TERM TWO

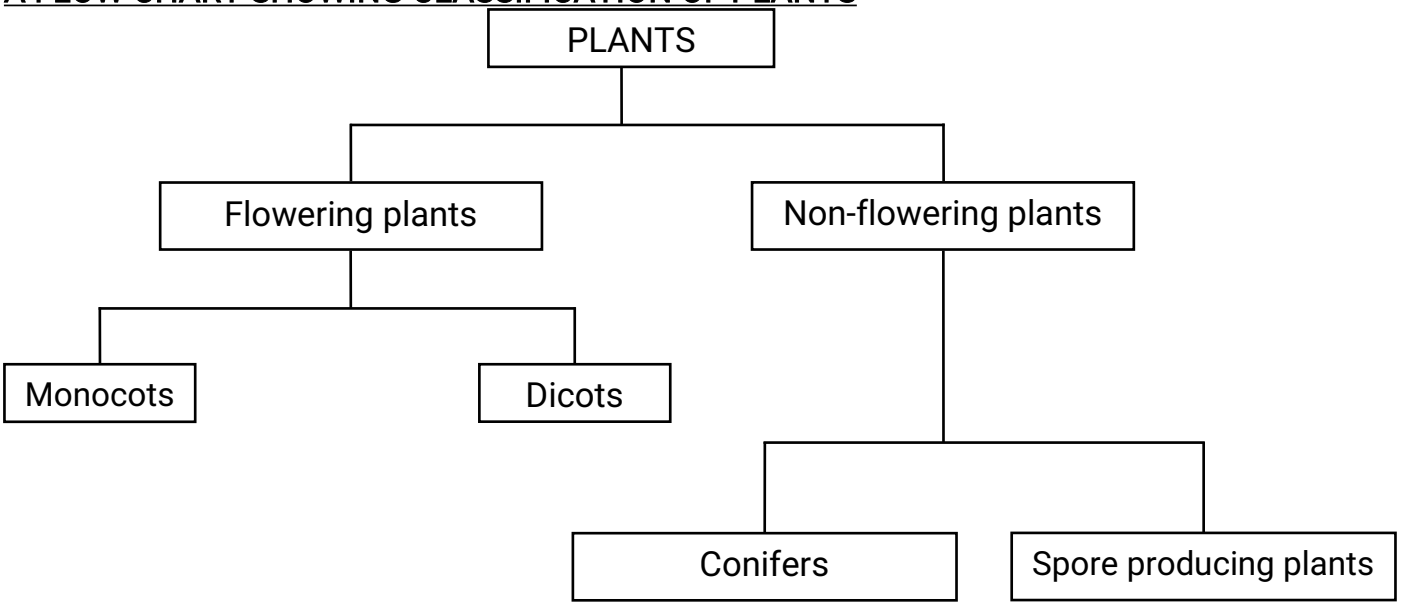
CLASSIFICATION OF PLANTS

- Plants are living things with chlorophyll and can make their own food.
- They belong to **plant kingdom** of living things

Characteristics of plants

- They have chlorophyll
- They make their own food

A FLOW CHART SHOWING CLASSIFICATION OF PLANTS



GROUPS OF PLANTS:

- Non flowering plants
- Flowering plants

NON-FLOWERING PLANTS

- These are plants which do not bear flowers.

Groups(classes of non-flowering plants

- Spore producing plants
- Coniferous plants/conifers

SPORE BEARING PLANTS

- These are plants that reproduce by means of spores.

Examples of spore producing plants:

- Ferns
- Mosses
- Liverworts
- Horsetails
- Hornworts

A spore is a single reproductive cell capable of developing into a new organism without fusion with another reproductive cell.
A spore is protected by a spore case (sporangia).
Sporangium (spore case) produces and stores spores.
Mature spores are always dispersed by **wind** or **insects**

FERNS



- They have chlorophyll and can make their own food
- They have proper leaves, roots and stems.
- A leaf of a fern is called a **frond**
- They reproduce by means of spores.
- Their spores are produced on the lower side of the leaves in brown spore cases.
- They grow in shady moist places (damp places).
- They dry when exposed to direct sunshine

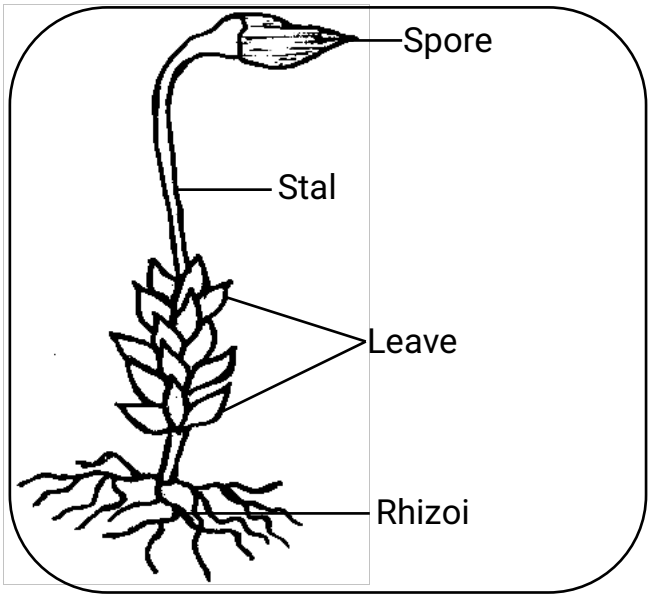
Why is the fern regarded as the most advanced spore producing plant?

- It has proper leaves, roots and stems.

MOSSES

- These are small green plants.
- They have stalk, leaves and rhizoid
- They grow in areas of high humidity and in cold regions
- They grow on house roofs, veranda, and tree trunks, on rotting logs, damp rocks, and soil in damp places.
- Spores are produced and stored by the spore case (sporangium)
- Reproduce by means of spores.
- Contain chlorophyll and makes its own food.

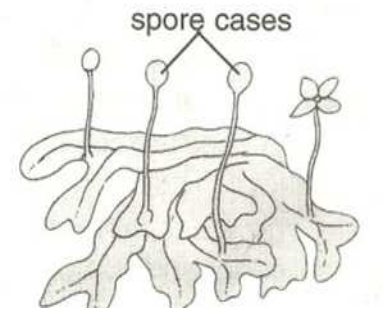
A diagram showing a moss plant



Importance of mosses

- Their rhizoids hold soil to prevent soil erosion.
- Peat moss is used to make organic fuel e.g peat moss.

3. Liverworts



- Have flat, liver like shape of their main body
- Have plate-like or leaf like structures with chlorophyll to make food
- Grow in warm moist places
- Reproduce by means of spores.
- Spores are produced in a bulb like spore case (sporangium)

4. Hornworts

These are the smallest group of bryophytes
They grow in damp areas such as ditches, along edges of streams and near the shores of lakes
They look like liverworts

Reasons why mosses, liverworts and ferns are called plants

- Have chlorophyll
- Can make their own food
- Have leaves, stems and roots

CONIFERS

These are non-flowering plants that reproduce by means of seeds

- The seeds are produced and stored in cones
- Have small needle shaped green leaves.
- Have true leaves and stems
- Do not have flowers but produce pollen and ovules in cones
- Reproduce by means of seeds.

All conifers are trees or shrubs.

Examples of conifers

- Cycads
- Cedar
- Fir
- Cypress
- Podo
- Ginkgo
- Pine

Importance of conifers

- Give us soft wood timber.
- Act as wind breaks on compounds.
- Soft wood from conifers is used for making papers, match sticks, ceiling boards.
- Are sold for income.
- They act as live fences

LIVING ORGANISMS RELATED TO PLANTS

- Algae
- Euglena
- Lichens

ALGAE

- These organisms belong to kingdom protista
- They have no roots, stems and leaves
- They have chlorophyll and can make their own food
- Larger algae reproduce by means of spores.
- Small algae reproduce by **fragmentation**
- They grow in both salty and fresh water
- They can also live in soil, on tree barks, moist rocks and inside hydra cells

Examples or groups of algae

- Seaweeds
- Spirogyra
- Stonewort
- Red algae
- Green algae
- Brown algae
- Kelp
- Fucus
- Diatom

Importance of algae

- Are used to make iodine
- Are used as fertilizers in some places
- They provide oxygen to aquatic animals
- They act as food for aquatic animals

EUGLENA

- This is a unicellular organism which has both plants and animal features.
- It has chlorophyll so makes its own food.
- It can move from one place to another very quickly for protection
- It uses its **flagellum** for locomotion (movement)
- It is microscopic and lives in ditches and ponds.

LICHENS

- These are organisms which are partly algae and partly fungi.
- Lichen is **a symbiosis** feeding relationship between fungus and alga.
- It reproduces by means of spores.
- Have chlorophyll and can make its own food.
- The alga makes food while the fungus absorbs **water from the atmosphere** this enables lichen to grow on dry rocks.

FLOWERING PLANTS

- These are plants that bear flowers.
- They reproduce by means of seeds.

Groups of flowering plants

- Monocotyledonous plants (monocots)
- Dicotyledonous plants (dicots)

MONOCOTYLEDONOUS PLANTS

- These are plants whose seeds have one cotyledon

Characteristics of monocots

- They have seeds with one cotyledon
- They undergo hypogeal germination
- They have fibrous root system
- They have parallel leaf venation

Examples of monocots

- Millet
- Maize
- Sorghum
- Rice
- Rye
- Barley
- Wheat
- Oats
- Sugar cane
- Onion
- Grass

CEREALS

- These are plants which produce grains (corns).

Examples of cereals

- Maize
- Wheat
- Millet
- Rice

- Sorghum
- Barley
- Rye
- Oat

Points to note about cereals

- They produce grains
- They are annual crops

These are crops which mature within one year.

- Tall cereals develop prop roots (maize, millet, sorghum and wheat) during flowering stage.

To provide extra support to the plant.

- They are wind pollinated (since they have flowers without petals).
- They have green leaf-like scales instead of petals

To protect the inner parts of the flower.

Uses of cereals

- They are used as food by man (they are sources of carbohydrates)
- They are used to make alcoholic drinks
- They are used as animal feeds
- They are used to make corn oil (e.g maize)

DICOTYLEDONOUS PLANTS

- These are plants whose seeds have two cotyledons.

Examples of dicots

- Beans
- Soybeans (soya beans)
- Peas
- Groundnuts
- Mango
- Orange
- Cassava
- Pawpaw

Characteristics of dicots

- They have seeds with two cotyledons
- They undergo epigeal germination
- They have tap root system
- They have network leaf venation

LEGUMES

- These are plants with root nodules
- They store their seeds in pods

Examples of legumes

- Beans
- Soybeans (soya beans)
- Peas
- Groundnuts

Uses of legumes

- They are used as food (they are source of plant proteins)
- They improve soil fertility

How? By fixing nitrogen in the soil

- They are source of income when sold
- Some legumes can be used to make oil e.g groundnuts

DIFFERENCES BETWEEN DICOTS AND MONOCOTS

MONOCOTS	DICOTS
▪ Have seeds with one cotyledon	▪ Have seeds with two cotyledons
▪ Have fibrous root system	▪ Have taproot systems
▪ Have parallel leaf venation	▪ Have network leaf venation
▪ Undergo hypogeal germination	▪ Undergo epigeal germination

PARTS OF A FLOWERING PLANT

SYSTEMS OF A FLOWERING PLANT

- Shoot system
- Root systems

SHOOT SYSTEM

- This is the system of a plant that grows above the ground.
- It consists of; the stem, leaves, lateral/axillary bud, terminal bud, flowers, fruits nodes and internodes

ROOT SYSTEM

- This is the part of a plant that grows below the soil.
- It consists of; main (tap root), root hairs, lateral root and root cap

Types of root systems

- Fibrous root system
- Tap root system

TAP ROOT SYSTEM

- This is where the radicle forms a main (tap) root with lateral roots
- It is found in dicotyledonous plants

Examples of plants with tap root system

- Bean plant
- Soybeans (soya beans)
- Peas
- Groundnuts
- Mango
- Orange
- Cassava
- Pawpaw plant
- Avocado plant
- Jack fruit plant

A diagram showing the tap root system of legumes (e.g bean plant or cow peas)

Root hairs
- They absorb water and mineral salts from the soil

Root cap
- It protects the tip of the growing root

Root nodules
- They store nitrogen fixing bacteria (rhizobia)

State the importance of nitrogen fixing bacteria stored in root nodules
- They fix nitrogen in the soil
- They help in formation of root nodules

State the importance of planting legumes in the garden.
- They improve soil fertility (they fix nitrogen in the soil)

Fibrous root system
- This is where many roots of the same size and length grow from the radicle.
- It is common in monocotyledonous seeds

Examples of plants with fibrous root system
- Millet
- Maize
- Sorghum
- Rice
- Rye
- Barley
- Wheat
- Oats
- Sugar cane
- Onion
- Grass

Diagram showing fibrous root system

TYPES OF ROOTS
Primary roots
Adventitious roots (secondary roots)

Primary roots
These are roots which develop from the radicle.

Examples of primary roots
Tap root e.g in bean plant and groundnuts
Fibrous roots: e.g maize, wheat, rice and in grasses

Adventitious roots
These are roots which grow from any part of the plant but not from the radicle.

Examples of adventitious roots
- Breathing roots: grow upwards above the ground

They help the plant to breathe e.g mangrove
- Prop roots: in tall cereals e.g maze, sorghum and millet.

They give extra support to the plant
- Buttress roots: e.g silk cotton trees and mahogany
- Stilt roots:

They give extra support to a plant in mud or swamps
- Clasping roots
- Roots of rhizomes
- Roots of bulbs
- Roots of corms

- **Roots of yam**
- **Storage roots:** store food for the plant

They are swollen because they store starch.

Examples of storage roots (root tubers)

- Carrots
- Cassava
- Sweet potatoes
- Turnip
- Parsnip
- Beetroot
- Swede
- Dahlia

Diagrams showing a carrot and sweet potato root tubers

Carrots are rich in vitamins e.g vitamin A

Diagram

Qn. What are aerial roots?

These are adventitious roots which grow above the ground

Examples of adventitious roots which grow above the ground /aerial roots

- Prop roots
- Clasping roots
- Breathing roots
- Stilt roots
- Buttress roots

Functions of roots to the plant

- Absorb water and mineral salts from the soil by **osmosis**
- Hold the plant firmly in the soil.
- Some roots store food for the plant.
- Some roots help the plant to breathe.

Uses of roots to man

- Some roots are sold to get income.
- Some roots are source of food.
- Some roots are used as herbal medicine.
- Some roots provide wood fuel.

Dangers of roots to man

Some roots are poisonous when eaten

Note

- Absorption of water by plant roots is by **osmosis**
- Absorption of water and mineral salts (mineral salt solution) by roots is by **osmosis**
- Absorption of mineral salts by roots is by **active transport**

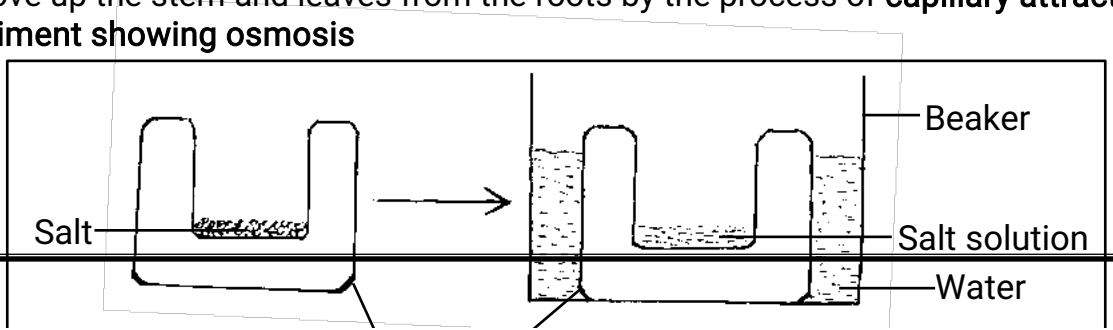
OSMOSIS

This is the movement of water molecules from a region of low salt concentration to a region of high salt concentration through a semi-permeable membrane.

Root hairs absorb water and mineral salts from the soil by the process of **osmosis**

Water move up the stem and leaves from the roots by the process of **capillary attraction**

An experiment showing osmosis



Importance of osmosis

- It enables plant roots to absorb water and mineral salts from the soil
- It enables water to move from roots to stem and leaves by capillary action

A DIAGRAM SHOWING A STEM

Functions of each part of the stem

- **Node**: it is where a leaf or flower is fixed (grows from)
- **Internode:** it is the region between two nodes
- **Terminal bud**: it is the growing tip of the plant
- **Axillary/lateral bud**: it grows into branch or leaf or flower

An axillary bud is found in the axil

- **Axil:** the angle between each leaf and the stem

FUNCTIONS OF THE STEMS TO PLANTS

- They transport water and mineral salts from the roots to the leaves
- They transports glucose/starch from the leaves to other parts of a plant (they help in translocation)
- They hold up the leaves to get sunlight
- They hold the flower for pollination
- They hold fruits for proper dispersal
- Green stems make food for the plant
- Some stems store food for the plant.

Translocation

- This is the movement of food (glucose) from the leaves to other parts of a plant

FUNCTIONS OF STEMS TO MAN

- Some stems provide food to man
- Some stems provide herbal medicine
- Some stems are sold for income
- Some stems provide timber
- Some stems provide wood fuel
- Some are used in vegetative propagation

TYPES OF STEMS

- Upright stems
- Weak stems
- Underground stems

With diagrams

Climbing stems

These are weak stems which cannot support themselves upright.

REASONS WHY PANTS CLIMB OTHERS (WHY DO PLANTS CLIMB OTHERS?)

- To get enough sunlight

- To get extra support

WAYS HOW PLANTS CLIMB OTHERS (HOW DO PLANTS CLIMB OTHERS?)

- Use of tendrils e.g passion fruits, cucumber, watermelon, gourd, pumpkin and cowpeas
- Use of hooks e.g strawberry
- Hooks are pointing downwards to prevent the climbing plant from slipping off the plant.
- By twining or clasping e.g morning glory, tomato, vanilla and some beans

UNDERGROUND STEMS

- They have buds, scale leaves and adventitious roots
- They are **swollen** because they store food (starch)

Why are underground stems sometimes called storage stems?

- They store food (starch)

Groups of underground/storage stems

- Stem tubers
- Bulbs
- Rhizomes
- Corms

STEM TUBERS

- These are swollen underground stems that store food
- We eat the stem tuber

Examples of stem tubers

- White yam
- Irish potatoes

A diagram showing a stem tuber (e.g Irish potato)

- **Scale leaf:** it protects the axillary bud
- **Axillary bud:** it develops into a shoot

How are white yams and Irish potatoes propagated?

- By means of stem tubers

Why is a sugarcane plant not called a stem tuber?

- Its storage stem is above the ground while that of a stem tuber is found underground
- Its storage stem is not found underground

BULBS

- These are small underground stems with swollen fleshy leaves
- They have adventitious roots

Examples of bulbs

- Onion
- Garlic
- Shallot
- Spider lily

A diagram showing a bulb (e.g onion)

- **Foliage leaves:** to make food
- **Fleshy leaves:** to store food
- **Scale leaves:** to protect the fleshy leaves

How are onions propagated?

- By means of bulbs
- By means of seeds

RHIZOMES

- These are horizontal underground stems that store food
- They have adventitious roots which grow from nodes of the stem

Examples of rhizomes

- Ginger
- Turmeric
- Zoyzia
- Canna lily
- Couch grass
- Spear grass

A diagram showing a rhizome (e.g ginger)

How is ginger propagated?

- By means of rhizomes

CORMS

- These are short vertical underground stems that store food

Examples of corms

- Coco yam
- Crocus
- Gladiolus

A diagram showing a corm (e.g coco yam)

How is coco yam propagated?

- By means of corms

THE STRUCTURE OF A LEAF

FUNCTIONS OF EACH PART OF A LEAF

Leaf blade/lamina

- For photosynthesis/ It helps in making of starch
- For respiration
- It is where transpiration mainly takes place
- It is where the breathing organs (stomata) are found

Apex

It is the sharpest tip of the leaf

It provides protection to the leaf

Stomata

For breathing
Allow out water during transpiration
Let in carbon dioxide by diffusion during day time and oxygen during night time.

Veins

- They transport water and mineral salts in the leaf
- They transport food from the leaf blade to the main vein (midrib)

Leaf stalk (petiole)

- It holds a leaf
- It transports water from the stem to the leaf
- It transports food from the leaf to the stem

Leaf base

- It attaches the leaf to the stem

Leaf blade (lamina)

- It is where photosynthesis occurs

FUNCTIONS OF LEAVES TO PLANTS

- They make food for the plant (carry out photosynthesis)
- They plants in breathing
- They carry out transpiration
- Some leave store food for the plant e.g cabbage and onion

FUNCTIONS OF LEAVES TO PEOPLE

- Some leaves are eaten as food
- They are sold for income
- They are used as herbal medicine
- They are used as animal feeds
- Dry leaves can be used as mulches
- Some leaves can be used for plant propagation e.g bryophyllum
- They are used for thatching houses
- For decoration
- Tea leaves can be used on beverages

TYPES OF LEAVES

- Simple leaves
- Compound leaves

SIMPLE LEAVES

- These are leaves with one leaf blade and leaf stalk
- They have one leaflet on the stalk
- They have one leaf stalk
- They have one margin
- Their leaf blade (lamina) is undivided or not completely divided

Examples of simple leaves

- Simple entire e.g mango, avocado and jack fruit
- Simple serrated e.g black jack
- Simple divided entire
- Simple lobed
- Simple palmate e.g pawpaw and castor oil
- Monocotyledons leaf (simple lanceolate lea) e.g maize, sorghum, millet, elephant grass, rice and reeds

Diagrams of simple leaves

COMPOUND LEAVES

- These are leaves with more than one leaflet on the stalk.

- They have many leaflets
- They have many leaf stalks

Examples of compound leaves

- Compound pinnate e.g acacia and eucalyptus
- Compound bipinnate e.g jacaranda
- Compound digitate e.g cassava and silk cotton leaves
- Compound trifoliate e.g beans and soya beans
- Compound bifoliate e. g bryophyllum

Diagrams of compound leaves

LEAF VENATION

- This is the arrangement of veins in the leaf

Types of leaf venation

- Network leaf venation (reticulate leaf venation)
- Parallel leaf venation

NETWORK LEAF VENATION

- This is when veins form something like a net in a leaf
- It is found in dicotyledonous plants

A diagram showing network leaf venation

Examples of plants with network leaf venation

- Beans
- Soybeans (soya beans)
- Peas
- Groundnuts
- Mango
- Orange
- Cassava
- Coffee

PARALLEL LEAF VENATION

- This is when the veins are parallel to each other
- It is common in monocotyledons plants

A diagram showing parallel leaf venation

Examples of plants with parallel leaf venation

- Millet
- Maize
- Sorghum
- Rice
- Rye
- Barley
- Wheat
- Oats
- Sugar cane
- Onion
- Grass

PROCESSES THAT OCCUR IN LEAVES

- **Photosynthesis**
- **Transpiration**
- **Breathing (gaseous exchange)**
- **Guttation:** loss of water in form of water droplets from the plant leaves

PHOTOSYNTHESIS

- This is the process by which plants make their own food (glucose/starch)
- It is a biochemical process in plants
- It mainly takes place in the leaves
- It can also occur in green stems

Photo – means light
Synthesis – means to build up (to make)

RAW MATERIALS FOR PHOTOSYNTHESIS

- Water
- Carbon dioxide

CONDITIONS FOR PHOTOSYNTHESIS

- Chlorophyll
- Sunlight

PRODUCTS OF PHOTOSYNTHESIS

- Glucose/starch (it is the main/useful product)
- Oxygen (it is the byproduct/waste product)

EQUATION SHOWING PHOTOSYNTHESIS

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{Glucose} + \text{Oxygen}$$

REQUIREMENTS FOR PHOTOSYNTHESIS

- Water
- Carbon dioxide
- Chlorophyll
- Sunlight

Water

- Water is got from the soil
- It provides the hydrogen needed to form glucose

Carbon dioxide

- Carbon dioxide is got from air in the atmosphere
- It provides carbon needed to form glucose

By what process does carbon dioxide enter the stomata of the leaf?

- By diffusion

Chlorophyll

- This is the green pigment in plants
- It traps sunlight

Sunlight

- It helps to splits water into hydrogen and oxygen

Why can't photosynthesis occur at night?

- There is no sunlight

ADAPTATIONS OF LEAVES FOR PHOTOSYNTHESIS

- They are broad and flat

To trap sunlight easily

- They have thin walls

To allow easy diffusion of carbon dioxide

- They have chlorophyll

To trap sunlight

- They have stomata

To allow in carbon dioxide

- They have veins

To transport water to all leaf cells

- They are well arranged on the stem

To get sunlight easily

FACTORS THAT AFFECT PHOTOSYNTHESIS

- Light intensity
- Carbon dioxide concentration
- Optimum temperature

How do plants benefit from photosynthesis?

- Plants get food

How do animals benefit from photosynthesis?

- Animals get oxygen for respiration
- Some animals get food e.g herbivores and omnivores

How does photosynthesis purify air (control global warming)?

- It uses carbon dioxide and gives out carbon dioxide

STEPS OF TESTING A GREEN LEAF FOR STARCH

- Boil the leaf in water for some minutes

To kill the cells

To break the cell wall of a leaf

- Boil the leaf in alcohol (ethanol/methylated spirit)

To remove chlorophyll

- Wash the leaf with hot water

To remove alcohol and soften the leaf

- Put drops of iodine solution on a leaf

It starch is present, iodine turns blue black (dark blue)

If starch is absent, iodine will remain brown

POINTS TO NOTE

- Killing the cells helps to stop all the chemical reactions in a leaf
- Breaking the cell wall enables easy removal of chlorophyll
- Removing chlorophyll enables clear observation of colour changes of iodine solution
- Making the leaf soft enables easy diffusion of iodine

TRANSPIRATION

- This is process by which plants lose water inform of water vapour to the atmosphere

Types of transpiration

- Lenticular transpiration: in the **lenticels**
- Stomatal transpiration: in the **Stomata**
- Cuticle transpiration: **in the cuticle of the stem**

Transpiration occurs in the leaves and some stem.
Most transpiration occurs in the **leaves**

An experiment showing transpiration

Polythene bag
To trap and condense water vapour
Potted plant
To carry out transpiration
Importance of transpiration to plants

- It cools the plant
- It pulls up water and mineral salts to the leaves

Dangers of transpiration (transpiration as an evil process in plants).

- It can lead to wilting
- It lowers crop yields due to less water left in the plant

Give the similarity among these processes; transpiration, sweating and panting

- All are cooling processes (they cool living things)

Importance of transpiration in the environment

- It helps in the water cycle

FACTORS THAT AFFECT THE RATE OF TRANSPIRATION
These are conditions that either increase or decrease the rate of transpiration;

- Temperature
- Light intensity
- Wind
- Humidity
- Surface area of the leaf
- Number of stomata on the leaf

Temperature

- The higher the temperature, the higher the rate of transpiration and vice versa

Light intensity

- High light intensity opens the stomata, lenticels and cuticle which increases transpiration

Wind

- Strong wind increases the rate of transpiration.
- It blows off water molecules on the plant giving space for more vapour to come out.

Surface area (size) of the leaf

- The larger the surface area, the higher the rate of transpiration and vice versa

Humidity

- Humidity is the amount of water vapour in the atmosphere
- High humidity lowers the rate of transpiration and vice versa

Number of stomata on the leaf

- The higher the number of stomata, the higher the rate of transpiration and vice versa

Ways how plants reduce the rate of transpiration

- By shedding their leaves during dry season e.g deciduous trees (mvule, fig tree, elk,

basswood, beech, maple and oak)
- Some plants have a layer of wax on the leaf surface e.g banana.
- Some plant leaves are modified into thorns e.g cactus and aloevera.
- Some stems have tough lenticels and cuticle to prevent water loss
- Some plants have leaves with small surface area
- Some plants develop needle-like structured leaves
- Some plant leaves have few stomata and distributed at the lower part

How do farmers reduce transpiration among their crops?
- By cutting off leaves from suckers while planting
- By transplanting seedlings in the evening
- By putting a shade on a nursery bed

XEROPHYTES

These are plants that grow in the desert
- Euphorbia
- Cactus
- Prickly pear

Adaptations of cactus to its survival in deserts (dry places)

•It has a fleshy stem to store water.
•It has very long fibrous roots to get water a distance
•Its leaves are reduced into thorns to reduce transpiration

POINTS TO NOTE
- Lime water is used to test for carbon dioxide
- It turns milky if carbon dioxide is present
- Potassium chloride is used to test for water

REPRODUCTION IN FLOWERING PLANTS

There are two types of reproduction in plants.
- Asexual reproduction

Example

Vegetative propagation
Spore formation
- Sexual reproduction.

Example

Seed propagation

THE FLOWER

It is the reproductive part of the flowering plant

Processes which occur in the flower

•Pollination
•Fertilisation

Use of a flower to the plant

For reproduction
Help a plant to form seeds and fruits
It has gametes and gonads
- The male gonads in flowers are **pollen**
- The male gametes in flowers are **anthers**
- The female gonads in flowers are the **ovaries**

The structure of a flower (Its parts and functions)

POLLINATION

This is the transfer of pollen from anthers to the stigma.

Types of pollination

- Cross pollination
- Self pollination

1. SELF POLLINATION

This is the transfer of pollen from anthers to the stigma of the same flower or another flower on the same plant.

Characteristics of self pollinated flowers

- Filaments are longer than the style
- Do not have scent
- Have heavy pollen grains
- Their anthers are above the stigma
- Have dull coloured petals
- Produce small quantity of nectar

How some flowers are adapted to self pollination?

- They are hermaphrodites/bisexual
- The flower remains closed until self pollination has taken place
- Some flowers are buried in the ground
- The stamen and pistil mature at the same time e.g tomato
- The filaments are longer than the style
- The anthers are above the stigma

Examples of plants with self pollination

- Tomato
- Vanilla
- Wandering jew: its flower does not open
- Ground nut: its flower grow at the ground

Disadvantages of self pollination

- ➤ The new plants and seeds produced are generally weak
- ➤ The plants produced are vulnerable to diseases
- ➤ The chances of introducing new characteristics in new plants is minimized.

Diagram

2. CROSS POLLINATION

This is the transfer of pollen from anthers of one flower to stigma of another flower on different plants but of the same kind

Characteristics of cross pollinated flowers

How are some flowers adapted to cross pollination?

- The male and female flowers grow on the same plant but mature at different time e.g the maize and the coconut
- In some plants, the male and female flowers grow on different plants e.g the pawpaw
- In some plants, pollen grains cannot germinate on the stigma of the same flower e.g the passion fruit

Examples of plants with cross pollination

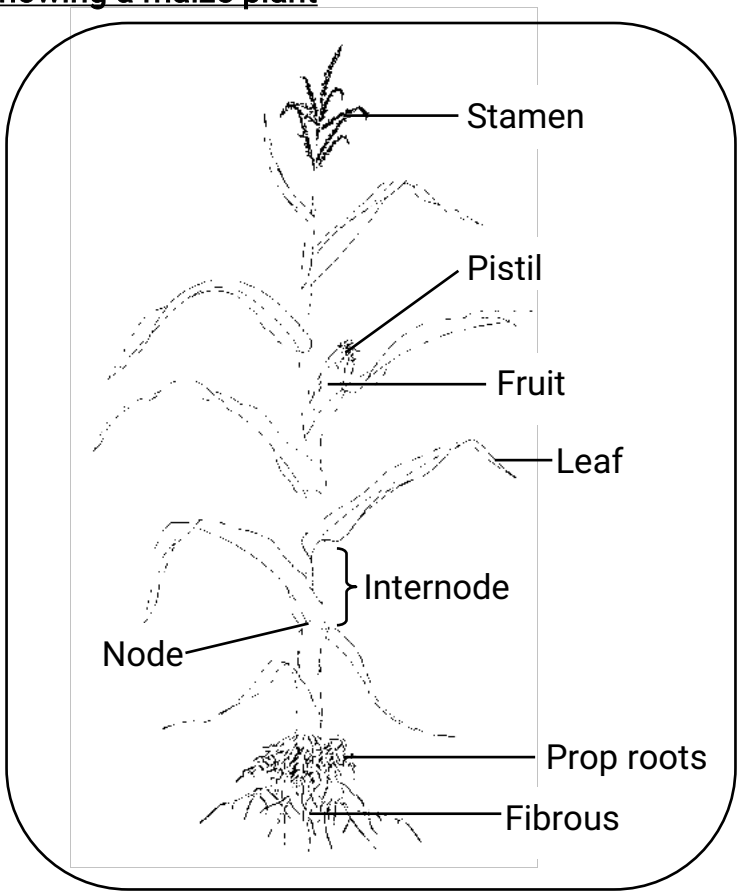
- Passion fruit

- Maize plant
- Coconut plant
- Pawpaw plant

Advantages of cross pollination

- Healthier plants are produced
- The seeds and fruits produced are larger in size
- Disease resistant varieties are produced

A diagram showing a maize plant



AGENTS OF POLLINATION

- Insects e.g bees, butterfly, beetles (ladybird) and moths
- Wind
- Water
- Birds e.g sunbirds and humming birds
- Bats e.g fruit eating bats: have hairy body on which pollen is attached

Characteristics wind pollinated flowers

- Have no nectar
- Have dull coloured petal
- Produce a lot of pollen grains
- Are small in size
- Have no scent
- Have feathery stigma to trap pollen floating in air
- Have light pollen grains.

