

THEME: THE HUMAN BODY
TOPIC 1: MUSCULAR AND SKELETAL SYSTEMS
LESSON

Definition of the skeleton

- ☆ A skeleton is the supportive structure of the body of an organism.
- ☆ A skeleton is the framework of the body.
- ☆ A skeleton is the structure that forms the support of the body.

Types of skeletons

They include;

- a) Hydrostatic skeleton
- b) Exo skeleton
- c) Endo skeleton

1. Hydrostatic skeleton.

This is a type of skeleton where the body of an organism is filled with a liquid under pressure.

In this skeleton, there is no hard tissue on the body of an organism.

Organisms with hydrostatic skeleton

- | | | |
|--------------|----------------|--------------------|
| ☆ Earthworms | ☆ Caterpillars | ☆ Intestinal Worms |
| ☆ Slugs | ☆ Star Fish | |
| ☆ Snails | ☆ Jelly Fish | |

2. Exo skeleton.

This is a type of skeleton found outside the body of a creature.

Exo skeleton is common with all arthropod/ insects like house flies, grasshoppers, mosquitoes, spider, crab, crustaceans, myriapods, arachnids, terrapins and tortoise.

Exo skeleton provides support and protection to soft parts of a centipede and arthropod.

The hard skeletons in insects are called **cuticles**. Cuticles provide insects with hard, tough outer covering.

Animals with exo skeleton periodically shed their outer most layers and form the new cuticle on the exposed surface. This is called **ecdysis (moulting)**

3. Endo skeleton.

This is the type of skeleton where the hard tissues are found inside the body of an organism.

All vertebrates have endo skeleton.

Examples of animals with endo-skeleton

Man, Goat, Cat, Sheep, Lion, Hen

They have bony skeleton in their bodies.

These animals can grow by a continuous increase in the size and not by a series of ecdysis.

Activity

1. Define the word skeleton.

2. State any **two** types of skeletons found in living organisms.

3. Name the type of skeleton where the body of an organism is filled with a liquid under pressure.

4. Give any **two** organisms with hydrostatic skeleton.

5. Which type of skeleton is commonly found in all insects?

6. State any one use of cuticles to the insects.

7. State **one** reason why insects moult.

8. All vertebrates have endo skeleton.

a) What do you understand by this statement?

b) State any **two** examples of these vertebrates with endo skeleton.

9. Give any **two** examples of organisms with endoskeleton.

SPELLING EXERCISE

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LESSON

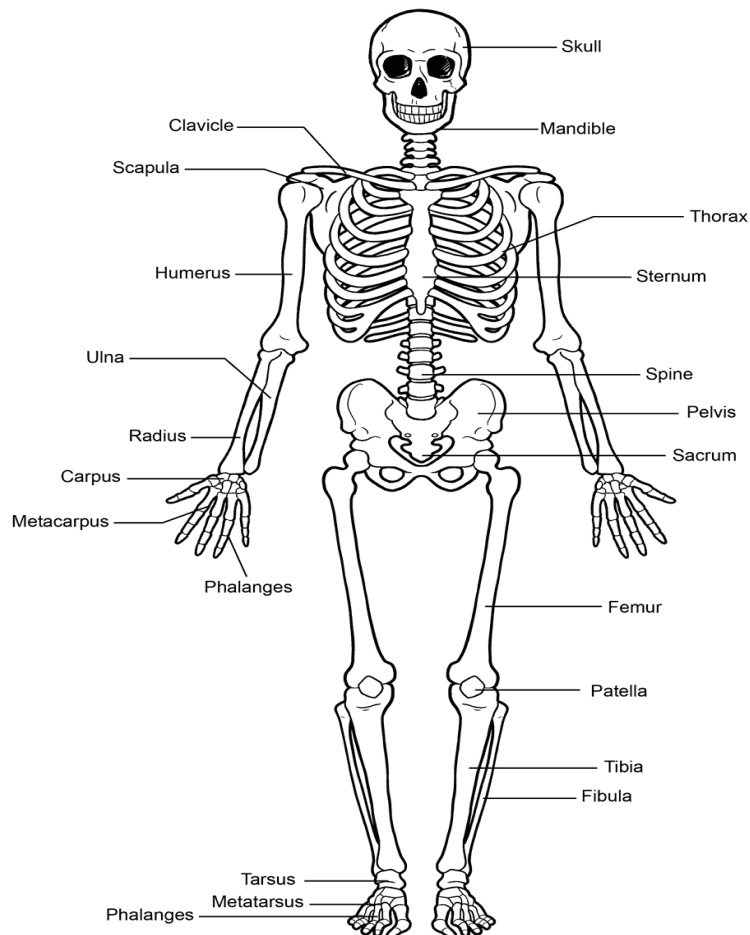
The structure of the human skeleton

The human skeleton is made up of 206 bones in total.

The human skeleton is subdivided into two main regions namely

1. Axial skeleton
2. Appendicular skeleton.

The structure of human skeleton



Axial skeleton

This region consists of the vertebral column/spine and skull. It forms the foundation of the skeleton and on this the ribs are attached.

i) The back – bone

This forms the central axis of the body and has 33 bones called vertebrae.

The back bone is divided into 5 regions.

1. Cervical region

This is found in the neck and has seven bones.

2. Thoracic region

This is found behind the chest and the ribs are attached on it.

The ribs together form the rib cage.

The thorax region has 12 vertebrae

3. Lumbar region

This is found in the abdomen and has 5 vertebrae.

4. Sacral region

- the sacrum is found in the pelvic and has 5 vertebrae fused together.

5. **Coccyx region**– this is found in the tail and has 4 vertebrae fused together.
The rib cage – this is made up of 24 ribs (12 pairs) all of which are attached to the back – bone (spine)
The upper 14 ribs (7 pairs) are attached directly to the sternum (breast bone) by means of cartilages.

ii) The skull

This is made up of 22 bones.

It consists of the cranium and face – bones.

The cranium is formed by many bones fused together by interlocking serrated edges. These edges become fused in adulthood.

2. Appendicular skeleton

This consists of the girdles and the four limbs.

Pectoral (shoulder) girdles.

- ✓ These are made up of 4 bones, two on either side.
- ✓ These bones are scapula (shoulder bones) and clavicle (idler bones)
- ✓ Pelvic (hip girdle). This is made up of 3 bones.

The limbs

These include two upper limbs and two lower limbs

a The upper limbs (arms)

- These have three (3) long bones each.
- The three bones are humerus, radius and ulna.
- In each arm there are short bones such as carpals (8), metacarpals / bones of the palm (5) and phalanges / finger bones (14)

b The lower limbs (legs)

- These also have 3 long bones each.
- The three bones are femur, tibia and fibula
- In each limb there are patella / knee bone(1), tarsal / ankle bones (8), metatarsals / foot bones, (5) and phalanges / toe bones (14)

Functions of the skeleton

1. It gives support to the soft parts of the body.
2. It helps in movement which is caused by the muscles attached to it.
3. It provides surface for attachment of muscles.
4. It gives the body shapes
5. It stores and controls the amount of calcium and phosphorous in the body.
6. It protects the delicate organs.
7. Skeletons store fats in the yellow bone marrow.
8. The skeletons manufactured new body cells.
9. It contributes to the formation of blood cells e.g. in porous ends of the long bones the red blood cells and some white blood cells are made.

Protective functions of the skeletons

- The skull protects the inner ear (ear drum) and the brain.
- The eye sockets(orbis) protects the eyes

- The rib cage protects the heart and the lungs.
- The pelvis (pelvic girdles) protects the reproductive system in women, ovaries and kidneys.
- The backbone, spine or vertebral column protects the spinal cord and nerves.

Activity

1. Name the process by which the upper ribs (are attached directly to the sternum (breast bone)

2. Name the part of the body where femur, tibia and fibula are found.

3. State any **two** functions of the skeleton.

4. Name the skeletal part that protects the inner ear and the brain.

5. Which sense organ is protected by the eye sockets?

6. Mention any **two** delicate body organs protected by the rib cages.

7. Name the skeletal structure which protects the spinal cord.

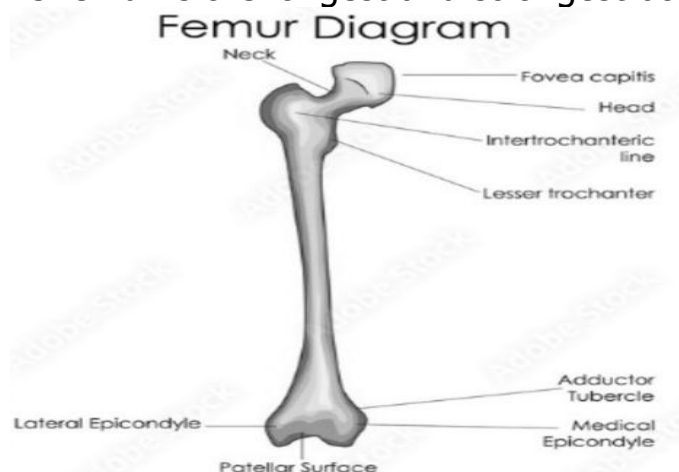
LESSON

BONES

Bones are hard connective tissues found in the body of an organism.

1 Long bones

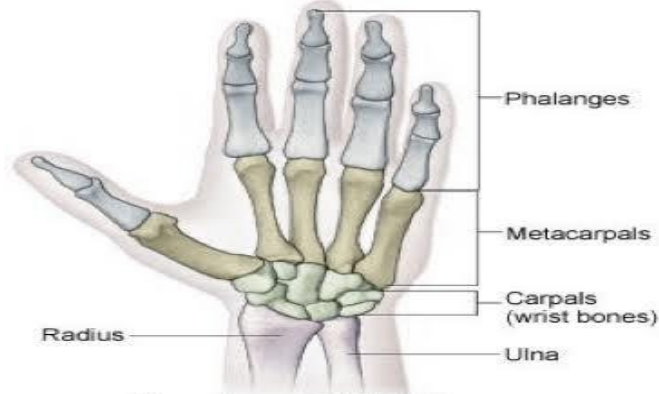
These bones are found in the arms and legs e.g femur, radius, fibula, ulna and tibia. The femur is the longest and strongest bone in the body.



2 **Short bones**

These are found in the last edges of the limbs.

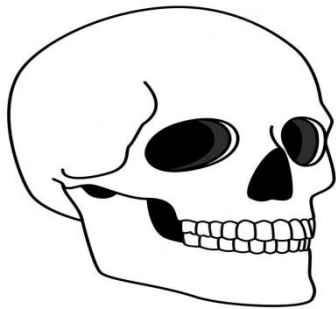
These include the carpals, metacarpals, phalanges, tarsals, metatarsals



3 **Flat bones**

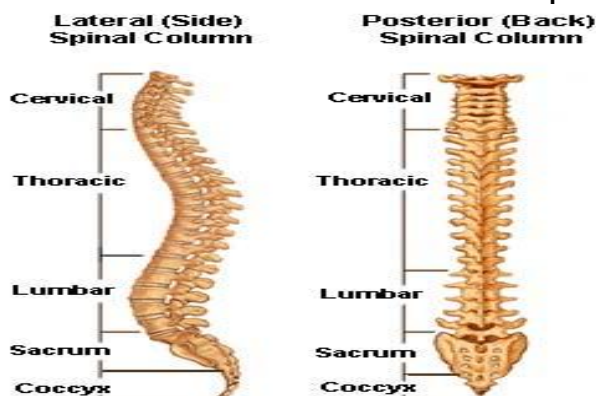
These include the bones of the skull, scapula, patella (knee cap).

Structure of the skull



4 **Irregular bones**

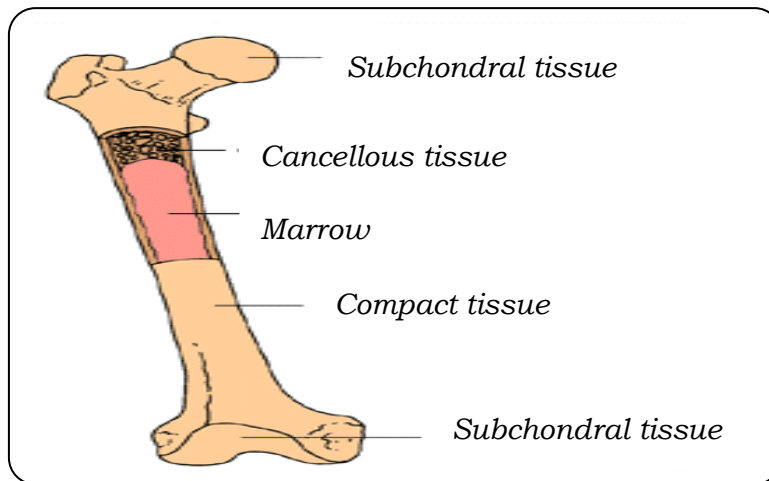
These include the vertebrae of the spinal column.



Functions of the bones

1. They manufacture blood cells i.e
 - ✓ White blood cells are manufactured in the yellow bone marrows of long bones.
 - ✓ red blood cells are manufactured in the red bone marrows of short bones
2. It provides the surface area for attachment of muscles

The structure of a bone



Cartilage

These cover the ends of the bone that moves.

They act as cushions to absorb friction when bones rub each other.

Yellow bone marrow

This is where white blood cells are manufactured from. It also contains fat cells.

Activity

1. What name is given to the hard connective tissues found in the body of an organism?

2. Name the longest and strongest bone in the body.

3. Mention any **two** examples of flat bones

4. Name the blood cells manufactured in the yellow bone marrow of long bones.

5. Where are red blood cells manufactured from in the short bones?

6. State any **two** importance of bones in the body of an organism.

LESSON

Spongy bone

This is the porous part of the bone which is filled red bone marrow.

Hard bone

This part protects the bone marrow from escaping. It contains calcium.

Main bones and their other bones

1. Skull – cranium
2. Scapula – shoulder bone
3. Sternum – breast bone
4. Clavicle – collar bone

5. Jaw bone – mandible
6. Back bone – spine/ vertebral column
7. Pelvis – hip bone
8. Tail bone – coccyx
9. Patella – knee cap
10. Femur – thigh bone
11. Tibia – shin bone
12. Palm bones – metatarsals
13. Ankle bone – tarsals

JOINTS

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

- ✓ At the joint, the bones are joined to each other by ligaments.
- ✓ The ligaments also help to prevent dislocation of the bones.
- ✓ At the end of some bones, there are cartilages which act as slippery and smooth surface. Within the joint there is synovial fluid which helps to reduce friction.

Types of joints

These include:

- Movable joints
- Immovable joints

1. Movable joints

- These are joints which allow movement in the body.
- Movable joints are held together by ligaments and tendons.

Examples of movable joints

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

Hinge joint

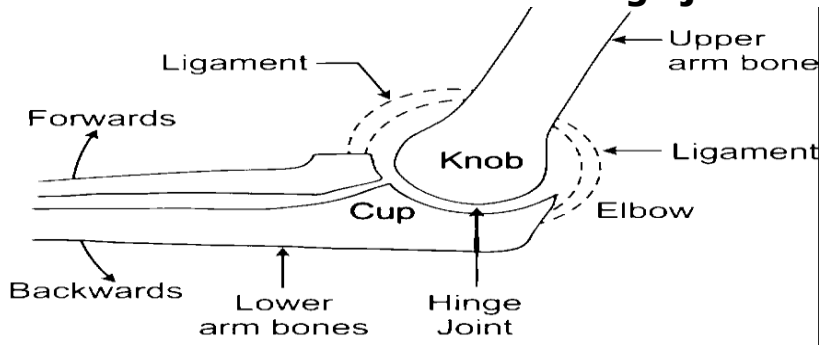
This is a type of movable joint which allows movement in one plane/ one direction only.

Examples of hinge joint

- ☆ The elbow joint
- ☆ The knee joint

NB: They are called hinge joints because their movement is like that of a door on its hinges. They allow movement only forward and backward. This makes it easy to bend and stretch that body part.

Illustration of the structure of hinge joints



Ball and socket joints

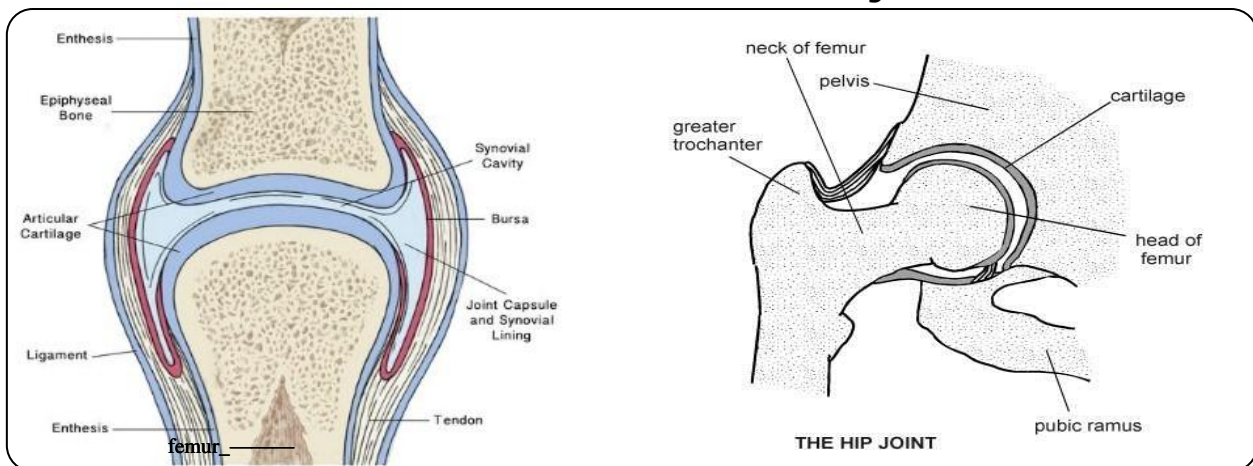
This is a type of movable joints which allow movement in all directions. I.e. forward, backward, sideways and in circular form.

Examples:

- The shoulder joint.
- The pelvic girdle (hip joint)

They are called ball and socket because the ball shaped end of one bone fits into a socket in the other bone. They are found in the hip and the shoulder.

Illustration of the structure of ball and socket joint

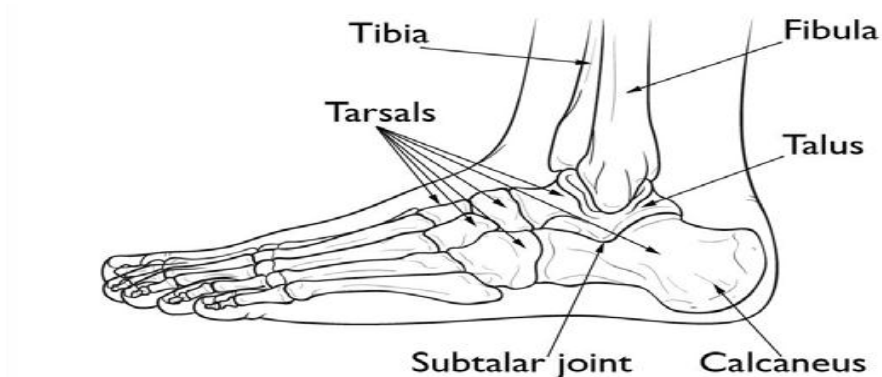


Pivot joints

- This is a type of joint which allows rotation of certain parts of the body on other parts.
- An example of pivot joints is the neck vertebra.
- Pivot joints help us to nod our heads.

