objects which are fixed in one position.
- Viscosity friction- friction experienced in liquids and gases (fluids).
- Sliding friction- friction between moving objects.

Properties of friction

- There is more friction in rough surfaces than in smooth surfaces.
- The greater the load the greater the friction.
- Whenever friction occurs, heat is produced.

Advantages of friction

1. It enables us to sharpen pencils.
2. It enables us to climb trees.
3. It enables us to write.
4. It is used to light match sticks.
5. It is used to sharpen knives.
6. It enables us to grind food
7. It enables us to walk.
8. It enables vehicles to start and stop

Disadvantages of friction

- It causes wear and tear.
- It produces unnecessary noise.
- It delays work.
- It causes unnecessary heat.

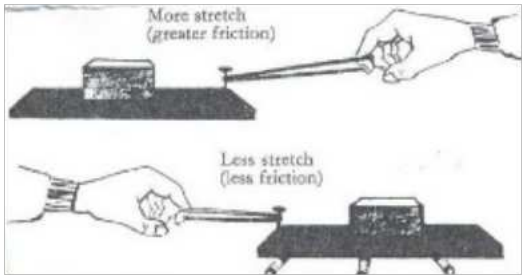
- Clothes grow older due to friction.
- It leads to an outbreak of fire from moving parts of a machine

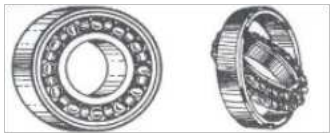
Ways of increasing friction

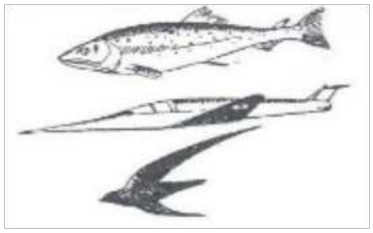
- Use of grips / by making smooth surfaces rough
- Putting treads on tyres.
- Increasing the weight of objects.
- Use of spikes
- By pouring sand and small stones on roads.

Ways of reducing friction

- Streamlining bodies
- Using ball bearings
- Lubricating machines (greasing and oiling)
- Making rough surfaces smooth.







Examples of lubricants

- Oil
- Grease

EXCRETORY SYSTEM

What is excretion?

Excretion is the removal of nitrogenous compounds from the body.

Or

Excretion is the process by which the body removes waste products.

-Respiration produces carbon dioxide and water vapour as waste products.
-Other body reactions produce waste products like urea, uric acid and lactic acid.
-These together with mineral salts have to be removed from the body.

The human body has special organs that carry out the function of excretion and these are;

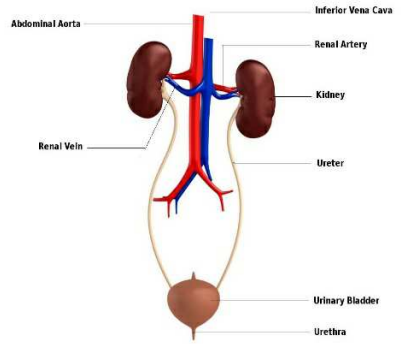
- skin
- liver
- kidneys
- lungs

Summary table of excretory organs and waste products

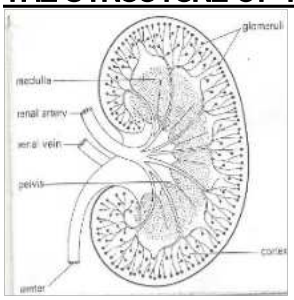
1	The kidneys	Urine (uric acid, excess salts)
2.	Skin	Sweat (urea, lactic acid, excess water)
3.	The lungs	Carbon dioxide and water vapour
4	The liver	Bile pigments

Why do people urinate frequently during cold weather?
-It is only the kidneys that remove excess water from the body during cold days.
Why do people urinate more frequently when they have taken a lot of fluids?
-To enable the kidneys maintain constant level of water in blood.

THE HUMAN KIDNEY
-There are two kidneys in the body.
-Kidneys are reddish brown bean-shaped organs found at the back of the abdomen.
Importance of kidneys
-It filters blood to remove nitrogenous wastes.
-It regulates the amount of water and mineral salts in blood.
NOTE-
-The main function of the kidneys is to filter blood.
The urinary system
-This is the part of the excretory system responsible for removing waste products in form of urine from the body.
-The organs that make up the urinary system are the kidneys, ureters, urethras and the bladder.