Examples of plant flowers pollinated by wind

- Maize
- Wheat
- Grass flowers

Characteristics of insect pollinated flowers

- Have nectar
- Have brightly coloured petals
- Are big in size
- Anthers produce few pollen grains
- Have good scent
- Have heavy sticky pollen grains
- The style is longer than the filament

Importance of pollination

- It allows fertilization to take place in crops
- Leads to high yields in farmers harvest.

Uses of flowers to man

- For decoration
- Making of insecticide
- Are used as wreath (sign of respect to death)
- Used to make perfumes
- Used as sign of welcome (bouquet)
- Are sold for income
- Are used to get dyes
- Act as sign of love.
- Some flowers can be eaten as food e.g cauliflower

FERTILISATION IN PLANTS

This is the union of male and female gametes to form a zygote
It is a biological process that occurs in the ovary of a flower
After pollination, the pollen grains form a pollen tube.
The pollen tube grows downwards through the style to take pollen to the ovary to meet the ovules.
Fertilisation in plants occurs in the flowers
In flowers, fertilisatiobn occurs in the ovary

After fertilisation,

- Ovules become seeds
- Ovary develops into a fruit.
- The calyx, corolla, stamen and style wither away.
- Ovary wall becomes the pericarp

Note:

A banana plant forms a fruit by parthenocarpy (a fruit develops without fertilization)

Diagram

SEEDS

A seed is a mature fertilised ovule.
It has one scar

Classes/ groups of seeds

- Monocotyledonous seeds
- Dicotyledonous seeds

1. Monocotyledonous seeds
These are seeds with one cotyledon.

Examples of monocotyledonous seeds/ grains
- Maize
- Rice
- Millet
- Sorghum
- Barley
- Oats
- Most grass

Maize grain
It is not a seed but a fruit
It is a fruit because it has two scars

Scars of the maize grain
Stalk scar: the part where the fruit was attached to the cob
Style scar: the part where the style was attached

2. Dicotyledonous seeds
These are seeds with two cotyledons.

Examples of dicotyledonous seeds
- Beans
- Peas
- Ground nuts
- Oranges
- Tomatoes
- Coffee
- Avocado
- Soya bean

Structure of a bean seed

GERMINATION
This is the development of a seed embryo into a seedling.

Types of germination
- Epigeal germination
- Hypogeal germination
- Viviparous germination: it is found in mangrove

1. EPIGEAL GERMINATION
This is the type of germination where the cotyledons come above the ground level.
It occurs in all dicotyledonous plants e.g beans, peas and ground nuts.
Note:
Simsim is the only monocot that undergoes epigeal germination.
Diagram

2. HYPOGEAL GERMINATION
This is the type of germination where the cotyledons remain below the ground level.

It occurs in all monocotyledonous plants e.g wheat, maize and sorghum
Diagrams

Conditions necessary for germination

- **Oxygen**:

It aids in respiration

- **Water**:

It makes the cotyledon to swell and break the testa
It dissolves stored food in the seed
It activates the protoplasm of seed cells

- **Warmth:**

It provides suitable temperature for proper working of enzymes that initiate seed germination

FRUITS

- A fruit is a developed ovary.
- Fruits have two scars i.e. style stalk and stalk scar.

Importance of fruits to plant

- Fruits protect seeds.
- Fruits assist in seed dispersal.

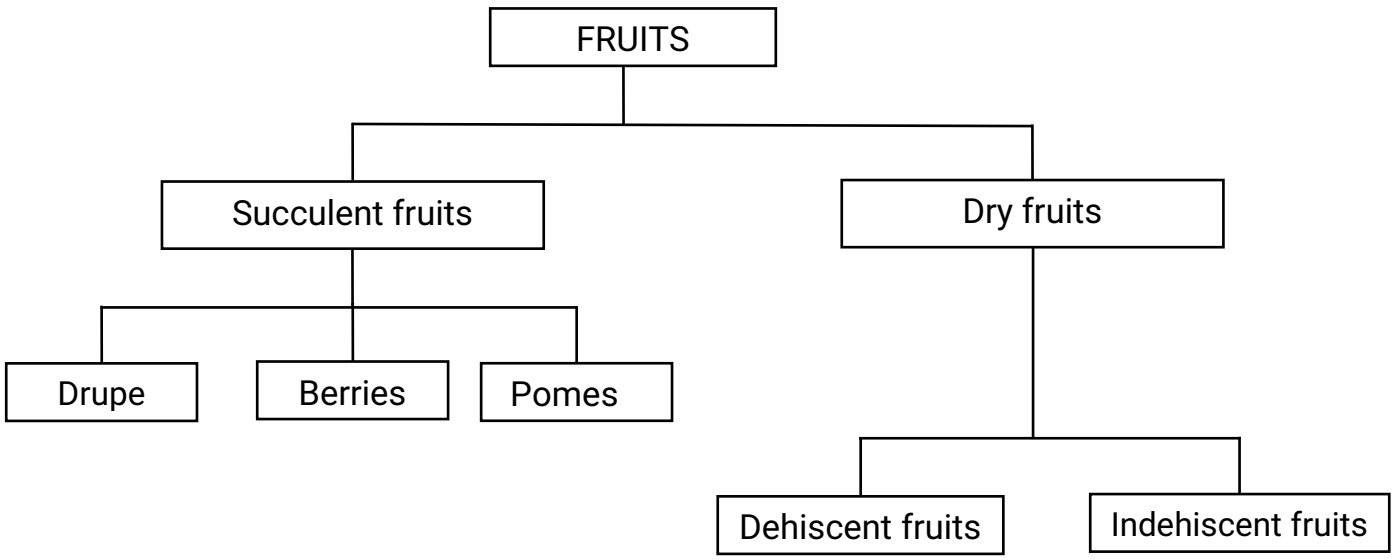
Difference between seeds and fruits

- A seed is a fertilized ovule while a fruit is a developed ovary.
- A seed has one scar while a fruit has two scars.

TYPES OF FRUITS

- Succulent fruits (fleshy fruits or juicy fruits)
- Dry fruits

A flow chart showing classification of fruits



1. **SUCCULENT FRUITS / JUICY FRUITS/ FLESHY FRUITS**

- These are fruits with juicy pericarp.

Pericarp:

- These are layers of a fruit

Parts which make up the pericarp

- **Epicarp:** outermost layer
- **Mesocarp:** middle juicy layer
- **Endocarp:** innermost layer

Groups of succulent fruits

- Berries
- Drupes
- Pomes

BERRIES

- These are juicy fruits with many seeds.

Examples of berries

- Oranges
- Tomatoes
- Pawpaw
- Passion fruit
- Grapes
- Guavas
- Thorn apple
- Sodom apple
- Lemon

Diagram of an orange fruit.

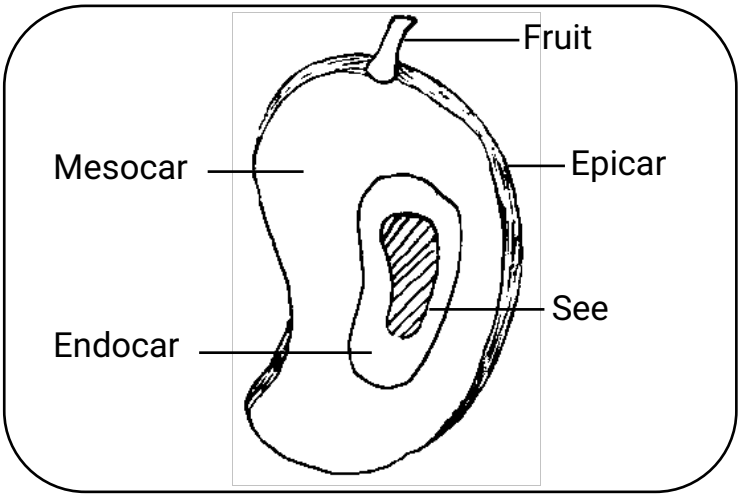
DRUPES

- These are juicy fruits with one seed.

Examples of drupes

- Mango
- Avocado
- Coconut
- Oil palm
- Cashew nut

A diagram showing a drupe



POMES

These are fruits formed from the receptacle
Its inner core is the pericarp.

Examples

- Apples
- Pears

Diagram of an apple

2. DRY FRUITS

These are fruits with a dry pericarp

Groups of dry fruits

- •Dehiscent fruits /splitting fruits
- •Indehiscent fruits /non splitting fruits

Dry dehiscent fruits

These are dry fruits which split to disperse the seeds

Examples of dry dehiscent fruits

- Beans
- Peas
- Castor oil
- Cassia
- Tobacco
- Sodom apple
- Desmodium
- Poppy

A structure of a dehiscent fruit

The fruit splits along the lines of weakness

Dry dehiscent fruits

These are dry fruits which do not split to disperse the seeds

Examples

- •Sunflower
- •Tridax
- •Black jack (bidens pilosa)
- •Maize
- •Cashew nuts

OTHER FRUITS

- Multiple fruits
- Aggregate fruits

Multiple fruits

These are fruits formed when all flowers on a stalk make a fruit

- ➢ Jack fruit
- ➢ Pineapple

Aggregate fruits

These are fruits formed by many fruits from one axis

- •Strawberry

FRUIT AND SEED DISPERSAL

This is the scattering of seeds and fruits from parent plants to a new area.

Importance of seed dispersal

- It prevents overcrowding of plants
- It reduces competition for sunlight, water and nutrients.
- It enables plants to colonise new areas.
- It prevents extinction of plant species (it increases chances of survival of plant species)

Disadvantage of seed dispersal

- It leads to growth of weeds
- It exposes seeds to pests
- It exposes fungal infections

Agents of fruit and seed dispersal

- Wind
- Animals : including birds and people
- Water

Types/ methods of fruit and seed dispersal

- Water dispersal
- Animal dispersal
- Wind dispersal
- Explosive mechanism (self-dispersal or mechanical dispersal)

CHARACTERISTICS OF SEEDS DISPERSED BY:

1. Wind

- Some are small and light to float in air e.g orchid.
- Some have hairy structures e.g cotton and silk cotton
- Some have parachute like structure e.g dandelion and tridax
- Some have wing like structures to float in air e.g jacaranda, Tacoma and terminalia
- Some seeds are dispersed when wind blows and shakes the capsule e.g poppy

Examples of seeds dispersed by wind

- Orchid
- Tridax
- Poppy
- Jacaranda
- Dandelion
- Cotton seed

2. Water

- They are light to float on water
- They are water proof (have a hard testa)
- They have air-tight epicarp
- They have fibrous mesocarp

Examples of seeds dispersed by water

- Coconut
- Water lotus
- Mangrove
- Oil palms
- Water lily

3. Animals

- Some have hooks to attach on animal's fur or clothing e.g black jack
- Some seeds stick on the beaks of birds e.g boehavia
- Some seeds have a hard coat to protect them from digestive juices e.g passion fruits, tomato and guava
- Some seeds are found in fruits with bright colours to attract animals e.g mangoes
- Some seeds are found in fruits with good scent to attract animals e.g jackfruit and mangoes
- Some seeds are found in fleshy fruits

Examples of seeds dispersed by animals

- Passion fruit
- Guava
- Jack fruit
- Mango
- Avocado
- Tomato
- Pawpaw
- Orange
- Blackjack
- Pumpkin

4. Explosive mechanism

- The fruit/pod splits and throws the seeds as it dries
- It is common in dry dehiscent fruits

Characteristics of seeds dispersed by explosive mechanism

- They are found in dry dehiscent fruits
- They are found in pods or capsules
- Their pods have lines along which they split when dry
- Their pod splits open to throw away seeds as it dries

Examples of seeds with explosive mechanism

- Beans
- Castor oil
- Lupin
- Peas
- Soybean (soya beans)
- French beans

TROPISM

- Tropism is a growth response of a plant towards stimuli

Stimuli

- These are things in the environment to which living things are sensitive

Examples of stimuli for plants

- Water
- Light
- Gravity
- Chemical
- Touch

KINDS (TYPES) OF TROPISM

- Phototropism
- Hydrotropism
- Chemotropism
- Thigmotropism
- Geotropism

Phototropism (heliotropism)

- This is a growth response of a plant towards light
- The plant shoot is positively phototrophic while the roots are negatively phototrophic

Diagram

Geotropism

- This is the growth response of a plant towards gravity
- Plant roots grow downwards due geotropism
- Plant roots are positively geotropic **because** they grow towards gravity
- Plant shoot is negatively geotropic **because** it grows while opposing gravity

Diagram

Hydrotropism

This is the growth response of a plant towards the water

Diagram

Chemotropism

This is a growth response of a plant towards chemicals
Pollen tubes move along chemicals produced by style, ovary walls and ovules
Diagram

Thigmotropism (haptotropism)
This is the growth response of a plant towards touch
It helps climbing plants such as some beans, tomato and morning glory to twine (clasp) other plants.
Diagram

PLANT PROPAGATION
Plant propagation refers to the methods used in growing certain plants
This is the method of making plants multiply in the environment
This is the way how plants can be grown
Basic methods (types) of plant propagation
- Seed propagation
- Vegetative propagation

SEED PROPAGATION
This is the growing of a new plant by means of seeds
It is common in most flowering plants and coniferous plants.
Examples of plants which are grown by means of seeds
- Beans
- Mango
- Avocado
- Pine
- Cedar
- Cypress

Seed propagation is an example of **sexual reproduction in plants**

Advantages of seed propagation (sexual reproduction in plants)
- New varieties are produced
- Seeds are always able to survive bad weather
- Good offsprings are produced
- Plants have high chances of colonising new areas
- There is little or no competition for nutrients among parent plants and the new plants

Disadvantages of seed propagation
- It is a slower means of reproduction

- It requires the agents of pollination
- It requires the agents of seed and fruit dispersal
- Parental food supply to the new plant is limited

Vegetative propagation
This is the growing of a new plant using other parts of a parent plant but not the seeds
The farmer gets new plant species
It is an example of asexual reproduction in plants

Parts of plants used in vegetative propagation are:-
- Stems
- Leaves
- Buds

Types of vegetative propagation
- Natural vegetative propagation
- Artificial vegetative propagation

Parts used in natural vegetative propagation

Plants	Part of a plant used in natural vegetative propagation
white yam, Irish potato	Stem tubers
Coco yam, crocus, gladiolus	Corms
Ginger, turmeric, zoyzia, canna lily	Rhizomes
Banana , pineapple, sisal	Use of suckers
Pineapples	Crowns , slips and suckers
Sisal	Suckers, bulbils
Onion, garlic, spider lily, shallot	Bulbs
Strawberry	Runners
Bryophyllum, begnonia	Leaves
Dahlia, asparagus	Roots

Artificial vegetative propagation
This involves use of special skill and techniques to produce high quality and high yielding crops which are resistant to diseases
Example of artificial vegetative propagation

a) Stem cutting
- Sweet potatoes
- Cassava
- Sugarcane
- Hibiscus

Sweet potatoes can also be propagated using **vines**

Description & Diagram

b) Layering

Description & Diagram

c) Grafting

Description & Diagram

d) Budding

Description & Diagram

e) Marcotting

Description & Diagram

Advantages of vegetative propagation (asexual reproduction in plants)
- The new plants mature in a short time
- Only one parent plant is needed to produce a new plant
- The new plant is exactly similar to the parent plant
- The new plant gets food from the parent plant until it is well settled
- The parent plant does not need pollination or seed dispersal to produce a new plant
- It becomes easy to get hybrids without using seeds

Disadvantages of vegetative propagation (asexual reproduction in plants)
- No new varieties are produced

Why? There is no mixing of characteristics
- There is easy spread of crop diseases
- The new plant may not be resistant to diseases
- The new plant competes with the parent plant for sunlight, water and nutrients

ECONOMIC VALUES OF PLANTS TO MAN
- Plants provide food to man.
- Plants help in controlling soil erosion
- Plants are need in construction and building industry.
- They provide raw materials for agro based industries
- Agricultural industry is a source of revenue for government

ANIMAL HUSBANDRY

Animal husbandry is the care and management of livestock (farm animals)
Or: Animal husbandry is the keeping of farm animals (livestock)
Livestock are all kinds of farm animals

Examples of farm animals (live stock)

Goats	Pigs	Cattle
Rabbits	Sheep	Poultry

KEEPING CATTLE

Cattle means cows and bulls
Cattle keeping is the rearing of cows and bulls.

Terms used in cattle keeping.

Bull
This is a male animal of cattle family
Cow
This is a female animal of cattle family
Calf
This is a young one of a cow
Heifer
This is a young female cattle that has not yet had a calf
Oxen
These are castrated bulls kept for doing work
Bullock
This is a young castrated bull
Steer
This is a castrated bull kept for meat production

Reasons why farmers rear cattle

- For meat production
- For milk production
- For income after sale
- For provision of labour

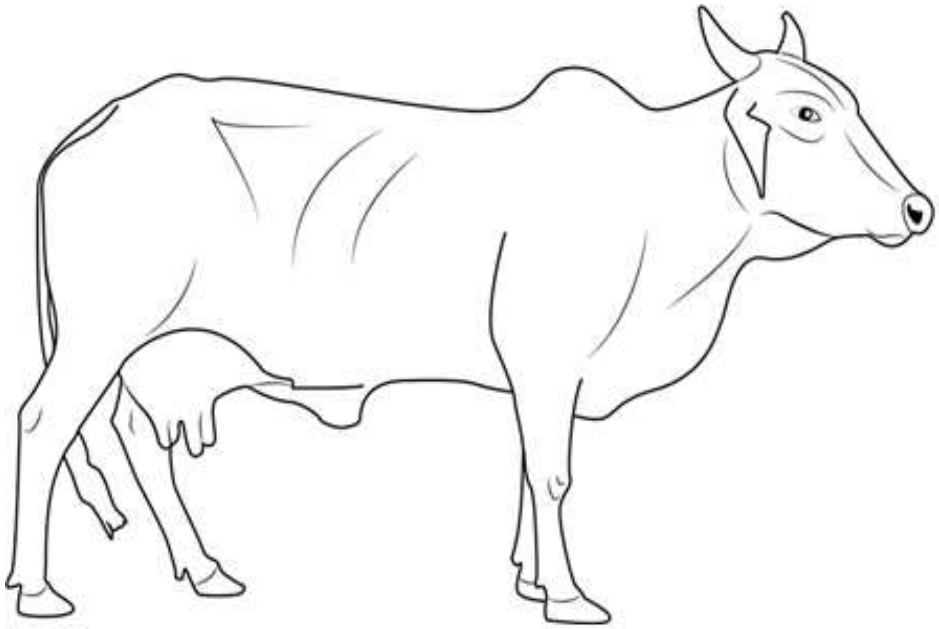
Importance of cattle keeping.

- Cattle provide us with meat
- Cattle provide us with milk
- Cattle are source of income when sold
- Bulls and oxen are used for ploughing and transport
- Cow dung and urine are used to make manure
- Cattle provide hides used for making leather
- Their bones, horns and hooves are used to make glue and animal feeds.
- Cattle are used to pay dowry or bride price.
- Their horns are used to make buttons

CATTLE PRODUCTS

- Meat
- Fats
- Blood
- Hides
- Bones
- Milk
- Horns and hooves
- Cattle dung and urine

External parts of a cow



TYPES OF CATTLE

A type of cattle is a group of cattle kept for a specific purpose.

- Beef cattle
- Dairy cattle
- Dual purpose cattle
- Draught cattle (Work type cattle)

BEEF CATTLE

These are cattle mainly kept for meat production.

Characteristics of beef cattle

- They grow and mature quickly
- They have a rectangular block shape
- They have small heads
- They have short legs with broad backs.
- They have small udders
- They produce a lot of meat
- They have thick muscles
- They are more resistant to high temperature

Examples of exotic breeds of beef cattle

- American Brahman
- American beef master
- Galloway
- Hereford
- Aberdeen Angus
- Charolais
- Santa Gertrudis

Diagram of beef cattle as seen from above and from sides

Seen from sides Seen from above

DAIRY CATTLE

These are cattle kept mainly for milk production

Characteristics of dairy cattle

- They are triangular in shape
- They produce a lot of milk
- They have well set legs to support their weight
- Their hind legs are wide apart
- They are usually docile (calm)
- They have small necks (long flexible necks)
- They have big udders
- They have wide hind quarters
- They have four large teats

Examples of exotic breeds of dairy cattle

- Friesian
- Brown Swiss
- Jersey
- Guernsey
- Ayrshire
- Jamaica hope
- Danish Red cattle

Diagram of a dairy cow as seen from above and aside

Seen from above Seen from sides

DUAL PURPOSE CATTLE

These are cattle kept for both meat and milk production.

Examples of dual purpose cattle

- Red Poll
- Short horn
- Sahiwal

DRAUGHT CATTLE

These are cattle mainly kept for providing labour on a farm (ploughing and transport).
They are used to plough soil, pull carts and transporting harvested crops from gardens.

Examples of draught cattle

- Oxen

BREEDS OF CATTLE

Cattle breed

This is a group of cattle that have similar characteristics.

Characteristics of a type of breed of cattle are determined by;

- Colour of cattle
- Size of cattle
- Milk yield of cattle
- Body shape of cattle

TYPES OF BREEDS OF CATTLE

- Local breeds
- Exotic breeds

- Cross breeds

LOCAL BREEDS

These are breeds that have existed in Uganda for a very long time.
They are also called **native breeds or indigenous breeds.**

External features of local breeds of cattle

- They have different colours.
- They have big humps.
- They have dewlaps.
- They always have long horns.

Examples of indigenous breeds

- Ankole cattle
- Boran cattle: for meat production
- Zebu cattle: for milk production
- Karimojong cattle
- Nganda cattle
- Nsagala (sanga) cattle: for milk production
- Intermediate cattle: for milk production

Advantages of local breeds of cattle

- They are resistant to diseases.
- They can survive on poor pasture and little water.
- They are resistant to bad weather
- They need less care.
- They produce high quality meat and milk

Disadvantages of local breeds of cattle

- They mature slowly
- They produce little milk
- They produce less meat

EXOTIC BREEDS

These are breeds which were imported from outside countries.

Examples of exotic breeds of cattle

- Friesian
- Hereford
- Jersey
- Guernsey
- Ayrshire
- Aberdeen Angus

Note

Exotic breeds of cattle are mainly beef and dairy cattle.

External features of exotic breeds.

- They have specific colours
- They have very small humps.
- They have thin dewlaps.
- They have short or no horns

Advantages of exotic breeds of cattle

- They mature fast
- They produce much meat
- They produce a lot of milk

Disadvantages of exotic breeds of cattle

- They are vulnerable (not resistant) to diseases
- They need good pasture and water.
- They are not resistant to harsh weather
- They need a lot of care.
- They are expensive to manage.

Differences between local and exotic breeds of cattle

Local Breeds	Exotic Breeds
They have different colours	They have specific colours.
They mature slowly.	They mature quickly.
They produce less meat and milk.	They produce more meat and milk.
They need less care.	They need a lot of care.
They are more resistant to diseases.	They are less resistant to diseases.
They can survive on poor pasture and water.	They need good pasture and water.

CROSS BREEDS

These are breeds got when a local breed mates with an exotic breed.

Advantages of cross breeds over local and exotic breeds.

- They grow faster than the local breeds.
- They produce more meat than the local breeds.
- They produce more milk than local breeds.
- They are more resistant to diseases than the exotic diseases.

BREEDING OF CATTLE

Breeding

This is the keeping (maintaining) of inherited characteristics in cattle.

Examples of inherited characteristics in cattle;

- Colour
- Growth
- Resistance to diseases
- Milk production
- Ability to live long

Types of breeding

1. In-breeding
2. Line breeding
3. Out breeding.
4. Cross breeding
5. Upgrading
6. Selective breeding

- **In Breeding**

This is the mating of very closely related animals

Example of in-breeding

Mating of brother and sister
Mating of mother and son
Mating of father and daughter

OR. The mating of near relatives in animals

Advantages of in breeding

It strengthens good quality of animals

Disadvantages

- It leads poor quality animals
- It leads to poor production of animals
- It leads to inherited diseases
- It can lead to sterility in animals
- It can lead to inheritance of bad traits.

- **Line-breeding**

This is the mating of closely related animals
It is common in chicken and rabbits because they grow faster

Examples of line-breeding

Mating of cousins
Mating granddaughter and grandson

Advantage of line-breeding

- It maintains animals related to their ancestors

Disadvantage of line breeding

- Leads to inheritance of bad traits
- Leads to poor production of animals

- **Out breeding**

This is the mating of distantly related animals.

Example of out-breeding

Mating of animals of the same breed but from different herds

Advantage of out-breeding

It restores good qualities that may be disappearing in a breed

- **Cross breeding**

This is the mating of unrelated animals of different breeds.

Example of cross breeding

Mating of exotic breeds with local breeds
The off springs after cross breeding are called **cross breeds**.

Advantages of cross breeding

It improves the quality of local breeds
It creates a hybrid
Cross breeds have better performance than their parents or relatives.

- **Upgrading**

This is the improving of quality of one breed by using a breed of superior quality several times.

Advantages of upgrading

- Offsprings are of good quality
- It increases the quantity of farm products
- Young ones produce good yields

- **Selective Breeding**

This is the mating of selected good breeds in a herd.
OR. This is the allowing of certain animals to be parents of future generation
Poor breeds in a herd are sold off.

MATING

This is the sexual union of the male and female animals.
Mating of a bull and a cow occurs only when a cow is on heat.
During mating, **insemination** takes place.
A heifer is ready for mating at the age of **18 months.**
A cow or heifer ready for mating shows signs of heat.

HEAT PERIOD /ESTRUS PERIOD

This is the time when a female animal is in need of a male animal for mating.

OR

This is the time when a female animal is ready to mate with a male animal.

Oestrus cycle

This is a period when a female animal can conceive if it mates.

Signs of a cow on heat

- The cow mounts cattle.

- The cow loses appetite to graze.
- Mucus discharge from the vulva.
- It makes a lot of noise (frequent bellowing)
- It stands still when the bull is mounting it
- Slight rise in the body temperature of a cow.
- The vulva swells and turns red.
- The cow urinates frequently.
- The cow becomes restless
- Milk production in lactating cows drops.
- The cow stands while others are lying down

Three weeks after the period of service, if the cow shows no more signs of heat, we say it has conceived.

INSEMINATION/SERVICE

This is the depositing of sperms into the vagina of a cow/female animal.

Types of service/insemination

- Natural Insemination
- Artificial Insemination

Natural Insemination

This is when a bull deposits sperms into the vagina of a female animal using its penis

Systems of natural insemination

- ❖ Hand mating
- ❖ Pasture mating

Hand mating

This is when a bull is kept separate from cow and it is only brought to mate with a cow on heat.

Pasture Mating

This is when a bull is allowed to move with cows so that it mates easily with those on heat.

Advantages of natural insemination

- It saves time.
- It does not require a skilled cattle keeper to carry it out.
- It is easy for a bull to inseminate the cow
- It is cheap for a farmer since semen is not bought.
- It is easy for a bull to notice the signs of heat in cows.
- Both animals enjoy their natural sexual rights.

Disadvantages of natural insemination

- Controlling venereal diseases is difficult.
- Small cows can be injured by heavy bulls.
- It leads to venereal diseases in animals
- It is expensive to buy and maintain a bull
- It encourages inbreeding.
- It is difficult to control hereditary diseases
- Once a bull dies, the sperms are lost

2. Artificial insemination

This is the depositing sperms into the vagina of a cow using syringe or an inseminating gun.

An inseminator is a trained person who uses a syringe to deposit sperms into the vagina of the cow

Advantages of artificial insemination

- It controls venereal diseases in animals.
- It is cheaper to than keeping a bull.
- Small cows cannot be injured by heavy bulls.
- Semen is not wasted
- Semen can be stored and used even after death of a bull.
- It controls inbreeding.

Disadvantages of artificial insemination

- It requires an expert to carry it out.
- Storing semen is difficult.
- Animals are denied their natural sexual rights
- It may not give good results.
- A farmer may not easily notice the cow on heat.

REPRODUCTION IN CATTLE

Reproduction is the process by which living things multiply in number.
Reproduction is the ability to produce off springs and increase in number.

Forms of reproduction

- **Sexual reproduction**: involve gametes
- **Asexual reproduction:** does not involve gametes

Examples of the asexual reproduction

- **Budding** e.g in yeast and coelenterates
- **Cell division (binary fission)** e.g in bacteria and amoeba
- **Spore formation** e.g in most fungi, algae, ferns, liver warts and algae
- Fragmentation e.g flatworms and algae
- **Vegetative propagation** e.g grafting, marcotting and layering

THE REPRODUCTIVE SYSTEM OF A COW

Uses of each part

Vulva

It receives and directs the penis to the vagina.
It protects and covers the vagina.

Vagina

It receives sperms and passes them to the uterus.
It is a birth canal.

Cervix

It closes the uterus and protects the foetus during pregnancy
It separates the vaginal canal and the uterus

Ovary

This is the female gonad

- It releases mature ova for possible fertilisatiobn
- It produces hormones which controls the sexual cycle.

- It protects the ova

Ova

These are female reproductive cells/gametes

Uterus

- It is where implantation takes place.
- It is where the foetus develops from.

Oviduct (fallopian tube)

- It is where fertilization and conception take place.
- It passes a fertilized egg to the uterus.

Urethra

It passes out urine from the bladder.

Urinary bladder

It stores urine for a short time

THE REPRODUCTIVE SYSTEM OF A BULL

Uses of each part

Testes/testicles

These are male gonads

- They produce sperms.
- They produce testosterone hormone

Uses of testosterone

It is responsible for puberty

Controls sexual desires

Urethra

- It passes urine to the penis
- It passes sperms to the penis.

Sperm ducts

They carry sperms to the urethra.

Penis

It deposits sperms to the vagina

Epididymis

- It stores manufactured sperms.
- It allows sperms time to mature

How is epididymis adapted to its function?

- It is a long tube

Prostate glands and seminal vesicles

They produce semen which helps sperms to swim.
They produce a fluid which weaken any remaining urine in the urethra

Scrotum

This is the outer covering of the testicles.

- It protects the testicles.
- It regulates the temperature of the testicles.

Why is the scrotum always hanging between the legs?

- To regulate temperature of the testes.

Sheath

- It protects the glans penis (head of the penis)

FERTILIZATION IN A COW

Fertilization is the union of male and female gametes to form a zygote.

- It occurs in the **oviducts (fallopian tubes)**

Gametes

These are reproductive cells
The female gamete is called **Ovum**
The male gamete is called a **Sperm**

Diagram of a sperm and an Ovum

Sperm Ovum

After fertilization, the zygote (embryo) is formed
Embryo develops into a foetus
Foetus finally into a calf

Embryo (zygote)

This is the developing baby between conception and eight weeks

Foetus

This is the developing baby after eight weeks and before birth

CELL DIVISION

After fertilization in the oviducts, the embryo begins cell division as it passes to the uterus.
When it reaches the uterus, conception (implantation) takes place

IMPLANTATION

This is the attachment of the fertilised ovum onto the uterus walls
Implantation occurs in the **uterus (womb)**
The embryo is attached to the uterus wall by the **placenta.**

GESTATION PERIOD

This is the time taken from conception to birth.
The gestation period of an in-calf is 270 days or nine months.
In-calf is a pregnant cow.