Gliding joints / plane joint

- This is a type of joint where two moving bones are flat and slide over one another easily.
- Gliding joints are found in the waist and ankle.



Importance of joints

1. Joints allow movements in the body.
2. They enable us to stretch and bend the body.

Features of a typical movable joint

1. The cartilage and synovial fluid – reduce friction in the joint.
2. Ligaments – structures which join bones together at a joint.
3. Tendons – structures which join muscle to bone.
4. Synovial membrane / synovium – is a capsule of fibrous material whose inner membrane secretes synovial fluid.

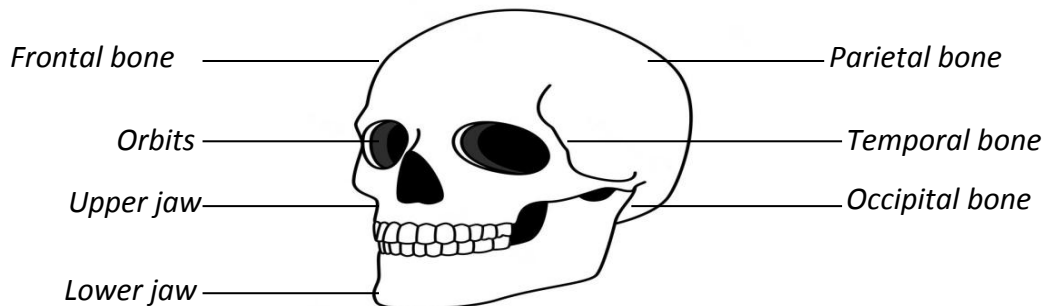
2. Immovable joints

- This is a type of joint that does not allow any movement because they are tightly fixed together.

Examples:

The suture joints found in the skull

Parts of immovable joints



Activity

1. What name is given to the joint at the knee?

2. In which one way can friction be reduced at a joint?

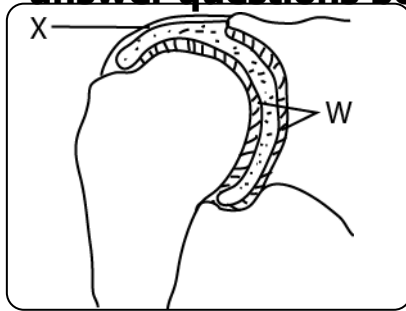
3. Give one example of the following types of joints

(i) Hinge joint_____

(ii) Ball and socket joint_____

(c) Name the food substance that helps in formation of strong bones.

The diagram below shows part of a joint. Study it and uses it to answer questions below.



4. Name the part marked **X** _____
5. How is the part marked **W** important to the joint?

6. **The table below shows joints and their position in the human body. Study and complete it correctly**

Joints	Position in the body
Pivot joint
.....	shoulder
.....	Knee
Suture joint

LESSON

MUSCLES

- ✓ These are elastic substances found in the body of animals
- ✓ Muscles are the soft flesh attached to the bones.
- ✓ Muscles are pieces of body tissues that contracts and relaxes in order to move a particular body part.

Muscles are connected to the bones by tough fibrous tissues called **tendons**.
Muscles only relax and contract.

There are three types of muscles namely;

1. Voluntary or skeletal muscles
2. Involuntary or smooth muscles or visceral muscles.
3. Cardiac muscles.

(A) Voluntary or skeletal muscles/ striated muscles

These are muscles whose movement can be controlled by the brain.

1. They are always attached to the skeleton by tendons.
2. These are muscles that contract and relax at one's will.
3. These are muscles attached or joined to the bones i.e skeletal muscles.
4. These muscles form the bulk of the body.
5. They operate the functions of the skeleton.

Examples of voluntary muscles:

1. Biceps muscles (Flexor)
2. Triceps muscles(Extensor)
3. Calf muscles

4. Fernalis muscles
5. Masseler muscles

Characteristics of voluntary muscles

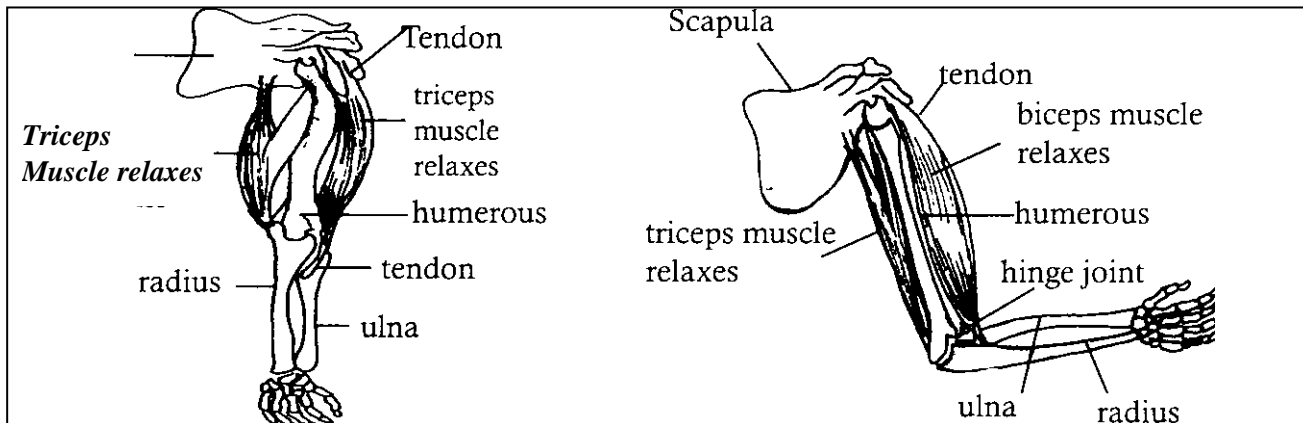
1. They are attached to bones.
2. They relax and contract at one's will

Movement of biceps and triceps

When bending the arm, the biceps contract while the triceps relax.

When the arm is straightened, the biceps relax and the triceps contract

Diagram showing the arm and its parts



(B) Involuntary or smooth muscles

- ✓ These are muscles whose movement is automatic.
- ✓ We have little or no control over them.
- ✓ These muscles are not connected to the bones.
- ✓ They do not contract and relax at will.

Characteristics of involuntary muscles

1. They are not attached to the bones.
2. They have automatic movement
3. They are located on body organs
4. Intercostal muscles
5. These muscles move automatically

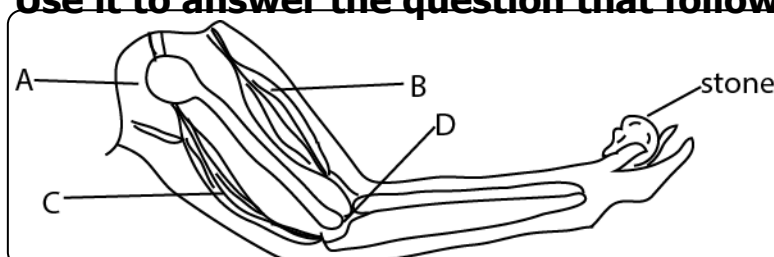
Examples of the involuntary muscles:

1. Muscles of the walls of the alimentary canal.
2. Muscles of the reproductive system.
3. Muscles of the blood vessels.
4. Muscles of the excretory system.

Activity

The diagram below shows the human arm holding a stone.

Use it to answer the question that follow



(a) Which muscle acts as the effort in order to lift the stone?

(b) What happens to muscle C when the arm is raised?

(b) What kind of movement is possible at each of the following joint?

(i) Joint **A** _____

(ii) Joint **D** _____

Why are the triceps and biceps muscles referred to as voluntary muscles?

LESSON

(C) CARDIAC MUSCLES

These muscles combine both structures of the voluntary and involuntary muscles.

They contract and relax alternatively without any nervous stimulation

They move automatically and rhythmically.

Examples of cardiac muscles

Muscles of the heart and in the lungs;

These have the capacity to contract and relax throughout life without getting tired.

They only stop when the person is dead.

Function of muscles.

1. They help in joining bones in our body.
2. They help in movement (Locomotion)
3. They help animals to perform work.
4. They aid in movement of food through the alimentary canal
5. Some muscles help in controlling blood pressure
6. They are used in storage of oxygen
7. Muscles maintain proper body postures

NOTE:

- Antagonistic muscles are muscles which work in pairs.
- When one relaxes the other contracts.
- Examples are the Biceps and Triceps muscles of the arm.

Importance / functions of the skeletal and muscular system

1. They give the body shape.
2. They help in body movement
3. They protect the inner delicate organs of the body.
4. They help in manufacturing of blood cells.
5. They provide room for muscular attachment

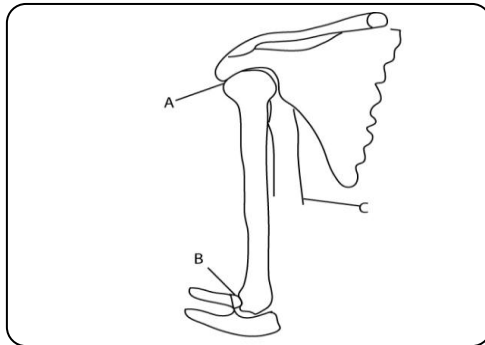
Activity

1. State the injury that results from tearing of muscles.

2. Mention the structure that joins a bone to a muscle

3. Name the muscles which helped Kandi to remove the foot immediately after stepping on the fire.

4. **The diagram below is of a part of a human arm, use it to answer the questions that follow**



- (a) Name the joint A

- (b) What kind of movement does the joint **A** allow?

- (c) Complete the drawing of muscles C to show where its lower end is attached.
- (d) If the arm is in the position shown, name the muscle which must be contracted.

LESSON

POSTURES

Posture is the way a person positions his or her body when performing an activity. There is correct posture for sitting, standing, walking, running and sleeping.

Types of posture



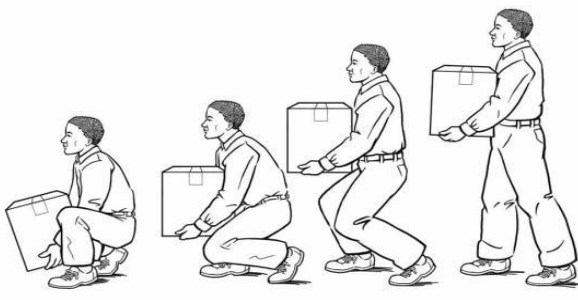
- ✓ Good posture
- ✓ Bad posture

Good posture:

This is the proper way of positioning the body when performing an activity.

How to promote good posture

1. Always sit properly without bending.
2. By tightening the ankles and knees during movement.
3. By placing all the feet on the ground during movement
4. By putting all body weight on both buttocks when sitting.




Good standing posture	Good sitting posture	Good lifting postures
		

Importance of having good body posture

1. It makes the muscles and bones strong.
2. It allows proper growth and development of body organs.
3. It prevents skeletal and muscular disorders and deformities
4. It enables protection of internal body organs
5. It allows proper digestion of food
6. It makes one look smart
7. It prevents chest and back pain

Bad posture

This is the improper positioning of our bodies when performing an activity.

Poor sleeping posture	Poor sitting postures	
		

Activities that can lead to bad posture

1. Standing while bending forward.
2. Sleeping while bending some body parts
3. Sitting while bending forward
4. Walking and running while bending forward

Dangers/Effects of bad posture

1. It leads to deformation of bones and muscles
2. It causes chest and back pain
3. It causes indigestion
4. It leads to poor blood circulation in the body
5. It causes skeletal disorders

Activity

1. What do you understand by the term posture?

2. State any **two** types of postures.

3. Mention **two** ways of promoting good posture.

4. Give any **two** importance of having good body posture.

5. Mention any **two** activities that can lead to bad posture.

6. State any **two** effects of bad posture to the body.

7. Give any **two** importance of body exercise

LESSON

Diseases and disorders associated with the skeletal and muscular system.

Diseases associated with the skeletal and muscular system.

- | | |
|-----------------------------|-----------------------|
| ☆ Polio | ☆ Osteoporosis |
| ☆ Rickets | ☆ Tetanus |
| ☆ Osteomalacia | ☆ Cancer of the bones |
| ☆ Tuberculosis of the spine | ☆ Arthritis |
| ☆ Leprosy | |

(i) Polio (Poliomyelitis)

It is caused by a **virus** passed out by an infected person in faeces.

- The virus can get into our bodies through drinking contaminated water.
- The virus can also get into our bodies by eating contaminated food.
- The disease affects bones especially the limbs and paralyses them.
- That is why it is called the disease of the limbs or bones.

Signs and symptoms

1. Deformed bones of the limbs
2. High fever
3. Paralysis of the limbs
4. General body weakness
5. Lameness

Prevention and control of polio

1. Immunization with polio vaccine by giving drops in the mouth.
2. Use latrines wherever possible.
3. Wash hands with soap and water before eating food.
4. Drink boiled water.

(ii) TUBERCULOSIS OF BONES

- ✓ Tuberculosis is caused by a bacterium called a mycobacterium.
- ✓ The bacterium was first discovered by Robert Koch in 1882.
- ✓ The bacterium is spread through air and milk from infected cows.
- ✓ There are several types of mycobacterium.
- ✓ There is one which causes Tuberculosis of the lungs and the other which cause Tuberculosis of the spine or backbone.

Symptoms of tuberculosis of bones

1. Long lasting painful backache.
2. A lump grows on the spine.
3. Pain in the backbone while walking.
4. Paralysis of the legs and failure to walk.

Prevention and control of tuberculosis

1. Immunization with BCG vaccine on the right upper arm at birth.
2. Isolate the infected person.
3. Treatment of the infected person.
4. Drink boiled or pasteurized milk because the bacteria also attack cows and can be spread through unboiled milk.

(iii) TETANUS

- It is caused by a bacterium found in the soil.
- The bacteria enter the body through fresh cuts or wounds.
- It attacks muscles making them stiff and also breathing becomes difficult.
- In new born babies, it can enter through the umbilical cord if its cut with a dirty unsterilized instrument like a razor blade or knife.

Signs and symptoms of tetanus

1. Stiff muscles all over the body.
2. Spasms when touched.
3. The baby stops sucking mother's breasts.

Prevention and control of tetanus

- Early immunization with DPT vaccine on the left upper thigh.
- Treatment of the infected people

Leprosy

- ✓ It is caused by bacteria.
- ✓ It is spread through direct body contact with an infected person
- ✓ It attacks both muscles and bones.

Prevention

- ✓ Isolating infected person
- ✓ Avoid sharing towels, basins, beddings with an infected person.
- ✓ Treat early cases with antibiotics

RICKETS

It is a food deficiency disease which affects bones especially during pregnancy when the mother did not have enough foods containing Vitamin D, Calcium and phosphorous.

- It causes oxbow legged or knock-knees legs.

- In adults, rickets can cause common fractures.

Signs and symptoms of Rickets

1. Weak bones especially leg bones.
2. Poor teeth formation.
3. Fractures very common to one person.
4. Oxbow legs.
5. Knock-knee legs.

Prevention and control of Rickets

Eat foods containing vitamin D, Calcium and Phosphorous in the diet.

Exposing a child to direct sunshine for about 10 minutes daily before 10:00am

Arthritis (Joint disease)

These are inflammatory joint wounds. They make the joints painful and swollen.

Activity

1. State any **two** ways one can get polio viruses into one's body.

2. Suggest **two** signs and symptoms of polio.

3. State **two** ways of preventing and controlling polio in our community.

4. Mention any **two** muscular and skeletal infections caused by bacteria.

5. Mention **one** deficiency disease which affects bones.

6. Tendo's child has the following signs and symptoms,

- i. Stiff muscles all over the body.
- ii. Spasms when touched.
- iii. The baby stops sucking mother's breasts.

- a) Name the disease the baby is suffering from.

- b) Mention **two** ways of preventing the disease named above.

- c) Name the body part affected by the leprosy.

LESSON

Disorders of the skeletal and muscular system

A body disorder is an injury or illness that causes a part of the body to stop functioning properly.

Examples of disorders of the skeletal and muscular system

- ☆ Fractures.
- ☆ Sprains.
- ☆ Strains.
- ☆ Dislocation.

Fracture

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

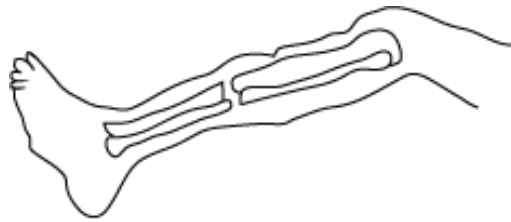
Types of fracture

- ☆ Simple fracture
- ☆ Compound fracture
- ☆ Green stick fracture
- ☆ Comminuted fracture

Simple (closed) fracture

A simple fracture is the body injury where a bone breaks and remains inside the skin (flesh).

- It is also called a closed fracture.
- However the muscles and blood vessels surrounding the bone may be damaged

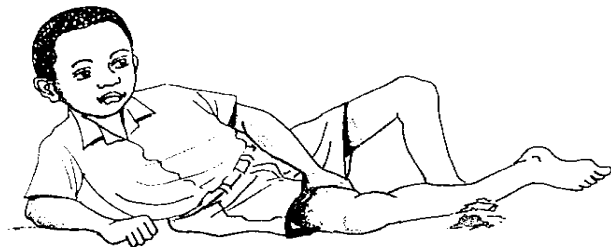


Symptoms of simple fracture

- ☆ Swelling of the injured part
- ☆ Painful feeling when touching the injured part
- ☆ Unable to put the injured part in the normal position
- ☆ The broken limb appears crooked.
- ☆ Failure to move the fractured part with ease.

Compound (open) fracture

This is when the bone breaks and comes out of the skin (flesh).



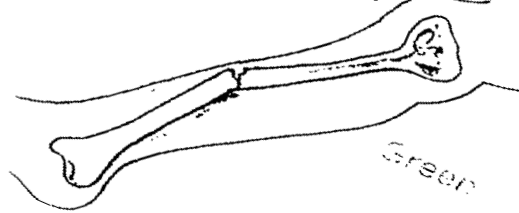
Signs of compound fracture

- ☆ The broken bone is seen pushing out of the skin.
- ☆ The injured limb may be shortened or may lie in an unusual position.
- ☆ The casualty may have felt a snap of the bone.
- ☆ Swelling and bruising of the fractured part.
- ☆ Severe pain and tenderness of the site of injury.
- ☆ Excessive bleeding

Green stick fracture.