THE STRUCTURE OF THE HUMAN KIDNEY



Functions of parts of the human kidney
1. **Renal artery:**
   -It carries oxygenated blood to the kidney.

2. **Renal vein**
   -It carries de-oxygenated blood away fromthe kidney.
3. **Ureter**
   -It passes/ carries urine fromthe pelvis to the urinary bladder.
4. **Urethra**
   -It carries urine fromthe urinary bladder out of the body.
5. **Urinary bladder**
   -It stores urine before it's passed out.
6. **Urinary Sphincter**
   -It controls the flow of urine out of the urinary bladder.
7. **Cortex.**
   -It's where filtration of blood takes place.
8. **Medulla**
   -It's where selective re-absorption of water takes place
   -It absorbs back water that has been removed fromthe blood
9. **Pelvis**
   -It's where urine is produced and stored for some time.

How kidneys work.

-When blood fromthe renal artery reaches the cortex, it is filtered to remove urine.
-Urine passes through the medulla, pyramids and pelvis and then to the ureter which takes it to the urinary bladder.
-Blood fromwhich waste products have been removed leaves the kidney through the renal vein and joins the vena cava.
-Movement of urine fromthe urinary bladder is controlled by the urinary sphincter.

Examples of diseases that affect the human kidneys.

- Kidney stones
- Kidney failure
- Kidney cancer
- Gonorrhoea.
- Syphilis
- Bilharziasis
- Nephritis

Kidney failure

-This is when the kidneys fail to function due to some complications.

Signs

-Fever
-Pain in the lower back
-Nausea and vomiting
-Feeling weak

Kidney stones

-These are solid particles formed in the pelvis of the kidney.
-They are as a result of solidification of salts with in urine.

Signs

-A lot of pain in the back where kidneys lie
-Bloody urine
-Difficulty in passing urine

Treatment and prevention

-Drink a lot of water
-Seek medical advice.

Suggest the ways of maintaining the proper functioning of the kidneys

- By having regular physical exercise
- By eating foods rich in a balanced diet
- Avoid eating salty, sugary foods and alcoholic drinks
- Avoid holding back urine for a long time

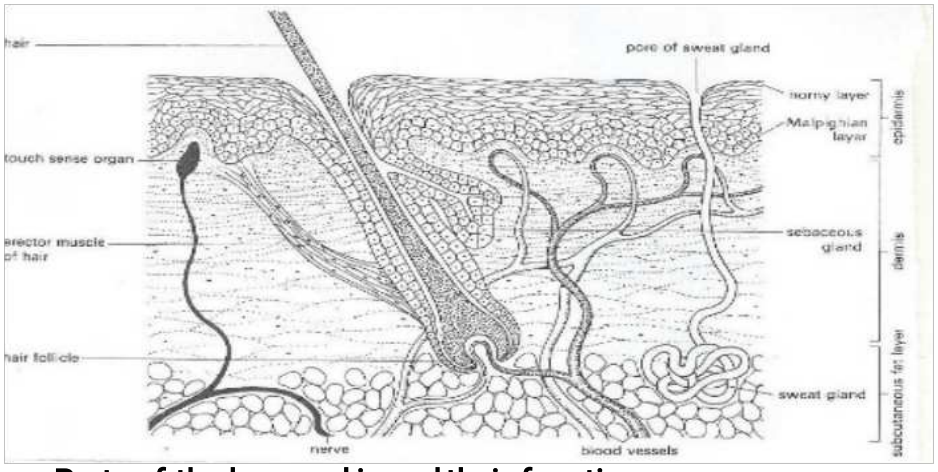
THE HUMAN SKIN

-The skin is the outermost layer of the body
-The skin is the largest organs in the human body.

Functions of the human skin

- The skin excretes sweat (urea, lactic acid and salts)
- It protects the body from damage.
- It is a sense organ for feeling and touch
- It stores fats
- The skin helps in the formation of vitamin D
- It regulates body temperature

THE STRUCTURE OF THE HUMAN SKIN



Parts of the human skin and their functions.