Signs of pregnancy in cows

- The uterus enlarges
- The cervix closes up
- The udder increases in size
- The cow does not go to heat 21 days after service
- The movement of foetus can be seen or felt after 7 months.
- There is mucus around the cervix

DRY PERIOD

This is the time when a lactating cow is left without milking it towards giving birth.
A cow is dried two months before calving.

Drying off the cow

This is the practice of not milking a pregnant cow before it gives birth

Importance of drying off

- Lengthens the next lactation period
- Helps the cow to prepare and produce enough colostrum
- Leads to increased milk during next lactation

During the dry period, the in-calf is fed on foods rich in protein.

STEAMING UP

This is the feeding of a pregnant animal on foods rich in protein.
It is done in the last two months before giving birth.

Reasons (importance or advantages) of steaming up

- It leads to increased milk rich in colostrum
- It enables the foetus to grow healthy.
- It builds a cow's body in preparation for calving (parturition)
- It prevents low birth weight.
- It prolongs milk let down.
- It lengthens the lactation period

Lactation period

This is the time a female animal takes while suckling its young ones

Milk-let-down

This is the flow of milk from the udder to the teats of a cow

CALVING (PARTURITION)

This is the act of giving birth in cattle (cows).

Signs of calving

- The vulva swells and becomes red.
- The cow becomes restless
- The teats open
- The cow stops grazing
- The udder and teats become swollen.
- The cow isolates itself

Colostrum

This is the first milk got from a cow which has given birth.

Importance of colostrum

- It has a lot of nutrients.
- It opens up the digestive system of a calf.
- It boosts the calf's immunity (it contains a lot of antibodies)
- It is easy to digest

WEANING

This is the gradual introduction of semi-solid food other than breast milk alone
Weaning in calves starts during the **third week**

Types of weaning calves

- **Early weaning:** calves stop suckling at 5 weeks
- **Late weaning:** calves stop suckling at 16 weeks

METHODS OF FEEDING CALVES

- **Mother cow feeding:**

This is the act of allowing a calf to stay with a mother cow for some time.

- **Nurse-cow feeding:**

This is the act of allowing many calves to suckle one cow

- **Open bucket feeding:**

This is the act of feeding the calves on milk in buckets

- **Teat feeding:**

This is the act of feeding calves from teats attached to one bucket

Importance of feeding calves on roughages

- Helps in formation of vitamin B
- Stimulates rumination process (ability to chew cud)
- It quickly develops the digestive system of a calf

MILKING

This is the removal of milk from the udder of a cow through teats.

Milk let down

Milk let down is the flow of milk from the udder of a cow.

Types of milking

There are two types of milking namely;
Hand milking
Machine Milking

Hand milking

Hand milking is the removal of milk from the udder of a cow by squeezing teats using hands.
Hand milking is also called **full hand milking.**

Machine milking

This is the removal of milk from the udder of a cow using a machine.
The parts of a milking machine must be washed to avoid milk contamination.

PREPARATION FOR MILKING

Assemble the clean milking equipment.
Put the cow in a milking place and tie the hind legs with a rope. **This prevents the cow from kicking the person who is milking** and **to prevent the cow from kicking the milk container.**
Give the cow some feeds **to keep it busy and relaxed during milking.**
Wash the udder and teats with warm clean water **to encourage milk let down.**
Wash your hands clean **to prevent milk contamination/to remove germs and dirt.**
Draw one or two streams of milk from each teat into a strip cup (fore cup) **to detect the presence of mastitis in milk**.
If the cow has mastitis, bloody milk clots will remain on the wire mesh of a strip cup.
A cow with mastitis should be milked last.
After milking, wash the milking place and equipment using disinfectants. **To kill germs which may make milk to go bad**

STRIP (FORE) CUP
This is an instrument used to detect the presence of mastitis in milk.
Diagram of a strip cup

LACTOMETER
This is an instrument used to;
Detects whether water has been added to milk
Detects whether fats have been removed from milk.
Detects the purity of milk
Measures specific gravity/density of milk
A lactometer is a closed weighed tube graduated to make the level of normal milk.

How a lactometer works
A lactometer is dipped in a container having milk.
If water has been added to milk, it will sink deeper due to lack of support.
Diagram of a lactometer

MILK PRESERVATION
This is the way of keeping milk free from bacteria

Methods of preserving milk
Sterilization
Refrigeration
Pasteurization
Boiling

Sterilization
This is the method of killing bacteria in milk by maximum boiling followed by cooling and covering.
Disadvantage of using sterilization in milk preservation
It reduces vitamins and proteins

Pasteurisation
This is the heating of milk at controlled temperature and cooling it rapidly.
Heating kills germs
Quick cooling prevents the bacteria from entering and multiplying in milk
Advantage of pasteurisation
It kills bacteria without destroying nutrients prevent
It increases the quality of milk
It does not cause change in taste of milk
Pasteurisation of milk was discovered by **Louis Pasteur,** a French Scientist who discovered that milk goes bad due to bacteria.
Refrigeration
This is the putting milk in a refrigerator to lower its temperature to about 4^0C.
Low temperature makes bacteria dormant and unable to multiply (prevents multiplication of bacteria).

Boiling helps to kill germs which enter in milk when it is cold
Disadvantage of boiling
A lot of milk is lost by evaporation.

HOMOGENIZING

This is a way of treating milk so that fats are broken down and the cream is mixed with the rest.

PRODUCTS GOT FROM MILK

- Butter
- Cheese
- Yoghurt
- Ice cream
- Ghee
- Whey
- Casein

CASEIN

It can be used as food

It is a raw material for making shinny paper.

Whey

It used as sauce to accompany food.

Examples of processed milk

- Whole milk
- Skimmed Milk
- Pasteurized Milk
- Fortified Milk
- Condensed Milk

CALF MANAGEMENT PRACTICES ON A FARM

These are ways of caring for calves on the farm

- Numbering/identification of cattle
- Dehorning/Disbudding
- Hoof trimming
- Castration
- Dehorning
- Spraying
- Dipping
- Dusting

NUMBERING

This means putting a mark or label on the body of animals.

Importance of livestock identification/numbering

- Helps a farmer to easily find his animals in case they get lost
- Helps a farmer to keep proper records

Ways of numbering/methods of livestock identification

- Branding
- Ear notching
- Ear tagging
- Use of a number lace
- Ear tattooing
- Tail Bobbing

Branding

This means putting marks on the body of animal using hot iron.

It is done on head, on hump and legs because **it spoils quality of the hides**

Ear notching

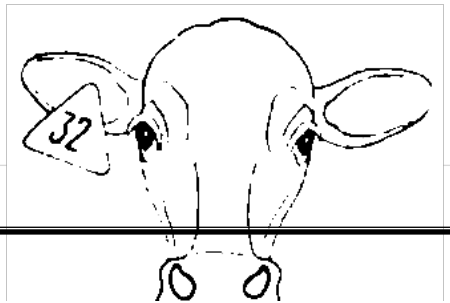
This is the cutting of the edge of the ears of animals with marks.

Diagram

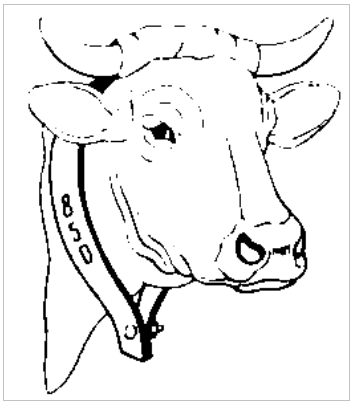
Ear Tagging

- This means fixing tags with numbers on the ear of animal.
- It is done using an applicator

A drawing showing ear tagging



Using a number Lace
This is the putting of a wooden or iron piece of plate around the neck of animals.
A drawing showing use of a number lace as a method of cattle identification



Ear tattooing
This is the putting of permanent mark on the ears of animals using pliers carrying numbers on them.
Diagram

Tail bobbing
This is the trimming long hair on the animals' tail/switch.
NB: Cows are not usually docked i.e. tails are not shortened.
Diagram

HOOF TRIMMING

This is cutting off overgrown hooves of animals.
It is done using a hoof trimming knife or a pair of shears
Advantages
It reduces the risk of injuries among cattle.
It reduces the risk of transmission of diseases.
Note
After hoof trimming, the animal is made to walk in a foot bath **to prevent foot rot disease**
Foot rot is caused by bacteria

CASTRATION

- This is the removal or inactivation of testicles of a male animal

Methods of castration

- Open castration
- Closed castration
- Loop castration (band castration)

Open Operation/open castration

- This is when the scrotum is cut to remove the testicles
- The sperm ducts are then sealed by burning using a hot metal.

Instruments used in open castration
- Sharp knife
- Razorblade
- Scalpel

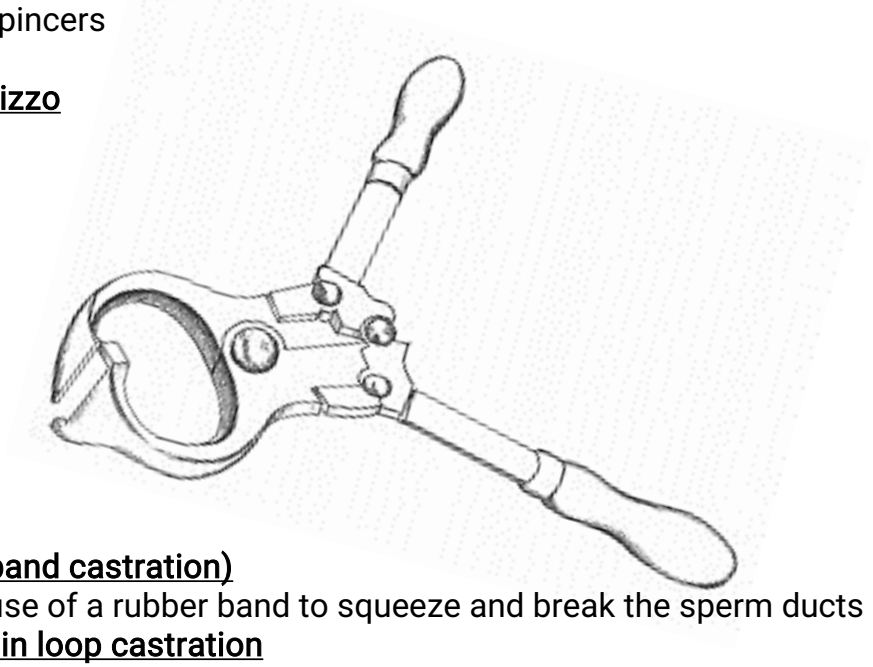
Closed castration
- This is the use of burdizzo to crush the sperm ducts and blood vessels

Instrument used in closed castration
- Burdizzo

How is a burdizzo useful on cattle farm?
- It is used in closed castration of livestock

How is a burdizzo adapted to its function?
- It has blunt pincers

Diagram of a burdizzo



Loop castration (band castration)
- This is the use of a rubber band to squeeze and break the sperm ducts and blood vessel

Instruments used in loop castration
- Rubber band
- Elastrator

An elastrator is used to apply rubber band around the scrotum during band castration

Advantages of castration
- It prevents inbreeding
- It prevents random mating
- It prevents unwanted pregnancies
- It makes the male animal humble (docile)
- It makes the male animal grow big and fat
- It reduces bad smell in male animals

Disadvantages of castration
- It is painful
- It increases the risk of infections
- It can lead to excessive bleeding hence death
- It can lead to swelling
- It denies the male animal its right of reproduction
- It needs a skilled person

DEHORNING (DISBUDDING)

- **Dehorning** is the removal of horn buds from the head of a young animal
- **Disbudding** is the removal of horn buds from the head of a young animal

Methods/ways of dehorning
- Use of spoon dehorners: at 2 months of age
- Use of chemicals such as common salt and potassium hydroxide: 3 to 14 days
- Use of dehorning iron (hot iron rod): 6 to 30 days after calving.

Instruments used in dehorning
Spoon dehorner
Dehorning iron

Advantages of dehorning
- It makes animals easy to handle.
- It increases space in the Kraal (byre)
- It prevents animals from destroying farm structures.
- It prevents animals from injuring people and other animals.

Disadvantages of dehorning
- It is painful to the animal
- The wound may become septic
- The animal loses its defence organs
- It needs skilled person.
- It leads to mental disturbance

DEWORMING
- This is the giving of medicine to animals to kill worms (endoparasites)

Why farmers deworm their animals?
- To kill endoparasites (worms) in animals.

Examples of worms (endoparasites) in animals
- Tape worm
- Liver fluke
- Hook worm

Methods of deworming
- Drenching
- Dosing

Drenching
This is the giving of liquid medicine through the mouth to kill worms in animals.

Equipment used for drenching
- Drenching gun (it is the main tool for drenching)
- Bottle
- Syringe

How does a cattle farmer make use of a drenching gun?
- For drenching

Diagram of a drenching gun

Dosing
This is the giving of solid medicine through the mouth to kill worms in animals.

Forms of solid medicine used for dosing.
- Deworming capsules

- Deworming tablets

Equipment used for dosing
- Bolus gun

How does a cattle farmer make use of a bolus gun?
- For dosing

SPRAYING
This is act of sprinkling acaricides on the animal's body.

Why do farmers spray acaricides on their animals?
- To kill ticks and mites
- To prevent tick-borne diseases.

Knapsack sprayer is the farm tool used for spraying acaricides

DIPPING
This is the act of making animals to move through water mixed with acaricides in a dip tank.

Dip tank
This is a farm structure in which acaricides are put for animals to pass through.

Advantages of using a dip tank
- Less labour is needed
- The animal is well covered by acaricides
- The acaricides can be used again
- It is very useful for farmers with large herds

Disadvantages of using a dip tank
- It requires a lot of capital
- Skilled labour is needed to detect the strength of acaricides

Diagram of a dip tank

Why should the dip tank be cemented?
- To make it last longer
- To prevent contamination of acaricides
- To prevent drainage of acaricides through the walls

Why should a dip tank be made shallow?
- To prevent the animals from drowning.

Why are cattle first given drinking water before dipping?
- To prevent farm animals from drinking the acaricides.

Why are farm animals passed through a footbath before dipping?
- To prevent contamination of acaricides.

Why is a dip tank and a sprayrace always made narrow?
- To prevent the animal from turning.

Examples of acaricides used in a dip tank
- Gumtox
- Tsetsetick
- Taktic
- Triatix
- Amitraz

DUSTING
This is the act of smearing the animal with acaricides to kill ticks and mites.
DETICKING
This is the act of using hands to pick ticks from the animal's skin.

Removal of extra teats
This act of cutting extra teats from the udder of a cow.
There should be only four teats.

HOUSING OF CATTLE
This is the constructing of houses for cattle

Reasons for housing of cattle
- To protect animals from bad weather
- To protect animals from predators
- To protect animals from thieves

Importance of houses on a cattle farm
- Houses protect animals from bad weather
- Houses protect animals from thieves
- Houses protect animals from predators
- Houses are used to keep farm produce
- Houses are used to keep farm records.
- Houses are used to keep animal feeds
- Houses are used to keep farm tools (farm equipment)
- Houses are used as milking places.
- Houses are used as treating places for animals.

Qualities of a good house for cattle
- It should be well ventilated

To allow free circulation of air
To allow in fresh air
- It should have a waterproof roof

To prevent leaking of rain
- It should concrete or cemented floor

To make cleaning easy
To prevent accumulation of mud
- It should have a slanting floor

For easy drainage of urine

Dangers of sharing a house with animals
- It leads to bad smell in the house
- Animals may spread parasites to people
- Animals may destroy household property
- It leads to competition for oxygen
- Animals may spread diseases to people

Zoonosis (zoonotic disease)
This is a disease that can spread from infected animal to humans
Examples of Zoonoses

- Tuberculosis (TB)
- Rabies
- Anthrax
- Brucellosis
- Anaplasmosis

FENCING

Fencing is the putting of a barrier of live or dead materials around the farm or home
A fence is a barrier of live or dead materials around the farm or home.

Types of fences

- Natural fences (live Fences)
- Artificial fences (dead fences)

NATURAL FENCES

These are fences planted by man.
Examples of plants used to make natural fences

- Bamboo
- Sisal
- Pine
- Cedar
- Thorny plants
- Acacia

ARTIFICIAL FENCES

These are fences made out of non living materials

Examples of artificial fences

- ★ Chain-link fence
- ★ Barbed wire fence
- ★ Concrete block fence
- ★ Electric fence
- ★ Stone fence
- ★ Wooden fence
- ★ Plain wire fence
- ★ Brick fence

Importance of fencing

- It allows proper use of pasture.
- It protects animals from thieves.
- It controls the spread of cattle diseases
- It prevents animals from destroying crops
- Natural fences act as wind breaks.
- It controls boundary disputes
- Natural fences promote practice of agroforestry
- It facilitates rotational grazing
- It makes culling easy.
- Some fences add humus to the soil.
- It enables a farmer to easily separate animals according to age, sex and health.

Disadvantages of fencing

- ★ Thorny plants can cause injury to animals

- ★ Fences can hide snakes and ticks
- ★ Some fences are expensive to maintain

PASTURE
This is the grass for feeding farm animals.
PASTURE LAND
This is an open grassland on which animals graze.

TYPES OF PASTURE
a) Natural pasture
b) Prepared pasture

- **Natural pasture**

This is pasture that grows by itself.

Examples of natural pasture
- Kikuyu grass
- Guinea grass
- Nandi grass
- Goat weed
- Star grass
- Elephant grass
- Guatemala grass
- Alfalfa

- **Prepared pasture**

This is pasture made out of fodder crops.

What are fodder crops?
These are crops grown for feeding animals
Examples of fodder crops
- ★ Maize
- ★ Sorghum
- ★ Rice
- ★ Millet
- ★ Sweet potatoes
- ★ Oats
- ★ Cloves
- ★ Elephant grass

Kinds of prepared pasture.
- ➤ **Silage**

This is undried green grass cut and stored to be used as food for animals
- ➤ **Hay**

This is the grass cut and dried to be used as food for animals.

Importance of pasture
- It is food for farm animals
- It adds humus to the soil after decaying.
- It is used as animal bedding.
- It controls soil erosion.

- It is used for thatching houses
- Leguminous pastures fix nitrogen in the soil.

PASTURE WEEDS
These are unwanted plants in the pasture land.
Examples of pasture weeds.
- Thorn apple
- Sodom apple
- Lemon grass
- Tick berry
- Catstail grass (timothy grass)

Dangers of pasture weeds.
- They are poisonous to farm animals.
- They compete with pasture for nutrients.
- They add a strange smell in milk.

TANNING
This is the process of making leather from hides

Methods of tanning (methods of preserving hides and skins)
- Wet salting

Salt absorbs moisture from hides.
- Suspension drying

This is the act of stretching a hide on flat surface to dry under shade.

FEEDING HABITS IN CATTLE.
- Cattle are herbivores (they feed on vegetation)
- Cattle are ruminant (ungulate)s hoofed mammals.

RUMINATION
This is the ability of some mammals to chew cud

RUMINANTS
These are mammals that chew cud.
Characteristics of ruminants
- They chew cud
- They have four stomach chambers.

How do most ruminants protect themselves?
- By using their horns.

Examples of ruminant animals
- Cattle
- Sheep
- Goats
- Horse
- Giraffe
- Camel
- Antelope
- Elephant

THE DIGESTIVE SYSTEM OF RUMINANTS

Uses of each part

Mouth

- It chews food by the help of teeth

Gullet (oesophagus)

- It is the passage of food mouth to rumen

Food (roughage) moves from gullet to rumen by a process called **peristalsis**.

Rumen (paunch)

It is the first and largest stomach chamber of a ruminant.

- It stores food for a short time before chewing cud.
- It breaks down cellulose and vitamin B
- It is where food is fermented and softened.

Reticulum (honeycomb stomach)

It is the second stomach chamber of a ruminant.

- It retains foreign bodies.
- It maintains supply of digestive fluids.
- It separates well chewed food from unchewed food

Omasum

It is the third stomach chamber of a ruminant.

- It grinds food.
- It absorbs water.

Abomasum (true stomach)

It is the fourth stomach chamber of a ruminant.

- It is where digestion of proteins starts.
- It mixes food with enzymes

Small intestines (ileum)

- It absorbs digested food.

Caecum and appendix

- It is where cellulose is digested by the action of bacteria

Rectum

- It stores undigested food as dung

Anus

- It is where dung is passed out of the body

TYPES OF CATTLE FEEDS.

- Forages
- Concentrates
- Production rations
- Maintenance rations
- Additives

Forages:

These are plants given to cattle as food

- Hay (dried grass)
- Maize stalks
- Vegetables
- Legumes
- Silages
- Green grass
- Roughages

Concentrates

These are commercial cattle feeds prepared in factories

- Maize bran
- Crushed oil seeds
- Bone meal
- Blood meal
- Fish meal

Supplements

- These are proteins and vitamins added to cattle feeds.

Production rations

- These are extra feeds given to cattle to produce more beef or milk.

Maintenance rations

- These are feeds given to cattle to sustain their usual feeds.

Additives

- These are drugs and flavour added to cattle feeds (such as; salt)

IMPORTANCE OF SALT TO CATTLE

Why are cattle given salt to lick?

- It stimulate milk production
- It controls milk fever disease.
- It provides mineral salts to the body
- It fattens the cows

GRAZING

This is the proper use of grassland by livestock

SYSTEMS (METHODS) OF GRAZING

- Herding
- Paddock grazing
- Strip grazing
- Tethering
- Zero grazing

Mention three methods of rotational grazing;

- Paddock grazing
- Strip grazing
- Tethering

HERDING

This is when a herdsman looks after animals as they graze.
Herding is sometimes called **free range grazing or open range grazing**

Advantages of herding

- Animals eat a variety of feed
- Animals make enough body exercise
- Less attention is needed
- It is cheap

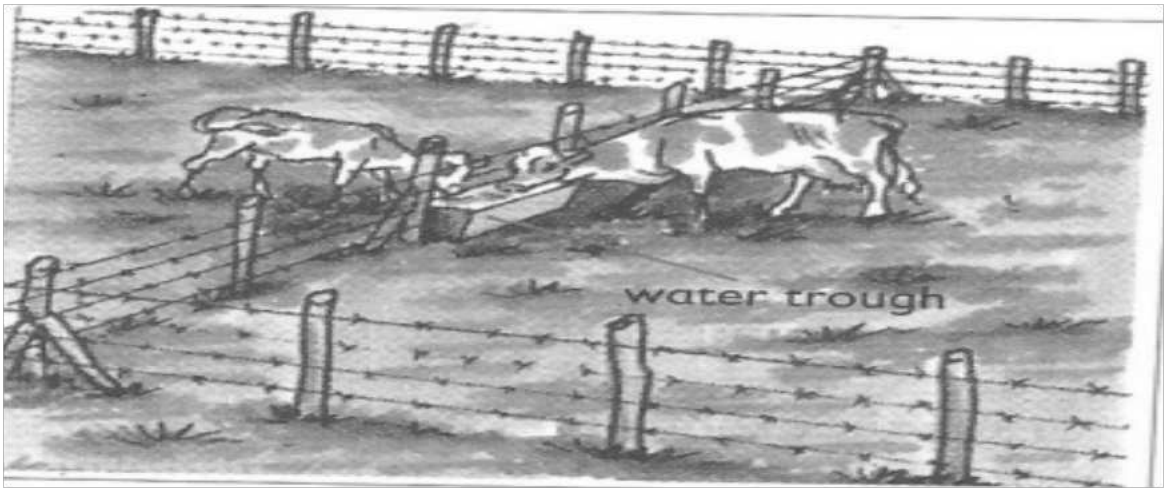
Disadvantages of herding

- ★ There is easy spread of cattle diseases and parasites
- ★ Animals can destroy crops.
- ★ Animals can get lost
- ★ It needs a big piece of land.
- ★ It can lead to overgrazing.

PADDOCK GRAZING

Paddock grazing is the grazing of animals on a pastureland divided into small fenced plots.
Paddocks are small fenced plots on pastureland.

Illustration of paddock grazing



When the pasture is fully grazed by animals, the animals are moved to another paddock.

Advantages of paddock grazing

- It allows proper use of pasture.
- It gives pasture time to grow.
- It controls over grazing.
- Animals do not destroy crops.
- Manure is evenly distributed on the farm.
- It prevents easy spread of tickborne diseases
- It controls ticks

How?

- By starving ticks to death (it breaks the life cycle of ticks).

Disadvantages of paddock grazing

- It is expensive to fence the paddocks
- It needs a big piece of land.
- Animals do not make enough body exercises

STRIP GRAZING

This is the grazing of animals on a pastureland divided into strips using electric wires.

How do electric wires used in strip grazing limit animals from going escaping?

- They shock animals to keep them in the strip.

Illustration of strip grazing

When the pasture is fully grazed by animals, the wire is moved to a different area.

Advantages of strip grazing

- There is proper use of pasture.
- It controls cattle diseases and parasites
- It prevents over grazing
- Animals do not destroy crops

Disadvantages

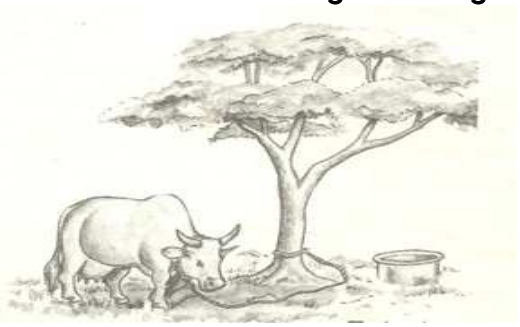
- It is expensive to maintain

- Few animals are kept
- Animals do not make enough body exercises
- It can only be used in places with electricity

TETHERING

This is the grazing of animals in which a farmer ties the animal on a peg or tree using a rope. The animals tethered is moved to a new place when necessary.

An illustration showing tethering



Advantages of tethering

- No fence is needed.
- It is easy to start
- It is cheap to manage
- It needs a small piece of land
- Animals may not destroy crops
- The farmer gets time to do other work

Disadvantages of tethering

- Animals do not make enough body exercises
- Animals do not get balanced diet.
- The rope can easily strangle the animal
- Few animals are kept.
- Animals can easily be stolen
- Animals can easily be killed by predators.

ZERO GRAZING

This is the keeping of animals in stalls where water and food are provided.
Zero grazing can also be called **stall grazing**

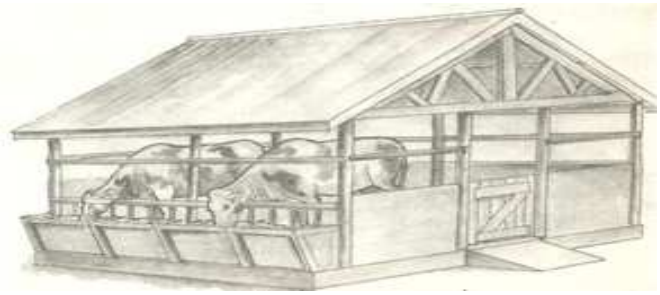
Advantages of zero grazing

- Feeds are not wasted.
- It needs a small piece of land
- Animals are protected from bad weather
- It is easy to collect manure
- It is easy to cull sick animals
- It is easy to control cattle diseases and parasites
- It is easy to carry out selective breeding
- Many animals are kept in a small area.
- Animals produce a lot of milk. (since there is no wastage of energy)

Disadvantages of zero grazing

- It is expensive
- Animals lack body exercises
- It needs a lot of labour (to clean the stalls and to provide food

ILLUSTRATION SHOWING ZERO GRAZING



REQUIREMENTS FOR ZERO GRAZING

- ★ **Cattleshed (byre)**

It is where the animal is kept.

- ★ **A store**

It is used to keep farm tools and animal feeds

- ★ **Feeding trough**

It is where animal feeds are put.

- ★ **Water trough**

It is where animals drink water from.

- ★ **Workers**

To clean the shed

- ★ **Garden**

It is where fodder crops are grown

- ★ **Chaff cutter**

It is used to cut animal fodder into fine pieces (maize stalks, hay and elephant grass)

PRACTICES THAT HARM DOMESTIC ANIMALS

- Making animals to over work
- Dehorning
- Castration
- Branding
- Piercing them to get blood
- Over beating the animals
- Neglecting the animals when they are sick
- Over loading of animals on small vehicles
- Brutal ways of killing animals (in abattoir)

Handling structures on the livestock farm

- **Milking parlour**

For handling the animal when milking

- **Cattle crush**

For restraining the farm animal during some farm practices (dehorning, branding, drenching and castration)

- **Spray race**

For handling the animals during spraying

SPRAY RACE.

This is a confined space in which cattle are sprayed.

Advantages of a spray race

- It is quick
- Many animals can be sprayed in short time
- There is no wastage of acaricides

- Less labour is needed

Disadvantage of a spray race
- It is expensive

CATTLE PARASITES
- These are parasites that attack cattle
- **A parasite** is an organism that depends on another organism for survival
- **A host** is an organism on which a parasite depends for food.

How do parasites benefit from their host for survival?
- Parasites get food from their host
- Parasites get shelter from their host

GROUPS (TYPES OR CLASSES) OF PARASITES
- External parasites (ectoparasites)
- Internal parasites (endoparasites)

External parasites (ectoparasites)
These are parasites that live outside the body of host.
- Ticks
- Tsetse flies
- Mites

Control of ectoparasites
- Spraying animals with acaricides
- Dipping animals in acaricides
- Using a spray race
- Clear bushes around the farm (to control tsetse flies)
- Use tsetse fly traps to control tsetse flies.
- By paddock grazing
- By dusting animals with acaricides
- By hand picking the ticks (deticking)

Internal parasites (endoparasites)
These are parasites that live inside the body of the host.
They live in muscles, intestines and liver
- Tape worms
- Hook worms
- Thread worms
- Liver flukes

Control of endoparasites
- By deworming
- Regular vaccination
- Grazing in well drained areas (to control liver flukes).
- Giving animals clean feeds
- Always clean the feeding equipment

Effects of parasites of cattle
- Pests suck blood from animals.
- Some pests spread diseases.
- Pests damage the skin of animals.
- Some pests cause discomfort to the host

CATTLE DISEASES
- These are diseases that attack cattle.

Signs of sickness in farm animals (cattle)

- Dullness
- Rough hair
- Coughing
- Sneezing
- Diarrhoea
- Blood stained dung
- Runny eyes
- Dry muzzles
- Loss of appetite

Symptoms of diseases (sickness) in farm animals

- Fever
- Body weakness
- Constipation

Conditions that can lead to diseases in farm animals

- Poor feeding
- Poor sanitation in their houses
- Dirty food and water
- Physical injuries like dirty wounds
- Infected bites from vectors

Routes of disease infection in animals

- Direct body contact with sick animals
- Through dirty food and water.

Mention three groups of causative organisms for cattle diseases

- Bacteria
- Viruses
- Protozoa

GROUPS OF CATTLE DISEASES.

- Bacterial diseases
- Viral diseases
- Protozoan diseases

EXAMPLES OF CATTLE DISEASES

Bacterial diseases

- Anthrax
- Brucellosis/bang disease/contagious abortion
- Mastitis
- Tuberculosis
- Foot rot
- Black Quarter
- Red water
- Heart water
- Calf scour

Viral diseases:

- Rinderpest
- Foot and mouth disease

Viral and bacterial disease

- Pneumonia

Protozoan diseases

- Nagana (trypanosomiasis)
- East coast fever (ECF)
- Coccidiosis

Mention four tick-borne disease in cattle

- Heart water

- East coast fever
- Anaplasmosis
- Red water

Name of disease	How its spread	Signs and symptoms	Prevention control and treatment
<u>Bacterial diseases</u>			
Anthrax It is caused by a bacterium called <u>bacillus anthracis</u>	• Through body contacts and contaminated feeds • Feeding animals on dirty feeds • Feeding animals on dirty water • Through open wounds	• High fever • Loss of appetite for pasture. • Sudden death • Blood stained dung • Watery blood from body openings	Bury the dead animal in deep pits. Burn the carcass. Regular vaccination annually. Isolate and sick animals
Mastitis It affects the mammary glands (teats and udder).	• Through body contact with an infected animal • Through sores on the teats	• Milk with blood stains and pus • Swollen udder and teats • A cow refuses to be milked and suckled • The udder gets dead and gives no milk.	Treat with antibiotics Use a strip cup to detect mastitis in cattle Regular vaccination Ensure proper hygiene when milking Use disinfectants during milking Use the right milking techniques
Foot rot	• It attacks hooves of all hoofed animals. • It is always common during wet weather.	Swollen hooves Rotten hooves Smelly hooves Lameness High fever Reduced milk production	Treat with antibiotics. Trim affected hooves. Always provide foot bath to animals. Regular foot trimming.