This is a type of fracture where the bone bends and breaks. Part of the bone remains attached.

This type of fracture is common in young children because their bones are soft.



Symptoms of green stick fracture

- ☆ The injured limb may be shortened or may lie in an unusual position.
- ☆ The casualty may have felt a snap of the bone.
- ☆ Slight swelling and bruising of the fractured part.
- ☆ Painful when pressing the painful part

Comminuted fracture

- ✓ This is a type of fracture where the bone is broken into several parts.
- ✓ Pieces of the bones may pierce or may not pierce the skin.
- ✓ This is why this type of fracture is also called a complicated fracture.

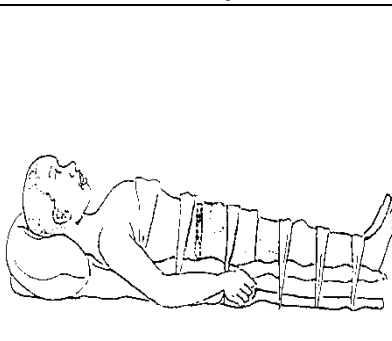


First aid for fractures

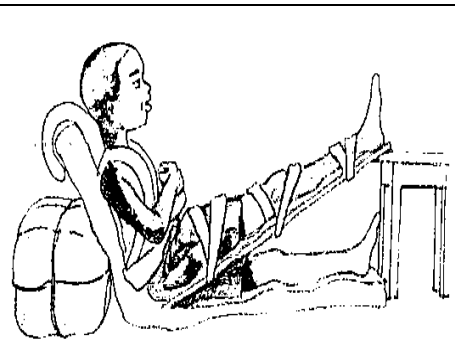
1. Tie splints around the injured part.
2. Removes any object which may have caused the fracture.
3. Stop any bleeding around the injured part.
4. Give comfort and assurance that he / she is to recover soon.
5. Prevent infection of the injured part by using antiseptics.
6. Prevent any further movement of the injured part.
7. Apply a splint to keep the bones in position.



Splint tied with an arm sling



Splints tied on a fractured thigh



Splints tied on a fractured knee cap

If the bones keeps moving further more injuries may occur.

NB: An arm sling is tied around the neck to support a broken arm.

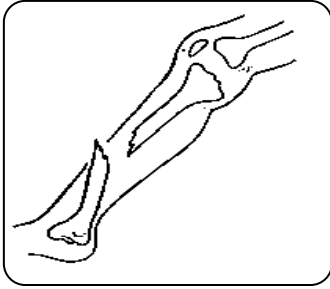
Activity

1. Which type of fracture is also called a complicated fracture?

2. Name the type of fracture which is common in young children.

3. State the reason to support your answer in (a) above.

4. Name the type of fracture when the bone breaks and comes out of the skin (flesh).



5. Name the type of fracture shown below.

6. Name the type of fracture which is also called a closed fracture.

7. What is a fracture?

SPELLING EXERCISE

- 1
- 2
- 3
- 4
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- 7
- 8

LESSON

Muscle wasting

This is the reduction in the mass of the muscles. It is caused by lack of body exercise and malnutrition

Sprains and strains

- ✓ A sprain is an injury on the ligament.
A sprain is a torn or over stretched ligament.
- ✓ A strain is a torn or over stretched muscle as a result of violent movement.

Signs and symptoms of sprains and strains

1. Severe pain at the injured part.
2. Sudden swelling and bruising of the injured part.
3. Failure to move the affected part with ease.
4. Pain at the point of injury
5. The point of sprain or strain becomes hot

First aid for sprains and strains

1. Use a firm bandage to support the affected part.
2. Movement of the affected part should be stopped.
3. In case of a sprained wrist, an arm sling should be applied for support.
4. Take the patient to a doctor.

Dislocation

A dislocation is when the bones that form a joint have been displaced. Dislocation is the displacement of one or more bones at a joint.

Signs and symptoms a dislocation

1. Severe pain at the affected part.
2. Sudden swelling and bruising of the affected part.
3. Failure to move the affected part with ease.

First aid for dislocation

1. Prevent any further movement of the affected part.
2. Comfort the patient and assure him / her of quick recovery.
3. Take the patient to the doctor.
4. Avoid tampering with the affected part by trying to put the bones back into their normal position.

How to keep the muscular and skeletal systems healthy

1. Eat a balanced diet.
2. Always maintain a good posture.
3. Take all children for immunization.
4. Avoid bad games.
5. Carry out regular physical exercises.

Activity

1. What is a sprain?

2. What do you understand by the word strain?

3. How is sprain different from a strain?

4. Suggest any **two** signs and symptoms of sprains and strains

5. Write down **two** first aid for sprains and strains

6. Name the first aid component marked **M** above.

7. How useful is the structure marked **M** to the injured person?



8. State ant **two** signs and symptoms a dislocation.

9. State any **two** ways of keeping the muscular and skeletal systems healthy

LESSON

How to maintain proper skeletal and muscular system

1. Eat food containing a balanced diet especially mineral salts like calcium and phosphorous and also food containing vitamin D.
2. Have children taken for early immunization against tuberculosis, Polio and Tetanus.
3. Avoid bad games
4. Ensuring proper body postures
5. Avoid climbing trees to avoid fractures.
6. Carry out regular physical exercises

Importance of body exercise

1. It promotes physical fitness
2. It allows proper circulation of blood in the body
3. It makes the joints more flexible
4. It reduces the level of fats in the body
5. They strengthen bones and muscles
6. They break fatigue
7. They increase energy production in muscles
8. They promote the proper functioning of the body organs and system
9. It reduces the risks of getting heart diseases
- ✓ The heart muscles grow stronger and larger.
- ✓ The heart delivers more blood to the muscles.
- ✓ More enzymes are made in the muscle tissue to break down glucose and fatty acids.
- ✓ Ligaments and tendons become stronger to reduce chances of injury
- ✓ Weight is lost, i.e. you don't become extra fat.
- ✓ The risk of heart attack is reduced.
- ✓ Digestion of food is carried out quickly and easily.

Activity

1. State any **two** diseases that children can be taken for early immunization against.

2. Mention any **two** bad games that can lead to skeletal disorders.

3. Give any **two** ways in which regular physical exercises are important in the body.

4. In which way is the physical exercise important to the human heart?

5. Mention any **two** importance of regular exercises to the body.

6. Give any **two** ways of maintaining proper functioning of a skeletal system.

THEME: MATTER AND ENERGY

TOPIC 9: ELECTRICITY AND MAGNETISM

LESSON

Electricity

- Electricity is a form of energy produced by the flow of electrons.
- Electricity is the form of energy produced by charged particles.
- **Electrons** are negatively charged particles of an atom.
- **An atom** is the smallest possible unit of matter that can take part in a chemical change. Atoms link together to form molecules.

What is an electric current?

An electric current is a flow of electrons through the conductor. We measure electric current by use of an ammeter which gives units in amperes (amps)

Uses of electricity

Electricity is used for lighting homes.

1. Operating machines in factories.
2. For running office equipments like computers, printers, scanners
3. To operates machines in the hospitals
4. Electrical energy helps to operates machines in our homes
5. Electricity provides heat for ironing and cooking.
6. Protection / security fences.
7. Help to run telecommunication boosters, internet servers and radio radars
8. They help to run machines in the hospitals

Advantages of using electricity

1. It is quick and fast to use.
2. It is clean and smokeless.
3. It is environmentally friendly.
4. It is easy to operate.
5. It is more efficient
6. There is low maintenance cost

Dangers or disadvantages of using electricity

- It can shock and kill.
- It can burn property.
- It increases family expenses in term of bills
- It is expensive to build power plants

Types or forms of electricity

There are two types of electricity

1. Static electricity
2. Current electricity

Static electricity

- This is the type of electricity where electrons do not flow.
- Static electricity is the form of electricity which exists as a result of friction between insulators.
- Lightning is an example of static electricity in nature.

Examples of static electricity

- Lightning in nature.
- Rubbing insulators against each other.

Laws of static charges

Like charges repel each other while unlike charges attract each other

Examples of this law of charges

- (a) Positive charges and positive charges repel each other.
Meaning protons + protons = repulsion
- (b) Negative charges and Negative charges repel each other
Meaning electrons + electrons = repulsion
- (c) Positive charges and Negative charges attract each other.
Meaning protons + electrons = attraction

Activity

1. What is electricity?

2. What is an electric current?

3. Uganda Electricity Board generates most of its electricity at Jinja.

- (a) State the source of electricity energy

- (b) How does the electricity generated at Jinja get to a consumer in Kampala?

- (c) Give **two** uses of electricity to a family.

4. Mention **two** advantages of using electricity over our sources of energy.

5. State **two** dangers of using electricity at home.

-
-
6. Mention **two** ways of reducing dangers caused by the electricity at home.
 7. Mention **two** forms of electricity.
 8. Define static electricity.
 9. Mention **two** examples of static electricity.
 10. Why do the electric wires look to be loose on hot days and tighter on warm days?
-
-

LESSON

Lightening and thunder

Lighting is the flash of light produced as a result of electrons crossing from a negatively charged to a positively charged cloud.

It is a form of static electricity.

It is sometimes referred to as a form of electricity in nature.

How lightning is produced

1. Lightning is caused when clouds become heavily charged with static electricity by means of friction.
2. This is when positively charged clouds rub against negatively charged clouds.
3. When positively charged clouds meet negatively charged clouds, a huge spark of light is seen and this is what we call lightning.
4. During lightning, the surrounding air becomes strongly heated, expands and contracts suddenly which causes a vibration that produces sound called thunder.
5. The continuous noise is due to the echoes.
6. Lightning is seen before thunder is heard because light travels faster than sound in air.

Advantages of lightning in nature

- It converts atmospheric nitrogen into nitrates for plants to use.

Dangers caused by lightning.

1. It damages buildings.
2. It can cause fires outbreak.
3. It can leads to death of people

Effects of lightning:

- ✓ Can cause damage to buildings.
- ✓ Can set things on fire e.g. trees and buildings. So it is not advisable to stand under trees when it is raining because lightning may strike the tree.

Prevention of dangers caused by lightning

1. Install lightning conductors on tall buildings. Lightning arrestors are also called lightning arrestors.
2. Avoid standing under tall trees during a rain storm.
3. Avoid swimming in open water during rain.
4. Always put on rubber shoes whenever it is raining.

Lightning conductors

This is the pointed rod erected on the tall buildings to protect it against lightning.

Activity

1. State the main reason why lightning always strike tall buildings.

2. What causes lightning?

3. What type of electricity is lightening?

4. State the reason why lightning is seen before thunder is heard.

5. What evidence shows that light travels faster than sound in air?

6. State **one** importance of lightning in nature.

7. Mention **two** dangers caused by lightning.

8. Write down any **one** effect of lightning:

9. State **two** ways of preventing dangers caused by lightning.

SPELLING EXERCISE

1 2

3 4

5 6

7 8

LESSON

Current electricity

- Current electricity is the type of electricity where electrons flow through a conductor.

Types of current electricity

- ☆ Direct current electricity (DC).
- ☆ Alternating current electricity (AC).

Direct current electricity

This is the type of current electricity which flows in only one direction that is from the source to the appliance.

Sources of direct current

1. Dry cells
2. Simple or wet cells
3. Accumulators

Alternating current electricity

This is the type of current electricity which flows in both directions, that is forward and backward.

It can be stored in form of direct current electricity and it can be stepped up and down

Sources of alternating current electricity

1. Hydro-electricity:

This is the electricity produced by the force of powerful flowing water.

- At a power station, kinetic energy of moving water turns turbines which are connected to generators that produce electricity.
- Hydro-electricity can also be produced by tides along coasts.

2. Thermal electricity:

Thermal electricity is the type of electricity produced by burning fuel, coal or oil which contains stored chemical energy.

3. Atomic electricity:

Atomic electricity is the type of electricity produced by burning atomic uranium mineral.

4. Solar electricity:

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

It is got by using solar cells which trap heat and light from the sun that are sent to solar batteries to produce electricity.

5. Geo-thermal electricity:

Geo-thermal electricity is the type of electricity produced by steam from hot springs.

Activity

LESSON

Electric cells:

Electric cells are devices that produce and store electricity.

There are two types of electric cells.

- (a) Primary cells.
- (b) Secondary cells

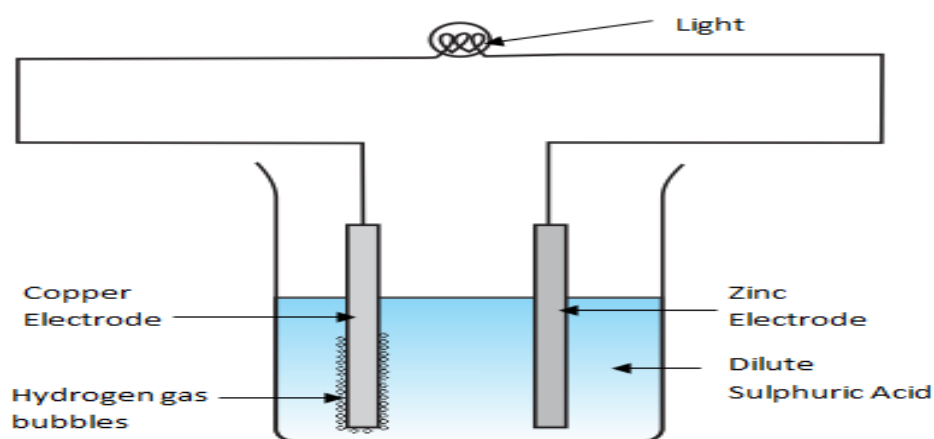
Primary cells

- These are cells that cannot be recharged once they are used up.

Examples of primary cells

- Simple cells or wet cells
- Dry cells

Parts of a simple cell (Diagram)



1. **Copper rod:** It acts as the positive terminal (Anode)

2. **Zinc plate:** It acts as the negative terminal (cathode)

3. **Dilute Sulphuric acid:** Acts as an electrolyte.

- ☆ An electrolyte is a liquid that conducts electricity e.g. Lemon juice, salt solution, Sulphuric acid, water etc.
- ☆ Electrode is the pole which current enters or leaves an electrolyte.
- ☆ Cathode is negative electrode.
- ☆ Anode is positive electron

- A simple cell is not efficient because of two factors.

- (a) Polarization.
- (b) Local action

Polarization is when bubbles of hydrogen gas cover the copper rod stopping the flow of electrons.

Local action is when bubbles of hydrogen gas are seen coming off the zinc plate cutting off flow of current.

Disadvantages of simple cells

- 1. It is bulky.
- 2. It can only be used in upright position.

3. It produces electricity for a short time.

Activity

1. What name is given to a device that stores and produces electricity?

2. Mention any **two** types of electric cells.

3. What are primary cells?

4. State any **two** examples of primary cells

5. What do you understand by the term electrolyte?

6. Name the electrolyte used in a wet cell.

7. Mention any **one** local material used for making simple cells.

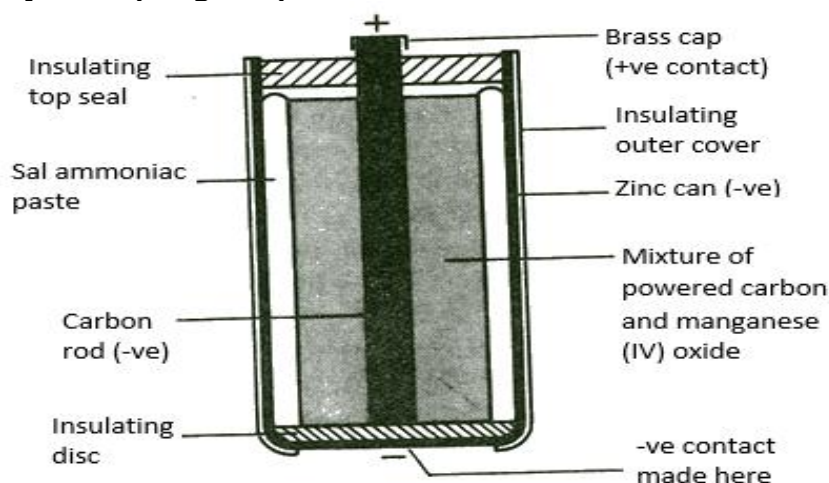
8. Mention **two** reasons why dry cells are not used in a mobile telephone.

9. What is polarization?

10. Mention any **two** disadvantages of simple cells.

LESSON

Dry cell (diagram)



Functions of parts of a dry cells

Brass cap – the contact for the positive terminal of a dry cell

Pitch or top seal:

- Prevents ammonium chloride jelly from drying up.

Ammonium chloride paste:

- It acts as the electrolyte in a dry cell. It also helps in the transfer of electrons. It also acts as a depolarizer.

Electrolyte:

- ✓ It is made up of powdered carbon and manganese oxide.
- ✓ The powdered carbon provides a partial conductor across the inside of a cell
- ✓ It reduces the work of the cell in moving electrons
- ✓ Reduced the internal resistance of the cell.
- ✓ Absorbs hydrogen.

Manganese oxide

- Prevents a buildup of hydrogen gas around the carbon rod.
- It is a depolarizing agent.
- Depolarization leads to leaking of cells when exhausted.

Carbon rod:

- It is a non-metallic conductor of electricity found in a dry cell.
- It is made from graphite. It acts as the positive terminal of a dry cell.
Carbon is the anode of the cell.

Zinc case:

- It acts as the negative terminal of a dry cell. Zinc is the cathode of the cell.

Advantages of a dry cell over a simple cell

- ☆ It is portable while simple cells isn't portable
- ☆ It is affected by depolarization unlike in a simple cell

Secondary cells:

- These are cells which can be recharged once exhausted.

Examples of secondary cells

- Lead acid battery
- Telephone batteries.