Layers of the skin.

-The skin is made up of two major layers namely;
-Epidermis
-Dermis

The epidermis

This is the outer most layer of the skin. It is made up of three layers i.e
-Cornified layer
-Granular layer
-Malpighian layer

1. **Cornified layer**
   - It has dead cells and forms a tough outer coat which prevents skin damage, germ infections and water loss by evaporation.
2. **Granular layer**
   -It consists of mature cells which are no longer dividing.
   -It contains living cells which grow and form the Cornified layer.
3. **Malpighian layer**
   - It consists of fast dividing cells. When the cells grow old, they form the granular layer.
   - It contains a pigment called melanin
   - Melanin determines skin colour.
   - Melanin protects the body against ultra-violet rays from the sun.

DERMS

-This is the deeper region of the skin.
-It is thicker than the epidermis.
-In the dermis we find the following;

- Blood capillaries
- Nerve cells
- Sebaceous gland
- Hair and hair follicle
- Sweat glands
- Sweat ducts

Sweat glands

-They produce sweat

Sebaceous glands

-They produce the oil substance called sebum which keeps the skin smooth and moist.

Sweat duct

-It carries sweat from the sweat glands to the pores

Sweat pores

-They let out sweat

Hair and hair follicle.

-Hair develops from the base of the hair follicle.
-The cells that make hair contain a substance called keratin.
-Keratin makes the hair water proof and hard.
-The hair helps to keep the body warm

Blood capillaries

-These supply oxygen, food nutrients and other requirements to the skin.
-They take away carbon dioxide from the skin cells so that it can be excreted.
-They carry excess salts, water and lactic acid to the sweat glands for excretion.

Fats

-They insulate the body and keep it warm

Nerve cells.

-These are sensory cells.
-They help to detect heat, coldness, touch, pain and pressure.

How the skin carries out excretion.

-When the weather is hot, the arterioles widen allowing more blood to flow near the skin surface.
-At the same time, the sweat glands become more active excreting sweat.
-The sweat duct lets out the sweat.
-When the surface reaches the skin surface, it absorbs some heat from the body that makes it to evaporate.
-Evaporation of sweat causes cooling of the body.

Write down the functions of the human skin

- The skin excretes sweat (urea, lactic acid and salts)
- It protects the body from damage.
- It is a sense organ for feeling and touch
- It stores fats
- The skin helps in the formation of vitamin D
- It regulates body temperature.

Importance of sweating to the body.
-Helps to cool the body.
-Helps to remove excess water from the body.
-Helps to remove excess salts from the body.

How does the skin (body) control too much heat?

- Through sweating.
- Through vaso-dilation.
- Through relaxation of the erector muscles causing the hair to erect.
- Through decrease in metabolic rate.

How does the skin (body) respond to low temperature?

- Less or no production of sweat.
- Vaso-constriction
- Contraction of erector muscle.
- Increased metabolic rate.
- Shivering

NOTE:

- Vasodilatation is the opening of capillaries so that more blood flows and more heat is lost through the skin.
- Vasoconstriction is the closing of the capillaries so that less blood flows and less heat is lost through the skin.

Why do blood vessels/ capillaries dilate on hot days?
-To allow more blood flow and more heat loss through the skin.

Why do people frequently urinate during cold weather.
-It's only the kidneys that remove excess water from the body during cold weather.

Skin diseases

Boils
-It is caused by bacteria
Signs and symptoms
-Pus forms in the hair follicle or oil glands
How it spreads
-Lack of proper body hygiene
Treatment and prevention
-Bathe your body regularly.
-Do not squeeze or press the boil

Impetigo
-It is caused by bacteria
Signs and symptoms
-Reddish small spots appear on the skin and later become blisters.
-The skin itches but does not pain.
How it spreads
-Through close body contact with an infected person.
-Sharing combs, cloths or towels with an infected person
Treatment and prevention
-Avoid sharing clothes, combs and towels with an infected person
-Bathe regularly with clean water and soap
-Seek early treatment.