Tuberculosis It is caused by a bacterium called **mycobacterium tuberculosis**	• Through inhaling contaminated air • Through milk of infected cows	• Coughing • Loss of weight (emaciation) • Loss of appetite to	Isolate and treat sick animals Ensure proper sanitation Kill infected animals Early treatment using antibiotics
Brucellosis (contagious abortion or bang's disease) It is caused by a bacterium called **Brucella**	• Through mating with infected animals • Through body contact with infected animals	• Miscarriage (abortion in cows) • Brownish discharge from vulva • Swollen testicles • Still births in cows • The placenta remains inside the uterus	Isolate and treat the sick animals Regular vaccination Use gloves to hold aborted foetus. Use artificial insemination to avoid mating infection Always drink well boiled milk.
Anaplasmosis It destroys the red blood cells	• Through bites of infected ticks (blue ticks). • Through surgical and dehorning instruments with infected blood	Constipation Blood in urine and dung Loss of weight High fever Rapid reduced milk production Loss of appetite for food Rapid loss of weight Pale skin around the eyes and muzzle Abortion	Dip cattle in acaricides Spray animals with acaricides
Heart water	• Through bites of infected ticks (brown ear tick)	• Animals walk in circles. • Animals become restless • Animals place their heads on objects • When the animal falls, legs keep paddling in air	Dip animals in acaricides Spray animals with acaricides
Red water It damages the liver	Through bites of infected ticks (red tick)	• High fever • Red urine • Loss of appetite • Constipation	Dip animals in acaricides Spray animals with the

		• Infected animal stays away from the herd	acaricides.
Viral diseases			
Foot and mouth disease It attacks the muzzle and coronet.	• Through sharing feeding containers with infected animals • Through sharing grazing land with infected animals • Through body contact with infected animals	• Swollen teats and lameness • Salivation in the mouth • Lameness (due to wounds on the cornet). • Blisters on top of hooves, tongue and muzzle • Loss of appetite for pasture • High fever • Reduced milk production	Regular vaccination (every six months) Applying quarantine. Slaughter the infected animals **It has no treatment**
Rinderpest	• Through body contact with infected animals	• Soars in the mouth • Sunken eyes • Nasal discharge • Rapid breathing • Discharge from eyes • High fever • Profuse diarrhoea	Regular vaccination Applying quarantine Slaughter t5he infected animals **It has no treatment**
Bacterial and viral disease			
Pneumonia	• Spreads through inhaling contaminated air • Through living in dirty places	• Difficulty in breathing • Coughing, • Nasal discharge • Loss of appetite for pasture • High fever	Use well ventilated dry and clean pens. Treat the animal at the early stage of the disease
Protozoan disease			
Nagana (trypanosomiasis) It is caused by protozoan parasite called Trypanosoma.	• Through the bites of infected tsetse flies	• Loss of weight • Anemia • Loss of appetite • High fever • Dullness • Licking of soil by Animals • Swollen lymph nodes • Runny eyes	Clear all bushes around the farm Spray with insecticides Use tsetse fly traps Treat using drugs

East coast fever (ECF) It is caused by a protozoan parasite called Theileria parva	• Through bites of infected ticks (brown ear tick)	• Nasal discharge • Diarrhoea • Loss of appetite • High fever • Difficulty in breathing • Body weakness • Swollen lymph nodes	Dip animals in acaricides Spray animals with acaricides
Coccidiosis	Through infected dung in the kraal	• Blood stained dung • Diarrhoea • Rapid dehydration • Loss of weight • Loss of appetite	Isolate and treat the sick animals Use coccidiostat drugs in food and water
Deficiency disease			
Milk fever It is common in pregnant and lactating cows	Lack of calcium in the diet	• Loss of appetite • Body weakness • Dry muzzle • Dullness • Stillbirths	Provide feeds rich in calcium after calving Provide calcium salts in an oral gel Feed animals on forages

FACTORS TO CONSIDER BEFORE STARTING A LIVESTOCK FARM

- Land
- Capital
- Labour
- Market
- Management

➢ Land

This is the place on which the farm is started.

Ways of getting land

- By buying the land
- By inheriting the land
- By hiring the land
- From donations

The reward to land is **rent**

➢ Capital

This is the money used to buy things needed to start a farm.

Ways of getting capital

- ➢ Through donation
- ➢ Through savings
- ➢ Through loans

The reward to capital is **interest**

➢ Labour

These are all people who do activities on the farm.

Groups of labour (classes of workers) on the farm

- Skilled labour
- Unskilled labour

Skilled labour

These are people who are trained to do specialised work

Examples of specialized work on the farm

- Vaccination
- Artificial insemination
- Castration
- Deworming
- Dehorning
- Dipping

Unskilled labour

These are people who do casual work on the farm

Examples of activities done by unskilled labour

- Feeding the animals
- Weeding the farm
- Cleaning the farm
- Milking

The reward to labour is **wage** or **salary**

➤ **Market**

This is the demand for cattle and cattle products.

➤ **Management**

These are skills applied on the farm to have work done in a profitable way.

FARM RECORDS

These are written information showing different activities done on a farm.

TYPES OF FARM RECORDS

- Breeding records
- Production records
- Health records
- Labour records
- Sales and expenses records
- Inventory records
- Feeding records

REASONS FOR KEEPING FARM RECORDS

- To know the profits or losses.
- To be taxed fairy.
- To enable the farmer to make decision.
- To get loans easily.
- To know the farm history.
- To plan for the farm.

FREEDOM OF DOMESTIC ANIMALS

- Freedom from fear
- Freedom from pain

- Freedom from hunger
- Freedom from discomfort
- Freedom of reproduction

RESOURCES IN THE ENVIRONMENT

A resource is anything that people use to meet their needs.
A resource can be a living or non-living component of environment.

Types of resources

Renewable resources
Non-renewable resources

Renewable resources

These are resources that can be replaced naturally.
They are sometimes called in**exhaustible resources**

Examples of renewable resources

Soil (land)
Plants
Animals
Water
Sun
Air or wind
Fungi

Non-renewable resources

These are resources that cannot be replaced naturally.
They are sometimes called **exhaustible resources**.

Examples include;

Rocks
Minerals
Fossil fuels

IMPORTANCE OF PLANTS AS RESOURCES

- Some plants are used as herbal medicine.
- Some plants provide food to animals.
- Plants provide shades and shelter to animals
- Some plants provide wood for making furniture
- Some plants provide wood fuel
- Some plants provide electric poles
- Some tree barks are used to make bark cloth
- Some plants provide plant fibres
- Some plants are used as live fences.

Examples of plant fibres

- Cotton: to make cotton cloths
- Sisal: to make sisal ropes, sacks and doormats
- Jute: to make gun bags, ropes, carpets and window blinds
- Linen: to make clothes
- Hemp
- Raffia
- Ramie

How to conserve plants as resources

- By afforestation
- By reforestation
- By agroforestry
- Use of energy saving stoves (clay stoves)
- Use of electricity and biogas for cooking
- Avoid deforestation
- Use of better methods to harvest wood

Methods of harvesting wood

- Pollarding

This is the cutting of the top part of a tree.

- Lopping

This is the cutting of side branches of a tree.

- Coppicing

This is the cutting of the whole tree leaving a small stamp

How does covering of wood with banana leaves conserve plants?
It prevents heat loss hence using less wood fuel

IMPORTANCE OF ANIMALS AS RESOURCES

- Some animals provide animal fibres
- Some animals provide hides and skins
- Some animals are sources of food (eggs, meat, milk and honey)
- Some animals are used for transport (donkeys, horses and camels)
- Some animals are used to plough land (oxen and donkeys)
- Some animals are used to guard people's homes (dogs and parrots).
- Some animals are used for hunting (dogs)
- Animal wastes are used to make biogas
- Animal dung and urine are used as manure.

Examples of animal fibres

- Mohair: from Angora goats
- Wool: from Sheep and Llama
- Rabbit fur: Angora rabbits
- Silk: from Silkworms

Beasts of burden (draught animals)
These are animals that are used to provide labour.
Forms of animal labour

- Pulling carts
- Ploughing
- Transport
- Turning machines

Examples of beasts of burden

- Donkeys
- Horses
- Mule
- Camels
- Oxen

How to conserve animals as resources

- Vaccinating animals
- Treating sick animals
- Putting strict laws on poaching
- Putting endangered animals in zoos
- Use of legal fishing methods

Examples of poor (illegal) fishing methods

Overfishing
Use of under sized nets
Use of poison

By what process are plants and animals replaced naturally?

By reproduction

FUNGI

These are organisms which lack chlorophyll and cannot make their own food

How do fungi feed?

- Most fungi feed saprophytically
- Some fungi feed parasitically

Examples of fungi

- Yeast
- Moulds (penicillium, rhizopus and mucor)
- Mushrooms
- Toadstools
- Puffballs
- Bracket fungi

IMPORTANCE OF FUNGI AS RESOURCES

- Penicillium moulds are used to make penicillin drug (antibiotics)
- Mushrooms are sources of food
- Mushrooms are sold for income
- Yeast helps in making of alcohol (fermentation of alcohol)
- Yeast helps in baking of breads (it is used to leaven bread)
- Yeast extracts are sources of vitamin B when eaten
- Fungi help in decomposition of organic matter to form soil
- Penicillium is used in making of cheese

SOIL

Soil is the top layer of the earth's surface.

IMPORTANCE OF SOIL AS A RESOURCE

- For growing crops
- For building houses
- For making glasses
- For making ceramics
- For making sand papers
- For making bricks
- For putting out fire.

- For washing cooking utensils
- For filtering water

How soil can be conserved as a resource.

- By mulching
- By manuring
- By intercropping
- By agroforestry
- By bush fallowing
- By cover cropping
- By strip cropping
- By contour ploughing
- By terracing
- By crop rotation

How can soil be replaced naturally?

- By decomposition
- By weathering

SUN

It is the main natural source of heat and light energy.

IMPORTANCE OF SUN AS A RESOURCE

- Sunlight helps crops to make starch.

How?

By splitting water into hydrogen and oxygen

- Sunlight is used to produce solar electricity.
- Sunlight helps our skin to make vitamin D
- Sun's heat dries wet clothes

How?

By evaporating water from wet clothes

- Sun's heat helps to preserve food (dries harvested crops)

How?

By evaporating moisture from food

- Sun helps in the water cycle

How?

It heats plants and water bodies to cause transpiration and evaporation

What do we call energy from the sun?

Solar energy

Why the sun is called an energy resource

It provides people with useful energy

IMPORTANCE OF WATER AS A RESOURCE

- For cooking
- For bathing
- For drinking
- For washing
- For mopping
- For irrigation
- Water is used as a raw material in beverages industries

- Water is used to cool machines
- Water helps in seed germination
- Water helps crops to make starch
- Water is a used for keeping aquatic animals like fish
- Fast flowing water is used to generate hydro electricity

How is water replaced naturally?
Through rain cycle (water cycle)

Sources of water
- Rain (it is the main natural source of water)
- Lakes
- Rivers
- Swamps
- Wells
- Hot springs

Games played on water bodies
- Swimming
- Boat racing
- Water surfing
- Water relay

AIR AND WIND AS RESOURCES

AIR
This is the mixture of gases

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

IMPORTANCE OF AIR A RESOURCE

Oxygen
- Oxygen is used for respiration
- Oxygen supports burning (combustion)
- Oxygen helps in seed germination

Carbon dioxide
- Carbon dioxide is used to put out fire.

Why?
It does not support burning
- Carbon dioxide is used by plants to make starch
- Carbon dioxide helps to preserve bottled soft drinks

Why?
It does not allow germs to multiply

Nitrogen
- Nitrogen is used to preserve vaccines and semen

Nitrogen is very cool
- Nitrogen is used in aeroplane tyres

Rare gases
- Rare gases are used in electric bulbs

- Rare gases such as helium are used in gas balloons

Mention two gases used in gas balloons
- Helium
- Hydrogen

Why does a gas balloon fly up in air when released?
- Air inside the balloon is lighter than air outside

Why is a balloon tied with a thread?
- To prevent it from flying up in air

Why a balloon is always tied with long threads
- To prevent the gas inside the balloon from escaping

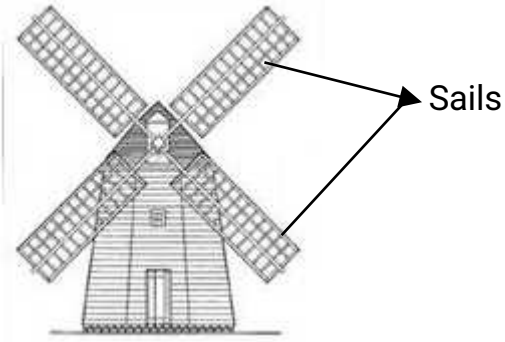
WIND

This is air in motion (moving air)

What causes wind?
- Difference in atmospheric pressure between places

IMPORTANCE OF WIND AS A RESOURCE
- It is used for winnowing
- It turns windmills to produce electricity
- It is used to fly kites
- It sails boats and dhows
- It helps in seed dispersal
- It helps in pollination
- It increases the rate of evaporation to enable the clothes to dry faster

STRUCTURE OF A WINDMILL



Uses of a windmill
- It is used to draw water from underground tanks
- It is used to grind grains and seeds
- It is used to generate wind electricity

Why are windmills not commonly used in Uganda to produce electricity?
- Uganda does not have regular windy seasons

Dangers of wind to people
- It is an agent of soil erosion
- It spreads airborne diseases
- It destroys houses
- It capsizes (overturns) boats on water bodies
- It breaks trees and crops

MINERALS AS RESOURCES

A mineral is anything that occurs naturally in the earth's crust.

OR

A mineral is a useful solid or liquid material obtained from underground.
Minerals are non-renewable resources.

Examples of minerals and their uses

- Chalk
- Clay
- Copper; making telephone wires, bullets, coins and refrigerators.
- Gold: coating trophies and making coins
- Tin; making food cans and tins for carrying water
- Silver; coating metals and trophies
- Gold; coating metals, rings and trophies
- Cobalt
- Wolfram: provides tungsten for making filaments of electric bulb
- Asbestos; making roofing sheets and fire suits for fire service men
- Uranium; producing nuclear electricity
- Diamond; cutting of glass and drilling of rocks.(It is the hardest metal)
- Lead; making accumulators, batteries and water pipes
- Phosphates: used to make phosphate fertilizers
- Limestone; for making cement
- Bronze; coating rings, trophies and medals
- Aluminium; making aircrafts and cooking utensils
- Mercury; used as a thermometric liquid, to make insecticides and to fill dental caries

General uses of minerals

- They are source of income when sold
- They are used as raw materials in industries
- They earn foreign exchange for the government

Ways of conserving minerals

- Making alloys
- Painting metals to avoid rusting
- Recycling scrap metals

ALLOYS

An alloy is the mixture of two or more metals.

Reasons for making alloys (importance of making alloys)

- To make the metals harder
- To lower the melting point of metals
- To reduce wear and tear of metals
- To increase electrical resistance of metals

EXAMPLES OF ALLOYS AND THEIR USES

ALNICO: This is a mixture of aluminum, nickel and cobalt

- For making magnets

CUPRONICKEL: This is a mixture of copper and nickel.

- For making coins

SOLDER: it is a mixture of lead and tin

- For joining metals

DENTIST AMALGAM: it is a mixture of copper and mercury

- For filling dental cavity in tooth.

BRONZE: it is a mixture of copper and tin

- For decorating metals
- For making coins and medals

BRASS: it is a mixture of copper and zinc

- For decorating ornaments
- For making wires
- For making brass musical instruments

ALNICO: it is a mixture of aluminium, nickel and cobalt.

- For making permanent magnets

STEEL: is a mixture of iron and carbon

- For making cars

Examples of steel

- **Cobalt steel**

For making permanent magnets

- **Stainless steel (chromium steel)**

For making cooking utensils that do not rust.

- **Manganese steel**

For reducing wear and tear on railway lines

- **Nickel steel**

ROCKS AS RESOURCES

A rock is a solid substance made up of tightly packed minerals.

A boulder is a large rock

Importance of rocks as resources

- They form soil by weathering
- They contain minerals
- They describe earth's history
- They provide raw materials for building

TYPES OF ROCKS

- Igneous rocks
- Metamorphic rocks
- Sedimentary rocks

Igneous rocks

These are rocks formed when magma cools and hardens.

They are hard and impervious (waterproof).

- Basalt
- Quartz
- Pumice: for scrubbing human feet during bathing
- Obsidian: it was used by early man to make tools
- Feldspar
- Granite

Sedimentary Rocks

These are rocks formed by accumulation of sediments (sand, clay and mud).

They are soft and porous.

- Limestone
- Sandstone

- Ironstone
- Shale (clay-rock)
- Flint

Metamorphic rocks
These are rocks which change from one form to another.
They are also called **changed rocks**
- Marble
- Slate
- Graphite
- Schist
- Quartzite

Ores
An ore is a rock that contains metals

Examples of metal ores
- **Bauxite**: an ore of aluminium
- **Galena**: an ore of lead
- **Calamite**: an ore of zinc
- **Malachite**: an ore of copper
- **Haematite and magnetite:** are ores of iron

Magnetite is a natural magnet

FOSSILS
These are remains of plants and animals which lived and died long time ago.
They are found in sedimentary rocks and stone quarries

Examples of fossils
- Plant fossils
- Animal fossils

Uses of fossils
- Fossils help geologists to determine the age of a place or rock.
- Fossils help geologists to determine the plants and animals which lived in a given place.
- Fossils help to tell how the land looked before.
- Fossils show us how sedimentary rocks were formed.
- Fossils help to tell what the animal or plant looked like.
- Fossils help in formation of fossil fuels.

FOSSIL FUELS AS RESOURCES
These are fuels formed from remains of plants and animals which lived and died long time ago.
Fossil fuels are sometimes called **fossil minerals**

What made fossils to turn into fossil fuels?
Heat and pressure from underground

Examples of fossil fuels (fossil minerals)
- Crude oil (petroleum)
- Coal

- Natural gas

Coal and petroleum are not got from ores.

How are fossil fuels are obtained from underground?

- By mining

PETROLEUM (CRUDE OIL)

This is a liquid fossil fuel got from remains of animals

Fuels got from crude oil (petroleum)

- Petrol
- Diesel
- Kerosene (paraffin)
- Jet fuel

Fuels are got from petroleum by a refinery process called **fractional distillation**

Other petroleum products

- Plastics
- Lubricating oil
- Grease
- Petroleum jelly
- LPG (Liquefied petroleum gas)
- Paints
- Antiseptics
- Detergents

Importance of petroleum products

- They are used to produce thermal electricity in generators (petrol and diesel)
- They are used to run engines (petrol, diesel and jet fuel)
- It provides kerosene for cooking and lighting.
- They are used to prevent rusting of metals (grease, lubricating oil and paint)
- They are used to reduce friction (grease and lubricating oil)
- Antiseptics and detergents are used to kill germs
- LPG which provides a hot flames to cut metals

COAL

This is a solid fossil fuel got from remains of plants

Coal is a hard black material found below the ground.

Products from coal

Coal tar

Coal gas

Importance of coal

- It is burnt to produce thermal electricity
- It is used to supply heat at power stations
- It is used as a fuel in steam engines
- It provides coal gas is used for lighting and cooking
- It provides coal tar for surfacing roads

NATURAL GAS

This is a gaseous fossil fuel mined from areas where petroleum is found.

Gases which make up natural gas

- Methane
- Ethane
- Propane
- Butane

Uses of natural gas

- It is used for lighting
- It is used for heating
- It is used as a fuel at power stations

Write LNG and LPG in full

- Liquefied Natural Gas
- Liquefied Petroleum Gas

Disadvantages of using fossil fuels

- They pollute the environment
- They can lead to fire outbreak
- They are expensive

How to conserve fossil fuels and minerals

- Using petroleum products sparingly
- Avoid over mining
- Using alternative energy resources
- Using bicycles instead of driving vehicles
- Walking short distances instead of driving vehicles
- Repairing vehicles in dangerous mechanical conditions to conserve fuel

FUELS

This is anything that burns to produce energy.

Forms of energy produced by fuels

- Heat energy
- Light energy
- Electric energy

TYPES OF FUELS

Liquid fuels

- Kerosene
- Petrol
- Diesel
- Jet fuel

Solid fuels

- Firewood
- Charcoal
- Sawdust
- Coal
- Wood shavings

Gas fuels

- Biogas
- Natural gas

EXAMPLES OF SYNTHETIC (ARTIFICIAL) FIBRES.

- Nylon
- Rayon

- Polythene (polyethylene)
- Orlon
- Polyester
- Acrylic

HARVESTING RESOURCES

This is the collection of materials from the environment for the purpose of using them

a) Harvesting non – living resources

- Obtaining sand from dry river beds: scooping it with spades and machinery
- Mining sand from the ground

Harvesting minerals

- By mining
- Fossil fuels like oil
- By drilling

Harvesting energy from the sun (solar energy)

- It can be harvested in the following ways
- Uses of solar panels
- Use of solar cookers
- Use of solar driers
- Use of solar heater

Harvesting water

- Using water tanks
- Using big drums
- Using basins
- Using jerrycans
- Using buckets
- Using windlass to draw water from deep wells
- Using electric water pumps.

Harvesting energy from air

- Wind can be trapped and used to drive wind will
- It can be tapped using sail to drive sail boat + dhows

Harvesting living resources

Plants resource

- Hand picking ripe coffee berries , cotton balls
- Plucking tea leaves from tea plants
- Ready maize cobs are harvested by hands
- By cutting sisal leaves

Harvesting animal resources

a) Meat

Animals are slaughtered, skinned and meat cut off from the carcass.

b) Skins and hides

Animals are slaughtered and skins carefully removed from the carcass.

c) Horns

The horns are cut or sawn off with the saw from the head of the slaughtered animals

d) Milk

It is obtained by milking using either hands or machines

d) Honey:

It is extracted from honey combs.

THE ENVIRONMENT
Environment refers to an organism and its surrounding.

COMPONENTS OF ENVIRONMENT
The environment is composed of the following
- Water
- Soil
- Air (wind)
- Plants
- Animals
- Sun
- Fungi
- Bacteria
- Protista

TYPES OF ENVIRONMENT
Environment is divided into two types:-

Biological environment (Biotic / non physical environment)
This is the type of environment which consists of living things eg plants and animals

Physical environment (a biotic environment)
This is the type of environment which consists of non – living things eg mountains , lakes , rivers , temperature , wind (air) vapour.

FOOD CHAIN
A food chain is the way how organisms in an environment get their food. In the environment, plants make their own food and are called producers.
The organisms which depend on food made by plants (producers) are called consumers are consumers
Consumers are divided into the following groups

Primary consumers
These are organisms which feed directly on producers eg goats, cattle, rabbits, sheep etc

Secondary consumers
These are organism which feed on primary consumers eg foxes, dogs, lions

Tertiary consumers
Tertiary consumers which feed on secondary consumers eg. Leopards, man, birds of prey etc.
NB: In a food chain , organism like fungi and bacteria help in reducing food to its component parts (decay / rot) are called decomposers
The sun is the main source of energy in a food chain from which energy flows other organism in the environment

Illustration of a food chain
Producer – primary consumer – secondary consumers – Tertiary consumers.
plants -grasshoppers – lizard – Hawks.

A FOOD WEB

A food web is a more complicated interrelationship of how organism in an environment obtain their food.
A food web involves many organism in an ecosystem how they get food from many other living things
Illustration of a food web

Ecosystem
An ecosystem is the community of living things (organisms) in a habitat and non-living things.

A habitat
This is a home of an organism in the environment

Degradation
Degradation is the way of lowering (spoiling) the quality, stability and usefulness of something.

Environment degradation
Is the lowering the quality, stability and usefulness of the environment

Types of environment degradation
- Soil / land degradation
- Deforestation / devegetation
- Wetland drainage
- Pollution
- Wild life destruction (degradation)
- silting

Causes of environmental degradation
There are two main causes of environmental degradation
a) Human activities
b) Natural causes

HUMAN ACTIVITIES THAT CAUSES ENVIRONMENTAL DEGRADATION
a) Mining / quarrying
b) Construction and road work
c) Poor waste disposal
d) Bad agricultural practices e.g bush burning, over grazing etc.

NATURAL CAUSES OF ENVIRONMENTAL DEGRADATION
- Soil erosion / leaching
- Silting
- Hurricanes
- Tornados
- Whirl wind / whil pools
- Earth quakes
- Hailstones
- Land slides
- Flood
- Tsunamis
- Volcanic eruptions
- Global warning

a) Soil / land degradation

This is the destruction / lowering the quality or usefulness of land by human activities or natural causes.

Leaching
Is a process through which mineral salts or nutrients sink deeper into the soil layers where they cannot be reached by plant roots
It is caused by too much rain.

Soil erosion: Is the washing / blowing away of top soil by agents of erosion.

SILTING

This is the deposition of eroded materials into water bodies

Causes of silting
- Soil erosion
- Cultivation near water sources
- Allowing animals to drink from water bodies
- Swamp drainage
- Burning / destroying vegetation in the swamp

Dangers of silting

It leads to water pollution

It reduces the depth of water bodies

It leads to flooding of water bodies

It destroys homes of some marine (aquatic) animals

It leads to death of some marine animals

Effect of silting
- It destroys habitat for animals that live in water
- Lower water level and it dries out
- Destroys source of food for fish and other aquatic animals
- Kills fish of other animals and plants in water
- Destroys eggs of fish and other aquatic animals.

Deforestation
Deforestation is also called devegetation ie cutting down large number of trees / plant without replacing them.

Causes of deforestation
- Population growth leading to need for land for settlement , farming and recreation
- Industrialization (development of industries in an area)
- Wild fires / bush burning

- Clearing forests for fire wood , charcoal , building poles timber etc

Effects of deforestation

- It leads to reduction of rain fall causing to drought / desertification
- Loss of habitat for different plants and animal species
- Soil erosion leaving poor soils
- Silting of water bodies.

Wet land degradation

A wet land is any area which has water and growing vegetation throughout the year

Examples of wet lands

- Swamps
- Marshes
- Bogs
- Lakes and rivers

Importance of wet lands

- They are habitats to many plant and animals spices
- They control floods by sucking the water
- They filter muddy water by trapping the impurities
- They regulate the climate by influencing the temperature and humidity
- They provide water
- They provide water for domestic and industrial use.
- They are source if food eg fish
- They provide raw materials for art and crafts eg clay papyrus etc
- They are source of building materials

POLLUTION

Pollution is the contamination of the natural environment caused by natural or human activities

CAUSES OF POLLUTION

- Waste gases from industries
- Industrial waste / chemical
- Exhaust fumes from vehicles
- Oil spills from ships in the ocean
- Chemical sprays
- Non degradable wastes eg polythene , glass plastics etc
- Smoke from burning tyres , oil or bushes
- Dust

TYPES OF POLLUTION

a) Air pollution - caused by smoke and fumes / poisonous gases.
b) Soil pollution – caused by agricultural sprays, industrial waste, refuse etc
c) Water pollution - By silt, oil spills, refuse, human waste and industrial waste washed into it.
d) Noise pollution – Due to too many vehicles or industries in the environment, loud music etc

EFFECTS POLLUTION

- Poisoning of soil and water by chemical naste dumped on them.

- Death and disappearance of biodiversity (variety of plants and animals living things)
- Outbreak of disease in the environment
- Loss of soil fertility leading to poor yields
- Formation of acidic rains due to gases from industries and vehicles as they dissolve in rain.
- Destruction of habitats for many plants and animals
- Less production of plants such as fibers , timbers fruits and other construction materials

CONTROL AND PREVENTION OF POLLUTION IN THE ENVIRONMENT

- Uses of alternative energy source eg. bio gas , natural gas , solar energy , wind m power , hydro electricity
- Ensure proper disposal of domestics and industrial wastes
- Educating people about the danger of pollution
- Using good method of farming

Advantages (importance) of conserving wildlife

- Some mammals, plants and birds are a source of food for man.
- Some animals and birds are valued as cultural heritage by some countries and clans.
- Plants are homes of many animals, birds and insects.
- Trees or forests help in the formation of rainfall.
- Mammals, birds and trees species earn foreign exchange for the government through tourists.
- Plants improve the atmosphere by balancing the amount of carbon dioxide and nitrogen.
- Plants provide shade to man and other animals.

How to conserve and protect wild life.

- Animals are protected by law in their habitant through the Uganda Wildlife Authority (UWA).
- A habitant is a natural environment or home of a plant or animal.
- Uganda wildlife Authority is a department which is responsible for wildlife in Uganda.
- The animals are being taken care of in national game parks and game reserves.
- Banning the selling and buying of wildlife trophies helps to reduce their being killed.
- Fishes can be conserved by controlled fishing.
- Some rare animals should be caught and let to breed in wildlife educational centre.

Conserving non renewable resources

- Soil erosion should be controlled.
- Soil should be kept fertile by using manure and fertilizers.
- Plastic wastes like broken Jerrycans, polythene papers should be recycled.
- Vehicles in dangerous mechanical conditions should be repaired to conserve fuel.
- Petroleum products should be used wisely to prevent further exploitation of oil.

Conserving the natural vegetation

- Over grazing should be discouraged because it causes soil erosion.
- Bush burning should be restricted to certain areas.
- Over stocking is dangerous because it leads to over grazing.
- The government should limit population growth because more people means more land to be destroyed for housing and agriculture.
- Cattle farmers should practice rotational grazing.

- Afforestation should be practiced.
- Swamps and wetlands should be declared restricted areas.

RESPIRATION

Respiration is the oxidation of food in the living cells to produce energy
It occurs in the **living cells**.
Respiration is a **chemical change**
Oxidation is the process by which oxygen combines with a substance

Importance of respiration to the human body.

- It provides energy to the body

EQUATION FOR RESPIRATION

Food + Oxygen ⟶ Heat energy + Carbon dioxide + Water vapour

Raw materials for respiration

- Food (glucose or carbohydrates)
- Oxygen

Main (useful) product of respiration

- Energy

By-products (waste products) of respiration

- Carbon dioxide
- Water vapour

TYPES OF RESPIRATION

- Aerobic respiration

This is the type of respiration that uses oxygen

- Anaerobic respiration

This is the type of respiration that does not use oxygen

Note

In animals, it produces lactic acid in muscles during vigorous exercises
In plants and yeast, it produces alcohol and carbon dioxide

Why does a person breathe heavily after a vigorous exercise?

- To pay the oxygen debt.

THE RESPIRATORY SYSTEM (BREATHING SYSTEM)

This is the group of organs that deal with breathing and respiration

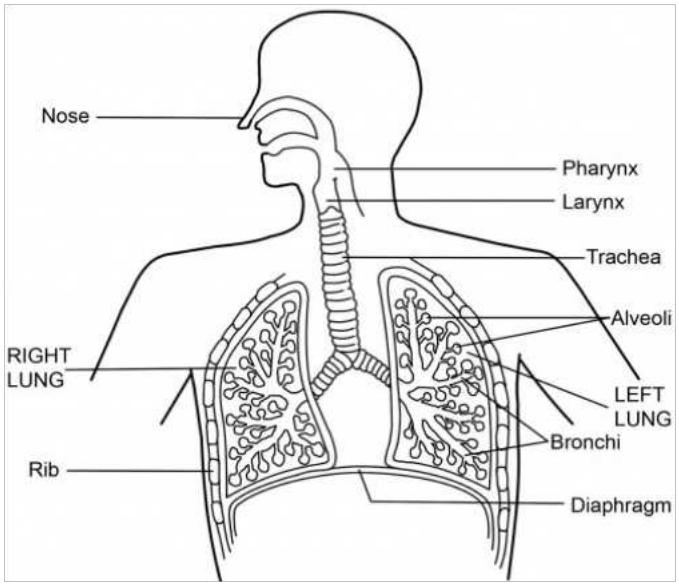
Importance of the respiratory system

- It supplies the body with oxygen.
- It gets carbon dioxide out of the body.