Activity

1. What form of energy is produced by dry cells?

2. Name the part of a dry cell which prevents ammonium chloride jelly from drying up.

3. Which substances in dry cells change hydrogen to water?

4. How do electrolytes reduce the internal resistance of the cell?

5. Name the non-metallic conductor of electricity found in a dry cell.

6. Which part of a dry cell acts as the negative terminal?

7. State any **two** advantages of dry cells over secondary cells.

8. What are secondary cells?

9. Mention any **two** examples of secondary cells.

10. Mention **two** advantages of secondary cells over primary cells

11. Why is the telephone batteries referred to as secondary cells?

SPELLING EXERCISE

1 **2**

3 **4**

5 **6**

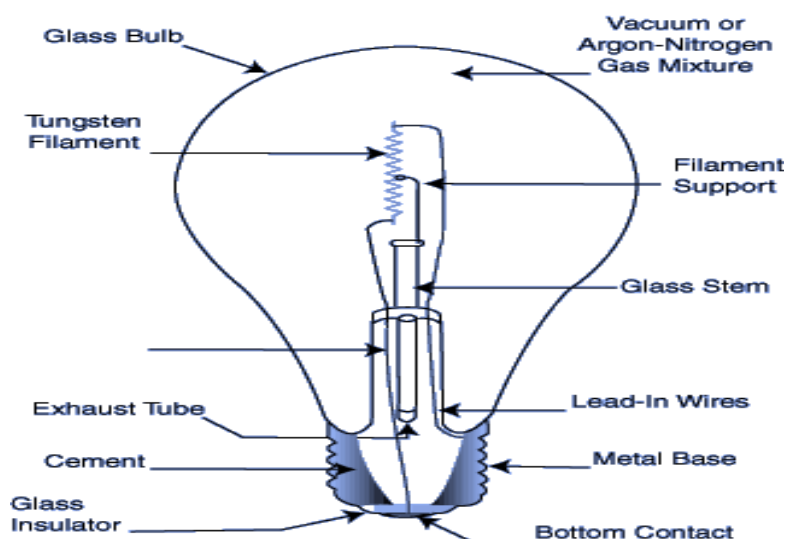
7 **8**

LESSON

An electric bulb

An electric bulb is an electric appliance that changes electricity to heat and light energy.

Parts of an electric bulb



Brass cap: Enables the bulb to be fixed into the lamp holder.

Sealing tube: Enables air to be removed from the bulb and this prevents the filament from combining with oxygen.

Coiled filament:

- The filament changes electrical energy to heat and then light energy.
- The filament is coiled to increase resistance to electric pressure.
- The filament is made up of tungsten which has a high melting point.
- Tungsten is got from a mineral called wolfram m.

How coiling a bulb affects the resistance in the bulb

- ☆ It increases the length of the filament
- ☆ It increases the number of coils of the filament in a bulb

Glass bulb (Glass envelope)

- It protects the inside parts of the bulb.
- Holds a mixture of two inert gases: Argon and Nitrogen.
- Glass envelope prevents the evaporating of tungsten.
- It enables the tungsten to burn at a higher temperature.
- These gases prevent the filament from combining with oxygen to burn up.

Activity

1. Name the electric appliance that changes electricity to heat and light energy.

2. Name the part of an electric bulb which changes electrical energy to heat and then to light energy.

3. State **one** reason why oxygen is not used in an electric bulb.

4. State the mineral from which the tungsten is got.

5. Suggest the reason why the filament is made up of tungsten which has a high melting point.

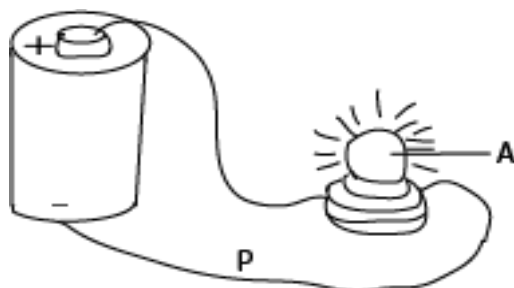
6. Which property helps the filament to resist high electric pressure?

7. Name the **two** gases found in the glass bulb.

8. In which way are the gases stated above important in the glass bulb?

9. How is the brass cap important to the person fixing an electric bulb?

The diagram below is of a simple circuit. Use it to answer questions that follow.



9. Draw an arrow on line P to show the direction of the flow of electricity.

10. Apart from light, which other form of energy is produced at **A**?

LESSON

Devices connected to electricity:

(i) Generator:

- A generator produces electricity by changing mechanical energy in form of kinetic energy to electric energy.
- This is done by rotating coils of wire in a strong magnetic field.
- The main use of generator is to produce electricity.

How to make a generator produce more electricity:

- ☆ Increasing the number of turns in the coil.
- ☆ Increase the magnetic field.
- ☆ Increasing the speed of rotation.

(ii) Dynamos.

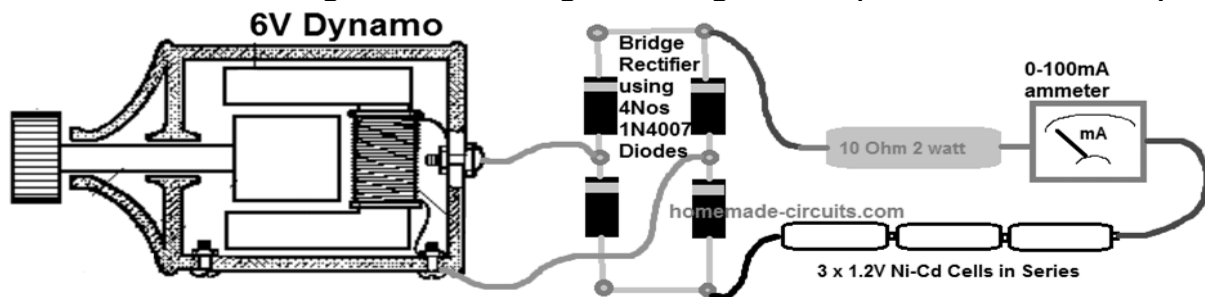
A dynamo is a machine which converts kinetic energy into electrical energy.

A dynamo produces electricity by converting mechanical energy in the form of kinetic energy into electric energy.

- An example of a dynamo is found on a bicycle and bigger ones on vehicles. Those in vehicles help in charging the batteries.

A bicycle dynamo

A bicycle has a dynamo which produces electricity for the head lamps to give light at night. The dynamo has a magnet which rotates in a coil as a result of the movement of magnet. The coil gets charged and produces electricity.



Factors determining the output of the dynamo

- ☆ Number of coils inside it
- ☆ Speed of rotation
- ☆ Strength of magnet inside it

Electric motors

Electric motors are the reverse of generators and dynamos. Generators and dynamos use mechanical energy to produce electricity while motors use electric energy to produce mechanical energy.

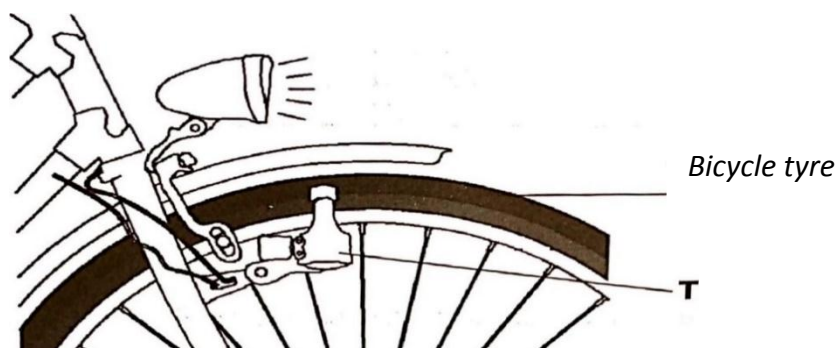
Uses of motors

1. They start engines of cars
2. They move buses / trains
3. They are used in lifts, vacuum cleaners, egg beater, electric sewing machines, radio cassettes, etc.

Devices that use motors are: fans, blender, car engines, some movable toys, egg beaters, electric sewing machines, radio cassettes

Activity

1. The diagram below shows equipment on a bicycle that is used to produce electricity. Study and use it to answer the questions that follow.



1. Name the equipment labelled T.
2. Give the function of the bicycle tyre in producing the electricity.

3. State the energy change that takes place in equipment labelled T when it is in use.

4. State one way in which the amount of electricity produced by the equipment labelled T can be increased.

5. Which type of electricity is produced by generators?

6. State any **two** appliances which use electricity in our homes.

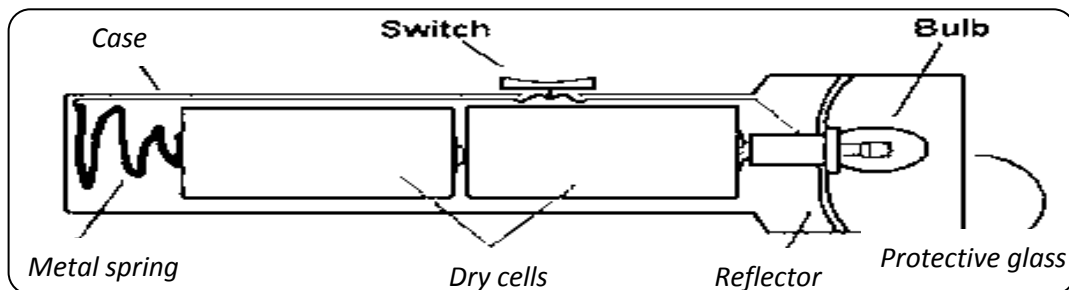
7. State any **two** ways in which we can reduce the costs of electricity bills at home.

8. State **two** ways in which a generator can be made to produce more electricity.

LESSON An electric torch

A torch uses dry cells. In most cases, the dry cells are placed in series.

Parts of the torch



1. **The switch** breaks and completes the circuit at a user wish.
2. **The Bulb** changes electric energy into heat and heat to light energy.
3. **The dry cell (battery)** changes the stored chemical energy to electric energy.
4. **The reflector** directs lights into a diverging beam
5. **The case** completes the circuit and also keeps the dry cells tightly closed.
6. **Springs** are used to press and fasten the cell to touch the bulb and prevent loose connection
7. **Protective glass** protects the bulb from direct damages.

However, the torch may fail to work if;

1. The bulb is not fixed properly.
2. The dry cells are not arranged properly
3. The cover is not properly fixed.
4. When the dry cells are wrongly arranged.
5. When the dry cells are used up.

6. When the bulb is blown.
7. When some parts of the torch are rusted.
8. When the used bulb has a higher voltage than the used torch.

If it starts working properly and then later fails.

- The bulb could have blown
- The dry cells could have become exhausted
- When some parts of a torch are rusted

ACTIVITY

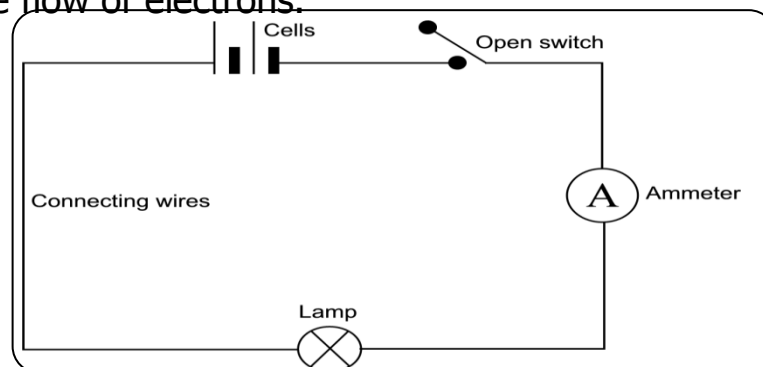
Name the part of the torch that protects the bulb from direct damage.

SPELLING EXERCISE

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|---------|---------|
| 1 | 2 |
| 3 | 4 |
| 5 | 6 |
| 7 | 8 |

AN ELECTRIC CIRCUIT

- An electric circuit is a complete path through which an electric current flows.
- Current is the flow of electrons.



Parts of an electric circuit and their uses:

Ammeter: Measures electric current in a circuit.

Conducting wires: Is a medium for conducting current from the source to the appliance.

Switch: Completes or breaks the circuit at one's will.

Fuse: Is a safety device which breaks the circuit in case of too much current flow.

Battery: Stores chemical energy that is changed to electric energy when the circuit is complete.

- The bulb has the ability to change electric energy to heat and light energy.

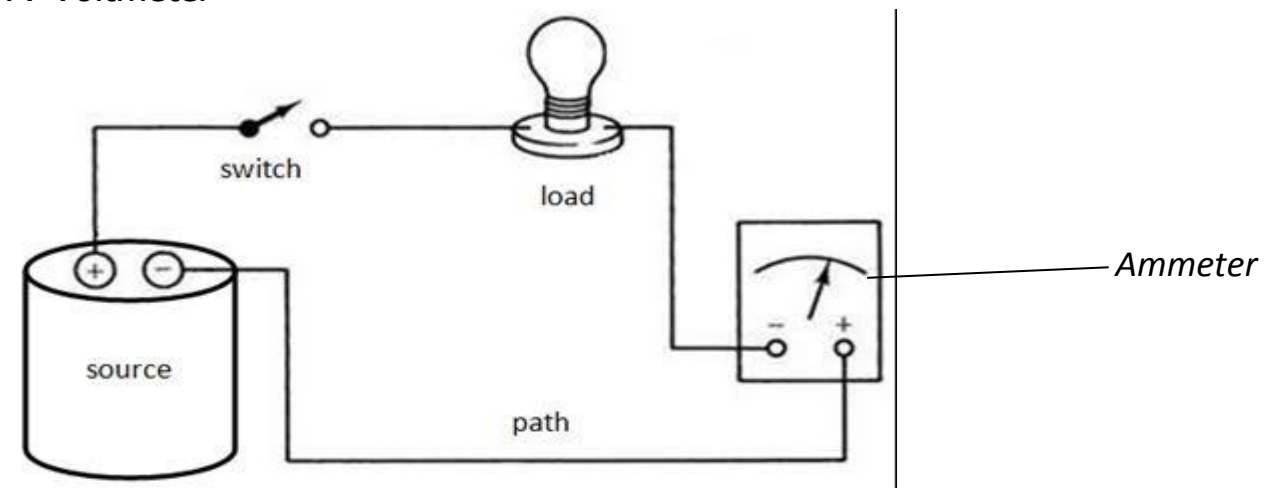
NB:

- In a simple electric circuit, electricity / current flows from the positive terminal to the negative terminal.
- Electrons flow from the negative terminal to the positive terminal.

- For current to flow easily, the positive terminal must be connected to the negative terminal if you are using more than one dry cell, e.g
- Electricity will flow if the dry cells are connected in series as shown in (a), but it will not flow as shown in (b) and (c).

Component of an electric circuit

1. Dry Cell
2. Switch
3. Conductors
4. Fuse
5. Light bulb
6. Ammeter
7. Voltmeter



Functions of each part of the circuit

- **Ammeter:** It is used to measure electric current or flow of current.
- **The switch:** it breaks and complete the circuit at one's own will.
- **The bulb:** Once the circuit is complete, the bulb produces light. A bulb has the ability to change electric energy to heat then to light energy.

The bulb will stop lighting if any of the following takes place:

1. When the filament burns out or if it blows.
2. When the fuse blows, burns out or breaks.
3. When the dry cells become exhausted.
4. If it is not fixed properly.
5. If the dry cells are not arranged properly.
6. If the circuit isn't complete.
7. If the conductor / wire isn't connected properly,

Dry cells

- ☆ Dry cells produce electricity for the appliance.
- ☆ It store electricity in form of chemical energy.
- ☆ It converts or change chemical energy to electric energy once the switch is closed or pressed.
- ☆ The cells must be arranged in series in that the positive terminal meets the negative.

A fuse

- ✓ It is safety device which breaks the circuit in case of too much flow of current.
- ✓ It is simply a wire made of an alloy of tin and lead (solder)
- ✓ A fuse is made up of thin wires to increase electric resistance in order to produce more heat.
- ✓ The alloy has a low melting point. So, it easily melts and breaks the circuit

How does a fuse work?

A fuse wire melts and breaks the circuit if current is greater than rated value flows through it.

This prevents large current from harm or damage.

Advantages of fuses

1. Reduces the risks of electric fires in houses.
2. They protect the delicate electric equipment (appliance) by breaking the circuit before damage is done.

Causes of too much current in the electric circuit

- ☆ Uncontrolled power supply from the source
- ☆ Using a faulty appliances
- ☆ Over loading of the circuit
- ☆ Using appliances with very high current consumption

Reasons why a fuse may blow or break

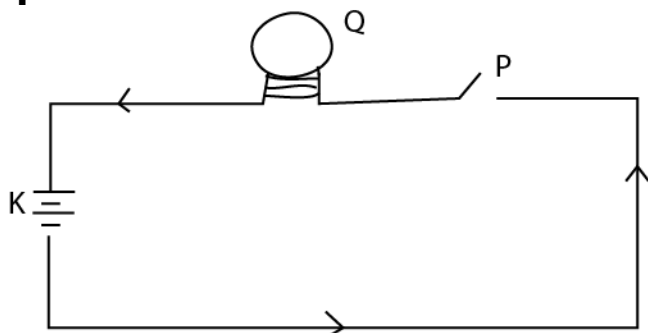
- ☆ Old and weakened wires
- ☆ Overloading the circuit
- ☆ Presence of a short circuit
- ☆ Too much flow of current from the source.

Safety precautions when replacing the fuse

- ☆ Switch off the source of power or unplug the appliance in use.
- ☆ Replace the blown fuse with the one of the same rating
- ☆ If a fuse of the current rating is blowing regularly, call the competent electrician to solve the problem

Activity

1. The diagram below is of an electric circuit. Use it to answer the question that follow



(a) Name the parts labelled P and Q in the diagram.

(i) P _____

(ii) Q _____

(b) Name part marked K.

2. (a) Give any **two** forms of energy produced by the part labeled Q when P is closed.

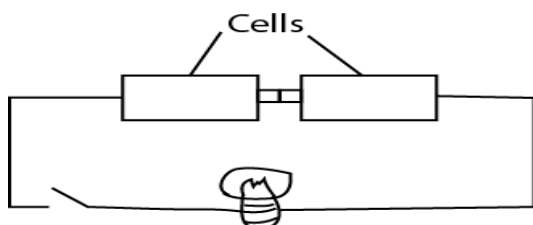
(b) State the energy change that takes place at Q when P is closed.

(c) Show with the help of arrows the flows of current in the above diagram.

3. (a) What is the use of fuse in a circuit?

(b) How does a fuse work?

4. David connected the circuit as shown below.



(a) Explain why a new bulb did not light when he switched on.

(b) In which way is a fuse similar to a switch in a simple electric circuit?

LESSON

Energy changes in a circuit

- When the circuit is complete, chemical energy in a dry cell is changed to electricity.
- In a bulb, electricity is changed to heat and then heat to light energy.

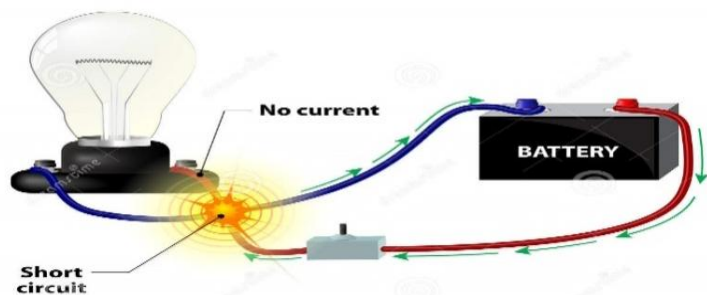
Types of a circuit

- (a) **Parallel circuit:** Is one in which all positive terminals are connected by one conductor and all negative terminals are connected by one another.
- (b) **Series circuits:** Is one in which the positive terminal of one cell is connected to the negative terminal of another cell to form a battery.