Athlete's foot
-It is caused by fungi
Signs and symptoms
-Blisters appear in between toes
-The skin softens and turns white and starts peeling off.
-There is itching and burning pain
How it spreads
-Wearing dirty infected socks or shoes
-Walking bare foot on infected floors
Treatment and prevention
-Wash your feet regularly and dry themwith a towel
-Soak your socks in a fungicide powder before using them
-Seek medical treatment froma health worker

Candidiasis
-It is caused by a fungus
Signs and symptoms
-Red patches around the anus, vagina, mouth and body folds
-Whitish substance appears on the surface.
-Burning and itching of the infected part.
How it spreads
-Close body contact with an infected person.
Treatment and prevention
-Keep the affected area cool and dry
-Observe general body hygiene
-Seek medical treatment

Ringworm
-It is caused by a fungus
Signs and symptoms
-Reddish scaly patches on the affected part.
-The affected part itches
How it spreads
-Body contact with an infected person
-Sharing cloths, towels, combs, basins and sponges with an infected person.
Treatment and prevention
-Seek early treatment
-Avoid sharing cloths, towels and basins
-Bathe the body regularly

Herpes zoster
-It is caused by a virus common among Hiv/AIDS infected people.
Signs and symptoms
-Blisters formon -the back or chest
-You feel a burning sensation
Treatment and prevention
-Keep the affected areas clean to avoid further infections
-Seek early treatment.

Scabies
-It is spread and caused by itch mites.
-It attacks areas between the fingers, armpits, breasts, the navel and the thighs.

Signs and symptoms
-Inflammation of the affected part.
-Blisters with pus develop on the affected part.
-Itching of the skin.

How it spreads.
-Body contact with an infected person.
-Sharing cloths and sponges with an infected person
-Failure to observe good personal hygiene.
Treatment and prevention
-Seek early treatment.
-Avoid sharing cloths, towels and basins with an infected person.
-Bathe the body regularly.

Skin cancer
-It is caused by ultra-violet rays fromthe sun.
Signs and symptoms
-Scaly wart like spots on the skin
-The scales become loose and fall off the body.
Treatment and prevention
-Seek early treatment.
-Avoid bleaching your skin as this removes melanin fromthe skin.
-Avoid too much exposure to sunshine.

Mention some examples of disorders of the human skin
- Corns
- Warts
- Wounds and cuts
- Scalds
- Burns
- Albinism

Suggest the ways of maintaining the proper functioning of the human skin
- By doing regular physical exercises
- By eating foods rich in a balanced diet
- By regular bathing with clean warmwater and soap
- By covering wounds and cuts with sterilized bandages
- By rubbing the skin with a clean towel to stimulate the flow of blood.

Give the similarity between the kidney and the skin in terms of their function
-Both the kidney and skin remove excess water fromthe body.

THE LIVER
- The liver is the most important organ in the human body with about 500 functions

State the functions of the liver in the human body
- The liver excretes bile pigments
- It produces bile
- The liver dilutes poisonous/ toxic substances
- The liver converts glucose and sucrose into glycogen
- It stores bile
- It stores fats
- It regulates blood sugars
- It stores mineral salts

- The liver stores vitamins
- It produces heat energy etc.

Mention the diseases that commonly affect the liver

- Hepatitis B
- Liver cirrhosis
- Liver abscess
- Liver cancer etc

Suggest the ways of maintaining the proper working of the liver

- By doing regular physical exercises
- By eating foods drinking rich in a balanced diet
- By boiling drinking water
- Avoid eating and drinking sugar and salty foods.

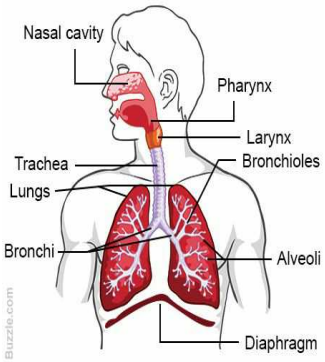
Name the childhood immunisable killer disease that affects the human liver.

- Hepatitis B

Name the blood vessel that carries digested food from the ileum to the liver.

- Hepatic portal vein.

The lungs as excretory organs.