ORGANS OF RESPIRATORY SYSTEM

- Nose
- Trachea (wind pipe)
- Lungs (the main respiratory organs)

THE STRUCTURE OF THE RESPIRATORY SYSTEM



NOSE

It is an olfactory organ (sense organ for smell)
It contains cilia and mucus that trap dust and germs

Importance of the nose

- For smelling
- It is the passage of inhaled air to the trachea
- It cleans, warms and moistens inhaled air

Why is the temperature in the nose slightly higher than the rest of the body parts?

- To warm the inhaled air before it reaches the lungs

Contents of the nose and their importance

a) Nasal mucus (snot)

- It traps germs and dust
- It moistens inhaled air
- It prevents the nose from drying up

b) Cilia

- Cilia filter inhaled air (trap dust and germs)

What happens to inhaled air in the nose?

- Air is cleaned (filtered)
- Air is warmed
- Air is moistened.

Why do people sometimes breathe through the mouth?

- Due to nasal congestion
- Due to deviated nasal septum

Why is it not advisable to breathe through the mouth?

- The mouth has no cilia to clean the inhaled air
- It can chill the lungs since air is not warmed

Disorders of the nose

- Nose bleeding
- Nasal congestion

What warms the inhaled air in the nose?

- Blood in the vascular membrane

Why should we cover the nose while sneezing?

To prevent spread of droplet infections (airborne diseases)

Care for the nose

- Wash the nose with clean water and soap.
- Do not share handkerchiefs
- Use a clean piece of cloth to clean the nose
- Avoid rough games that can harm the nose
- Do not allow mucus to flow and reach the lips

THROAT (PHARYNX)

This is a common passage for food and air

- It carries air to the respiratory tract and food to the digestive tract.

EPIGLOTTIS

- It prevents food from entering the trachea.
- It prevents choking.

LARYNX (VOICE BOX)

- It contains vocal cords

Vocal cords vibrate to produce sound when air flows over them

THE TRACHEA (WIND PIPE)

- It is the passage of air to the lungs.

Trachea is made up of rings of cartilage

Why?

- To keep it open all the time.

The trachea contains cilia **that trap dust and germs**.
The trachea divides into **bronchi** (left bronchus and right bronchus)
The bronchi subdivide into **bronchioles**
The bronchioles end into tiny air sacs called **alveoli**
Gaseous exchange takes place in the **alveoli**

DIAPHRAGM

This is a dome-shaped muscle that separates the chest cavity and abdominal cavity

- It helps in breathing

- **INTERCOSTAL MUSCLES**

They hold the ribs in position.

THE LUNGS

These are spongy air filled organs on either sides of the chest cavity.
Lungs are the breathing organs
The **rib cage** protects the lungs and heart.
A person has **two lungs** (left lung and the right lung)
Lungs are covered by **pleural membrane**
The pleural membrane produces **pleural fluid**
Pleural fluid reduces friction between the lungs and ribs.

The space between the two layers of pleural membrane is called **pleural cavity**
Pleural cavity holds the pleural fluid

Why are lungs regarded as respiratory organs?
- They supply oxygen for respiration

Why are lungs regarded as excretory organs?
- They remove metabolic wastes from the body

Importance of the lungs in the human body
- They supply oxygen to blood (they oxygenate blood)
- They remove carbon dioxide and water vapour from the body

Why are lungs elastic?
- To easily expand and contract during breathing

How are lungs adapted to their functions?

- They are spongy and elastic
- They have very many alveoli
- They have a dense network of blood capillaries.
- They have a moist surface
- They are covered in thin membranes

GASEOUS EXCHANGE IN HUMAN BEINGS
- This is the transfer of respiratory gases between the cells and the environment

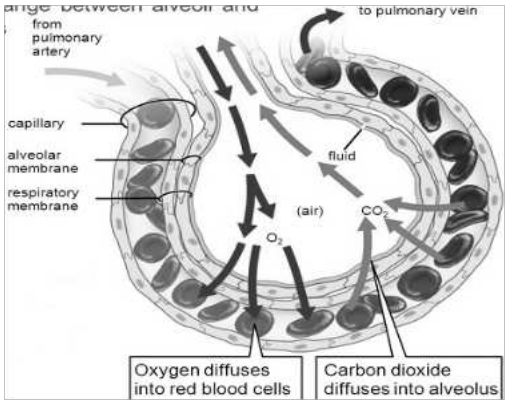
In which human body organ does gaseous exchange take place?
- In the lungs

Where in the lungs does gaseous exchange take place?
- In the alveoli (air sacs)

By what process does oxygen in the alveoli enter red blood cells?
- By diffusion

What is diffusion?
- Diffusion is the movement of molecules from an area of high concentration to an area of low concentration

ALVEOLI (AIR SACS)
This is where the exchange of gases takes place by diffusion.
The structure of the alveolus



Adaptations of alveoli (air sacs) to their function
- They have thin walls.

- They have a moist surface.
- They are covered by a dense network of blood capillaries.
- They are numerous (very many in number).

COMPOSITION OF AIR BREATHED IN AND OUT

Type of air	Inspired air	Expired air
Oxygen 0_2	21%	16%
Carbon dioxide CO_2	0.03%	4%
Nitrogen N_2	78%	78%
Water vapour	Low (less)	High (more)
Rare gases	0.97%	0.97%

Explanation:

- Inhaled air has more oxygen than exhaled air

Oxygen is used during respiration

- Exhaled air has more carbon dioxide than inhaled

More carbon dioxide is produced during respiration.

- Exhaled air has more water vapour than inhaled air

More water vapour is produced during respiration

- Nitrogen and rare gases in exhaled air and inhaled air remain the same

They are not used in the human body

BREATHING (VENTILATION OF THE LUNGS)

This is the movement of air in and out of the lungs

IMPORTANCE OF BREATHING

- It provides oxygen to the lungs
- It removes carbon dioxide from the lungs

What is tidal air?

This is the amount air that passes in and out of the lungs during a normal breath

TYPES (PHASES) OF BREATHING

- Breathing in (inhalation or inspiration)
- Breathing out (exhalation or expiration)

Breathing in (inhalation or inspiration)

This is the intake of air into the lungs.

Things that occur during inhalation (inspiration)

- Intercostal muscles contract
- Ribs move upwards and outwards.
- Diaphragm contracts and flattens
- Volume of the chest cavity increases
- The lungs expand.

In four steps, explain the mechanism of inhalation

i) Diaphragm and intercostal muscles contract
ii) Volume of the chest cavity increases
iii) Air pressure inside decreases
iv) Air rushes into the lungs

Why is inhalation said to be an active process?

- It involves muscle contraction that requires energy

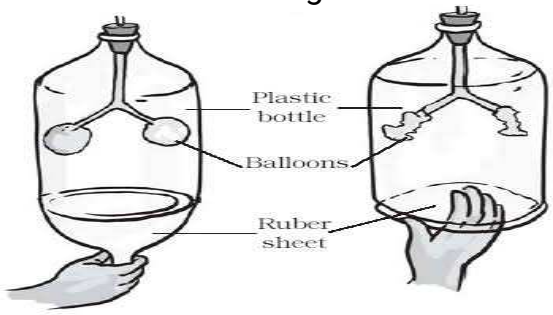
Breathing out (exhalation or expiration)
This is the expelling of air from the lungs.

Things that occur during exhalation (expiration)
- Intercostal muscles relax.
- Ribs go downwards and inwards.
- Diaphragm relaxes and becomes dome-shaped (move upwards)
- Volume of the chest decreases
- The lungs contract
- The lungs and the stomach go to their original size.

In four steps, explain the mechanism of exhalation
- Diaphragm and intercostal muscles relax
- Volume of the chest cavity decreases
- Air pressure inside increases
- Air moves out of the lungs

Why is exhalation regarded as a passive process?
- It does not involve muscle contraction

MODEL TO SHOW THE MECHANISM OF BREATHING
- Cut off the bottom of a plastic bottle.
- Cover and tie the open end with a rubber sheet.
- Tie two empty balloons to a Y – shaped (straw) glass tube.
- Insert the straw into the bottle through its cork.



When the rubber sheet is pulled outwards, the balloons expand.
When the rubber sheet is pushed inwards, the balloons contract

DISORDERS OF THE RESPIRATORY SYSTEM
- Nasal congestion
- Hiccups
- Sneezing
- Choking: It is caused by blockage of air passage to the lungs by a foreign object (food)
- Yawning
- Coughing: it is caused by irritation of the windpipe by dust

DISEASES OF THE RESPIRATORY SYSTEM (RESPIRATORY DISEASES)
Communicable (infectious) respiratory diseases
- Tuberculosis (TB)
- Diphtheria
- Whooping cough (Pertussis)
- Common colds
- Pneumonia
- Influenza (Flu)

Non communicable (non-infectious) respiratory diseases
- Lung cancer
- Emphysema
- Chronic bronchitis

} They are caused by tobacco smoking

- Asthma: it is a hereditary disease
- Asbestosis: it is caused by too much exposure to asbestos

RESPIRATORY DISEASES WORSENED BY TOBACCO SMOKING

- Asthma
- Tuberculosis

ASTHMA

It is a hereditary disease of the respiratory system
It blocks the bronchioles hence making breathing difficult.

Sign of asthma

- Difficulty in breathing (especially during cold days)
- Wheezing

Why is asthma called a hereditary disease?

- It is passed on from the parents to the offsprings through blood.

TUBERCULOSIS

- It is a bacterial airborne disease (droplet infection)
- It attacks the respiratory and skeletal system
- It mainly affects the lungs and the backbone (spine)

Name the germ (bacterium) which causes tuberculosis

- Mycobacterium tuberculosis

How does tuberculosis spread?

- Through inhaling contaminated air
- Through drinking unboiled milk from tubercular cows

Signs and symptoms of tuberculosis

- Chronic cough
- A lot of sweating at night
- Loss of body weight

Ways of preventing and controlling tuberculosis

- Immunise babies using BCG vaccine
- Isolate and treat the infected person
- Drink boiled or pasteurized milk

CARE FOR THE RESPIRATORY SYSTEM

- Perform regular body exercise
- Avoid tobacco smoking
- Take infants for immunisation
- Do not play in dusty places
- Always keep the nose away from dust
- Always breathe through the nose but not the mouth
- Sleeping in a well-ventilated house
- Feed on a balanced diet

TERM THREE

TOPIC: SCIENCE AT HOME AND COMMUNITY

SANITATION

- This is the general cleanliness of a place where we stay

Which element of P.H.C promotes public cleanliness and clean water supply?

- Water and sanitation

Tools used to promote sanitation

- Hoe
- Slasher
- Brooms
- Rake
- Dust bin (trash bin/litter bin)
- Panga
- Wheel barrow
- Mop or rag
- Mop bucket

COMPONENTS OR REQUIREMENTS OF A CLEAN HOME (ELEMENTS OF SANITATION)

- Rubbish pit or dustbin
- Latrine
- Kitchen
- Rack (plate stand)
- Bathroom
- Urinal place

Of what importance is a plate rack at home?

- It is where washed utensils are put to dry without contamination

How is a tippy tap important at home?

- For washing dirty hands

IMPORTANCE OF GOOD SANITATION

- It prevents bad smell in a place
- It prevents diarrhoeal diseases
- It prevents mosquito borne diseases
- It destroys breeding places for insect vectors
- It destroys hiding places for insect vectors

POOR SANITATION

- This is the general dirtiness of a place where we stay

Signs (indicators) of poor sanitation

- Tall grass in the compound
- Poor ventilation of a house
- Bushes around homes
- Sharing houses with domestic animals
- Bad smell in a place
- Many insect vectors in a place
- Still water near our homes
- Rubbish in the compound
- Faeces in the compound
- Dirty water sources

Diseases associated with poor sanitation

- Dysentery
- Malaria
- Cholera
- Typhoid
- Bilharziasis
- Trachoma
- Poliomyelitis
- Diarrhoea

- Leprosy

Causes of poor sanitation

- Poor disposal of human wastes
- Poor disposal of rubbish
- Lack of clean water supply
- Ignorance of good sanitation
- Poor drainage in a home
- Bursting of sewage pipes
- Overcrowding in a home

Why is it unhealthy practice to defecate in bushes near our homes?

- It leads to outbreak of faecal/diarrhoeal diseases

Dangers (effects) of poor sanitation

- It leads to bad smell in a place
- It leads to outbreak of diarrhoeal diseases
- It leads to outbreak of mosquito borne diseases
- It leads to contamination of water sources
- It leads to multiplication of vectors and germs

HOW TO CONTROL POOR SANITATION (WAYS OF PROMOTING PROPER SANITATION)

Mention four activities done to promote good sanitation.

- Constructing rubbish pits:

For proper disposal of rubbish

- Constructing pit latrines:

For proper disposal of faeces and urine.

- Picking rubbish around homes:

To keep away vectors like houseflies

- Burning rubbish at home:

To destroy breeding places for houseflies

- Providing dust bins:

For proper disposal of rubbish

- Sweeping away rubbish in the compound:

To keep away dust and insect vectors

- Draining still water:

To destroy breeding places of mosquitoes

- Smoking ordinary pit latrines:

To kill houseflies

To prevent bad smell

- Slashing tall grass in the compound:

To destroy hiding places for mosquitoes

- Cutting bushes around our homes

To destroy hiding places for mosquitoes and tsetse flies

- Treating sewage before it is disposed off
- Fencing and sweeping around water sources

To prevent water contamination

- Spraying insect vectors using insecticides
- Avoid sharing a house with domestic animals
- Scrubbing the floor of latrines
- Mopping the floor of the house

Incinerator

- It is where rubbish is burnt under high temperature

WATER

- This is a colourless liquid made up of hydrogen and oxygen.

The ratio of hydrogen to oxygen in water (H_2O) is **2:1**

Water supports life.

SOURCES OF WATER

Natural sources of water

- Rain
- Springs
- Streams
- Oases
- Lakes
- Rivers
- Swamps
- Oceans
- Seas
- Ponds

Rain is the main natural source of water

Artificial sources of water

- Wells
- Boreholes
- Dams
- Water tank

PROPERTIES OF PURE WATER

- It has no colour (colourless)
- It has no smell (odourless)
- It has no taste (tasteless)
- It boils at 100^{o}C and freezes at 0^{o}C

Importance of water in the human body

- It forms blood plasma
- It helps in food digestion
- It cools the body
- It forms body fluids (tears and saliva)
- It maintains the shape of body cells
- It prevents hiccups

USES OF WATER IN THE ENVIRONMENT

- For cooking
- For washing
- For bathing
- For drinking
- For mopping
- For building houses
- For mixing drugs and agrochemicals
- For making beverages
- For irrigation
- For cooling machines in factories
- For generating electricity
- It is used by plants to make starch

GROUPS (TYPES) OF WATER

- Hard water
- Soft water

SOFT WATER

- This is the water that lathers quickly

Examples of soft water

- Distilled water (pure water)
- Rainwater
- Spring water

Sources of soft water

- Rain
- Springs

Advantages of soft water

- Distilled water is used for mixing drugs in hospitals
- Distilled water is used in car radiators

HARD WATER

- This is the water that does not lather quickly

What causes hardness in water?

- Presence of much mineral salts in water
- High concentration of dissolved mineral salts in water

Mineral salts found in hard water

- Calcium
- Magnesium

Sources of hard water

- Lakes
- Oceans
- Rivers
- Oases
- Seas

Advantages of hard water

- It strengthens teeth and bones
- It is used for making beer
- It helps in formation of shells in molluscs
- It is used in science experiments to conduct electricity

Disadvantages of hard water

- It wastes soap
- It stains on clothes
- It damages hot water pipes
- It causes furring of kettles

Types of hardness in water

- Permanent hardness
- Temporary hardness

Ways of making hard water soft (removing temporary hardness in water)

- By boiling the water
- By distilling the water
- Use of detergents
- Adding washing soda (sodium carbonate)

WATER CONTAMINATION

- This is the way of making water dirty

WATER POLLUTION

- This is the releasing of harmful materials in water

Water impurities (water pollutants)

- These are things that make water dirty and unsafe to use

Examples of water impurities (water pollutants/water contaminants or foreign objects in water)

- Human wastes
- Animal wastes (animal dung, droppings and urine)
- Herbicides
- Insecticides
- Soil
- Garbage
- Rotting fruits
- Waste engine oil
- Industrial wastes

Ways of contaminating (polluting) water sources

- Urinating in water sources
- Defecating in water sources
- Dumping rubbish (or garbage) in water sources
- Using dirty containers to harvest water
- Constructing a pit latrine very near a water source
- Allowing animals to drink in water sources
- Washing clothes in water sources
- Bathing in a water source

Control of water contamination/water pollution

- Fencing open wells
- Avoid defecating in water sources
- Avoid urinating in open water sources
- Avoid washing in water sources
- Rubbish heaps should far from water sources
- Repairing damaged wells
- Clearing all bushes around a water source
- Avoid bathing from water sources
- Do not allow animals to drink from water sources
- Pit latrines should be constructed far from water sources

SILTING

- This is the deposition of eroded materials into a water sources

Agents of silting

- Flowing water
- Strong wind
- Moving animals

SILT

- These are eroded materials deposited into a water source

Examples of silt

- Soil/mud
- Cow dung
- Grass
- Rubbish

Causes of silting

- Soil erosion
- Cultivating along riverbanks and lake shores
- Allowing animals to drink from water sources
- Clearing vegetation around riverbanks and lake shores

Effects (dangers) of silting

- It leads to water pollution
- It reduces the depth of a water body (it makes a water body shallow)
- It leads to death of some marine animals
- It destroys the habitats for marine animals

How does silting lead to floods?

- By reducing the capacity/depth of water sources

How does silting lead to death of aquatic (marine) animals?

- Silt suffocates marine animals

Control of silting

- Avoid cultivating along river banks and lake shores
- Planting short grass around water sources
- Putting silt traps around water bodies
- Using a dredging machine to remove silt from water bodies

DREDGING

- This is the removal of silt from a water body.

Importance of dredging

- It maintains the depth of water bodies
- It prevents flooding of water bodies

Of what importance is a dredging machine?

- For removing silt from water bodies

DISEASES ASSOCIATED WITH WATER

- These are diseases that are spread by unprotected water

Groups (classes) of diseases associated with water.

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

WATER BORNE DISEASES

- These are diseases spread through drinking contaminated water

Examples of waterborne diseases

- Cholera
- Typhoid
- Bilharziasis
- Dysentery
- Poliomyelitis
- Diarrhoea
- Hepatitis B
- Guinea worm disease

Cholera

- It attacks the digestive system
- It is caused by bacteria called vibrio cholerae

Typhoid

- It attacks the digestive system
- It is caused by bacteria germs called salmonella typhi

Bilharziasis (schistosomiasis)

- It attacks the kidneys

- It is caused by blood flukes or schistosomes
- It is spread by fresh water snails

Poliomyelitis
- It attacks the skeletal system (bones)
- It also attacks the nerves (nervous system)
- It is caused by poliovirus
- It is spread by cockroaches

Dysentery
- It attacks the digestive system
- Bacillary dysentery is caused by bacilli bacteria called shigella
- Amoebic dysentery is also caused by an **amoeba** called entamoeba histolytica

Hepatitis A
- It attacks the liver
- It is caused by hepatitis A virus

Diarrhoea
- It attacks the digestive system
- It is caused by rotavirus

Guinea worm disease (GWD)
- It is caused by guinea worms

CONTROL OF WATERBORNE DISEASES
- Always drink clean boiled water (always drink safe water)
- Proper disposal of human wastes

What does "WASH" stand for?
- Water, Sanitation and Hygiene

Of what importance is WASH programme to the community?
- It reduces the spread of waterborne diseases
- It promotes clean water supply

WATER CONTACT DISEASES
- These are diseases spread through bathing or swimming in contaminated water

Examples of water contact diseases
- Bilharziasis
- Swimmer's itch
- Swimmer's ears (otitis externa)

CONTROL OF WATER CONTACT DISEASES
- Avoid swimming in contaminated water
- Avoid bathing with dirty water
- Treating water in swimming pools

WATER CLEANED DISEASES
- These are diseases spread when we do not use enough water to clean our body (to promote personal hygiene)

Examples of water cleaned diseases
- Trachoma
- Scabies
- Impetigo
- Athlete's foot
- Ringworm
- Conjunctivitis

Scabies
- It is caused by itch mites
- It attacks the skin

Impetigo
- It is caused by bacteria

- It attacks the skin

Trachoma
- It is caused by bacteria germs called chlamydia trachomatis
- It is spread by houseflies
- It attacks the eyes

Ringworm
- It is caused by fungi
- It attacks the skin

Athlete's foot
- It is caused by fungi
- It attacks the skin, mainly the feet

Conjunctivitis
- It is caused by virus or bacteria
- It attacks the eyes

CONTROL OF WATER CLEANED DISEASES
- Bathing with enough clean water and soap
- Washing clothes with enough clean water and soap

WATER HABITAT VECTOR DISEASES
- These are diseases spread by vectors that develop, live or get food from water.

Examples of water habitat vector diseases
- Bilharziasis
- River blindness
- Malaria
- Elephantiasis
- Yellow fever
- Dengue fever
- Zika fever
- Chikungunya fever

Bilharziasis (schistosomiasis)
- It is caused by blood flukes or schistosomes
- It is spread by a fresh water snail

River blindness (onchocerciasis)
- It is caused by onchocerca volvulus worms
- It is spread by a black fly
- It attacks the eyes

Malaria
- It is caused by protozoa called plasmodia
- It is spread by female anopheles mosquitoes
- It attacks the red blood cells (circulatory system)

Elephantiasis (filariasis)
- It is caused by filarial worms
- It is spread by culex mosquitoes

Dengue fever
- It is caused by dengue virus
- It is spread by aedes (tiger) mosquito

Yellow fever
- It is caused by flavivirus
- It is spread by Aedes (tiger) mosquito

Zika fever
- It is caused by zika virus
- It is spread by Aedes (tiger) mosquito

Chikungunya fever

- It is caused by Chikungunya virus (CHIKV)
- It is spread by Aedes (tiger) mosquito

EXAMPLES OF VECTORS THAT SPREAD WATER HABITAT VECTOR DISEASES

- Fresh water snail
- Black fly (Jinja fly or Simulium fly)
- Female anopheles mosquito
- Culex mosquito
- Aedes (tiger) mosquito

CONTROL OF WATER HABITAT VECTOR DISEASES

- Draining still water
- Oiling still water
- Spraying with insecticides to kill adult mosquitoes
- Keeping fish in ponds to eat mosquito larvae
- Treating water to kill water snails
- Avoid sleeping near river banks

SAFE WATER

- This is the water that does not contain germs

WAYS OF MAKING WATER SAFE FOR DRINKING

- By boiling
- Use of ultra Violet light
- By treating water with chemicals (chlorination or fluoridation)

BOILING

- This is the heating of water to its boiling point (100^0C)
- It is the cheapest and safest method to prepare safe water for drinking

How does boiling make water safe for drinking?

- It kills germs in water

Why should boiled water be put in clean containers and covered?

- To prevent water contamination

Why should clean cups be used to draw water from storage containers?

- To prevent water contamination

Common containers used to store boiled water

- Pots
- Jerrycans
- Water bottles
- Saucepans
- Vacuum flasks
- Buckets

Why are water storage containers in modern homes always kept in a refrigerator or freezer?

- To keep water cold and free from germs

How does a refrigerator keep water safe (free from germs)?

- It has cold conditions that prevent multiplication of germs

Why do most rural homes use pots instead of refrigerators to keep their boiled drinking water cool?

- Lack of electricity in most rural areas
- Pots are cheaper than refrigerators to buy

Why are pots used to keep boiled water first smoked with dry grass or dry bean husks before use?

- To kill germs in the pot
- To give water a good taste

Why is boiled water sometimes filtered before storage?

- To remove solid impurities

Why does water boil faster in an old aluminium saucepan with soot than in a new aluminium saucepan?

- An old aluminium saucepan with soot absorbs heat faster than a new aluminium saucepan

USE OF ULTRA VIOLET LIGHT (USE OF UV LIGHT)

- This is the use of strong electric current to kill germs in water

CHEMICAL TREATMENT OF WATER

- This is the killing of germs in water using chemicals.

Methods of treating water with chemicals

- By chlorination
- By fluoridation
- By adding iodine crystals

Chlorination

- This is the adding of chlorine in water to kill germs.

Fluoridation

- This is the adding of fluoride in water to kill germs

Examples of chemicals used to treat water

- Chlorine
- Fluoride
- Iodine

How do chemicals make water safe for drinking? (Importance of chemicals used in water treatment)

- They kill germs in water

Disadvantages of using chemicals

- They are expensive to buy
- They add some smell to water
- They add bad taste to water
- They add colour to the water
- Excess chemicals are poisonous

STEPS (STAGES) OF WATER TREATMENT FOR PUBLIC WATER SUPPLY

1. Screening
2. Coagulation
3. Sedimentation
4. Filtration
5. Chlorination

Screening

- This is removal of floating impurities at the water intake from the source to prevent damaging the pipes.

Coagulation

- This is the adding of a substance to make wastes turn into a semi solid that can be removed from water easily

Sedimentation

- This is the use of gravity to remove suspended impurities from water

Filtration

- This is separating of solid impurities from water using a filter

Chlorination

- This is the adding of chlorine to water to kill germs
- After chlorination, treated water is distributed to different areas through water pipes.

Write Nwsc in full

- National water and sewerage corporation

Duties of Nwsc

- To supply of treated piped water in urban areas
- To supply sewerage services in urban areas

How is boiling different from evaporation?

- Boiling occurs at a specific temperature while evaporation occurs at any temperature
- Boiling occurs in the entire liquid while evaporation occurs on the surface of the liquid
- Boiling occurs rapidly while evaporation occurs slowly
- Bubbles ate formed during boiling while bubbles are not formed curing evaporation

CLEAN WATER

- This is water that does not contain impurities

METHODS OF MAKING DIRTY WATER CLEAN

- Decantation
- Filtration
- Distillation

DECANTATION (THREE POT METHOD)

- This is the separating of a liquid from solid impurities or non-mixing liquids by gently pouring the liquid on top into another container

Application (importance) decantation at home

- For collecting clean water from dirty water
- For removing unwanted liquid from a mixture of immiscible liquids

Uses of water collected by decantation

- For washing
- For cooking
- For irrigation
- For mixing herbicides and acaricides

Why is water collected by decantation not safe for drinking?

- Decantation does not kill germs

Experiment of the three pot system (decantation)

- Get three containers (pots)
- Put dirty water in the first pot
- Allow dirt to settle at bottom and gently pour the clear water on top into another pot.
- After some time, gently pour the clean water on top into the last pot

FILTRATION

- This is separating of solid impurities from a liquid using a filter

Materials used as a filter (equipment used for filtration)

- Clean cloth
- Filter paper
- Sieve (strainer)
- Cotton wool

Which human body organ acts as a biological filter?

- Kidney

Examples of residue (solid impurities or suspended materials) filtered from water.

- Dirt (soil)
- Small stones
- Leaves
- Grass
- Animals dung

Diagram showing filtration

- **Filtrate** is the clear liquid that passes through the filter
- **Residue (filtride)** is the solid substance that remains on the filter

Why is the filtrate (filtered water) not safe for drinking?

- Filtration does not kill germs

Uses of filtered water at home

- For washing
- For washing
- For irrigation
- For cooking
- For mopping

Application (uses) of filtration in our homes

- For removing tea leaves from tea
- For removing husks from local beer
- For removing seeds from fruit juice

- For collecting clean water from dirty water

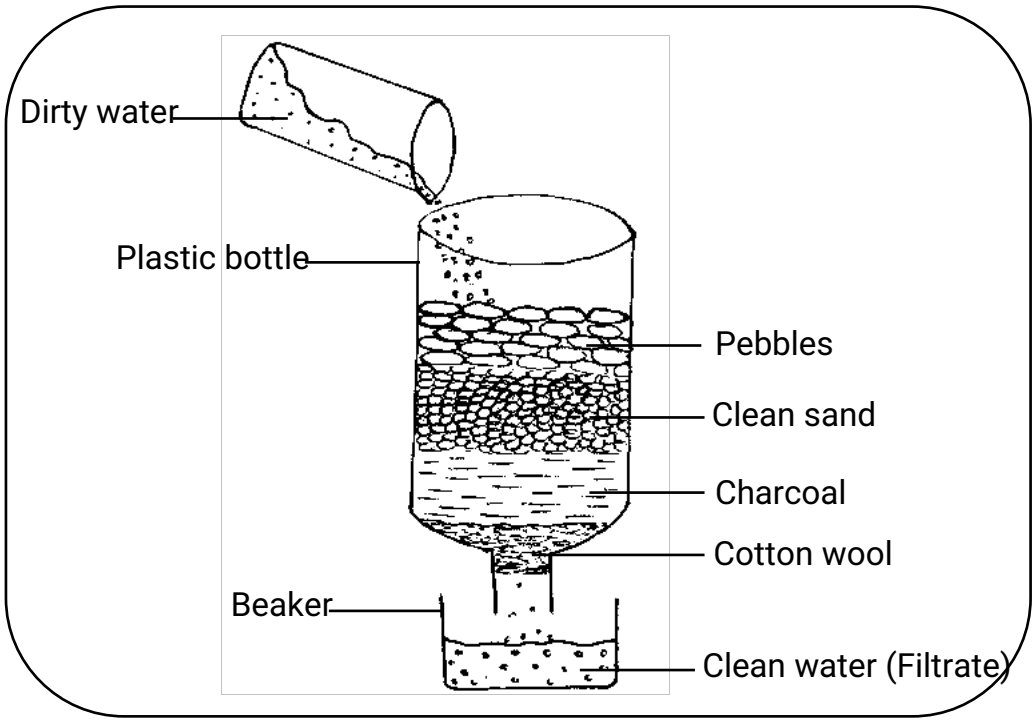
Local materials used in water filtration at home

- Sand
- Pebbles (small stones)
- Clean grass
- Banana leaves
- Charcoal
- Cotton wool

HOW TO MAKE A HOMEMADE WATER FILTER

- Cut off the bottom of a plastic bottle and turn it upside down
- Fix cotton wool in the neck or mouth of the bottle
- Put a layer of charcoal powder followed by clean sand and then gravel (small stones)
- Pour dirty water on top

A DIAGRAM SHOWING A HOMEMADE WATER FILTER (FILTRATION AT HOME)



IMPORTANCE OF EACH COMPONENT OF HOMEMADE WATER FILTER

Pebbles

- To remove bigger solid impurities

Clean sand (coarse sand and fine sand)

- To remove smaller solid impurities

Charcoal

- To remove smell and taste from water
- To remove toxin (poison) from water
- To adsorb pollutants

Cotton wool

- To allow out clean water (filtrate)

Beaker

- To collect the filtrate

Plastic bottle

- To hold the filtering materials

Why is the bottom of the plastic bottle cut off?

- To allow the dirty water to be poured into the filtration system

What force enables water to move down through the components?

- Gravity

Why is it advisable to always use two layers of sand in homemade water filter?

- To make water cleaner

DISTILLATION

- This is a method of collecting a pure liquid from impure liquid by evaporation and condensation
- Distillate is the pure liquid collected after distillation

Why is the distillate (distilled water) not good for drinking?

- It lacks mineral salts

Why does the distillate lack mineral salts?

- They are lost during evaporation

Use of distilled water

- For mixing drugs in drips and injections
- For drip hydration
- For cleaning the human body before taking an injection

Diagram showing distillation

Application (importance) of distillation

- It helps in making of alcohol
- It helps in water purification
- It helps in refining crude oil

Disadvantages of distillation

- It can lead to burns and scalds
- It can lead to fire outbreaks
- It needs much attention

CLEANING CLOTHES AT HOME

How do clothes keep our bodies warm?

- By preventing heat loss

LAUNDRY

- These are dirty clothes that need to be washed
- This is a business that washes clothes for customers

STEP USED IN CLEANING CLOTHES AT HOME

1. Sorting
2. Soaking
3. Washing
4. Rinsing
5. Wringing
6. Drying
7. Ironing

SORTING

This is the grouping of clothes according to colour, thickness or dirtiness.

- It prevents mixing of colours
- It prevents very dirty clothes from making white clothes dirty

- It enables the clothes that need special care to be washed separately

Factors considered when sorting clothes

- Colour of clothes
- Dirtiness (intensity of dirt)
- Thickness of clothes

SOAKING

- ✔ This is the putting clothes in soapy water (water with detergents) for some time.
- It dissolves dirt and stains
- It softens thick clothes.
- It reduces wear and tear of clothes during washing.
- It makes washing easy

WASHING

- This is the removal of dirt from clothes using clean water and soap

Reasons for washing clothes

- To remove dirt and stains
- To remove bad smell from clothes
- To prevent skin infections
- To remove parasites like lice

Why do we wash clothes with soap?