SHORT CIRCUITS

- ✓ Short circuit is a path of electricity with low resistance to electric pressure.
- ✓ Short circuit is a short path taken by electricity.
- ✓ A path with low resistance to flow of current.

An illustration about a short circuit



When the switch is closed, the bulb doesn't light up. The match stick instead lights up showing a short circuit which produces heat and fires sometimes.

Causes of Short Circuits

1. Dampness or rain which spoils the insulation.
2. Pushing metallic objects in the sockets.
3. Age of too old wires.
4. Over loading the circuit.
5. Damage made by rats or cockroaches to the insulation.
6. Use of faulty electrical appliances
7. Pouring water in electric appliances.
8. Poor wiring during electric installation.

Signs of short circuits

- ☆ Overheating in the circuit.
- ☆ Sparks are seen
- ☆ Smokes is produced
- ☆ Smells of burning wires
- ☆ Too much or little flow of electricity in the circuits.
- ☆ Some electric appliances may give electric shock.
- ☆ Some electric appliances may fail to work.

Dangers(Effects) of short circuits

- ☆ It causes the fuse to bow
- ☆ Short circuits may cause fire that may destroy property.
- ☆ It destroys electrical appliances.
- ☆ It can kill people.
- ☆ It burns down property and buildings

How to prevent short circuits

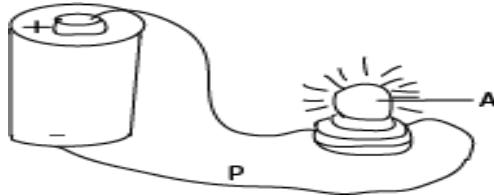
- ☆ Using properly insulated wires.
- ☆ Having electrical installations done by experts only.
- ☆ Having electrical repairs done by qualified personnel.
- ☆ By use of insulators
- ☆ Avoid using bare electric wires
- ☆ Avoid touching electric wires with wet hands
- ☆ Avoid putting metallic objects in the sockets

Activity

- 1) When the circuit is complete, chemical energy in a dry cell is changed to electricity.

-
-
- 2) In a bulb, electricity is changed to heat and then heat to light energy.
-
-

The diagram below is of a simple circuit. Use it to answer questions and 3 and 4.



- 3) Draw an arrow on line P to show the direction of the flow of electricity.

- 4) Apart from light, which other form of energy is produced at A?

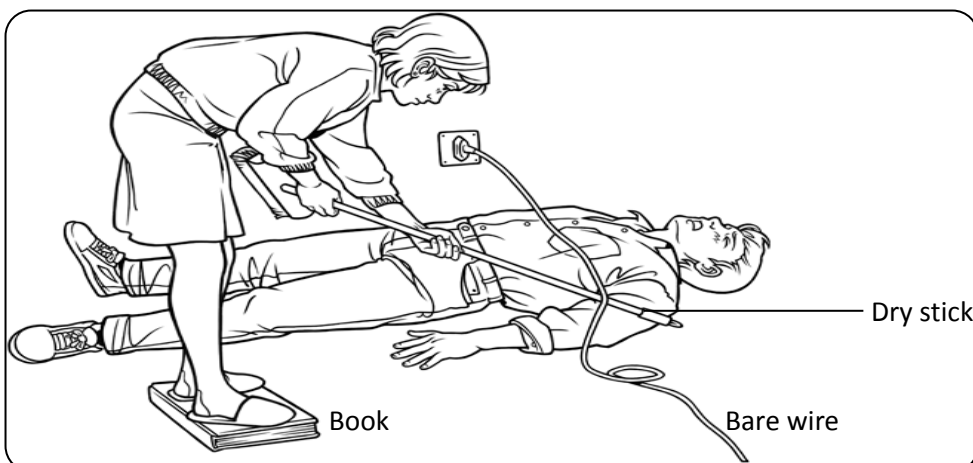
-
-
- 5) What is the difference between electric circuit and short circuit?

-
-
- 6) Suggest **two** causes of short circuits

-
-
- 7) State **two** signs of short circuits at home.

-
-
- 8) Write down **two** dangers of short circuits at a school.

-
-
9. **Study the diagram below and answer the questions that follow.**



- (a) What is the illustration showing?

-
-
- (b) State the reason why the lady is :

- (i) Standing on a book
-
-

(ii) Removing the bare electric wire using dry stick instead of wet stick.

(c) Mention **two** possible ways of preventing such accident at home.

10. Name the type of circuit in which the positive terminal of one cell is connected to the negative terminal of another cell to form a battery.

SPELLING EXERCISE

1 2
3 4
5 6
7 8

LESSON

Insulators / conductors:

Conductors

Conductors are substances which allow electricity or heat to flow through them easily.

Electric conductor

Electric conductors are substances which allow electricity to pass through them easily.

All substances which conduct electricity are able to do so because they have fixed electrons.

Examples (Liquid conductors / Non-metallic conductors)

☆ Undistilled water	☆ Alkalis	☆ Wet wood
☆ Acids	☆ Carbon	

Examples of metals that conduct electricity

1. Silver; is the best conductor of heat but it is very expensive		
2. Copper	4. Iron	6. Tungsten
3. Lead	5. Zinc	

Examples of solutions that conduct electricity

Hydrochloric acid, calcium chloride, potassium nitrate, Sulphuric acid and sodium hydroxide

Note:

1. Sodium chloride is an example of salt that can conduct electricity.
2. Distilled water doesn't conduct electricity because it lacks mineral salt.
Distilled water is not well ionized/ poorly ionized.
3. Copper is commonly used because it is cheaper

4. Silver is not commonly used because it is expensive.

Application of conductors

1. Conductors help us in cooking
2. It helps us in ironing
3. It helps us in wiring electricity

Insulators

Insulators are materials which do not allow electricity to flow through them.

Examples of insulators

- ☆ Rubber
- ☆ Plastic
- ☆ Dry wood
- ☆ Glass
- ☆ Dry clothes

NB: They protect users from electric shock / circuits.

Activity

1. What do you understand by conductors of heat?

2. Mention **two** examples of liquid conductors.

3. Name the best metallic conductor of heat.

4. Why do you think that distilled water doesn't conduct electricity?

5. Define the term insulators.

6. Write down **two** examples of good insulators of heat.

7. Give any **one** reason why wooden poles are usually used to carry electricity.

8. Mention any **one** reason why copper wires are commonly used to distribute electricity from one point to another.

9. Why does Uganda Electricity Board worker wear rubber gloves when working on wires carrying electricity?

10. Why are the handles of most electric appliances made of insulators?

Merits / advantages of using current electricity

1. It is easy to use compared to charcoal or firewood.
2. It is quick so it saves time.
3. It helps to conserve the environment by saving trees for firewood and charcoal.

4. Neat and clean work is produced using electricity.
5. It can easily transform into other forms of energy e.g electric to heat, electric to light, electric to sound, electric to magnetic.
6. It does not pollute the environment.

Demerits / disadvantages of using electricity

- (i) It causes fire
- (ii) It shocks and kills people once used carelessly
- (iii) Poor people can't afford paying bills, so it is expensive.

Equipment / appliances which use electricity in our homes

- Telephone receiver, radio receiver, flat iron, television set, juice blender, electric kettle, water heater, micro wave oven.

Calculation of voltage:

- One dry cell has a voltage of 1.5V.
- To calculate the voltage of an electric appliance, you multiply the number of dry cells by 1.5 volts.

Plugs and sockets:

There are two types of plugs, i.e. a two-pin plug and a three-pin plug.



Three pin plugs

Three pin plugs are used in flat irons, cookers, water, heaters, coils, hot plates, electric kettles etc.

Wiring a three-pin plug / cable / grid

- Neutral wire, colored black or blue takes back the current to the source.
- Live wires usually red or brown brings current from the source.
- Earth wire green or yellow minimizes any electric leakage or excess current and also prevents us from being shocked. (diagrams)

Activity

1. If you get a new torch with new dry cells and new working bulb in place, but when you switch it on, the bulb does not light. Suggest **two** possible problems with the torch.

2. Give **two** reasons why a bulb of torch may not give light when the switch is on.

3. Apart from a torch, mention any **two** appliances which use primary cells at home.

4. Marion's torch has a spoilt switch. State the main problem she will get while using her torch.

5. Name the part of a torch which changes electric energy into heat and to light energy.

6. Apart from completing the circuit, mention any **one** other use of the torch case and the spring.

7. State **two** conditions that may force a new torch not to work.

8. John bought torch on Monday and used it for three consecutive days then it stops working.
Suggest **two** possible causes of the above problems.

9. Mention **two** advantages of using electricity at home.

10. Mention any **two** health related problems associated with using electricity at home.

LESSON

Static electricity:

Static electricity is a form of electricity in which electrons don't move

Static means **not moving or stationary**.

1. It has two static charges, positive and negative charges.
2. The positive and negative charges.
3. The positive and negative charge attracts each other while positive and positive or negative and negative repel each other.
4. Like charges repel each other while unlike charges attract each other.
5. Static electricity is produced by friction.

Note:

Static is always made when insulators are rubbed together.

1. One insulator gains electron and becomes negatively charged while the one which loses electrons becomes positively charged.
2. Different charges, (positive and negative), attract each other while some charges, negative and negative or positive and positive repel each other.
3. Static electricity is also called stationary electricity.
4. The negative charges are called electrons while the positives are called protons.

Differences between static and current electricity

Static	Current
It occurs in insulators i.e plastics	It occurs in conductors i.e metallic cables
The charge is on the surface of the insulator	The charge is inside the conductor.

The charge doesn't flow from one point to another	The charge flows along the conductor i.e the entire conductor is filled with the charge.
Static electricity has both protons and electrons active.	Current electricity has only electrons active.

Rules governing electricity – the Nevers

1. Never touch a switch with wet hands because water conducts electricity.
2. Never over load connections
3. Never put anything in the fuse box or meter box.
4. Never connect an electric appliance you're not sure of.
5. Never touch an electric plug while bare footed
6. Never stand under trees when it is raining, lightning may strike the tree.
7. Report to UMEME offices near you for any broken mains or hanging wires or ring 185 across all networks.

Safety precautions in handling electricity / electrical appliances

1. Switch off electrical appliances in case of a problem
2. Do not touch live bare electric wire.
3. Never throw objects on the main power line
4. Have all electric repairs done by experts
5. Never operate electrical equipment with wet hands.
6. Do not put anything into an electric socket except a plug.
7. Never use appliances if the insulation on the cable is damaged
8. Always read the instructions before connecting the electrical appliances
9. Always switch off appliances before plugging out the plug.
10. Never repair electrical appliances when still plug in an electrical socket
11. Put on rubber shoes when working with any electrical appliance.
12. Use correct colour coding of wires
13. Stay away from broken electric poles and wires.
14. Avoid contact with anything in contact with electricity wires

Illustration showing dangers of electricity



Hatari

Activity

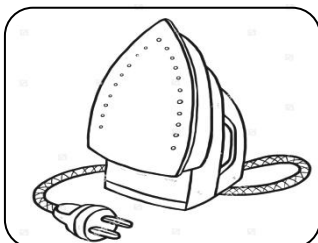
- 1 (a) what is the difference between solar ant thermal electricity?

- (b) Give any **two** advantage of solar electricity over the thermal electricity.

2. What is the source of energy in thermal electricity?

-
-
3. What type of electricity is obtained by rubbing a plastic material against hair or woolen cloth?
-
-
4. Why do electricity wires hanging on the electric pole sometimes appear loose and other times tight?
-
-
5. **Uganda Electricity Board generates its electricity at Jinja.**
- (a) What type of electricity is generated at Jinja?
-
-
- (b) How does electricity generated from Jinja reach a consumer in Mbale?
-
-
- (c) Give **two** uses of electricity
-
-
6. Name the form of electricity in which electrons doesn't move.
-
-
7. State any **two** differences between static and current electricity.
-
-
8. Mention **two** rules governing electricity.
-
-
9. Why shouldn't one touch an electric plug while bare footed?
-
-
10. Why are we advised not to touch a switch with wet hands?
-
-
11. Mention at least **two** common electrical appliances used at home.
-
-
12. State **two** safety precautions in handling electrical appliances
-
-

13. **The diagram below shows a faulty electrical appliance Okello is using in his home.**



a) Name the electrical appliance shown below.

b) Suggest the accident that Okello is most likely to get while the above appliance.

-
-
- c) How can you help Okello to avoid problem caused by the above faulty electrical appliance?
-
-

LESSON

UGANDA ELECTRICITY BOARD

This was the body under the Ministry of Energy and natural resources which was responsible for electricity in Uganda.

It was disbanded leading to the formation of several companies responsible for electricity in Uganda

Uganda Electricity Generation Company Limited (U.E.G.C.L)

It is responsible for construction of dams and generating electricity

Uganda Electricity Transmission Company Limited (U.E.T.C.L)

It is responsible for transmission of electricity in the country using pylons, poles and wires.

Uganda Electricity Distribution Company Limited (U.E.D.C.L)

It is responsible for the giving companies, industries and homes electricity

UMEME

UMEME is a Swahili word which means electricity.

It is responsible for billing, reading meters, connecting and disconnecting electricity to the defaulters

Problems faced by UMEME

- ☆ Non payments of electric bills
- ☆ Corruption among the boards and workers
- ☆ Unauthorized connection of electricity
- ☆ Vandalisation of UMEME properties

Activity

1. Under which ministry is electricity in Uganda?

2. Write the following in full:
 - a) U.E.G.C.L

 - b) U.E.T.C.L

 - c) U.E.D.C.L

3. Name the company responsible for construction of dams and generating electricity in Uganda.

4. Mention any **two** hydro electric stations built in Uganda.

5. State any **two** problems faced by UMEME.

MAGNETISM

Magnetism is a force in a magnet that has the ability to push or pull magnetic substances.

Magnetism is the power possessed by a magnet to attract other magnetic materials.

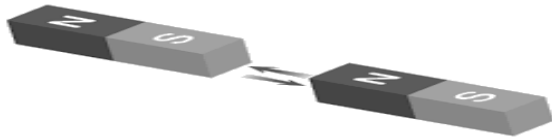
Magnetism is the force possessed by the piece of metal called the **magnet**.

Magnet

A magnet is a piece of metal with the ability to attract magnetic substances.

A magnet is made up of two poles named the North Pole and South Pole.

Illustration



Magnetic substances are materials which are attracted by a magnet.

Examples of magnetic materials

1. Iron, Steel, lead, cobalt, nickel, alloys of aluminium and tungsten

Non-magnetic materials are materials which are not attracted by magnets

Examples of non-magnetic materials

1. Rubber
2. Plastic
3. Paper
4. Cloth
5. Wood

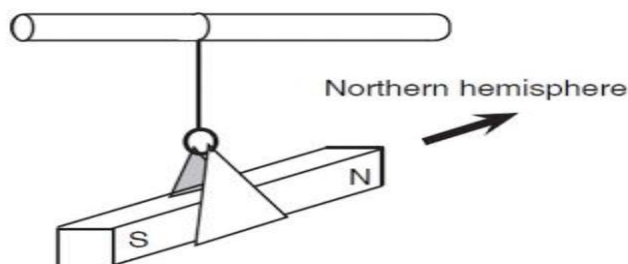
Properties of magnetism

Magnetism is the property of a magnet, which enables it to pull or push other magnetic substances or materials

The illustration of properties of magnets

1. Magnets show direction

A freely suspended magnet faces in the North – south direction

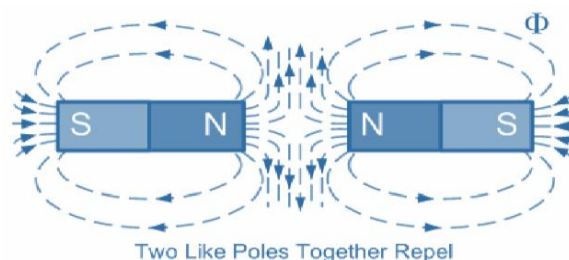
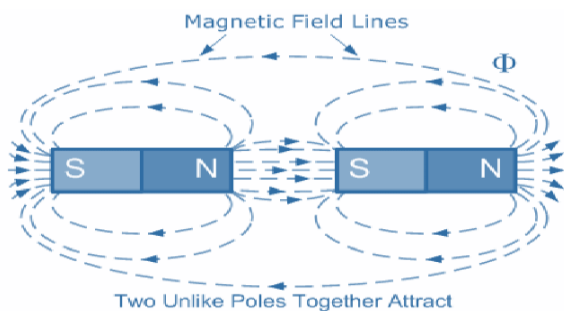


- magnetic properties originate at poles
- poles occur in equal and opposite pairs
- for a freely suspended magnet, its north pole (or north seeking pole) points to the earth's northern hemisphere

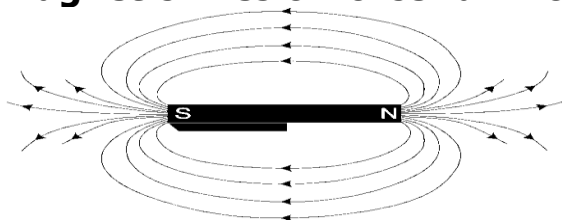
2. Magnetic force of a magnet are strongest at its poles



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



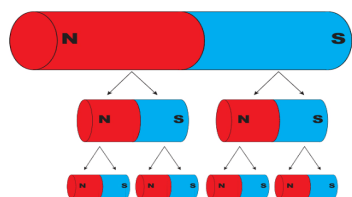
4. **Magnetic lines of force run from North pole to south pole**



5. **Magnetism can pass through a non-magnetic material**



6. **When a magnet is broken into pieces each piece becomes an independent magnet.**

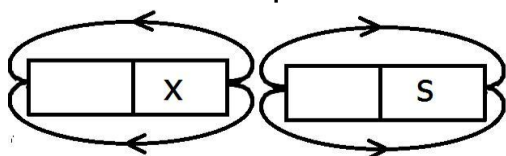


7. The magnetic force of a magnet acts in a limited region around it. This region is known as the magnetic field of a magnet.

8. Magnets have poles at either end.

Activity

The diagram below shows a bar magnet with iron fillings around it. Study and use it to answer the question that follows



1. Name the property of magnetism shown above.

2. Name the pole marked with letter S.

3. Which property of a magnet enables a magnet compass to work?

4. Give any **one** reason why a magnet cannot attract pieces of wood.

-
-
5. Define the term magnetism.
-
-
6. What is a magnet?
-
-
7. In which way are magnetic substances different from non-magnetic substances?
-
-
8. Mention any **two** examples of magnetic substances.
-
-
9. Mention any **two** examples of non-magnetic materials
-
-
9. Using a well labelled diagram, illustrate that magnetic lines of force run from North Pole to South Pole.