1. **Epiglottis**
   -It prevents food from entering the trachea / wind pipe.
   -It closes the upper end of the trachea during swallowing.
2. **The trachea/ wind pipe**
   This is tube running from the larynx to the lungs.
   -It carries air along the respiratory tract.
   -It is permanently kept open by the rings of cartilage in its walls.
   -The trachea contains tiny hair called cilia that help to filter and warm air
3. **Air sacs/Alveoli**
   - These are bag – like structures where gaseous exchange takes place.
   - Gaseous exchange in the air sacs takes place by the process of diffusion.

How are the alveoli/air sacs adapted to their function of gaseous exchange?

- They are well supplied with blood capillaries.
- They are thin walled to allow gases go through easily.
- They are very many in number to increase surface area for gaseous exchange.

Functions of the lungs as excretory organs.

-The lungs have tiny air sacs called alveoli.

-These are surrounded by a dense network of blood capillaries.
-Blood coming from the body cells into the lungs carries a lot of carbon dioxide and excess water.
-These waste products get into the air sacs of the lungs and are expelled from the body as we breathe out.

Write down the diseases that affect the respiratory system

- Lung cancer
- Emphysema
- Pleurisy
- Bronchitis
- Asthma
- Pneumonia
- Haemophilus influenza
- Tuberculosis
- Diphtheria
- Whooping cough/ pertussis

Name the diseases of the respiratory system caused by excessive smoking

- Lung cancer
- Emphysema

Name the childhood killer immunisable diseases that affect the respiratory system

- Tuberculosis
- Diphtheria
- Whooping cough
- Influenza

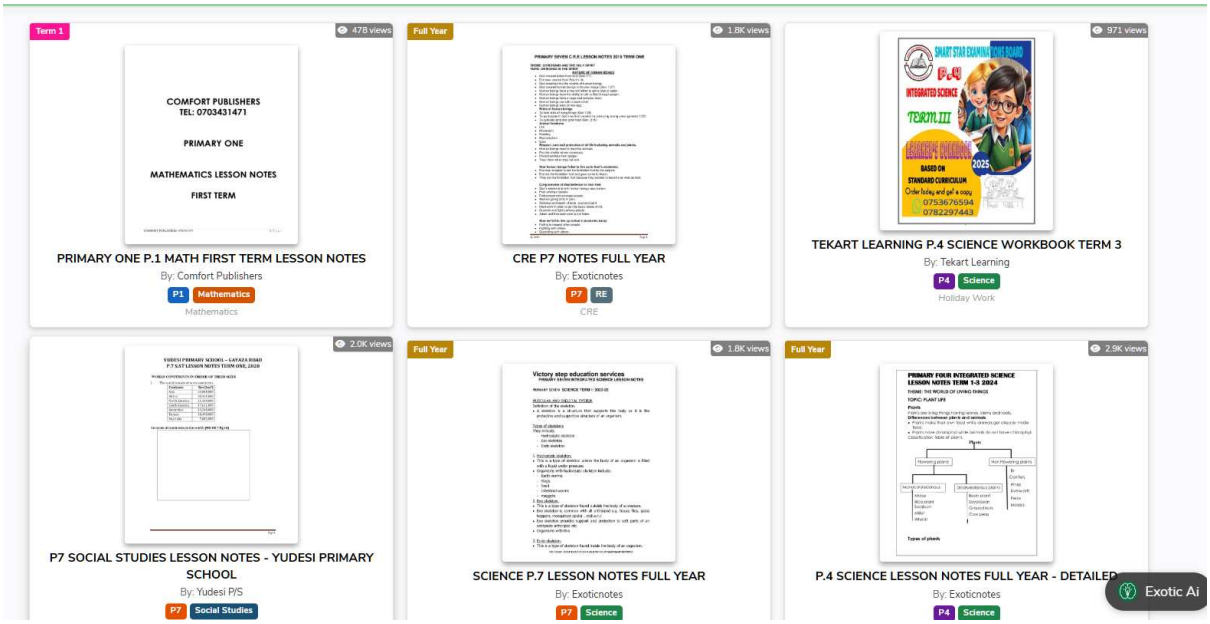
Mention some examples of disorders of the respiratory system

- Coughing
- Choking
- Yawning
- Hiccups

Suggest the ways of maintaining the proper functioning of the respiratory system

- By doing regular physical exercises
- By eating foods rich in a balanced diet
- Avoid bad social habits like smoking
- Avoid staying in places with a lot of dust and smoke.

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