- To kill germs and parasites in clothes
- To remove bad smell easily
- To prevent skin infections
- To remove dirt and stains easily

Common detergents used during washing

- Omo Washing Powder
- Nomi Washing Powder
- Magic Washing Powder
- Jik Bleach
- Lotus Liquid Soap
- Chamuka Liquid Soap

Reasons for using detergents when washing clothes

- To remove tough stains
- To kill germs and parasites
- To make hard water soft
- To whiten clothes
- To remove bad smell easily

RINSING

This is the putting of clothes in clean water to remove soapy water

- It removes soapy water from the clothes

WRINGING

This is the squeezing of clothes to remove excess water before they are dried

- It makes drying faster (speeds up drying)

Reasons why woollen clothes should be dried without wringing

- It prevents the clothes from losing their shape

DRYING

- This is the hanging of wet clothes on a clothesline to dry

How does sun's heat reaches our wet clothes on earth?

- By radiation

How does sun's heat dry wet clothes?

- By evaporating water from clothes

How do wet clothes dry when hung in shady places?

- By the help of wind

How does wind speed up drying of clothes?

- By blowing away water from clothes

Which property of air enables wind to dry wet clothes in a shade/at night?

- Air exerts pressure

State one danger of keeping damp or wet clothes for so long.

- It leads to growth of mosses which cause stains

IRONING

This is the pressing of clothes with a hot flat iron or charcoal iron box

- To kill germs and parasites
- To remove creases

Why should clothes be ironed when they have some little moisture?

- For easy removal of creases when ironing
- To save charcoal/electricity when ironing

ACCIDENTS AND FIRST AID

AN ACCIDENT

- This is a sudden happening that causes harm to the body

COMMON ACCIDENTS (INJURIES) AT HOME AND SCHOOL

- Burns
- Scalds
- Fractures
- Nose bleeding
- Cuts
- Strains
- Poisoning
- Bruises
- Sprains
- Strains
- Fever
- Convulsions
- Dislocation
- Insect stings
- Animal bites (snake bites)
- Near drowning
- Electric shocks

EFFECTS OF ACCIDENTS TO AN INDIVIDUAL

- Lameness
- Death
- Discomfort
- Brain damage
- Loss of some body parts
- Loss of property
- Dehydration

WAYS OF MANAGING ACCIDENTS AT HOME, SCHOOL AND ON THE ROADS

- Avoid playing with hot objects
- Avoid careless running
- Avoid fighting
- Avoid playing in bushes
- Avoid playing with cutting objects
- Always cross busy roads at zebra crossings
- Avoid putting metallic objects in electric sockets
- Avoid touching electric wires that have fallen off the poles
- Avoid unnecessary climbing of trees
- Avoid playing rough games
- Avoid speeding the vehicles
- Avoid playing on the roads

FIRST AID

- This is the immediate help given to a casualty before being taken to the hospital

Casualty

- This is a person who has been injured in an accident

Reasons (importance or advantages) of giving first aid

- It saves life (it is the main reason)
- It reduces pain
- It promotes quick recovery
- It prevents further injuries
- It stops external bleeding

FIRST AIDER

- This is a person who gives first aid

Qualities of a good first aider

- A first aider should be observant
- A first aider should be skilful
- A first aider should have common sense
- A first aider should be careful
- A first aider should be tactful
- A first aider should be knowledgeable
- A first aider should be quick in action
- A first aider should not panic

RESPONSIBILITIES OF A FIRST AIDER

- A first aider should take the casualty to the health centre
- A first aider should make use of the bystanders
- A first aider should chase away the crowd
- A first aider should improvise shelter
- A first aider should not make the situation worse
- A first aider should deal calmly with the injury
- A first aider should make a report about the casualty at the health centre
- A first aider should study the situation and find out what has happened

STEPS FOR GIVING FIRST AID

- Check whether the victim is breathing
- Check the blood circulation by feeling the heart beat

The above steps can be summarized as below;

- **ABC –** Airway, Breathing, Circulation

OR:

- **3Bs** - Breathing, Bleeding, Broken bone

FIRST AID BOX

- This is a small container used to keep first aid kit

Places where a first-aid box is found

- Schools
- Football stadium
- Airports
- Petrol stations
- Homes

Groups of people found in the school sick bay

- Health workers (nurses)
- Sick people (sick children)

FIRST AID KIT

- This is the set of tools used to give first aid

THE FIRST AID KIT (COMPONENTS OF A FIRST AID BOX)

- Bandage
- Plaster (adhesive bandage)
- Methylated spirit
- Cotton wool
- Razorblade
- Scissors
- Safety pin
- Surgical gloves
- Tweezers
- Pain killer
- Liniment
- A pair of tongs
- Small first aid book
- Tourniquet
- Arm sling

FIRST AID KIT	IMPORTANCE
Bandage	▪ To dress big cuts
Plaster (adhesive bandage)	▪ To dress small cuts
Methylated spirit	▪ To kill germs on cuts and wounds
Cotton wool	▪ To clean cuts and wounds
Razorblade	▪ To cut bandage ▪ To shave hair on the injured part
Scissors	▪ To cut the bandage
Safety pin	▪ To fasten bandage

	▪ To remove thorns from the skin
Surgical gloves	▪ To prevent direct contact with blood
Tweezers	▪ To remove insect stingers from the skin
Pain killer	▪ To reduce (relieve) pain
Liniment	▪ To reduce pain on sprains and strains ▪ To reduce swelling on sprains and strains
A pair of tongs	▪ To hold cotton wool when cleaning cuts and wounds
Tourniquet	▪ It is used to stop bleeding on cuts
Small first aid book	▪ To guide a first aider on how give first aid
Armsling	▪ To hold the broken arm in one position

How does a tourniquet stop bleeding?

- By stopping the flow of blood in the blood vessels

OTHER THINGS USED TO HELP CASUALTIES

Splints

- To keep the broken bone of the limb in one position

Ambulance

- To transport the casualty to the hospital

Plaster of Paris

- To hold the broken limb in one position as it heals

Crutch

- To support the casualty to walk

How do crutches support the casualty to walk?

- By reducing the body weight put on the leg

Stretcher

- It is used to carry a casualty who cannot walk

Why is a stretcher not kept in a first aid box?

- It is too big to fit in a first aid box

Mention four accidents (injuries) that require the use of a stretcher

- Fractures
- Dislocation
- Fainting
- Sprains
- Strains

How is a wheel chair important to a crippled person?

- It helps a crippled person to move

COMMON ACCIDENTS AND THEIR FIRST AID

SCALDS

- A scald is a skin injury caused by wet heat

Causes of scalds

- Skin contact with steam
- Skin contact with hot water
- Skin contact with hot porridge
- Skin contact with hot tea
- Skin contact with hot milk
- Skin contact with hot soup

Objects (things) that may cause scalds

- Hot milk
- Hot tea
- Hot porridge
- Hot sauce
- Hot cooking oil
- Steam

First aid for scalds

- Put the injured part in clean cold water

BURNS

- A burn is a skin injury caused by dry heat

How is a burn similar to a scald?

- Both are caused by heat

How does a burn differ from a scald?

- A burn is caused by dry heat while a scald is caused by wet heat

CAUSES OF BURNS

- Skin contact with hot charcoal
- Skin contact with hot flat iron
- Skin contact with hot plates and cookers
- Skin contact with acids
- Skin contact with fire
- Skin contact with burning cigarette
- Skin contact with high voltage electricity wires
- Too much exposure of the skin to sun rays
- Skin contact with friction from revolving wheels

Objects (things) that may cause burns

- Hot charcoal
- Hot flat iron
- Hot plates
- Hot saucepan
- Fire
- Hot charcoal stove
- Cookers
- Hot nails
- Acids

EXAMPLES OF BURNS

- **Dry burns:** are caused by fire flames and cigarettes
- **Chemical burns:** are caused by acids
- **Radiation burns:** are caused by too much exposure to sun rays or x-rays
- **Electrical burns:** are caused by high voltage electricity or lightning
- **Dry friction burns:** caused by the skin rubbing against objects such as ropes

DEGREE OR TYPES OF BURNS (CLASSIFICATION OF BURNS)

- First degree burns
- Second degree burns
- Third degree burns

FIRST DEGREE BURNS

- These are minor burns which do not form blisters

Why are first degree burns also called superficial burns?

- They affect the outermost layer of the skin

Signs of first degree burns

- No blister is formed
- Dry peeling skin as the burn heals
- Skin becomes red
- Minor swelling

Symptom of first degree burns

- Tender skin (painful skin when touched)

First aid for first degree burns

- Put the burnt part in clean cold water

Why?

- To reduce pain
- To cool down the temperature

Note

- First degree burns need no dressing

SECOND DEGREE BURNS

- These are burns which form blisters

Blister

- This is a raised skin with a liquid inside it.

Signs of second degree burns

- Blisters are formed
- Swelling of the skin

Symptom of second degree burns

- Much pain on the injured part

First aid for second degree burns

- Put the injured part in clean cold water; if the blister is not broken
- Cover the injured part with a bandage or clean cloth; if the blister is broken

Why it is not advisable to break (burst) blisters?

- It exposes the wound to germs
- It causes more pain

Why should a second degree burn be dressed in a clean bandage?

- To prevent infections

THIRD DEGREE BURNS

- These are very serious burns that damage all the layers of the skin
- They are the most severe burns

Signs of third degree burns

- Skin may turn white
- Skin may turn black/may be charred
- Skin is burnt deeply
- Raised and leathery skin

Signs of third degree burns

- Shock
- Numbness

First aid for third degree burns

- Put the burnt part in clean cold water
- Cover the wound with a clean cloth

To protect it from houseflies and dust

- Give the casualty a lot of fruit juice

To prevent dehydration

To replace the lost water and mineral salts

Why is a third degree burn not painful at all though it is very serious?

- It damages the nerves

How is skin grafting important in treatment of burns?

- It helps to fill the burnt part with skin cut from another body part

When is a burn said to be a fourth degree burns?

- When a burn affects muscles and bones

EFFECTS (DANGERS) OF BURNS AND SCALDS

- They lead to loss of some body parts
- They damage the skin
- They lead to loss of feeling
- They lead to death
- They can lead to dehydration
- They lead to lameness

PREVENTION OF BURNS AND SCALDS

- Use heat insulators to lift hot objects
- Cooking from raised places
- Keep hot objects and acids out of children's reach
- Do not keep petrol in a living house.
- Avoid cooking in open places
- Do not allow young children to cook
- Refill lanterns or lamps after putting them off

- Teach children the dangers of fire
- Do not play near hot things and acids
- Put smoke detectors in buildings
- Measure bath water temperature before use
- Lock up kitchens when not in use
- Handle home distillation tools with care when in use
- Do not put a burning candle near beddings and curtains at night

THINGS WE SHOULD NEVER DO TO BURNS AND SCALDS (DON'TS WITH BURNS AND SCALDS)

- Never apply cooking oil, rabbit fur and cow dung

They contaminate the wound and cause infections

- Never apply salt

It absorbs water and causes dehydration

- Never apply sugar

It attracts bacteria that cause infections

- Never burst the blisters

It exposes the wound to germs (it may lead to infections)

- Never apply cotton balls on a burn

They can stick in the injury and lead to infections

FEVER AND CONVULSIONS

FEVER

- This is the condition when the body temperature rises beyond the normal one
- This is the abnormal rise in body temperature

Note

- The normal body temperature is $37^{o}C$ or $98.6^{o}F$.
- Fever is not an illness but a symptom of many illnesses.

Signs of fever

- Excessive sweating
- Frequent urination

Causes of fever

- Reactions to vaccines
- Some sicknesses (diseases)
- High temperatures in the environment
- Body injuries

Diseases that has a symptom of fever

- Malaria
- Measles
- Typhoid
- Meningitis

FIRST AID FOR FEVER

- Apply tepid sponging

To reduce body temperature

- Give the victim plenty of fruit juice
- Remove most of the victim's clothes

Tepid sponging

- This is the act of putting a cloth soaked in lukewarm water on the forehead or chest of a victim

Why is it not advisable to leave a cold wet cloth on the patient's body for a long time?

- It can lead to convulsions(to prevent convulsions)

EFFECT OF FEVER

- High fever leads to convulsions

CONVULSIONS

- These are sudden uncontrolled body movements

OR

- This is the condition when the body shakes (jerks) involuntarily

CAUSES OF CONVULSIONS

- Epilepsy (fits)
- High fever
- Brain tumour
- Cerebral malaria
- Alcohol withdrawal

SIGNS OF CONVULSIONS

- Violet shaking of the body
- Foaming mouth (saliva bubbles in the Mouth)

FIRST AID FOR CONVULSIONS

- Apply tepid sponging

To cool down body temperature

- Remove all tight clothes on the victim

To cool down body temperature

- Put a clean object in the victim's mouth

To prevent the victim from biting the tongue.

- Control the bystanders

To enable the victim get enough fresh air

- Do not give any food or drink to the victim

To prevent choking

- Do not force the jaws to open in case they have closed

To prevent breaking the victim's jaws

Why are patients taken to hospitals after convulsions have stopped?

- For medical checkup and treatment

Causes of fits/epilepsy

- Brain damage during birth
- Epilepsy can be inherited

Give any one cause of baby's brain damage during birth

- Difficulty in delivery

FAINTING

- This is the loss of consciousness for a short time.
- Fainting is sometimes called **nervous shock**

Main cause of fainting

- Lack of oxygenated blood supply to the brain

Conditions that can lead to fainting

- Doing very heavy exercises
- Extreme anger
- Extreme excitement
- Dehydration
- Severe pain
- Excessive bleeding
- Excessive coldness
- Being frightened
- Excessive hunger(starvation)
- Sudden shocking news
- Standing under sunshine for a long time (excessive heat)
- Overcrowding in poorly ventilated houses

Why does a person faint after receiving shocking news?

- Due to shortage of oxygen supply to the brain

Signs and symptoms of fainting

- Loss of body balance (dizziness)
- Loss of senses for a short time

Symptom of fainting

- General body weakness (fatigue)

FIRST AID FOR FAINTING

- Raise the legs of the victim slightly above the head

To allow blood flow faster to the brain

- Loosen up all tight clothing and fan the victim
- Put the victim in a shade and fan him or her
- Avoid bystanders around the victim

To enable the victim have enough fresh air

State what should be done to a fainted victim after regaining consciousness

- Give the victim glucose (sweet warm water) to get energy
- Get the victim some soft food to eat
- Let the victim rest for some time

DROWNING

- This is the condition when a person dies in water

Why is there no first aid for drowning?

- The victim is already dead

NEAR DROWNING

- This is the condition when a person stops breathing due to having the lungs filled with water but not yet dead
- A person who has near drowned has **4 minutes** only to stay alive.

Common places for drowning and near drowning

- Swimming pool
- Ponds
- Lakes
- Wells
- Bathtubs
- Rivers
- Basins full of water
- Streams
- Irrigation trenches
- Pits dug by builders to trap rain water

Main cause of near drowning

- Having lungs filled with water

Factors that can lead to near drowning

- Lack of swimming skills
- Leaving babies in basins full of water
- Heart attack and seizures while in water
- Panic in water
- Alcoholism while in water

First aid for near drowning

- Apply the kiss of life (mouth to mouth resuscitation)
- Shout out for help
- Remove the casualty from water as quickly as possible

How to apply the kiss of life (mouth to mouth resuscitation/artificial respiration)

- Lie the casualty on his or her back
- Remove any foreign objects stuck in the mouth
- Press the casualty's nostrils with your fingers
- Blow into the casualty's mouth several times to restore breathing

How is the kiss of life an important first aid for near drowned person?

- It restores breathing

How can a first aider force water out of the lungs of a near drowned person?

- By making upward push on the belly using the hands

How to prevent drowning and near drowning

- Learn swimming skills
- Always empty bathtubs
- Cover all septic tanks

- Fence swimming pools
- Do not use leaking boats while fishing
- Do not store big open water containers in children's reach
- Wear life jackets when using water transport
- Pits to trap water for building should be fenced
- Do not allow children to go near open water sources without adults
- Do not allow babies to play in basins full of water

NOSE BLEEDING

- This is the sudden flow of blood from the nose

Main cause of nose bleeding

- Breaking of the blood vessels in the nose

Conditions that lead to nose bleeding

- Headache
- Over inhaling of dry air
- Over blowing of the nose
- Being hit on the nose or head

FIRST AID FOR NOSE BLEEDING

- Make casualty sit and bend forward

To prevent dizziness

- Pinch the nose just below the bridge

To enable clotting of blood in the nose

- Encourage the casualty to breathe through the mouth

To prevent over straining the blood vessels in the nose

- Put the ice pack on the nose

To moisten the lining of blood vessels in the nose

NOTE

Do not make the casualty to bend backwards

- To prevent blood from going to the throat that can cause vomiting

Do not blow the nose very soon after nose bleeding

- To prevent rebleeding

Why are casualties with excessive nose bleeding sometimes advised to bend backwards though it is not recommendable?

- To prevent excessive loss of blood

PREVENTION OF NOSE BLEEDING

- Avoid inhaling dry air
- Keep the nostrils moist
- Eat citrus fruits to make blood vessels strong
- Avoid rough games that can harm the nose

ELECTRIC SHOCK

- This is a sudden painful contraction of muscles when electricity flows through them

Causes of electric shocks

- Short circuits
- Touching electric wires that have fallen off the poles
- Pushing metallic objects in electric sockets
- Touching electric appliances with wet hands
- Repairing electric appliances when you are not an expert

First aid for electric shock

- Switch off current the source of electricity
- Use an insulator to put away the victim

Prevention of electric shocks

- Cover electric wires using insulators
- Do not put metallic objects in electric sockets
- Do not touch plugged electric appliances with your wet hands
- Electricians should wear rubber gloves during electric repairs
- Electric repairs should be done by experts

SNAKE BITES

- This is an injury when a venomous snake injects venom into the victim

Signs of snake bites

- Two puncture wounds (fang marks) on the injured part
- Bleeding from the injured part
- Swelling of injured part
- Difficulty in breathing
- Excessive sweating

Symptoms of a snake bite

- Pain
- Fever
- Necrosis on the injured part
- Blurred vision

FIRST AID FOR SNAKE BITES

- Tie the bandage slightly above the bitten part

To prevent venom from flowing to the heart

- Apply a black stone

To suck venom from the injured part

- Keep the casualty calm and at rest

To prevent venom from spreading

Why is it not advisable to wash a bitten part in case of a snake bite?

- Any venom left on the skin can help to identify the type of snake

Why is it advisable to identify the colour, markings and shape of a snake in case of a snake bite?

- To be given the right antivenin

HOW TO PREVENT SNAKE BITES

- Stay away from bushes
- Wear boots and gloves when working in a bush
- Do not try to capture a snake
- Give a snake room to move away if it appears

DON'TS WITH SNAKE BITES

- Don't apply ice on the snake bite

It blocks blood circulation (it causes frostbite)

- Don't suck blood with your mouth

To prevent swallowing the venom

- Don't cut across the wound

Venom may not be where you expect it to be since snake fangs are curved

- Don't apply a tourniquet

Concentrated venom destroys the cells rapidly since blood does not flow

- Don't try to capture the snake

It may bite you again

SPRAINS

- This is an injury on a ligament

OR

- This is a stretched/torn/twisted ligament

What is a ligament?

- This is a tissue that joins a bone to a bone

CAUSES OF SPRAINS

- Twisting of the ligament
- Tearing of the ligament
- Stretching of the ligament

SIGNS OF SPRAINS

- Swelling
- Bruising
- Difficulty in moving the injured part

Symptom of sprains

- Pain at the injured part

Mention three body parts where sprains occur

- Ankles
- Knees
- Thumbs
- Wrists

STRAIN

- This is an injury on a muscle or tendon

OR

- This is a stretched/torn or twisted/muscle or tendon

What is a tendon?

- This is a tissue that connects a muscle to a bone.

Causes of strains.

- Twisting of the muscle/tendon
- Tearing of the muscle/tendon
- Stretching of the muscle/tendon

SIGNS OF STRAINS

- Swelling
- Bruising
- Difficulty in moving the injured part

Symptoms of strains

- Pain at the injured part
- Muscle weakness
- Muscle spasms

Mention three body parts where strains occur

- Back
- Thigh
- Calf

First aid for sprains and strains

- Rest the injured part

To prevent further injuries

- Apply ice pack on the injured part

To reduce pain

- Wrap a clean bandage around the injured part

To prevent swelling

- Elevate the injured part

To reduce pain

Write RICE in full as used in first aid

- Rest, Ice pack, Compress, Elevate

HOW TO PREVENT STRAINS AND SPRAINS

- Perform regular body exercises
- Wear proper fitting sports shoes
- Feed on a balanced diet
- Warm up before any sports activity
- Wear protective equipment for every sport

DISLOCATION

- This is the condition when a bone is displaced from a joint

Signs of dislocation

- Swelling of the injured part
- Difficulty in moving the injured part

Symptom of dislocation

- Pain at the injured part

First aid for dislocation

- Rest the injured part
- Apply ice pack on the injured part
- Provide a crutch to let the casualty walk
- Use a stretcher to carry the casualty who cannot walk

FRACTURE

- This is a broken or cracked bone in the body

Causes of fractures

- Falls
- Heavy blows
- Unnecessary jumping
- Car knocks
- Fighting

What disorder of the skeletal system occurs due to excessive stress on bones?

- Fracture

General signs of fractures

- A snap of the bone is felt
- Difficulty in moving the fractured limb
- Swelling of the fractured part

Symptom of fractures

- Pain on the fractured part

TYPES OF FRACTURES

- Compound fracture (open fracture)
- Simple fracture (closed fracture)
- Comminuted fracture
- Greenstick fracture
- Depressed fracture
- Complicated fracture

COMPOUND FRACTURE

- This is the type of fracture where a broken bone breaks and comes out of the skin (flesh)

Signs of compound fracture

- The broken bone is seen outside the skin
- Bleeding on fractured part

SIMPLE FRACTURE

- This is the type of fracture where a bone breaks and remains inside the skin (flesh)

Signs of simple fracture

- The broken bone may be seen near the skin
- Swelling of the fractured part
- Bruise at the injured part

Symptom of simple fracture

- Pain on the fractured part

GREENSTICK FRACTURE

- This is the type of fracture where a bone is bent but broken on one side
- It is common in babies

Why is green stick fracture common in babies (young children)?

- They have weak bones

COMMINUTED FRACTURE

- This is when a bone breaks into many pieces
- A broken bone is crushed

DEPRESSED FRACTURE

- This is when a bone of the skull is pushed inside

COMPLICATED FRACTURE

- This is the type of fracture where a bone breaks and damages an internal body organ e.g lungs, heart or intestines
- It can occur when a rib is broken

FIRST AID FOR FRACTURES

- Tie splints around the fractured part

To keep the broken bone in one position

- Use arm sling to hold the broken arm in one position
- Use a stretcher to carry a casualty who cannot walk
- Provide a crutch (walking stick) to help the casualty in walking (for stability when walking)

Why are antibiotics applied on a compound fracture?

- To prevent bacterial infections

Why is it dangerous for the first aider to attempt putting broken/displaced bone in its position?

- It can lead to further injuries

EQUIPMENT USED TO GIVE FIRST AID TO FRACTURES

- Arm sling
- Stretcher
- Crutches/walking stick
- Wheelchair

Splints

- To keep the broken bone in one position

Stretcher

- It is used to carry a casualty who cannot walk

Why is a stretcher not kept in a first aid box?

- It is too big to fit in a first aid box

Crutch/walking stick

- It helps a casualty with a broken leg to walk

How do crutches help a casualty with a broken leg in walking?

- By reducing the body weight put on the broken leg

Arm sling

- To keep the broken arm in one position

BRUISE

- This is a swelling on the skin with blood inside it

Causes of Bruises

- Falls
- Sports injuries
- Car accidents
- Boxing
- Being hit by a hard object

Signs of bruises

- Swelling
- Skin discoloration
- Skin becomes tender

Symptom of bruise

- Pain

FIRST AID FOR BRUISE

- Wrap a clean wet bandage around the injured part
- Raise the injured part above the chest

To reduce pain

- Rest the injured part

To prevent further injuries

POISONING

- This is the condition when a harmful substance is taken into the body

Poison

- This is a substance that can cause harm or death when taken into the body

Examples of corrosive poisons

- Paraffin (kerosene)
- herbicides
- Rat poison
- Jik Bleach (liquid cleaners)
- Petrol
- Insecticides
- Acaricides
- Expired drugs
- Carbon monoxide gas

Ways through which poison can be introduced into the body

- Through inhaling contaminated air
- Through taking overdose of drugs
- Through taking expired drugs
- Through drinking harmful chemicals
- Through infected animal bites and stings
- Through absorption of harmful chemicals by the skin
- Through eating poisoned food

SIGNS OF POISONING

- Rapid breathing
- Sweating
- Mental confusion
- Coma
- Vomiting
- Loss of body balance
- The victim may smell poison

SYMPTOMS OF POISONING

- Feeling thirsty
- Blurred vision
- Low blood pressure (hypotension)
- Dizziness

CAUSES OF POISONING

- Keeping poisonous drugs in unlabelled containers
- Taking overdose of drugs
- Taking expired drugs
- Keeping harmful liquids in bottles of soft drinks
- Keeping poisonous substances children's reach
- Taking essential drugs got from local shops
- Breathing in poisonous gases

FIRST AID FOR POISONING

Poisoning with liquid poison/corrosive poison (kerosene, petrol and liquid cleaners)

- Give the casualty a lot of drinks (milk, juice or safe water)

To dilute the poison

Why is it not advisable to induce vomiting in case a person takes a corrosive poison?

- It causes double damage to the gullet

Poisoning with rat poison and expired solid drugs

- Give the victim soapy water to induce (cause) vomiting
- Push your finger into the victim’s mouth (throat) to cause vomiting

PREVENTION OF POISONING

- Keep drugs out of children’s reach
- Label the containers of poisonous drugs
- Follow the drug prescription
- Teach children the dangers of poisonous drugs.
- Do not keep poisonous liquids in bottles of soft drinks
- Do not buy drugs from local shops

- Dispose expired drugs
- Avoid drug misuse

What is food poisoning?

- This is a group of diseases caused by eating contaminated food

OR

- This is any food borne disease

Examples of food borne diseases

- Diarrhoea
- Cholera
- Typhoid
- Dysentery
- Poliomyelitis

CUTS AND WOUNDS

TYPES OF CUTS

- Minor cuts
- Deep cuts

Minor cuts

- These are cuts which do not go deep in the skin

Deep cuts

- These are cuts which go deep in the skin

Signs of cuts

- Bleeding from injured part

EFFECTS OF CUTS

- They cause wounds
- They cause bleeding

WOUNDS

- A wound is a tear on the skin that allows blood to escape

Types of wounds

- Lacerated wounds
- Puncture wounds
- Contused wounds
- Incised wounds
- Abrasion wound

Lacerated wounds

- These are deep wounds caused by sharp objects like knives and razorblades.

Puncture wounds

- These are deep wounds with a small hole caused by long pointed objects like needle, nail or spear

Contused wounds

- These are wounds caused by direct blows by some objects

Incised wounds

- These are wounds caused by sharp objects that can lead to open bleeding e.g razorblade and knife

Abrasion wounds

- These are wounds caused by friction when a body scrapes across a rough surface

FIRST AID FOR CUTS AND WOUNDS

- Apply a bandage
- Apply a tourniquet to stop blood flow

First aid for cuts and wounds

- Apply direct pressure with a clean cloth

To stop bleeding

- Raise the injured leg or arm above the heart

To reduce (slow) bleeding
- Cover the cut with a clean cloth or bandage

To prevent infections
To prevent exposing the wound or cut to germs
- Apply a plaster on the minor cut
- Apply a clean bandage/tourniquet on the deep cut

To stop bleeding

How does a tourniquet stop bleeding in case of a deep cut?
- By stopping the flow of blood

INSECT STING
- This is when insects put their stingers into the human skin

Examples of insects which sting
- Wasps
- Bees
- Fire ants

First aid for insect stings
- Apply ice pack on the injured part

To reduce pain
To reduce swelling
- Use tweezers to remove the sting if present
- Apply baking soda paste to reduce pain

FOREIGN BODIES
- These are objects that enter the human body through a natural opening

Examples of natural openings on the human body
- Nose
- Mouth
- Anus
- Eyes
- Ears
- Vagina
- Throat
- Rectum

How do foreign bodies enter our bodies?
- Some foreign objects enter by their own
- Some foreign objects are pushed by people into the body

Effects of foreign bodies
- They cause pain
- They cause discomfort

FOREIGN BODIES IN THE MOUTH
- Food remains
- Bone fragments
- Chewing gum

First aid for a foreign body in the mouth
- By rinsing the mouth with clean water
- By dental flossing
- By brushing the teeth

Why is it not advisable to remove food particles stuck between teeth using a tooth pick?
- A tooth pick can damage the gum

FOREIGN BODY IN THE EYE
- Dust
- Small insects
- Small stones
- Iron bits
- Splinters

First aid for a foreign body in the eyes
- Wash the eye with plenty of clean water

- Use a clean soft cloth to remove the foreign body

How do ophthalmologists/oculists remove iron bits in the victim's eyes?

- By using a magnet

Why is it not advisable to use a rough (sharp) object to remove a foreign object from the eye?

- The object can harm the eye

FOREIGN BODIES IN THE EAR

- Small insects
- Small seeds
- Small stones
- Dust

FIRST AID FOR A FOREIGN BODY IN THE EAR

- Pour clean cool water in the ear to make the insect come out

Why is it not advisable to try removing a foreign object besides an insect from the ear?

- It can damage the ear drum

How can you help a person who has got a small stone inside the ear?

- By taking the casualty to the hospital

FOREIGN BODIES IN THE NOSE

- Small insects
- Small seeds
- Small stones
- Dust
- Beads

First aid for a foreign object in the nose

- Blow the nose

To force out the insect

- Breathe through the nose

To prevent sucking the object into the wind pipe

Why is it not always advisable to try removing a foreign object besides an insect from the nose?

- It can go deeper and block the nose

FOREIGN BODIES IN THE ANUS

These are common in children who don't put on underwear or knickers

- Sand
- Small stones
- Leaves
- Grass
- Small seeds
- Dust

First aid for a foreign object in the anus

- Wash the anus with plenty of clean water

FOREIGN BODIES IN THE VAGINA

These are common in young girls who climb trees and adolescent girls

- Tampons (e.g cotton wool)
- Sand
- Small sticks
- Grass
- Small seeds
- Small stones

Tampons

- These are materials put in vagina to absorb menstrual blood e.g cotton wool

Why are adolescent girls at a risk of getting foreign bodies in their vaginas?

- Some tampons (cotton wool) can stick in their vaginas during menstruation

First aid for a foreign object in the vagina

- Wash the vagina with plenty of clean water
- Use clean fingers to remove the object from the vagina

Why should a foreign body in the vagina be removed as quickly as possible?

- To prevent infection of the vagina

Why do casualties sometimes fear to get first aid for foreign bodies in the anus or vagina?

- Due to shyness (fear for ridicule)

FOREIGN BODY IN THE THROAT

- Food
- Coins
- Beads

Food is the commonest foreign body in the throat

Effect of foreign bodies in the throat

- They cause choking

CHOKING

- This is the condition when a foreign body in throat blocks the airway to lungs

Conditions that can lead to choking

- Eating hurriedly
- Improper chewing of food
- Swallowing big food particles
- Eating while talking (talking with food in the mouth)

Signs of choking

- Coughing
- Hand signals pointing to the throat
- Sudden inability to talk
- Clutching the throat (victim grabs the throat with hands)
- Wheezing
- Difficulty in breathing

FIRST AID FOR CHOKING (FOREIGN BODY IN THE THROAT)

- Give the victim sharp blows on the back

To force out the choking object

- Apply abdominal thrusts

To force out the choking object

If the victim is a baby (smaller than you),

- Hold the baby upside down and give sharp blows at the back

State any two effects of choking

- Death
- Asphyxia

This is the loss of consciousness due to interrupted breathing

Why is it not advisable to give the person anything to drink during choking?