SPELLING EXERCISE

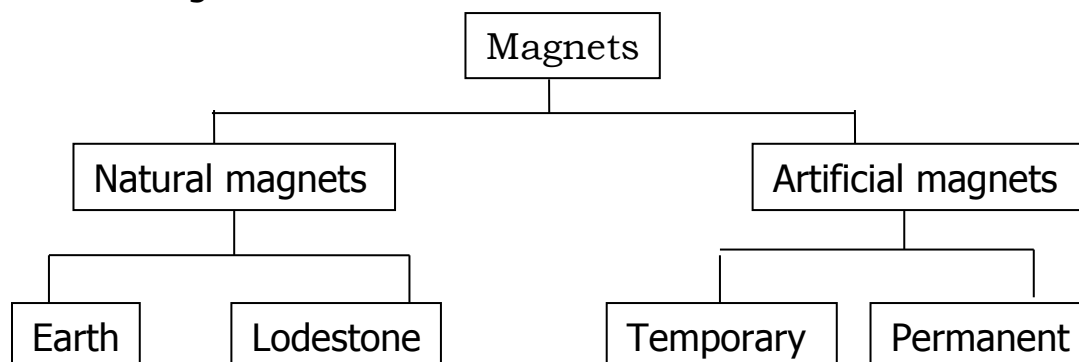
- 1 2
- 3 4
- 5 6
- 7 8

LESSON

Types of magnets

There are two types of magnets namely:

1. Natural magnets
2. Artificial magnets



Natural magnets:

These are magnets that exist on their own without a man making them

They are:

- (a) Lodestone (Magnetite)
- (b) The earth

The first natural magnet was found in Greece. It was known as Lodestone. Lodestone also known as **Leading Stone** was a stone which could attract other metals naturally.

Permanent magnets are made from metals like steel which are difficult to magnetize and also difficult to demagnetize.

Artificial magnets:

These are magnets made by human beings.

Artificial magnets are in all shapes and sizes depending on their uses. They can be permanent or temporary.

They are named according to their shapes.

These include;

- ☆ Horse shoe magnet
- ☆ Bar magnet
- ☆ Needle magnet
- ☆ Cylindrical magnets
- ☆ Electro magnets

Types of artificial magnets

These are:

Temporary magnets

Are magnets which lose their magnetism easily e.g. electro magnet

Permanent magnets

Permanent magnets retain their magnetism for a long time.

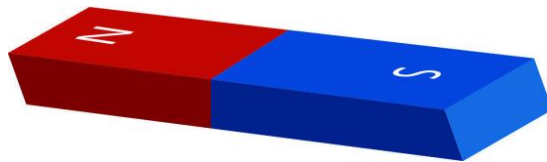
Examples of permanent magnets

1. Horse shoe
2. Bar magnet
3. Cylindrical magnets
4. Needle magnet

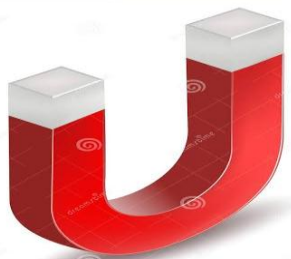
a) Bar magnets



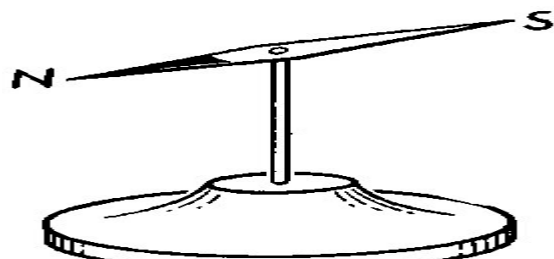
Cylindrical magnet



Rectangular bar magnet



b) Horse shoe magnets



(iii) Compass needle/magnet needle

Similarities between natural and artificial magnets

- ☆ both have powers to attract other magnetic materials
- ☆ both have got a magnetic field
- ☆ both have got magnetic lines of forces
- ☆ both have got poles(North and South poles)

Differences between artificial and natural magnets

- ☆ Natural magnets are made by the principles of nature while artificial magnets are made by people.
- ☆ Natural magnets have different shapes while artificial magnets are designed from the factories.
- ☆ Natural magnets cannot be demagnetized while artificial magnets can be demagnetized.
- ☆ Natural magnets are permanent while artificial magnets are temporary.

Activity

1. Name any **two** types of magnets

2. Name the type of magnets that exist on their own without a man making them

3. Why is the earth referred to as the magnet?

4. What type of magnets is made by man?

5. Mention any **two** examples of the above type of magnets.

6. State any **two** similarities between artificial and natural magnets.

7. Mention any **two** differences between natural and artificial magnets.

8. Mention any **two** examples of ferromagnetic substances.

LESSON

Terms used in magnetism:

1. Poles of magnets:

These are the ends of a magnet

2. Magnetic field:

This is an area around a magnet where the force of magnetism is formed.

3. Magnetic lines of force:

These are lines around a magnet through which magnetism runs from North to South Pole.

Magnetization

Magnetization is the process of making metals to acquire the force of a magnet.

Ways of making magnets.

1. Stroking method

2. Induction method

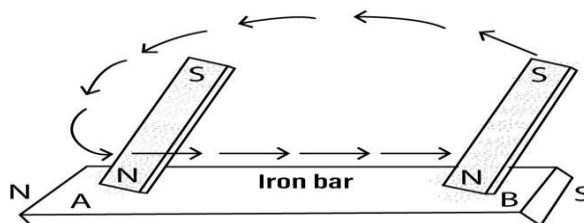
3. Electrical method

Single touch method

This is where one magnet is used to magnetize a metallic bar by stroking.

This is done by stroking a magnetic substance with another magnet in the same direction with the same pole of the magnet. The end of the magnetic substance last touched or stroked becomes the opposite pole of the magnet used.

The more times you stroke the iron bar or nails, the more powerful it will become.



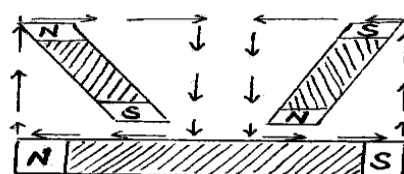
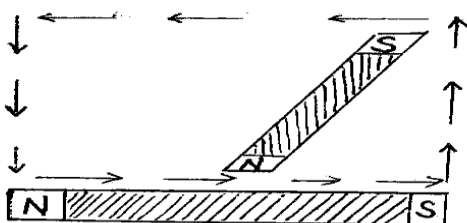
Single touch method

Double touch method / double stroking:

☆ This method is done by stroking using two bar magnets.

☆ Unlike poles and opposite direction must be kept and followed.

☆ Still opposite poles are produced at the point last stroked.

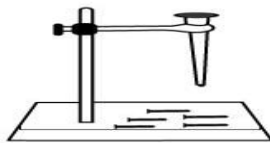
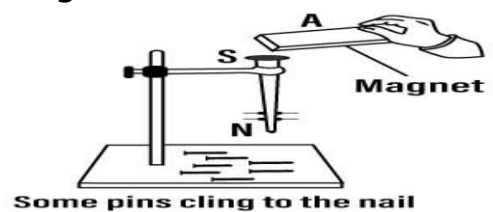


The induction method:

This is achieved or done by attaching a magnetic substance (steel bar) on to a permanent magnet.

The magnetic substance becomes magnetized by induction. The unlike poles are immediately formed to the ends of the magnet.

Note: the new magnets are known as induced magnets.



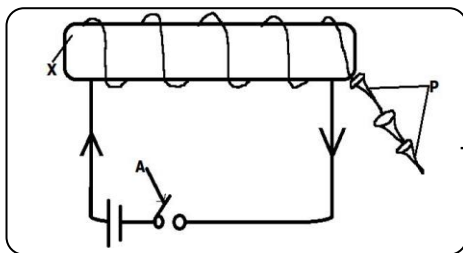
On removal of the magnet, pins fall down

ACTIVITY

1 .a) Mention any **two** methods of making magnets.

b) Give any **two** properties of magnets.

The diagram below shows a method of making a magnet. Use it to answer questions



a) Identify the method of making magnets shown above.

b) Name pole marked with letter **X**.

c) What happens to the pins at **P** when the circuit is open?

2 (a) Give any **one** way a magnet can lose its magnetism.

(b) Which part of a radio uses a permanent magnet?

3. Give a reason why an iron nail can be attracted by a magnet.

4. Write any **two** importance of magnets in our daily life.

5. State **one** way of protecting magnets against demagnetization

LESSON

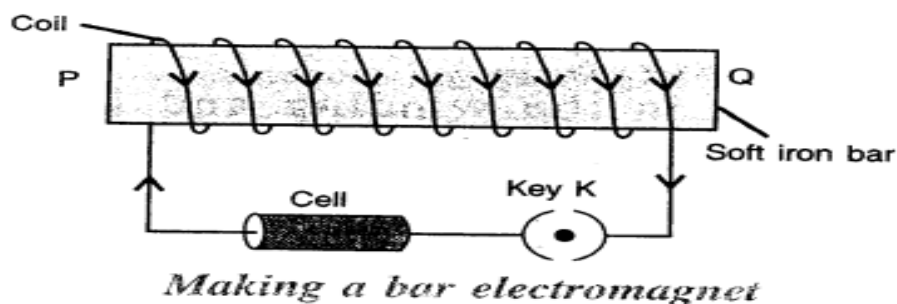
The electrical method

This is when electricity is used to magnetize a magnetic bar.

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

The more coils wound around the bar, the stronger the magnet. The metal bars only acquire magnetism only when the circuit is complete.

Electrical method is the best method of making magnets. The magnets made by electrical method are called **electromagnets**.

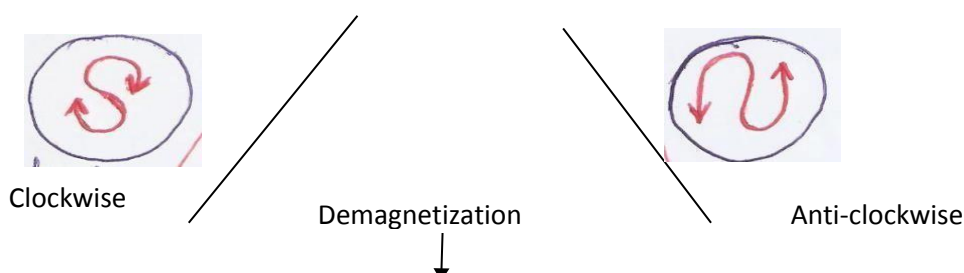


How to find the polarity of one electromagnet

The polarity of an electromagnet can be found using the following rule;

(a) Clockwise movement

If current flows clockwise, the pole becomes South and end where current enter the solenoid becomes the North Pole.



(a) Anti clockwise movement

If current flows anticlockwise movement, the pole becomes North Pole and end where current enter the solenoid becomes the South Pole.

Activity

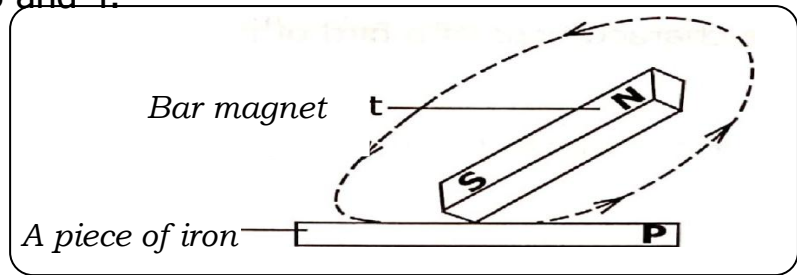
1. Define the following terms

(i) Magnetic field

(ii) Magnetic lines of force:

2. State **two** ways of making magnets

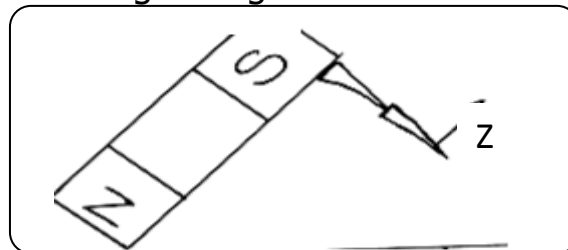
The diagram below shows a method of making a temporary magnet. Study and use it to answer questions 3 and 4.



3. Name the method shown above.

4. What will be the pole at P after magnetization?

5. Name the method of making a magnet shown in the diagram below.



6. Name the method of making a magnet shown above.

7. Name the pole marked Z.

8. Mention **two** importance of magnets to people.

9. State the compass direction in which a freely suspended magnet will rest.

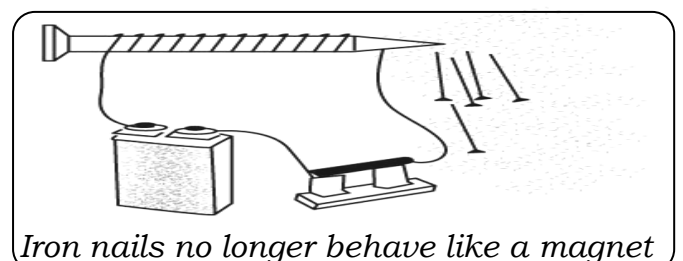
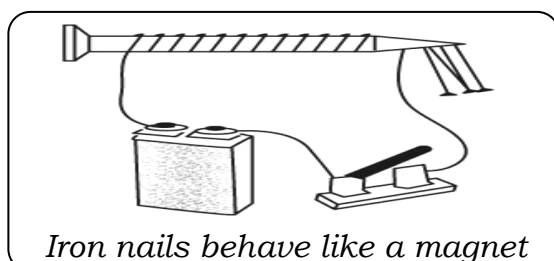
10. Give any **two** practices that can lead to the destruction of a magnet.

LESSON

Illustration of an electrical method

Electrical method is a method where current is used to make a magnet. The magnet made is called an **electromagnet**.

Illustration



Ways of increasing the strength of an electro magnet

1. Increasing the voltage
2. Increasing the turns in the solenoid

Advantage of using an electro magnet

- Its strength can be increased

An electromagnet can be demagnetized by passing it through alternating current.

Examples of equipment that use electro magnets

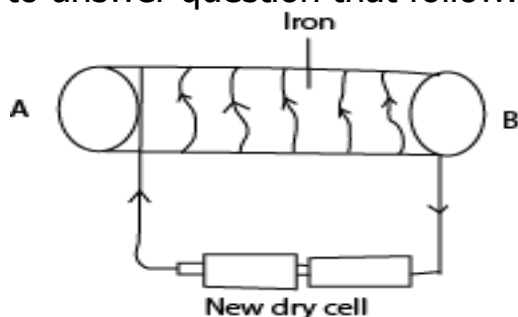
1. Electric bell
2. Sound amplifiers
3. Generators

Uses of electric magnets

1. It is used in lifting heavy metallic scrap during smelting
2. It is used in electric bells

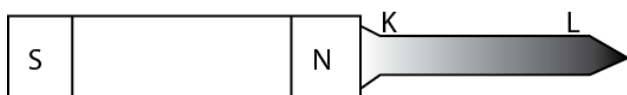
Activity

1. The diagram below shows a method of making a magnet. Study it and use it to answer question that follow.



- (a) Name the method of making a magnet shown in the diagram
- (b) What pole will the part marked A become?
- (c) What would you do to the dry cells in order to increase the strength of the magnet?
- (d) Apart from the method shown in the diagram, name any other method of making a magnet.

2. In the diagram below, when the nail was brought nearer to the magnet it was attracted as shown. Use the diagram to answer questions (a) to (d) below.



- (a) How does the nail get magnetized?
- (b) Name the pole marked L.

(c) Which other method can be used to magnetize the nail without using a magnet?

(d) Name the type of a magnet in (c) above.

LESSON

Demagnetization

Demagnetization refers to the way of making a magnet to lose its magnetism.

Ways of destroying magnets (demagnetization)

- ☆ By strong heating magnets till red hot.
- ☆ By hammering / hitting magnets on hard surface repeatedly.
- ☆ By leaving the magnet in an East-west direction for a very long time.
- ☆ Leaving magnets in water to rust.
- ☆ Keeping magnets without iron keepers.
- ☆ Keeping magnets with similar poles facing each other for a long time.
- ☆ Passing a magnet through alternating current voltage several times.

Ways of protecting magnets against demagnetization.

- ☆ By painting them to prevent them from rusting.
- ☆ Keeping them in iron keepers.
- ☆ Storing them while facing in the north-south direction.
- ☆ Storing them with unlike poles together.
- ☆ Protecting them against strong heat.

Uses of magnets

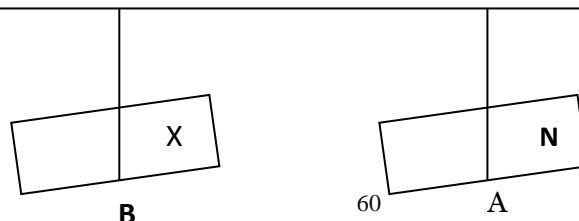
- ☆ They are used to pick up pins, needles or any other magnetic substances.
- ☆ Used in hospitals to remove iron fragments from eyes, wounds, etc.
- ☆ Keeps doors of cabinets and refrigerators closed.
- ☆ Magnets hold kitchen knives, spoons, etc. onto the walls.
- ☆ They are use in compasses in aero planes and submarines to find direction.
- ☆ Used in earpieces and telephone receivers.
- ☆ Used in generators in the production of electricity.
- ☆ Used in loudspeakers and microphones.
- ☆ Used by watch repairers, cobblers and shoe makers to hold tinny nails.

Activity

1. How are magnets important to a radio repairer?

2. Why is the earth called a magnet?

Two magnets A and B were suspended as shown in the diagram below. Use it to answer question 2.



3. If the pole marked N magnet A is the North Pole, what is the pole marked X on magnet B?

4. Mary suspended three magnets on strings near each other and observed that some ends came close but other ends moved away from each other. Why did this happen?