- To prevent fluids from covering the remaining space for passage of air

HOW TO PREVENT ACCIDENTS CAUSED BY FOREIGN BODIES

- Avoid eating hurriedly
- Do not talk with food in the mouth
- Swallow small pieces of food
- Do not put coins and beads in the mouth
- Wear eye glasses and helmets when moving on motorcycles and bicycles
- Teach children the dangers of putting foreign objects in their natural openings

HOUSING

- This is the providing of a proper house/shelter to an animal

Importance of proper housing to people

- It protects people from wild animals
- It protects people from bad weather
- It protects people from thieves

Factors to consider before selecting a site for a house

- Well drained soil
- Size of a house
- Nearness to the water source
- Nearness to the health centre
- Nearness to the market/shop
- Distance from the main road
- Security of the place

SITE OF A HOUSE

- This is a place where a house is located

Qualities of a good site for a dwellinghouse (residential house)

- It should have well drained soil
- It should be near a water source

To easily get water for domestic use

- It should be near a health centre

To easily get proper medical care in time

- It should be near shops and markets

To easily buy the domestic needs

- It should be at a reasonable distance from main road

To prevent motor accidents

- It should not be near a wetland or forest

They are hiding places for vectors and wild animals

QUALITIES OF A GOOD HOUSE

- It should be well ventilated
- It should have a veranda
- It should be well roofed
- It should be big enough to accommodate all family members

COMPONENTS OF A WELL-VENTILATED HOUSE

- Windows
- Doors
- Ventilators
- Louvres (louvers)

VENTILATORS

- To let out warm stale air

Why are ventilators always put (above windows and doors) near the roof/ceiling of a house?

- To easily allow out warm stale air which is lighter than fresh air

WINDOWS AND DOORS

- To allow in fresh air
- To allow in light

Why are doors and windows are put at a lower level than ventilators?

- To easily allow in fresh air which is denser than stale air

How does light help in control of insect vectors in a dwellinghouse?

- It chases away vectors like cockroaches

How is an egress window or door useful on a residential house?

- It acts as emergency exit

Besides allowing in light and fresh air, state other importance of a door on the house.

- It acts as entrance and exit

LOUVRES (LOUVERS)

- To allow in fresh air and light while keeping out rain

IMPORTANCE OF PROPER VENTILATION ON A HOUSE (REASONS WHY A GOOD HOUSE SHOULD BE WELL VENTILATED)

- To allow free air circulation (To allow in fresh air)
- To prevent easy spread of airborne diseases
- To reduce temperature inside the house

How does air move through the ventilation components of a house?

- By means convection currents/by convection

WAYS OF IMPROVING AIR CIRCULATION IN A WELL-VENTILATED HOUSE

- By opening windows
- By using air purifiers
- By using electric fans

DANGERS OF LIVING IN A POORLY VENTILATED HOUSE

- It leads to easy spread of air borne diseases
- It leads to suffocation

WAYS OF KEEPING THE DWELLING HOUSE CLEAN

- By sweeping the floor
- By mopping the floor
- By scrubbing the floor
- By removing cobwebs from the walls
- Avoid sharing same house with domestic animals

Dangers of sharing a house with domestic animals

- It leads to bad smell in the house
- It leads to competition for oxygen
- It leads to parasites in the house e.g ticks
- Sick animals may spread diseases to people
- Animal wastes make the house dirty
- Animals may destroy household property

Zoonoses (zoonotic diseases)

- These are diseases that can spread from sick animals to people

Examples of Zoonoses

- Tuberculosis
- Rabies
- Brucellosis
- Anthrax
- Bubonic plague

TYPES OF HOUSES

- Temporary houses
- Permanent houses

TEMPORARY HOUSES

- These are houses that last for a short time

Examples of temporary houses

- Huts
- Tents
- Caravans
- Houseboats

Materials used to build temporary houses

- Mud
- Dry grass
- Reeds
- Cow dung
- Banana fibres
- Sisal
- Small sticks
- Papyri
- Bamboo
- Dry leaves
- Tarpaulin

Advantages of temporary houses

- They are cheap to make
- They need less labour to make
- They need a small space

Disadvantages of temporary houses

- They last for a short time (they are not durable)
- They are vulnerable to bad weather
- They are small in size

PERMANENT HOUSES

- These are houses that last for a long time

Examples of permanent houses

- Flats
- Bungalow
- Mansion

Materials used to build houses

- Iron bars
- Concrete
- Cement
- Mortar
- Glass
- Bricks
- Wood
- Stones
- Iron sheets
- Steel nails
- Metallic poles
- Polythene sheets

Advantages of permanent houses

- They are durable (last longer)
- They are resistant to bad weather
- It is easy to build a big house

Disadvantages of modern houses

- They are expensive to make
- They require skilled labour to make

IMPORTANCE OF A VERANDA ON A HOUSE

- It prevents dampness
- It prevents flowing water from entering the house

DAMP-PROOF COURSE (D.P.C)

- This a layer of polythene paper in the walls of a house

Importance of damp-proof course (D.P.C)

- It prevents water from rising through the walls
- It prevents dampness of the walls and floor

By what process does water rise through the walls of a house?

- By capillarity/capillary action

MORTAR

- This is the mixture of water, cement and sand

Of what importance is mortar during building construction?

- It is used to bind/join bricks together
- It is used to plastering walls

CONCRETE

- This is the mixture of water, sand, cement and small stones

Importance (uses) of concrete

- It is used to make buildings
- It is used to make roads and bridges
- It is used to make concrete dams
- It is used to make pavements
- It is used to make culverts

Advantages of using concrete

- It is strong
- It is durable
- It is fire resistant (it does not burn)
- It does not rust
- It is a sound insulating material
- It can be cast in different shapes

Disadvantages of using concrete

- It is heavy
- It is less ductile
- It is expensive to make formwork to hold concrete

WAYS OF INCREASING THE STRENGTH OF CONCRETE

- Adding iron bars and wire mesh
- Reducing water to cement ratio
- Concrete curing

CONCRETE CURING

- This is the maintaining of enough moisture and temperature for hydration of concrete

Ways of curing concrete?

- By pouring water on concrete surface
- By putting sand on concrete surface

- By putting polythene sheet on concrete surface

Why do builders always pour water on concrete after construction? (Importance of concrete curing)

- To harden (strengthen) concrete
- To make concrete durable
- To prevent cracks

What do we call the process by which water hardens concrete after placement?

- Hydration

LATRINES

- These are places where human wastes are disposed

Importance of latrines

- For proper disposal of human wastes

Why should human wastes be disposed in a latrine? (importance of proper disposal of faeces)

- To prevent easy spread of faecal/diarrhoeal diseases
- To prevent water contamination
- To prevent bad smell in a place
- To prevent multiplication of vectors
- To limit exposure of human wastes to vectors

TYPES OF LATRINES

- Pit latrine
- Toilets (flush toilets)
- Potties

How is a lavatory useful in an aircraft?

- It helps in proper disposal of human wastes

1. PIT LATRINES
   - These are latrines made by digging a hole in the ground

Factors to consider when siting a pit latrine (qualities of a good site for a pit latrine)

- It should be 10 metres from a dwellinghouse, school, hotel or kitchen

To prevent food contamination
To prevent bad smell

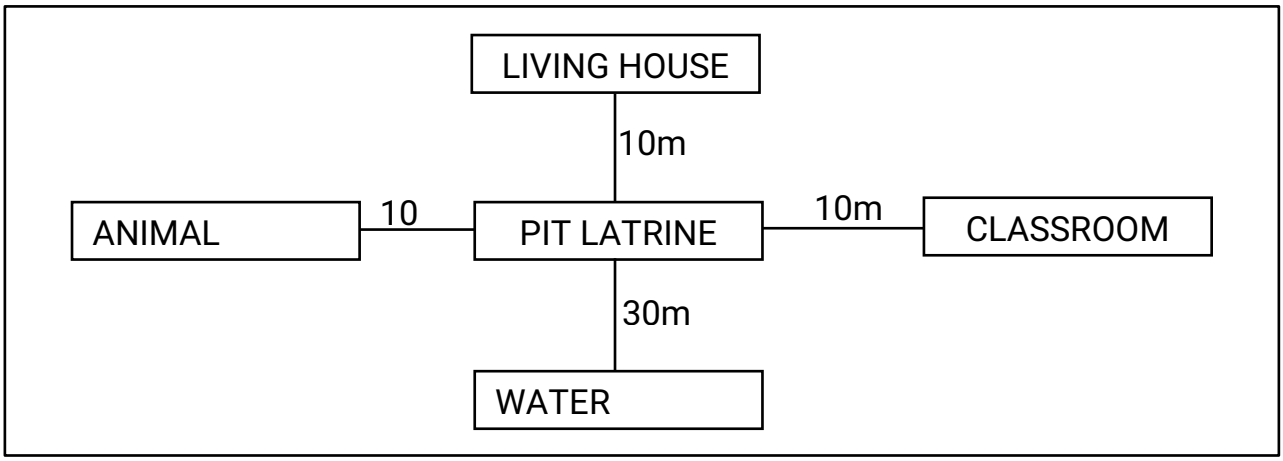
- It should be 30 metres from water source

To prevent water contamination

- It should be constructed downhill from a water source

To prevent water contamination

A diagram showing a good site for a pit latrine.



Qualities of a good pit latrine

- It should have a deep pit

To keep faeces for long time

- It should have a strong floor

To allow the user stand on

- It should have a smooth floor

For easy cleaning

- It should be well roofed

To prevent leaking of rain (to protect the floor and user from rain)

- It should have a hole that is big enough for the human wastes to pass but small enough to prevent children from falling inside
- It should have stances and walls

For privacy

- The pit should be 2 metres above the water table

To prevent contamination of ground water

DISADVANTAGES OF PIT LATRINES

- They can pollute ground water if not placed clearly
- They are not friendly to babies

WAYS OF MAKING PIT LATRINES DIRTY

- Defecating on the floor
- Urinating on the floor
- Dumping dirty toilet tissue on the floor
- Spitting on the floor
- Rubbing faeces on the floor

MATERIALS USED TO MAKE THE FLOOR OF PIT LATRINES

- Strong wood
- Iron bars
- Wire mesh
- Concrete
- Sand
- Mud

THINGS USED TO CLEAN THE FLOOR OF PIT LATRINES

- Soapy water
- Scrubbing brush
- Broom
- Disinfectants

Why should disinfectants be used when cleaning the floor of an ordinary pit latrine?

- To kill germs
- To reduce the bad smell

TYPES OF PIT LATRINE

- Ordinary/conventional pit latrine
- VIP latrines
- Ecosan latrine
- Pour-flush latrine

ORDINARY (CONVENTIONAL) PIT LATRINES

- This is a local pit latrine without a vent pipe and screen (flyscreen)
- It is made from local materials
- Ordinary pit latrines are common in rural areas

Characteristics of an ordinary pit latrine

- It does not have a vent pipe
- It does not have a screen (flyscreen)
- It has a lid on the squat hole

A diagram showing an ordinary pit latrine

Importance of a lid on the squat hole of an ordinary pit latrine

- To prevent bad smell from escaping
- To keep out houseflies

Local materials used to make ordinary pit latrines

- Reeds
- Banana fibres
- Papyri
- Dry grass
- Small sticks
- Cow dung
- Mud
- Clay
- Sisal
- Strong wood

Ways of keeping an ordinary latrine clean (how to maintain an ordinary pit latrine)

- Sweeping the floor
- Scrubbing the floor
- Smoking an ordinary pit latrine
- Removing cobwebs from the walls
- Repairing any damage on the latrine
- Cutting tall grass around the latrine
- Disposing human wastes directly into the squat hole

Importance of smoking an ordinary pit latrine

- To kill houseflies
- To reduce bad smell

CORRECT USE OF AN ORDINARY PIT LATRINE

- Remove the lid from the squat hole
- Squat and pass the wastes into the squat hole
- Clean yourself, dress up and cover the squat hole
- Wash your hands with clean water and soap

VIP LATRINE

- This is a modern pit latrine with a vent pipe and a screen (flyscreen)
- VIP **stands for** Ventilated improved pit latrine

Why is VIP latrine said to be ventilated?

- It has a vent pipe that takes out bad smell

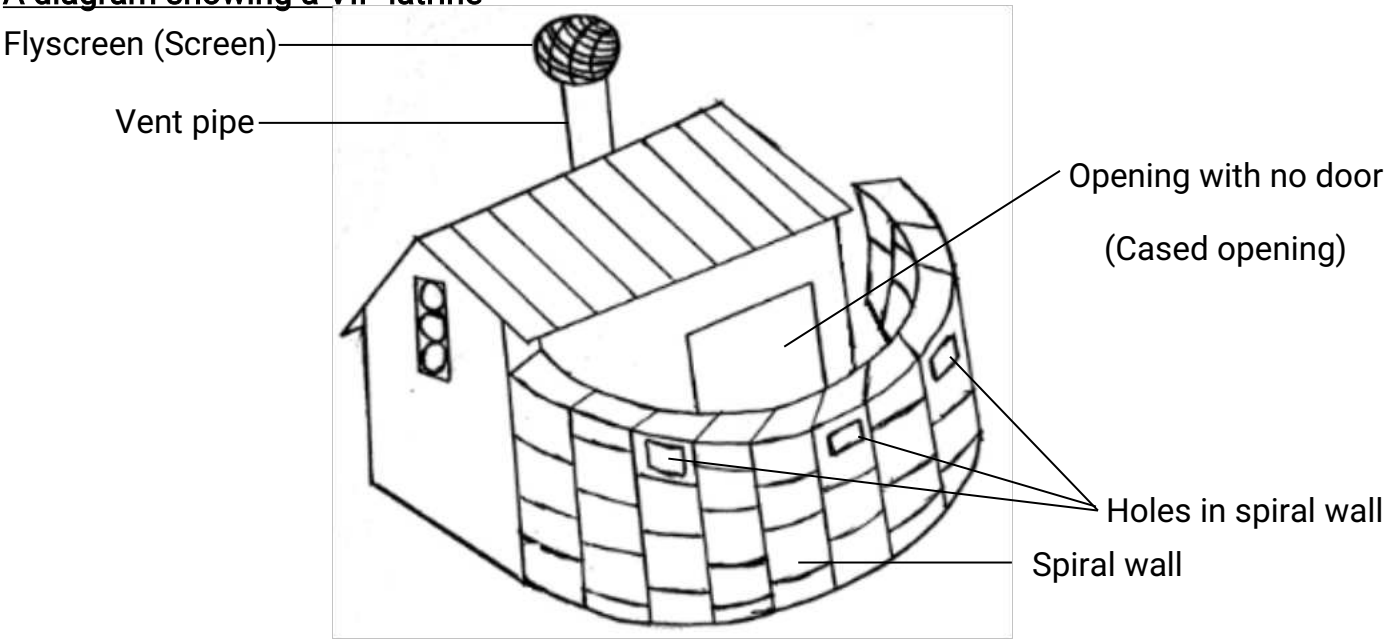
Why is VIP latrine said to be improved?

- It does not smell badly and it kills flies

CHARACTERISTICS (FEATURES) OF A VIP LATRINE

- It has a vent pipe
- It has a screen (fly screen)
- It has no lid for the squat hole
- It has spiral walls
- It has no door on its opening

A diagram showing a VIP latrine



IMPORTANCE OF EACH PART OF A VIP LATRINE

Vent pipe

- To let out bad smell

Screen (flyscreen)

- To trap and kill flies

How does the screen kill houseflies?

- It suffocates them without escaping

What attracts flies to pass through the vent pipe towards the screen?

- Light entering through the screen

Spiral walls

- For privacy

Why are the some holes put in the spiral walls of a VIP latrine?

- To allow free circulation of air

Why is a VIP latrine made with no door on its opening?

- To allow free circulation of air (to allow in fresh air)

Why does a VIP latrine has no lid for the squat hole?

- To allow in fresh air (to allow free circulation of air)

By what process does air move (circulate) in a VIP latrine?

- Convection

Ways of keeping A VIP latrine clean (How to maintain a VIP latrine)

- Sweeping the floor
- Scrubbing the floor
- Repairing any damage on the latrine
- Removing cobwebs from the walls
- Cutting tall grass around the latrine
- Disposing human wastes directly into the squat hole

Why is it not necessary to smoke a VIP latrine?

- It has a vent pipe that lets out bad smell
- It has a screen that kills flies

Why is a lid of no importance on the squat hole of a VIP latrine?

- It blocks air circulation

ECOSAN LATRINE

- This is a modern pit latrine in which urine does not mix with faeces
- **Ecosan** stands for **Ecological sanitation**

Characteristic (feature) of an Ecosan latrine

- It has a shallow pit

To allow ash reach faeces before spreading

Why is ash poured into the pit of Ecosan pit latrine after use?

- To dry up faeces

A diagram showing Ecosan latrine

ADVANTAGES OF ECOSAN LATRINE

- It does not produce any smell
- Human wastes collected are used as manure

Give a reason why an Ecosan pit latrine does not produce any smell

- There is no mixing of faeces and urine
- The ash dries up faeces

Ways of keeping an Ecosan latrine clean (How to maintain Ecosan latrine)

- Sweeping the floor
- Avoid dirtying the floor with ash
- Cover faeces with ash after use

Why are Ecosan pit latrines not cleaned with water?

- To prevent mixing of faeces with water

2. TOILETS (FLUSH TOILETS/ WATERBORNE TOILETS /WATER CLOSETS)
   - These are latrines with a water flushed bowl connected to a sewer
   - **WC** stands for **Water closet**

Why are toilets sometimes called flush toilets?

- They use water to carry away human wastes

PLACES WHERE TOILETS ARE FOUND

- Hospitals
- Banks
- Modern houses
- Hotels
- Urban schools

Why are flush toilets found in towns and cities?

- There is supply of piped water

Why are flush toilets not common in rural areas?

- There is no supply of piped water

Why are toilets not smoked?

- Heat can cause damage to the toilet equipment

A diagram showing a flush toilet

IMPORTANCE OF EACH OMPONENT OF A FLUSH TOILET

Seat

- It is where the user sits when using the toilet

Toilet bowl

- It is where human wastes are deposited

What is the importance of water that remain inside the toilet bowl after flushing?

- To prevent bad smell

Handle

- It is pulled or pushed or pressed to flush the toilet

Toilet water tank (cistern)

- To keep water for flushing the toilet

Why is the cistern (water tank) always raised up the bowl?
- To increase water pressure when flushing the toilet

Refill pipe
- To supply water to the water tank (cistern)

Upper pipe (water pipe)
- To carry water from the tank to the bowl

Lid (seat cover)
- To cover the seat and bowl when not in use

Toilet bowl brush
- For cleaning the toilet bowl

Sewage pipe (sewer)
- To carry human wastes from to the septic tank

Septic tank (cesspit)
- To store sewage (to store human wastes after flushing)

Why should a septic tank be cemented (made with concrete walls)?
- To prevent contamination of ground water
- To prevent drainage of sewage into the soil

Why should the septic tank not be put near a kitchen?
- To prevent food contamination

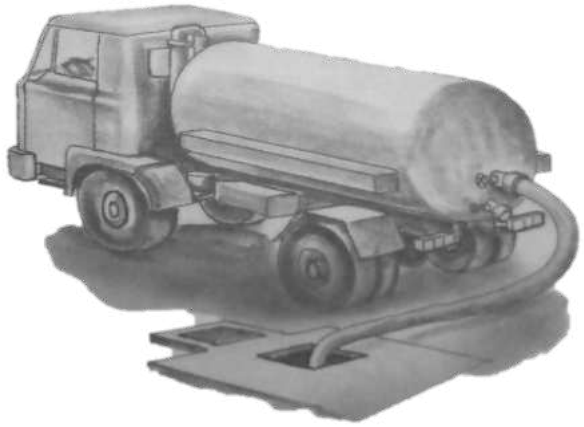
Why should the septic tank be covered?
- To prevent bad smell
- To prevent exposure of human wastes to vectors

CORRECT USE OF A FLUSH TOILET
- Open the lid and sit on the seat
- Pass wastes into the bowl
- Clean yourself with toilet paper and dress up
- Flush and cover the toilet bowl

Sewage
- These are human wastes carried from toilets through sewers

CESSPOOL EMPTIER
- This is a vehicle used to empty septic tanks and pit latrines

A diagram showing a cesspool emptier



Importance of a cesspool emptier
- To empty septic tanks and pit latrine

ADVANTAGES OF A WATERBORNE TOILET
- It can be put inside the house
- It is easy to clean
- It can be used by young children

Why are waterborne toilets said to be user friendly?
- They can be used by young children

DISADVANTAGES OF WATERBORNE TOILET
- It is very expensive to construct
- It be blocked if hard objects are put in it
- It needs piped water to use

National water and sewerage corporation (NWSC)

- It collects and treats sewage (it supplies sewerage services in towns)
- It supplies treated piped water in urban areas

Ways of keeping a flush toilet clean (how to maintain flush toilets/urban toilet system)

- Flush the toilet after use

To carry human wastes to the septic tank

- Do not squat on the seat

To prevent making the seat dirty

To prevent injuries in case the seat breaks

- Sweep the floor
- Remove cobwebs from the walls
- Dispose human wastes directly into the bowl
- Mop the floor with long stick mop
- Use a bowl brush to clean inside the toilet bowl
- Use soapy water or detergents to clean the toilet

To kill germs

To prevent the bad smell

- Do not use the toilet when it is blocked

To prevent spilling of human wastes

- Repair any damage on the toilet equipment
- Put disinfectants in the bowl

To kill germs

- Put toilet papers in the toilet

To prevent blocking the sewage pipe

- Put a dustbin in the toilet

For proper disposal of hard materials like sanitary pads and hard papers

- Do not use hard papers in a toilet

To prevent blocking the sewage pipe (sewer)

Why should we wear gloves when cleaning the latrine?

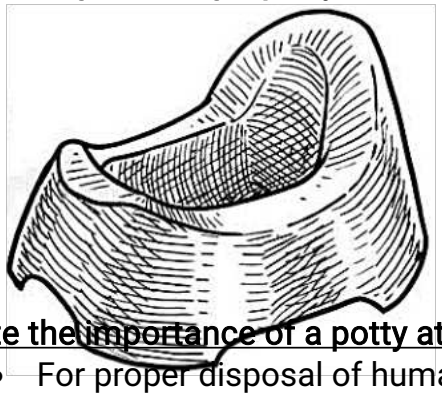
- To protect our hands from germs

Problems faced by urban toilet system/flush toilets

- Lack of water for flushing makes the toilet fail to work
- Use of hard materials blocks the sewage pipes
- Blocking of sewage pipe spills human wastes that attracts vectors in the toilet

3. **POTTY**
   - This is a small portable latrine for small children
   - It is usually used by toddlers as they train them to use other latrines

A drawing showing a potty



Groups of people who use potties

- Toddlers/Babies
- Very sick people/invalids
- Elderly

Why are potties not used by big children?

- To prevent them from breaking the potties

State the importance of a potty at home

- For proper disposal of human wastes by small children
- It is where small children dispose their human wastes

Mention one disease that can make a toddler to be with a potty all the time

- Diarrhoea

Why do crawling babies have a high risk of diarrhoea/food poisoning?

- They eat contaminated food

GROWTH AND DEVELOPMENT

Growth

- This is the increases in body size
- It is a biological change
- Growth is most rapid during infancy

Development

- This is the increase in maturity

Note:

- Growth and development occur at the same time

Factors that affect growth and development

- Hormones
- Genes
- Environment

PUBERTY

- This is the period when a person becomes sexually mature

ADOLESCENCE

- This is the transitional stage between childhood and adulthood

Adolescent

- This is a person developing from childhood to adulthood

At what age does adolescence usually begin and end in boys and girls?

- 10 to 19 years (10 to 24 years)

STAGES OF ADOLESCENCE (CHANGES THAT OCCUR DURING ADOLESCENCE)

- Primary sex characteristics (basic sex characteristics **or** puberty changes)
- Secondary sex characteristics (physical sex characteristics)
- Emotional (psychological sex characteristics)
- Out of step adolescent changes

PRIMARY (BASIC) SEX CHARACTERISTICS/PUBERTY CHANGES

- These are changes which prepare sex organs for reproduction
- Primary sex organs in females are the **ovaries** while in males are the **testes**

Examples of primary (basic) sex characteristics

i) In boys

- Penis enlarges (enlargement of the penis)
- Wet dreams begin
- Production of sperms

ii) In girls

- Menstruation begins
- Uterus develop (development of the uterus)
- Ovulation begins

SECONDARY (PHYSICAL) SEX CHARACTERISTICS

- These are changes on the body which distinguish a mature person from a young person
- They give a person either male or female appearance
- **Oestrogen** controls secondary sex characteristics in girls
- **Testosterone** controls secondary sex characteristics in boys

Examples of secondary (physical) sex characteristics

i) In boys

- Sweat glands become more active
- Growth of pubic hair and armpit hair
- Voice deepens
- Growth of pimples
- Body grows more muscular

ii) In girls

- Sweat glands become more active
- Growth of pubic hair and armpit hair

- Voice becomes soft and attractive
- Breasts enlarge (breasts grow bigger)
- Hips enlarge (widening of hips)

iii) In both boys and girls

- Sweat glands become more active
- Growth of pubic hair and armpit hair
- Change in voices
- Growth of pimples

EMOTIONAL (PSYCHOLOGICAL) CHANGES OF ADOLESCENCE

- These are changes which occur in minds of adolescents

Examples of emotional (psychological) changes in adolescents

- They get sexual feelings (They become interested in members of opposite sex)
- They want freedom
- They reject rules of elders (they become disobedient)
- They quickly react towards situation
- They want to have their own identity
- They want to be recognized as mature (they become ambitious)
- They quickly become angry (mood swings)
- They spend much time in peer groups

What causes mood swings in adolescent boys and girls?

- Changes in levels of sex hormone

OUT OF STEP ADOLESCENT CHANGES

- These are changes which occur to different individuals of the same age group

Examples of out of step adolescent changes

- Some boys and girls suddenly becomes taller than the agemates
- Some boys and girls suddenly become fatter than the agemates
- Some boys and girls grow pubic hair faster than the agemates
- Some girls develop breasts faster than the agemates
- Some girls undergo menstruation before their agemates

COMMON PROBLEMS OF ADOLESCENCE

- It leads to antisocial behaviour
- It leads to sexual conflicts
- It results into body odours
- It leads to conflicts with culture and religion
- It increases the risks of unwanted pregnancies
- It increases the risks of drug abuse
- It leads to conflicts with elders

HOW TO HELP ADOLESCENTS (HOW TO OVERCOME THE CHALLENGES OF ADOLESCENCE)

- Advise them to share their problems with elders
- Advise them to join good social clubs
- Advise them to have good role models
- Teach them how to manage the body changes
- Teach them the dangers of early sex
- Regular counselling and guidance

REPRODUCTION IN ANIMALS

- Reproduction is the process by which living things multiply in the environment
- Reproduction is the process by which new organisms are produced from the parent organisms
- It is a biological change

Importance of reproduction

- It prevents extinction of living things
- It promotes continuity of living things
- It increases the population of living things

TYPES OF REPRODUCTION

- Asexual reproduction
- Sexual reproduction

ASEXUAL REPRODUCTION

- This is the type of reproduction which does not involve the union of gametes

Examples/forms of asexual reproduction in animals

- Binary fission
- Budding
- Fragmentation
- Parthenogenesis

A table showing examples of animals that undergo asexual reproduction

FORMS OF ASEXUAL REPRODUCTION	ANIMALS
Budding	Coelenterates (Hydra, Corals, Jellyfish, Sea anemone)
Fragmentation	Starfish, Brittle star, Tapeworms, Blackworms, Hydra
Parthenogenesis	Some bees, Some ants, Some aphids, Some sharks

SEXUAL REPRODUCTION

- This is the type of reproduction which involves the union of gametes

Gamete

- This is a reproductive cell

Gonad

- This is a sex organ that produces a gamete

A TABLE SHOWING GAMETES AND GONADS IN ANIMALS

Male gonad	Male gamete	Female gonad	Female gamete
Testes	Sperms	Ovary	Ova

Examples/forms of sexual reproduction

- Reproduction in mammals (calving, kidding, lambing, childbirth, kindling and laying eggs)
- Reproduction in birds (laying eggs)
- Reproduction in fish (laying eggs)
- Reproduction in reptiles (laying eggs)
- Reproduction in amphibians (laying eggs)

HERMAPHRODITE

- This is an organism with both male and female sex organs

Examples of hermaphrodites

- Snails
- Slugs
- Earthworms

FERTILISATION

- This is the union of male and female gametes to form a zygote
- The immediate result of fertilization is **a zygote**

TYPES OF FERTILIZATION

- External fertilization
- Internal fertilization

EXTERNAL FERTILIZATION

- This is the type of fertilization which occurs outside the body of the female
- It takes place in water/moist areas/aquatic environment

Examples of animals which undergo external fertilisation

- Tilapia
- Nile perch
- Mudfish
- Shark
- Frog
- Toad

- Salamander
- Newt

Groups of vertebrates that undergo external fertilization

- Fish
- Amphibians

How are eggs of amphibians and fish fertilised?

- They ate fertilized externally

Why does external fertilization usually occur in water?

- Water facilitates the movement of sperms to the eggs

INTERNAL FERTILIZATION

- This is the type of fertilization which occurs inside the body of the female
- It takes place in the **oviducts (fallopian tubes)**

Examples of animals that undergo internal fertilization

- Human being
- Monkey
- Gorilla
- Chicken
- Duck
- Eagle
- Cobra
- Chameleon
- Crocodile
- Tortoise

Groups of vertebrates that undergo internal fertilization

- Mammals
- Birds
- Reptiles

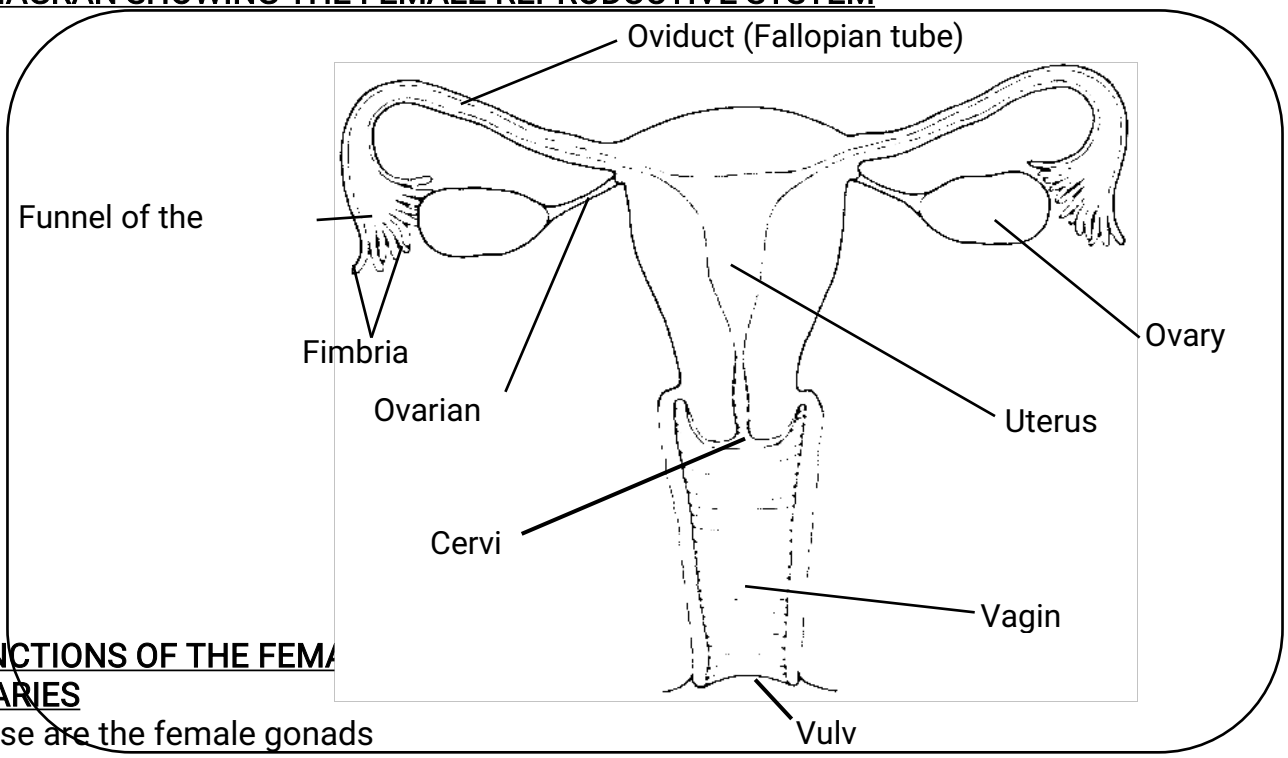
How are birds, mammals and reptiles fertilized?