5. Give **one** example of how a doctor in a hospital can use a magnet.

6. Give **two** items found in homes which make use of magnets.

7. What term is used to mean the ways of making a magnet to lose its magnetism?

8. Write down **two** ways of destroying magnets

9. Suggest **two** ways of protecting magnets against demagnetization.

10. State **two** uses of magnets

11. Mention **two** home appliances which use magnets.

12. In which way is a magnet important to the clinical officer?

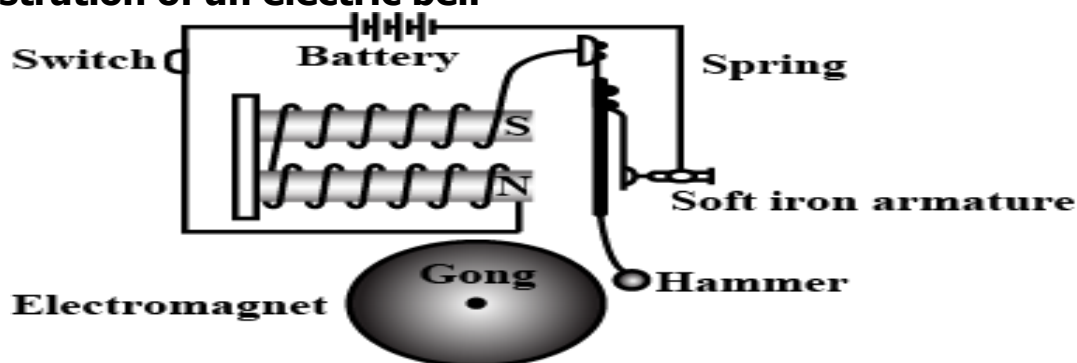
SPELLING EXERCISE

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LESSON

Electric bell

An illustration of an electric bell



How electric bell works

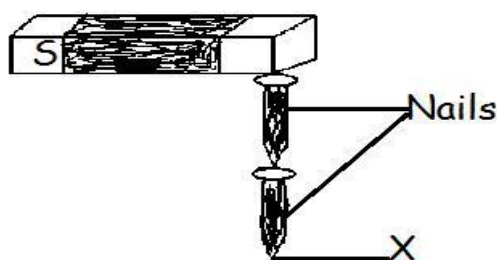
The iron vibrator is held by the springy metal strip against the contact screw when there is no electric current flowing through circuit. When electricity flows the electromagnet comes in operation attracting the vibrator towards it. The striker hits the gong and rings it. However, the electric circuit has now been broken since the springy metal strip is attached to the vibrator and moves with it. The magnet no longer operates and the springy metal strip pulls the vibrator back to the contract screw. This completes the circuit once again and the process described above is repeated until the electricity ceases to flow.

Generating electricity using a dynamo

1. A dynamo is an electrical generator which produces electrical energy in form of direct current
2. It converts mechanical energy to electrical energy.
3. It helps in production of electricity when the magnet is made to rotate.
4. Dynamos are found in bicycles and vehicles.

Activity

1. The diagram shows a method of magnetization. Study it and answer the questions.

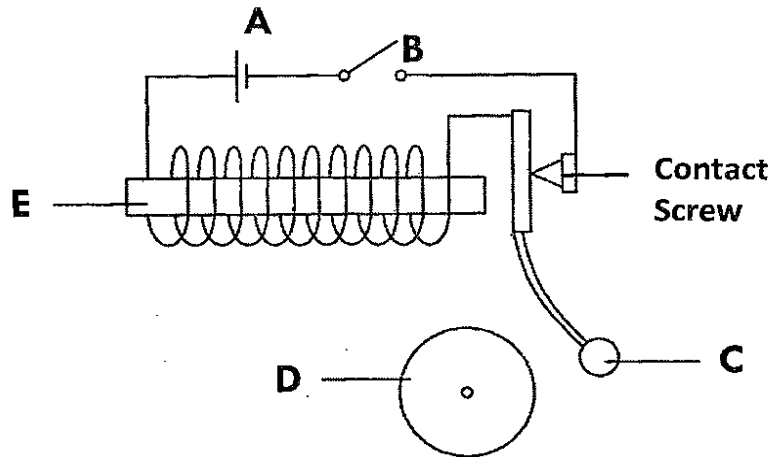


- a) What is the method called?

- b) What would happen if point X of the nail is put at pole S?

- c) Name **one** activity that would make a magnet loses its magnetism.

Study the diagram of an electric bell below and use it to answer question 55.



(a) Name the part marked A and C

- (i) A _____
 (ii) C _____

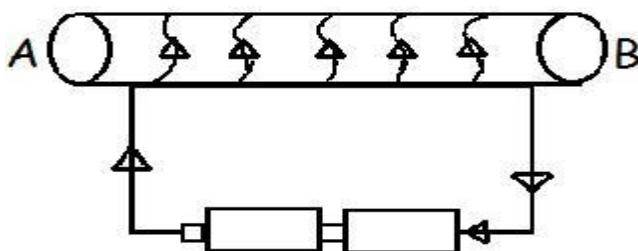
(b) What will happen to E when B is closed?

(c) What type of magnet is used when the bell is in use?

(d) How useful is part D on the electric bell?

(e) State any **one** use of an electric bell at school.

2. The diagram below shows a method of making a magnet. Study it and use it to answer the questions that follow.



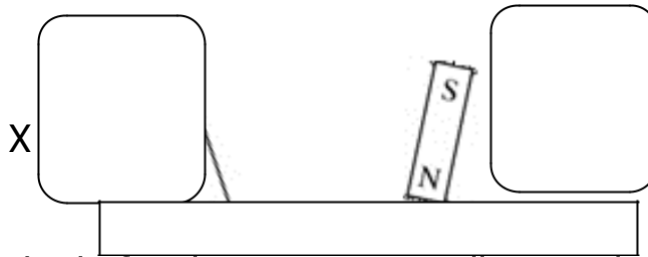
a) Name the method of making a magnet shown in the diagram above.

b) What pole will the part marked A become?

c) What would you do to dry cells in order to increase the strength of the magnet?

d) State any **two** importance of magnets to people.

3. State the compass direction in which a freely suspended magnet will rest.
-
4. Below is an illustration of how to make a magnet. Use it to answer the given questions



a) Which method of making magnets is illustrated in the above diagram?

b) What name is given to the magnet formed using the above method?

c) Mention one device that uses the above named magnet.

d) Name the pole marked X.

5. Magnets can help in separation of mixtures. Why can't a magnet separate nails from steel fillings?

6. State any one device which can use both the magnet and the electricity.

7. How can the strength of a magnet be increased?

THEME: THE ENVIRONMENT
TOPIC 12: ENERGY RESOURCES IN THE ENVIRONMENT

LESSON 1

Energy is ability to do work

Environment

Environment means all things that surround man.

Components of environment

- | | | |
|-------------|-----------|----------|
| ☆ Land/soil | ☆ Animals | ☆ Plants |
| ☆ Water | ☆ Air | |

Resources

- ✓ These are things that are needed by people to satisfy their needs.
- ✓ A resource is something which is used for a certain purpose.
- ✓ A resource is something or an object which is useful to us.

Energy resources refer to materials which we can use to produce energy.

The sun is the primary source of energy.

Energy resources refer to substances or objects which we can use to produce useful energy.

Types of resources

1. Renewable energy resources
2. Non – renewable energy resources
3. Common resources
4. Permanent resources

Renewable energy resources

These are energy resources that can be replaced by natural process after being used.

Renewable energy resources are resources which are constantly being replaced

Examples of renewable resources

- | | | |
|----------|-----------|---------|
| ☆ Air | ☆ Animals | ☆ Water |
| ☆ Plants | ☆ Soil | |

Non- renewable resources

These are resources that cannot be replaced by any means, once they are used up.

Examples of non renewable resources

1. Minerals
2. Natural gas
3. Fossils fuels like coal and petroleum oil

Permanent resources

These are resources that have been in existence since time in memorial and will continue to be. **Examples** are the sun and the earth.

Groups of resources

- Living resources
- Non – living resources

Living resources

These are resources which have lives in them like

- Plants
- Animals

Non living resources

These are resources which do not have life

Examples of non living resources

- ☆ Soil
- ☆ Sun
- ☆ Fossil fuels
- ☆ Water
- ☆ Minerals

Note: Resources can be classified according to common characteristics

Activity

1. Mention **two** groups of living things that surround man.

2. What name is given to things that are needed by people to satisfy their needs?

3. State **two** types of resources.

4. Name the type of resources that can be replaced by natural process.

5. Mention any **two** examples of resources that can be replaced by natural processes.

6. Define the word **non- renewable resources**.

7. Mention **two** examples of non-renewable resources.

8. Mention **two** examples of living resources found on non living resources.

LESSON 2

Land

Land is made up of soil, rocks and minerals.

Many activities of human beings are done on land and they include;

1. Crop growing
2. Rearing animals
3. Construction of buildings
4. Recreation
5. Mining of minerals

Water:

This includes surface and underground water

Surface water includes lakes, rivers, wells, streams and ponds

Areas with a lot of water in the soil (water logged are called wetlands

Water as a resource

- ✓ Moving water possesses kinetic energy which helps in generating hydro electricity
- ✓ Water is used for washing clothes
- ✓ Water sustain plants and animals lives
- ✓ It maintains animals cleanliness especially man.
- ✓ Water is used in making beverages
- ✓ Water is used in most of the domestic work
- ✓ Water is put into vehicles to cool their engines when they become hot.

Activity

1. State **two** examples of crops grown on swamps.

Animals and plants

Animals and plants can be found on land



Different living things benefit from plants in different ways. Plants are one of the great resources in the environment.

Energy from plants

- ☆ Plants are major source of energy to plants themselves and animals.
- ☆ Plants are source of fuel
- ☆ Plants are used to produce alcohol
- ☆ They are source of herbal medicines.



Energy from animals

- ☆ Animals help in transport, farming and carrying heavy luggage. These animals are called **pack animals**.
- ☆ They are sources of food
- ☆ They provide manure

Activity

1. What are pack animals?

2. Mention any **two** examples of pack animals.

3. State **two** examples of crops grown on land.

4. Mention any **two** uses of animals as resources

SPELLING EXERCISE

1 2

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Air and wind

Air is a mixture of gases while wind is moving air.

Air surrounds the earth and make up the atmosphere

Components of air include

☆ Nitrogen

☆ Carbon dioxide

☆ Oxygen

☆ Rare gases.

Air or wind as resources

1. Air like carbon dioxide is used in preserving soft drinks like sodas
2. Air like carbon dioxide is also used in the preservation of beers.
3. Carbon dioxide helps plants to make food which we eat
4. Oxygen is used for respiration by both plants and animals
5. Nitrogen and argon are used in bulbs to make them burn and give out brighter light.
6. Neon is used in bulbs which advertise things on buildings and billboards at night
7. Wind is used to turn wind mills.
8. Wind helps to sail boats and canoes on lakes and rivers.
9. Wind helps farmers in the village to winnow their seeds and grains.

Rocks and minerals

Minerals

Minerals are non renewable energy resources which occur in the ground naturally.

The mineral may be of metallic or non – metallic substances

Metallic minerals include gold, silver, platinum, copper, zinc and lead.

Non-metallic minerals may contain:

☆ Calcium carbonate

☆ Chloride

☆ Sodium

☆ Silicate

Importance of minerals as resources

1. Provide raw materials for making industrial and domestic equipment as well as tools
2. Provide raw materials for building houses and roads
3. Metallic minerals are used in the manufacturing of machines used in factories.
4. Crude oil provides us with fossil fuel.
5. Uranium is used in making nuclear energy.

Rocks

- ✓ A rock is a hard solid material that forms part of the earth surface and some other planets.
- ✓ Rocks are substances from which soil is formed.
- ✓ Soil is formed by weathering of rocks. This is when rocks break into tiny and small particles by the action of chemicals, rain, plant roots, heat etc. From rocks, we get stones.

Importance of rocks as resources

1. They are used in building houses.
2. They are used in the construction of roads.
3. Some rocks are worshiped in some culture and religions.
4. They are used to decorate buildings.

Activity

2. Why is land referred to as the most important resource?

3. Land is made up of _____, rocks and _____.

4. Mention **two** human activities carried out on land.

5. Mention **two** sources of surface water.

6. What name is given to the water logged area with vegetation?

7. Mention **two** resources that we can get from the water logged areas with vegetation.

8. Mention **two** biological components of environment which can be found on land.

9. State any **two** components of mixture of gases

10. Name the gas used in preserving soft drinks like sodas.

11. How is carbon dioxide important to plants?

12. Name the gas used in bulbs to make them burn and give out brighter light.

13. State **two** values of wind to farmers.

LESSON 3

Fossil fuels

Fuel is anything that burns to produce energy e.g. heat and light energy
Fossils are animal or plant remains that have turned into fuel resources.

Fossil fuels include;

1. Coal
2. Petroleum
3. Natural gas

Coal

It's a product of plant remains.

1. It provides thermal electricity when burnt
2. It is used to make dyes

Petroleum

3. It is a liquid fossil fuel from animal remains
4. It is a resource for power to run engines and electric generators

Products got from petroleum Petrol

- | | | |
|------------|--------------------|---------------------|
| ☆ Diesel | ☆ Lubricating oils | ☆ Tar used on roads |
| ☆ Paraffin | ☆ Grease | ☆ Plastics |

Alloys:

An alloy is a mixture of two or more metals.

Purpose or reasons of making alloys

1. To make metals harder.
2. To lower melting point of metals.
3. To make the metal more resistant to corrosion i.e wear and tear
4. To increase the electrical resistivity of metals

Examples of alloys

Alloy	Combination	Uses
Brass	Copper and zinc	Decorating ornaments, making wire, tubins, cases for bullets
Bronze	Copper zinc and tin	Making coins and medals
Dentist amalgam	Mercury and copper	Dental filling of the teeth
Gold	Cold and copper	Making coins
	Gold, copper and mercury	Making dental caps

Solder	Lead and tin	joining metals
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Steel

Steel consists of carbon dissolved in iron.

Different alloys are made from steel depending on what is needed.

Examples of different alloys

Manganese steel	It is a mixture of steel and manganese. This alloy is very tough and is used where friction may cause wear e.g. in railway points.
Nickel steel	It is a mixture of nickel and steel this alloy is called invar. When heated, it expands little.
Stainless steel	This is a mixture of chromium and steel. This alloy does not rust. It is used for making cooking kitchen utensils and cutlery.
Cobalt steel	This is a mixture of cobalt and steel. It forms an alloy with a high degree of magnetism; permanent magnets are made of cobalt steel as they retain their magnetism over a long period.

Purpose or reasons of making alloys

1. To make the metal more resistant to corrosion i.e. wear and tear

Examples of alloys

Copper and zinc

A rock is a hard solid material that forms part of the earth surface and some other planets.

Rocks as resources

An alloy is a mixture of two or more metals.

Activity

1. What are fossil fuels?

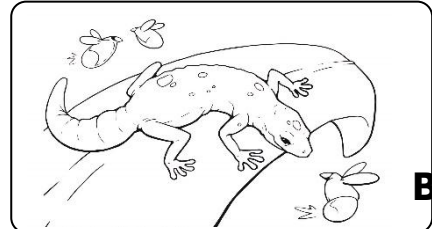
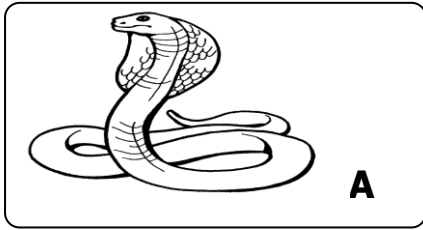
2. Write down two sources of fossil fuels.

3. Mention **two** products got from petroleum.

4. State two examples of machines that use petroleum products stated above.

5. What is a rock?

Use the diagrams below to answer the questions that follow.



6. Name the animal marked A.

7. In which **one** way does animal B benefit from the rock?

8. Suggest **one** way in which the above animals contribute to the formation of fossil fuel.

9. What is an alloy?

10. State **two** reasons of making alloys.

11. Name the alloy used for making coins.

12. Why are permanent magnets made out of cobalt steel?

13. Mention any **two** examples of cooking utensils and cutlery made out of stainless steel.

SPELLING EXERCISE

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LESSON

Fuels:

A fuel is any substance that burns to produce heat and light.

Examples of fuels

. Firewood Oil Coal Charcoal

All these fuels are resources got in our environment; some are renewable while others are non renewable.

Firewood:

- It is a renewable resource because we get them from plants or trees.
- It is a fuel because it burns to produce both heat and light.
- Firewood is got from plants or trees when they are cut and dried by the heat energy from the sun.
- We can control the cutting of trees and also plant young trees when we cut old ones.

Firewood as a resource

1. It is used to cook food at home, restaurants and hotels.
2. It is used in bakeries to bake bread.
3. It is used to provide heat energy in factories and industries.

Oil or petroleum

- Oil or petroleum is non renewable fossil fuel.
- It is mined from underground in some countries. We also have petroleum or crude oil in western Uganda in Bunyoro region. Arrangements for drilling it are already in advanced stages.
- Oil was formed many million years ago from animals which lived and died and were buried underground, but because of heat and pressure underground, they changed into oil.
- This is why oil or petroleum is called a fossil fuel because it was formed from living things which lived and died long ago.
- Oil is a black thick liquid fossil fuel. It is sometimes called black gold.

Oil or petroleum as a resource

- ☆ We get petrol, diesel, kerosene, jet fuel, cosmetics, polythene paper, plastics and many other things.
- ☆ Petrol and diesel are used to drive vehicles.
- ☆ Diesel is used in generators to produce electricity and also to run machines in factories.
- ☆ Oil is a fuel in many ways:
- ☆ Jet fuel is used to run aero planes.
- ☆ We get cosmetics like lipstick, Vaseline, eyebrows pencils etc.
- ☆ We get things made in plastic like basins, cups, plates made from the byproducts of petroleum.

ACTIVITY

1. What name is give to any substance that burns to produce heat and light?

2. State **two** examples of fuels

3. State the reason why firewood is referred to as :

a renewable resource. _____

a fuel _____

4. Mention **two** uses of firewood as a resource.

5. Of the **two**: forests and plants, suggest the source of firewood.

6. Why is crude oil called a fossil fuel?

7. Write **two** petroleum products used for running the vehicles.

8. State **two** plastic materials made from the byproducts of petroleum.

LESSON

Coal

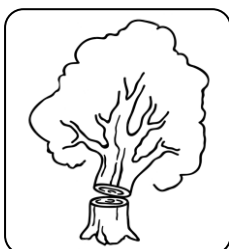
Coal is also a fossil fuel and a non renewable fossil fuel.

- It is mined from underground in some countries of the world
- Coal was formed from marshy vegetations and plants which lived long ago in river valleys and were buried underground. Because of heat and pressure they changed into coal.
- Coal is a black solid fossil fuel.

Coal as a resource

- ✓ Coal is a fuel in many ways. It is burnt to get thermal electricity; it is burnt to provide heat during winter in those temperate countries.
- ✓ We get chemicals used to make cosmetics, Vaseline and drugs.

Charcoal:



- ✓ Charcoal is a black solid renewable resource.
- ✓ It is got from plants after burning them in limited supply of oxygen.
- ✓ Charcoal is a fuel because it burns to produce heat and light.

Charcoal as a fuel resource:

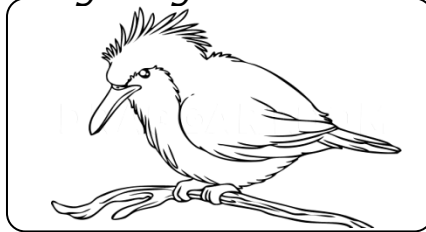
- It is used to cook food at home.
- It is used in bakeries to provide heat and bake bread.

Activity

1. Name the component of air needed for burning charcoal.

2. Why is a charcoal referred to a renewable resource?

Below is a diagram of a living thing. Use it to answer questions 3, 4, 5 and 6.



3. Name the type of environment in which the above living thing belongs.

4. Suggest **two** ways in which the above living thing benefits from plants.

5. In which way can charcoal burning affect the living thing above?

6. State **two** ways in which the above living thing is important in the environment.

7. State the type of electricity got after burning the coal.

8. Mention **two** uses of charcoal to a P.7 candidate while at home.

9. Why is charcoal referred to as fuel?

LESSON

Classification of resources

1. Common resources. (Global resources)

These are resources that are used by everyone and belong to nobody. They exist in plenty and extend beyond boundaries e.g. water air sun

2. Inexhaustible resources.

These are resources that will not be exhausted.

☆ Wind energy

☆ Tidal power

☆ Rainfall

☆ Solar energy

3. Exhaustible resources.

These are resources which people use and can be exhausted.

Examples of exhaustible resources

☆ Minerals

☆ Plants

☆ Animals

4. Recyclable resources.

These are resources that do not get destroyed or lose value through use. They can be reprocessed and then re-used many times.

Examples include

- ❖ Metallic scrap
- ❖ Waste papers
- ❖ Polythene papers
- ❖ Plastic scrap materials

Living things as resources

These include plants and animals in our environment

Plants (Importance of plants)

Some plants give us plant fibres e.g. cotton, sisal, jute and linen

Cotton and linen are used to make clothes while sisal and jute are used to make ropes and sacks

Some plants are used to make herbal medicine to cure certain diseases.

Some plants are used as food

Note: Synthetic fibres (artificial fibre) are:

- Rayon
- Terylene
- Cashmilon
- Nylon
- Acrilon

Arlon

- Rayon is silk made from wood pulp or crushed wood and cellulose from cells of plants
- Nylon fibres are made from plastic
- Nylon can be used for making clothes, ropes, fishing nets and fishing lines
- Animals.
- Some animals give us animals' fibres e.g. wool mohair and silk.
- Merino sheep gives us wool used to make cloth, blankets, carpets, bed sheets etc
- Silk worms give us silk
- The skin and hide from domestic animals are for making bags, shoes, belts
- Horns from cattle are used to make glue and buttons
- ✓ Bees give us honey and wax.

Activity

1. Mention **two** groups of living things utilized as resources.

2. Mention **two** ways in which we use these groups of living things as resources.
Plants

Animals

3. Mention **two** examples of plants species that we can use as resources.

4. What are global resources?

5. Mention **two** examples of resources that will not be exhausted.

6. State **one** reason why plants are considered as exhaustible resources.

7. Apart from plants, mention any other **two** examples of exhaustible resources.

8. What scientific term is used to mean resources that can be reprocessed and then re-used many times?

9. Name any **two** importance of the above mentioned types of resources.

LESSON

Wild life:

Wild life refers to plants and animals that live and grow on their own.
Some of these animals and plants have been extinct or are endangered because of increasing demand for their products e.g. Crocodiles for their skins
Elephant for their tusks
Rhinos for their horns

Importance of wild life

1. Some plants, mammals and birds are a source of food to us.
2. Some animals and birds are used for cultural heritage by some countries and tribes
3. Plants provide wood for fuel and timber
4. Forests help in the formation of rain
5. Earn foreign exchange for the government through tourist attraction.

Conservation of resources

- ✓ Conservation of resources means utilizing the limited resources sparingly with special consideration for future generation.
- ✓ Conservation is the protection and preservation of resources in our environment.

We conserve resources like forests, wildlife, water, soil, rocks, minerals.

How to conserve and protect wildlife

In Uganda, it is the responsibility of Uganda Wildlife Authority (UWA) to protect wildlife.

- ✓ A habitat is a natural environment or home of a plant or animals in an ecosystem.
- ✓ An ecosystem is the interaction between living things in their habitat and non living things in the environment.

Conservation of wild life

1. Banning of poaching
2. Control over fishing
3. Take care of animals in national game parks and game reserves
4. Some rare animals should be caught and let to bleed in the wild life centre

Conserving natural vegetation:

1. Overgrazing should be discouraged.
2. Bush burning should be restricted to certain areas.
3. Overstocking is dangerous because it leads to overgrazing.
4. Cattle farmers should practice rational grazing.
5. The government should limit population growth.
6. Re- afforestation should be carried out.
7. Swamps and wetlands should be declared restricted or gazetted area.

Conserving non- renewable resources

1. All petroleum products should be used wisely to prevent exploitation which can lead to oil getting exhausted from oil wells.
2. Soil erosion should be controlled by terracing, crop rotation, strip cropping
3. We should use manure and fertilizers to keep the soil fertile.
4. Plastic products like jerry cans, polythene papers and bottles should be put to some other use or recycled.
5. Broken glass and bottles are made from sand. They should be recycled instead of using new sand.
6. Cars in dangerous mechanical condition (DMC) should be repaired because they use a lot of fuel like petrol and diesel.

Activity

1. Mention **two** components of wild life.

2. Mention **two** examples of endangered species of animals.

3. Mention **two** importance of wild life to our environment.

4. State **two** ways of conserving and protecting wildlife.

5. Name the national body which is responsible for protecting wildlife in Uganda.

6. Define the following terms
(a) Habitat

(b) Ecosystem

7. State **two** ways of conserving natural vegetation.

8. Mention **two** examples of non- renewable resources that can be conserved.

9. Suggest **two** causes of soil erosion.

10. Give any **two** ways in which soil erosion can possibly be controlled.

11. Name the raw material used for making glasses and bottles.

LESSON ENVIRONMENT

Environment refers to our surroundings.

Types of environments:

1. Biological environment
2. Physical environment

Biological environment

This is the type of environment which consists of living things like plants and animals.

Physical environment

This is the type of environment which consists of non- living things.

Some of these can be seen while others cannot be seen.

Those which can be seen include: - mountains, lakes, rocks, soil, water and those which cannot be seen include: wind, temperature, vapour, air etc.

Environmental degradation:

What does the term degradation mean?

Degradation means a way of making something poorer or less attractive.

Degradation is a way of spoiling something.

What does the term environmental degradation mean?

1. Environmental degradation includes all sorts of things that affect the life of man and some other things around him.
2. Environmental degradation means a way in which the quality of our surrounding or environment is made less and less attractive, or
3. Environmental degradation is the lowering of the quality or spoiling our surroundings or environment.

LESSON

TYPES OF ENVIRONMENTAL DEGRADATION

I) Soil or land degradation:

Soil or land degradation is when soil is made poor and less productive through the following ways: -

a. Soil erosion:

Soil erosion is the washing away of topsoil from higher to lower levels by wind or running water.

Causes of soil erosion include:

- | | |
|-------------------------------------|-----------------|
| 1. Deforestation | 4. Bush burning |
| 2. Overstocking | 5. Overgrazing |
| 3. Building of houses and roads. | 6. Monocropping |
| 7. Over cropping / over cultivation | |

Effects or disadvantages of soil erosion

Soil erosion reduces soil fertility.

This in turn reduces food productivity, slowly; this leads to food shortage for the people.

It also leads to silting of rivers and lakes.

Soil erosion sometimes results in landslides and flooding which destroy human settlement and causes serious loss of life.

- c. **Causes movement to forests:** Soil erosion degrades land so that it can no longer support agriculture. People are forced to move to the more fertile forest areas where they again clear away more patches of forests for cultivation. Soil erosion thus leads to loss of forest cover.

b. Water loses quality:

The soil may carry pesticides that poison water or fertilizers, which aid the growth of bad water weeds such as the water hyacinth.

Spreading of a desert or desertification

As soil and vegetation cover is lost, the climate in an area becomes slowly, drier; eventually the land becomes a desert. This process of desertification is a major threat to food and water security in Uganda.

2. Deforestation:

This is the cutting down of trees in large numbers leaving the soil bare.

Deforestation is caused when trees are cut for the following:

- ☆ Firewood
- ☆ Brick making
- ☆ In mining industry
- ☆ For fish smoking
- ☆ For tobacco curing
- ☆ For charcoal
- ☆ For fuel in factories and industries.

3. Devegetation

This is the removing of soil cover or vegetation and leaving the soil bare.

Agricultural activities which causes soil erosion

- ☆ Deforestation
- ☆ Overstocking
- ☆ Overgrazing
- ☆ Bush burning

Once the soil cover is lost, then the same effects of soil erosion also occur.

ACTIVITY

1. Define soil degradation.

2. Mention any **two** causes of soil degradation

3. State **two** causes of soil erosion

4. Mention **two** agents of soil erosion

5. State **two** disadvantages of soil erosion

6. Write down **two** agricultural activities which causes soil erosion

7. What do you understand by the term **overstocking**?

8. Suggest **two** reasons why people carryout bush burning.

9. What is desertification?

10. Mention **two** causes of desertification.

11. What is deforestation?

12. State any **two** reasons why people destroy forests and they don't replant.

LESSON

4. Wetland degradation:

Wetlands are what we commonly call the swamps or marshes. In Uganda, they are areas where plants and animals are found and are often temporarily or permanently flooded with water.

Uses or values of wetlands, swamps or marshes

- ✓ They control floods.
- ✓ Wetlands filter out water
- ✓ Wetlands retain fertile soil
- ✓ Wetlands influence local climate
A wetland is cooler. This is very important for agriculture.
- ✓ Wetland provide forest resources
- ✓ Wetlands provide areas for fishing
Wetlands keep many animals and plants
- ✓ Wetlands provide fuel for energy production

Ways how our wetlands are abused or degraded

a Wetland over use:

- ✓ This is when people over harvest the papyrus reeds in the swamp without letting it to rest and allow more papyrus reeds to grow naturally.

b Wetland drainage:

Wetland drainage is the act of digging trenches in a swamp, thereby removing or channeling water away from the wetland in order to allow for the development of the area as agricultural land or for dairy farming. This later makes the wetland dry killing or displacing the organisms in their habitat.

c Wetland pollution:

This is done in the following ways:

1. Wastes from factories are discharged directly into the wetland.
2. Vehicles are often seen being washed right in the wetland.
3. Discharging sewage directly into the wetland or swamp killing all the

d. Burning of wetlands

This is when people set fire on wetlands or swamps killing all the insects, animals and plants which are important in our environment.

5. Silting of water

This is when fine solid, sand, mud, insects, animals, and plants which are humus and rock particles are carried

Activity

1. State **two** types of environments.

2. Mention **two** components of biological environment.

3. Name the type of environment which consists of non-living things only.

4. What does the term environmental degradation mean?

5. State any **two** types of environmental degradation.

6. How is land degradation different from soil erosion?

7. State **two** causes of soil erosion

8. What causes overgrazing?

9. Give any two effects of soil erosion on plants.

10. Define desertification.

11. State **two** similar causes of deforestation and devegetation.

12. What is silting?

13. Mention **two** examples of silts deposited in water bodies.

LESSON

Pollution:

Pollution is the release of harmful wastes into the environment.

Many substances are harmful not only to human life but also to other living things

Any agent which causes contamination of the environment is called a pollutant fume from factories, noise, oil discharge, heat, sewage, garbage scrap etc

Types of pollution:

☆ Air pollution

☆ Water pollution

☆ Land pollution

☆ Sound or noise pollution

Air pollution:

This is the release of harmful dangerous gases and fumes from factories and industries into the atmosphere.

Ways how air is polluted

1. Tobacco smoke from smokers.
2. Heat from engines and factories

Water pollution

Ways how water is polluted.

- a) Dumping of wastes from farms and industries.
- b) Discharging of raw or untreated sewage or human faeces and urine from toilet into lakes and rivers.
- c) Spilling of oil wastes from factories and refineries.
- d) Discharging of hot waste water from factories and industries.
- e) Dumping of household refuse into the water source.
- f) Urinating, bathing, defecating and washing in or near water sources.

3. Land pollution:

This is when land can be contaminated with land wastes.

Ways how land is polluted:

- (a) Rocks from mining pits after the mineral has been smelted off.
- (b) Dumping of old vehicles and factory machines.
- (c) Dumping of garbage especially in towns and cities.
- (d) Dumping of old used tins, polythene papers or buvera plastics etc.

4. Sound or noise pollution:

Sound pollution is when there is too much sound or noise for the ear. This unwanted sound is contributed in the environment by man in the following ways.

- (a) Noise from war weapons like bombs and artillery guns.
- (b) Noise from supersonic jets.
- (c) Noise from birds especially weaverbirds.
- (d) Noise from engines of vehicles and factories.
- (e) Blaring music in markets from people who sell tapes.

Activity

1. Define the word pollution.

2. What are pollutants?

3. Mention any **two** examples of pollutants.

4. Name the type of pollution that affects the environment most.

5. Name **two** types of pollution produced by factories and industries.

6. Write down **two** ways in which air is polluted

7. Define air pollution.

8. Mention **two** ways how water is polluted.

9. State **two** impacts of dumping household refuse into the water source.

10. In which way is defecating and washing in or near water sources dangerous?

11. Mention **two** ways in which a man has contributed to unwanted sound in the environment.

LESSON

Diseases related to pollution and contamination of the environment:

- ✓ Asthma from industrial fumes and smoking.
- ✓ Cancer from industrial chemicals and smoking.
- ✓ Diseases caused as a result of untreated sewage in water sources e.g. dysentery, cholera and typhoid fever.
- ✓ Genetical or hereditary diseases caused by radioactive substance from bombs like in Japan after the Second World War, some babies were and are still born with some parts of the body missing.

- ✓ Excessive sound pollution can cause headache, increased blood pressure, abortion in some mothers, damage to the heart and mental disorders.
- ✓ Broken bottles and scattered tins can cut people especially children as they move and run around to play.
- ✓ Some pollutants like scrap can house or harbour organisms that are harmful to man such as snakes and mosquitoes.

Effects of pollution on the resources and organisms

1. Water pollution kills fish and other living things in water; some of these pollutants accumulate in fish and when eaten by man can cause diseases like cancer.
2. Air pollution causes death to birds, useful insects and other organisms in the air.
3. Land pollution by chemicals kills bacteria and other organisms which help to maintain soil fertility.
4. Polythene bags or buvera prevent water from sinking into the ground and also if eaten by animals can cause death.
5. Some industrial fumes cause damage like sulphur containing chemicals, acid fumes, or particles of rock and dust from quarries. Sometimes these fumes cause acid rains.
6. Polythene bags make soil infertile when they are in large quantities.
7. Soot or dust particles can block stomata of leaves causing them not to use air for photosynthesis.

Effects of pollution on weather

1. Air pollution from heavy industrial town causes very heavy fog or mist.
2. This prevents sunlight and causes high humidity of the atmosphere.
3. Smoke from factories can cause rainfall in a given area
4. Release of heat into the atmosphere can increase environment temperature.
5. The accumulation of carbon dioxide gases in the atmosphere rises the temperature causing global warming.

Activity

1. Name **one** disease caused by industrial chemicals and smoking.

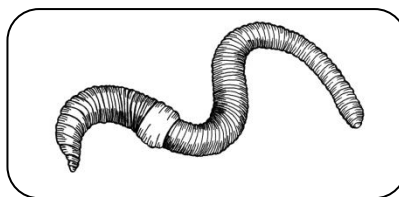
2. State **two** effects of excessive sound pollution.

3. How can excessive sound pollution affect some pregnant mothers?

4. Write down **two** diseases caused as a result of untreated sewage in water sources.

5. What causes acid rain?

Below is a soil macro organism. Use it to answer the questions to follow.



6. Name the organism above.

7. State **two** ways in which the above organism is important in the soil.

8. In which **one** way does it improve on soil aeration?

9. Apart from the above organism, mention **two** other living things which are affected by land pollution.

10. How is water pollution dangerous to fish and other living things in water?

11. Mention **two** effects of pollution on weather

LESSON

NATURAL CAUSES OF ENVIRONMENTAL DEGRADATION:

- Floods destroy large areas of vegetation and cause landslides. Flooded areas are sometimes permanently spoiled.
- Drought causes rain not to come in time on to our grassland. If the drought lasts a long time all plants die.
- Earthquakes and volcanic eruptions also destroy large areas of natural vegetation. The lava or molten rock from volcano flows down burning all the vegetation in its path.
- Strong wind blows trees and blows away tonnes of soil from one area to another.

(b) Man's activities which cause environmental degradation

The following are some of the man's activities, which can cause environmental degradation if they are not controlled.

These are:

- ☆ Deforestation
- ☆ Building of houses and roads.
- ☆ Bush burning
- ☆ Over-cropping or over cultivation.
- ☆ Mono-cropping
- ☆ Dumping industrial wastes in lakes, rivers and land
- ☆ Overstocking

- ☆ Building industries which release a lot of fumes into the space or atmosphere.

Ways how to control and prevent environmental degradation

- We should practice cover cropping, intercropping and agro-forestry, the growing of trees on the same land that you are also growing crops or raising livestock.
- Plant legumes, practice crop rotation and also use compost, green and farmyard manure to keep the soil fertile.
- No one should develop wetlands without approval from NEMA (National Environment Management Authority).
- Do not drain wetlands for agriculture.
- Use stoves, which save charcoal and firewood.
- Don't allow people to build and make any development too close to river banks or lake shores.
- Use the 5R'S to control wastes i.e. Reduction, Reusing, Recycling, Returning and Refusing.

Reduction

This means avoid using many things serving the same purpose.

You don't need to carry home something in a polythene bag which again is put in another polythene bag.

Recycling

This involves collection of material that have been thrown away be it glass, metal, etc. So that they are processed into new products e.g. polythene papers can be processed into water pipes and jerry

Reusing

This is the act of using something more than once or in different ways e.g. use a polythene bag more than once, an, old car tyre can be cut and flowers planted in or used as container for chicken feed.

Returning:

This means using something and then take it back to use it for repackaging the second, third and more times than once.

Refusing:

This means refusing the use of plastic things or buvera, you may refuse using them and you use other things like baskets or other types of paper bags.

- The population should be educated about the effects of pollution.
- Some pollutants can be burnt or buried in one place.
- Controlling of human population because a big population means more pollution.
- Planting trees to use more carbon dioxide.
- Reducing noise by fitting machines with silencers to reduce noise, loud disco music should be controlled; factories should be built far from residential areas.
- Using chemicals with a lot of care i.e. oil should not be spilled from motor vehicles, refineries and chemical wastes should first be treated before discharging them into water sources.

- Avoid starting forests or grassland fires; this makes smoke which pollutes the atmosphere.
- Use non-polluting means of transport like bicycles.

Activity

1. State **two** causes of environmental degradation.

2. Define drought.

3. State **two** effects of drought on:
 - (a) Plants

 - (b) Animals

4. State **two** effects of strong wind to our environment.

5. Mention **two** human activities which cause environmental degradation.

6. Suggest **two** places where dumping industrial wastes are wrongly disposed.

7. Write **two** ways of controlling and preventing environmental degradation.

8. Write National Environment Management Authority in short.

9. State **two** ways of saving charcoal and firewood in a home.

10. Write all 5R'S in waste management.

11. State **two** examples of materials that can be
 - (a) Recycled

 - (b) Reused

 - (c) Refused