- They are fertilized internally

REPRODUCTION IN HUMANS

- Humans undergo sexual reproduction
- They undergo internal fertilization
- Fertilization in humans occurs in the **oviducts (fallopian tubes)**

A DIAGRAN SHOWING THE FEMALE REPRODUCTIVE SYSTEM



FUNCTIONS OF THE FEMA

OVARIES

These are the female gonads

A woman has two ovaries

Ovulation occurs in the ovaries

- They produce ova/eggs (they produce female gametes)
- They produces female sex hormones (oestrogen and progesterone)

Besides producing eggs and female hormones, give other two functions of ovaries

- They release eggs for fertilization
- They protect the eggs

Ova (eggs)

These are the female gametes (female reproductive cells)

- An ovum (egg) unites with a sperm to form a zygote

Functions of oestrogen

- It regulates secondary sex characteristics in girls
- It regulates menstrual cycle
- It regulates vaginal lubrication (regulates sexual desires)

Functions of progesterone

- It thickens the uterus walls for implantation
- It maintains pregnancy

OVIDUCT (FALLOPIAN TUBE/UTERINE TUBES)

- It is where fertilisation takes place
- It is the passage of the egg from the ovary to the uterus
- It is where conception occurs

UTERUS (WOMB)

- It is where the foetus grows from
- It is where implantation takes place

CERVIX

- It closes the lower end of the uterus during pregnancy
- It prevents the foetus from coming out before it is time.

URETHRA

- It passes out urine from the Urinary bladder

VULVA

- It is the outer part of the female reproductive system

VAGINA

- It is where sperms are deposited
- It is a birth canal

How is the vagina adapted to its function as a birth canal?

- It has elastic muscular walls

How is mucus important in the vagina?

- It lubricates the vagina
- It keeps the vagina moist (prevents the vagina from drying up)
- It provides acidic medium to prevent growth of bacteria and fungi

FIMBRIAE AND FUNNEL OF THE OVIDUCT

- It directs the ovum (egg) into the oviduct

HYMEN

- It is the skin around the vaginal opening

CLITORIS

- It is the most sensitive part of the female reproductive organs

OUTER LIPS (LABIA MAJORA)

- It is the skin that protects the delicate organs inside

URINARY BLADDER

- It stores urine for a short time before urination

DISORDERS OF THE FEMALE REPRODUCTIVE SYSTEM

- Ectopic pregnancy
- Female sterility (barrenness)
- Fibroids
- Ovarian tumour
- Inflammation of oviducts
- Vaginal fistula
- Vaginitis (inflammation of vagina)

ECTOPIC PREGNANCY

- This is the condition when a fertilized egg develops outside the womb (implants itself in the oviduct)

Causes of ectopic pregnancy

- Inflammation of the oviduct
- Cigarette smoking

- Unsuccessful tubal ligation
- Pelvic inflammatory disease

FEMALE STERILITY (BARRENNESS)

- This is the condition when a woman fails to conceive

Causes of barrenness

- Failure to ovulate
- Blocked oviducts
- Damaged uterus
- Old age

FIBROIDS

- These are swellings that develop on the uterine walls

OVARIAN TUMOUR

- These are abnormal cells that grow on the ovaries

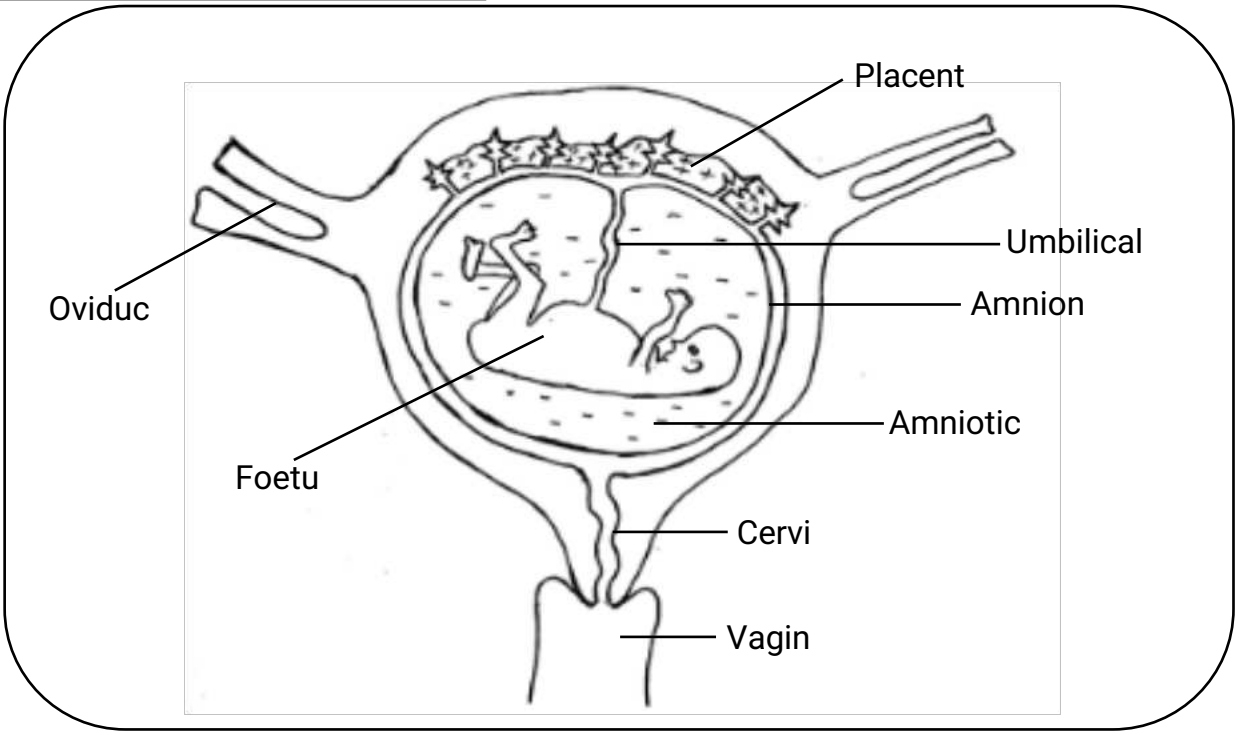
VAGINAL FISTULA

- This is abnormal opening that connects the vagina with another organ (e.g urinary bladder, colon or rectum)

Causes of vaginal fistula

- Injury during childbirth
- Surgery of the vagina

THE HUMAN FOETUS IN THE WOMB



PLACENTA

This is an organ that develops in the uterus/womb during pregnancy

- It provides food and oxygen to the foetus
- It removes waste products from the foetus (e.g carbon dioxide)
- It prevents harmful substances from reaching the foetus
- It prevents mixing of mother's blood and that of the foetus

Name any two harmful substances that can cross the placenta and harm the growing baby

- Alcohol
- Nicotine

What process allows exchanges between the mother and foetus in the placenta?

- Diffusion

UMBILICAL CORD

This is the tube that connects the foetus to the placenta

- It carries food and oxygen from the placenta to the foetus
- It carries waste products from the foetus to the placenta

How is the umbilical cord adapted to its functions?

- It has the umbilical vein and arteries

How is the function of umbilical artery different from that of umbilical vein?

- Umbilical vein carries oxygenated blood from the placenta to the foetus while umbilical artery carries deoxygenated blood from the foetus to the placenta

How is the umbilical artery similar pulmonary artery in terms of function?

- Both carry deoxygenated blood

How is the umbilical vein similar pulmonary vein in terms of function?

- Both carry oxygenated blood

AMNIOTIC SAC (AMNION)

- It protects the foetus from injury
- It keeps the amniotic fluid

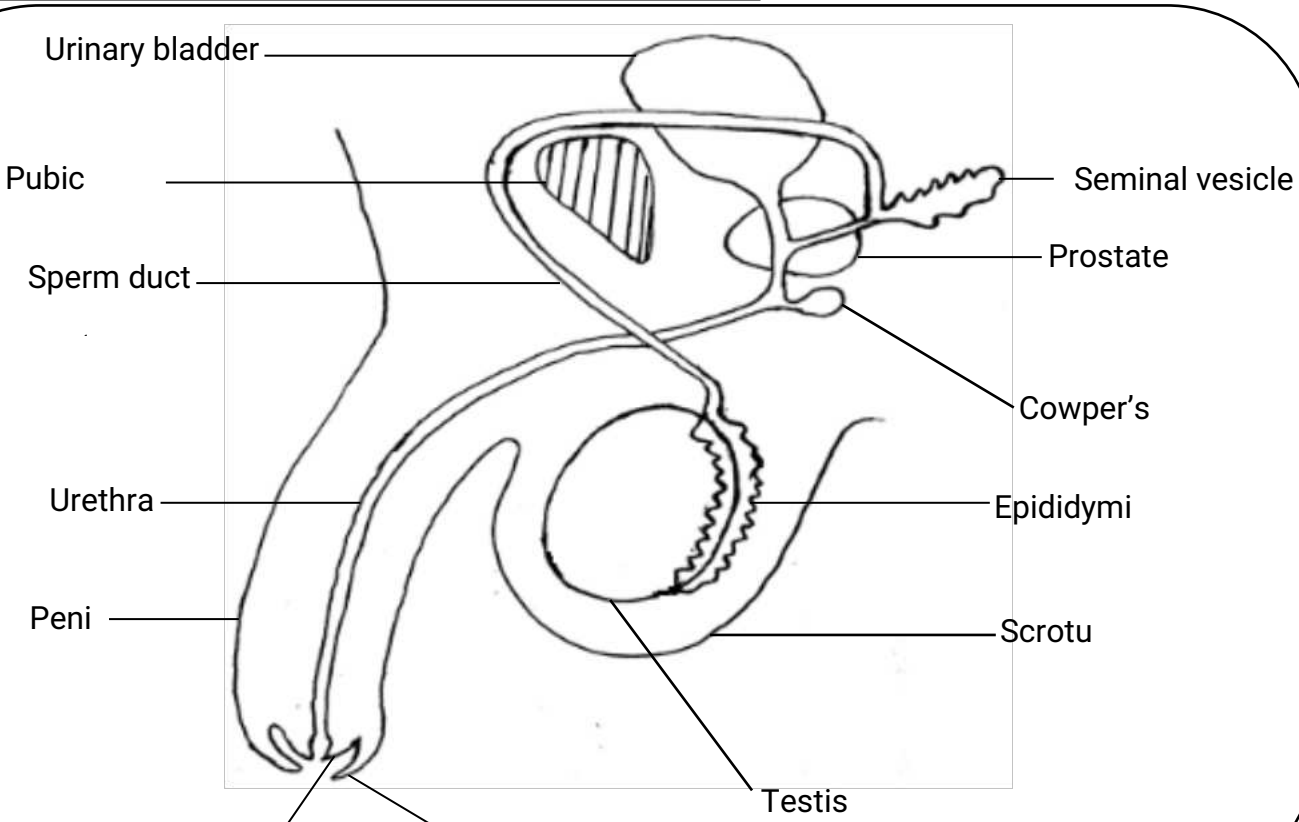
AMNIOTIC FLUID

- It protects the foetus from injury
- It prevents the foetus from drying up
- It lubricates the foetus and prevents body parts from growing together

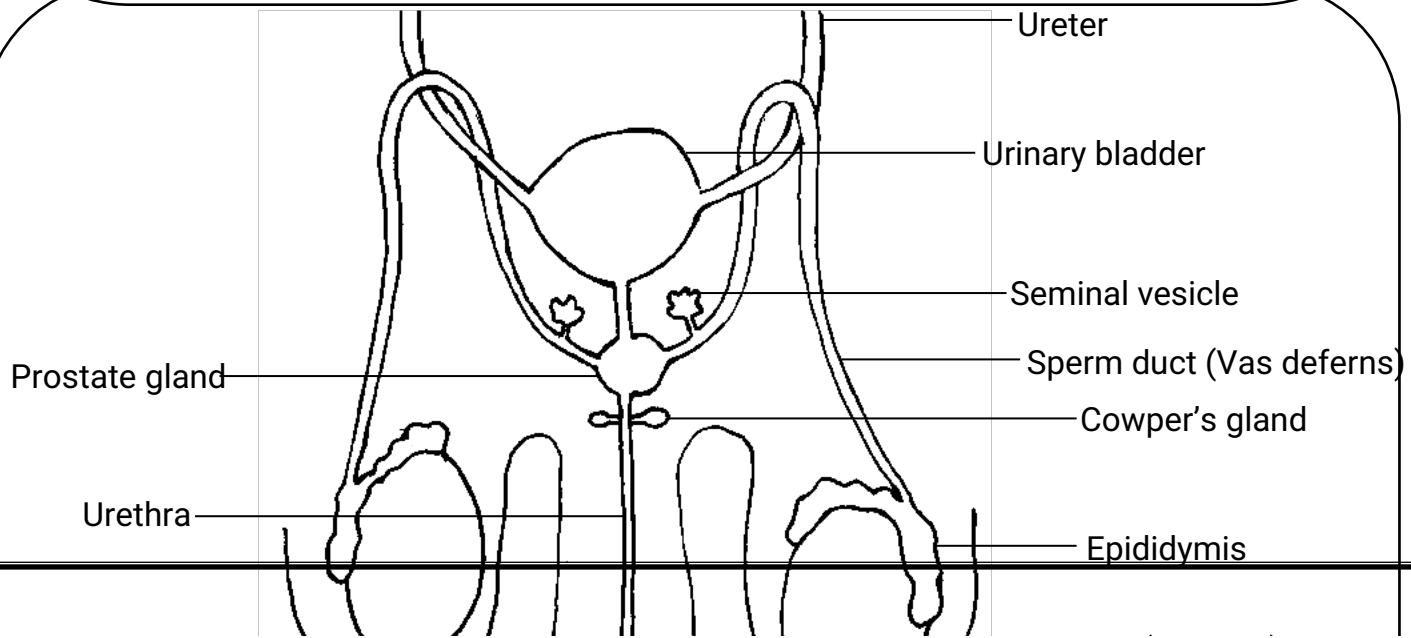
How does the amniotic fluid protect the foetus from physical damage?

- By absorbing shock

THE STRUCTURE OF THE MALE REPRODUCTIVE ORGAN



FRONT VIEW OF THE MALE REPRODUCTIVE SYSTEM



Examples of male reproductive organs found outside the body

- Penis
- Testes
- Scrotum

Examples of male reproductive organs found inside the body

- Epididymis
- Vas deferens (sperm duct)
- Urethra
- Seminal vesicles
- Prostate gland
- Cowper's gland

FUNCTIONS OF THE MALE REPRODUCTIVE ORGANS

PENIS

- It deposits sperms into the vagina

Ejaculation is the depositing of sperms into the vagina by an erect penis

The penis has an **erectile tissue** to erect the penis during sex

The most sensitive part at the tip of penis is called **glans penis**

Foreskin (prepuce)

- It covers the glans (head of the penis)

TESTES (TESTICLES)

These are the male gonads

Most men have two testes

- They produce the sperms (male gametes)
- They produce testosterone (the main sex hormone in men)

Uses of testosterone

- It controls secondary sex characteristics in boys
- It controls sexual desires

SCROTUM

- It protects the testes from harm.
- It regulates temperature around the testes

How does the scrotum regulate temperature around the testes on the following days?

i) Cold days;
   - It contracts for the testes to move up and get warmth from the body

ii) On hot days;
   - It relaxes for the testes to move away from the body to cool the temperature

Why is the scrotum hanging between the legs?

- To keep the testes at cooler temperature than the body temperature

EPIDIDYMIS

This is a long coiled tube on the backside of the testes

- It stores sperms
- It helps sperms to survive and mature

Why is the epididymis coiled?

- To allow sperms time to mature
- To delay release of sperms

SPERM DUCT (VAS DEFERENS)

- It carries mature sperms to the urethra

URETHRA
- It carries sperms to the vagina

SEMINAL VESICLE
- It helps in producing semen which helps sperms to swim
- It produces an alkaline fluid that neutralizes acids in urethra
- It produces a fluid that provides energy to sperms

PROSTATE GLAND
- It produces prostate fluid

Give two functions of prostate fluid
- To nourish sperms
- To neutralize acids in the vagina

COWPER'S GLAND
- It produces Cowper's fluid

Cowper's fluid is produced before ejaculation

Give two functions of Cowper's fluid
- To neutralize acids in the urethra
- To lubricate the urethra

DISORDERS OF THE MALE REPRODUCTIVE SYSTEM
- Impotence
- Low sperm count
- Enlargement/swelling of the prostate gland
- Epididymitis
- Orchitis
- Swelling of the scrotum/hydrocele

Impotence
- This is the inability of the penis to erect
- It is caused by obesity, diabetes or high blood pressure

Low sperm count
- This is the inability of the testes to produce enough sperms
- It is caused by drinking too much alcohol and tobacco smoking

Swelling of the prostate glands
- It occurs in men older than 50 years

Epididymitis
- This is the inflammation of the epididymis
- It is caused by bacterial STIs (gonorrhoea or chlamydia)

Orchitis
- This is the inflammation of the testes
- It is caused by mumps or bacterial STIs (gonorrhoea or chlamydia)

Hydrocele
- This is the accumulation of fluids in the scrotum
- It can be caused by an injury on the testes

REPRODUCTIVE HEALTH
- This is the state of physical, mental and social well-being of the reproductive system

Importance of reproductive health
- It prevents the spread of STIs (sexually transmitted infections)
- It helps a mother to deliver a healthy baby
- It creates awareness about safe sexual practices

CARE FOR REPRODUCTIVE SYSTEM (HOW TO PROMOTE REPRODUCTIVE HEALTH)
- Washing genital parts with clean water
- Shaving the long pubic hair
- Always put on clean dry underwear
- Abstain from premarital sex
- Avoid tight underwear

- Never spray perfumes on genital parts
- Observe good hygiene during menstrual periods
- Avoid sharing underwear and body towels
- Avoid cleaning the vagina with long fingernails and soap
- Always keep the flush toilets clean

FERTILIZATION IN HUMANS

Fertilization

- This is the union of male and female gametes to form a zygote
- It can follow sexual intercourse or artificial insemination
- It occurs in the **oviducts (fallopian tubes)**
- Its immediate result is the **zygote**

Conception

- This is the formation of a zygote
- It occurs in the **oviducts (fallopian tubes)**

Implantation

- This is the attachment of a fertilized ovum onto the uterine wall
- It occurs in the **uterus (womb)**

STAGES OF BABY DEVELOPMENT

1. Zygote
2. Embryo
3. Foetus

Zygote

- This is a single cell formed after fertilization
- It is the initial stage baby development

Embryo

- This is the developing baby from two weeks after conception to eight weeks

Foetus

- This is the developing baby from eight weeks until birth
- It is the final stage in baby development

GAMETES

- These are reproductive cells

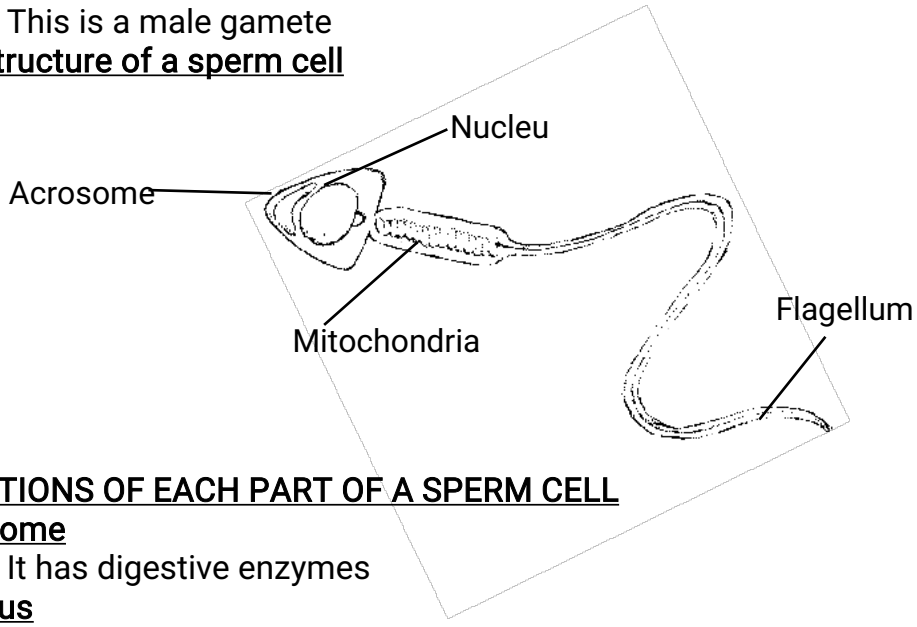
Examples of gametes in humans

- Sperm cells
- Ova (eggs)

SPERM

- This is a male gamete

The structure of a sperm cell



FUNCTIONS OF EACH PART OF A SPERM CELL

Acrosome

- It has digestive enzymes

Nucleus

- It contains chromosomes

Mitochondria

- To supply energy to the cell

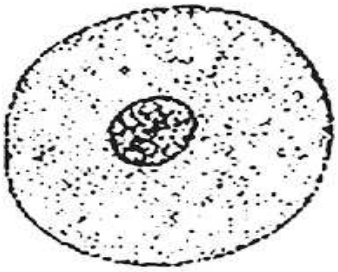
Flagellum (Tail)

- For movement (for swimming)

OVUM

- This is a female gamete

The structure of an ovum (human egg)



NOTE

- An ovum spends 3 days moving from the oviduct to the uterus
- A released mature ovum can survive for **24 hours**
- Sperms can stay in the female's body for about **3 days**

OVULATION

- This is the releasing of a mature ovum from the ovary
- It occurs at about 14 days from the first day of the last menstrual cycle
- An ovum is released every 4 weeks

MENSTRUATION

- This is the monthly flow of blood from the uterus through the vagina
- It recurs at about a month (4 weeks)
- The average length of menstrual cycle is 28 to 32 days
- Normal menstruation takes **3 to 4 days.**
- The first menstruation occurs at the onset of puberty

Importance of menstruation

- It prepares the uterus for implantation
- It prepares the body for pregnancy

Problems that may occur during menstruation

- Painful menstrual periods
- Heavy menstrual bleeding
- No menstrual bleeding

Conditions that cause missing menstrual periods (conditions that interrupt menstruation)

- Pregnancy or Conception or Fertilisation
- Breastfeeding
- Use of contraceptive (birth control) pills and injections
- Stress
- Menopause
- Strong fever
- Tobacco smoking

Menopause

- This is the time when menstruation stops permanently
- It generally occurs between the ages of 45 and 55
- It is confirmed when a woman misses her periods for 12 months

Care during menstruation

- Regular bathing
- Use tampons (sanitary pads to absorb blood)
- Visit health workers incase abnormalities are noted

PROCESSES INVOLVED IN DEVELOPMENT OF A BABY INSIDE THE WOMB

Fertilization	Zygote formation	Implantation	Childbirth

SEX DETERMINATION

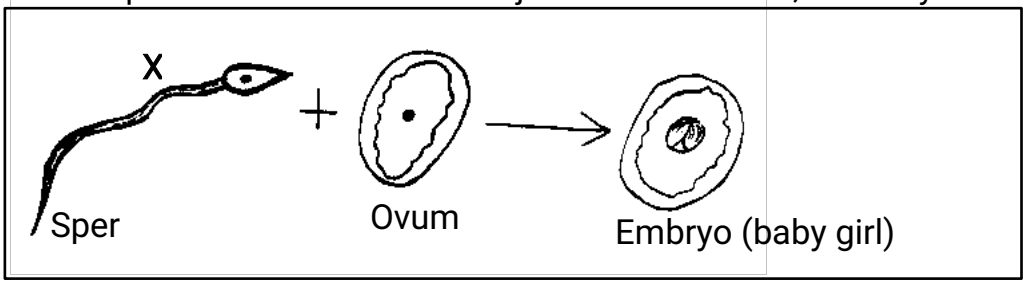
- The baby's sex is determined by **sex chromosomes in sperms**

Types of sex chromosomes

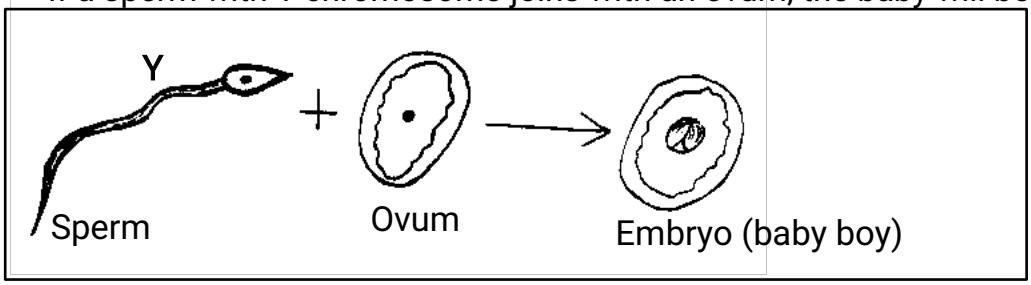
- X chromosome
- Y chromosome

All females have XX chromosomes
All males have XY chromosome.

- If a sperm with X chromosome joins with an ovum, the baby will be a girl



- If a sperm with Y chromosome joins with an ovum, the baby will be a boy



PREGNANCY (GESTATION PERIOD IN HUMANS)

- This is the time taken (period) from conception to birth
- Pregnancy in humans lasts for **9 months**

Signs of pregnancy

- Menstruation stops (missing the menstrual periods)
- Breasts enlarge (grow bigger)
- Frequent urination
- Morning sickness
- Belly enlarges

Danger signs of pregnancy

- Swollen feet
- Vaginal bleeding
- Severe vomiting

Problems that may occur during pregnancy

- Swollen feet
- Vaginal bleeding
- Severe vomiting
- Severe tiredness
- Severe headache
- Severe abdominal pain
- Severe anaemia
- Constipation
- Heartburn
- Backache
- Itchy breasts
- Difficult in seeing

Of what importance is the pregnancy test kit?

- For detecting pregnancy

Why do women prefer blood pregnancy tests to urine pregnancy tests?

- Blood tests detect pregnancy earlier than urine tests.

Why do pregnant women sometimes lick anthill soil?

- Due to lack of iron (due to iron deficiency)

REQUIREMENTS OF PREGNANT WOMAN (EXPECTANT MOTHER)

- Balanced diet (proper feeding)
- Antenatal care (prenatal care)
- Enough rest and sleep
- Appropriate clothing
- Regular body exercises
- Good personal hygiene

WAYS OF CARING FOR A PREGNANT WOMAN

- Feeding her on a balanced diet
- Taking her for antenatal care
- Encouraging her to do body exercises
- Helping her to do heavy work

FOOD FOR PREGNANT WOMEN

FOOD	FUNCTION
Proteins	▪ To build up body tissues of the foetus ▪ To repair worn out body tissues of the mother
Carbohydrates	▪ To provide energy to the mother's body
Vitamins	▪ To keep their body healthy ▪ To boost the mother's immunity
Roughage	▪ To prevent constipation
Iron	▪ To form blood ▪ To prevent anaemia
Calcium	▪ To strengthen bones

ANTENATAL CARE (PRE-NATAL CARE)

This is the treatment and education given to a pregnant woman at health centre

- **Ante** means **before**
- **Natal** means **birth**

Antenatal visit (prenatal visit)

- This is a visit made by a pregnant woman to the health centre

Services provided during antenatal visits (examples of antenatal care)

- Immunizing pregnant women with TT vaccine
- Monitoring the foetal growth and position in the womb
- Teaching pregnant women how to prepare for delivery (childbirth)
- Teaching pregnant women how to keep themselves clean
- Teaching pregnant women how to care for a newborn baby
- Treating some STIs when detected

Why are pregnant women immunized with TT vaccine (Tetanus Toxoid vaccine)?

- To protect the mother and her baby against tetanus during birth

POSTNATAL CARE (PNC)

- This is care given to the mother and her newborn baby up to six weeks after birth

Postnatal visit

- This is any visit made by a mother with her newborn baby to a clinic up to six weeks after birth

Services provided during postnatal visits (examples of antenatal care)

- Immunizing the baby
- Checking the mother's recovery after birth
- Reminding the mother to keep the baby warm

RESPONSIBILITIES OF FAMILY MEMBERS TO A PREGNANT MOTHER

- Giving her medical care
- Feeding her on a balanced diet
- Advising her to do body exercises
- Advising her to wear maternity clothes
- Helping her to do heavy work
- Giving her encouragement

WAYS OF PREPARING FOR CHILD BIRTH

- Buying new clothing
- Buying new beddings
- Buying mama kit
- Saving money for emergency/transport

NEEDS FOR THE PREGNANT WOMAN DURING DELIVERY

- Mama kit
- Cotton cloth

- Money for transport (emergency)
- Soap
- Basin
- Food and water
- Baby clothing
- Clean towel

MAMA KIT

- This is a set of things needed by a pregnant woman for clean and safe delivery

Examples of mama kit (Things needed by a mother for clean and safe delivery)

- Cotton wool
- Soap
- Surgical gloves
- Razor blade
- Disinfectant
- Plastic sheet (mackintosh)
- Cord ligature
- Sanitary pads

TEENAGE PREGNANCY

- This is the pregnancy got by a girl aged between 13 and 19 years
- This is the pregnancy in girls under the age of 20
- It is also called **adolescent pregnancy**

Who is a teenager?

- This is a person aged between 13 and 19 years

Causes of teenage pregnancy (adolescent pregnancy)

- Peer pressure
- Rape
- Premarital sex
- Drug abuse
- Lack of parental care
- Forced marriage
- Desire for luxury goods (greed for money)
- Poverty at home
- Unfulfilled promises by parents
- Lack of sex education

Effects (outcomes or consequences) of teenage pregnancy

- Dropping out from school (loss of school education)
- Rejection by parents
- Lack of financial support
- Obstructed labour

Due to contracted/small pelvis

- Difficulty in delivery

Due to contracted/small pelvis

- Attempt to have abortion
- Isolation by friends

Prevention of teenage pregnancy

- Avoid premarital sex
- Avoid bad peer groups
- Seek advice from elders
- Avoid gifts for sex
- Avoid bad touches
- Attend sex education

YOUNG PARENTS

- These are young girls and boys who give birth before the age of consent.

Young mother

- This is the girl who gives birth before the age of consent

Young father

- This is a boy who gives birth before the age of consent

Problems faced by young parents

- Lack of skills to manage the family
- Lack of financial support
- Isolation by friends
- Dropping out from schools
- Ignorance about caring for the baby
- Risks of abortion
- Risks of getting STDs
- Obstructed labour

CHILDBIRTH AND LABOUR

CHILDBIRTH

- This is the act of producing a baby in human beings

Methods of childbirth (delivery)

- Vaginal delivery
- Cesarean delivery

LABOUR

- This is the process by which the foetus and placenta leave the uterus

What is the normal birth weight?

- Between 2.5 kg and 4 kg

What is the average birth weight?

- 3.5 kg

Name the hormone which facilitates labour and childbirth

- Oxytocin

Why does a baby cry directly after birth?

- Due to cold air and the new environment

Why is it importance for a baby to cry after birth?

- It cleans and opens the breathing system

Why are babies sometimes held upside down by the legs after birth?

- To induce cry which cleans and opens the breathing system

MULTIPLE BIRTHS

- This is when a mother delivers two or more babies in a single birth

Forms (examples) of human multiple births

- Twins
- Triplets
- Quadruplets
- Quintuplets
- Sextuplets

TWINS

- These are two babies born by the a mother in a single birth
- It is the most common form of human multiple births

TYPES OF TWINS

- Identical twins/monozygotic twins
- Fraternal twins/dizygotic twins
- Siamese twins/conjoined twins

IDENTICAL TWINS

- These occur when a fertilized egg splits and develops into two babies

Features (characteristics) of identical twins

- The babies share the same placenta
- The babies are the same sex
- The babies look very alike
- The babies share the same DNA

FRATERNAL TWINS (DIZYGOTIC TWINS)

- These occur when two eggs are fertilized by two separate sperms.

Features of fraternal twins

- Each baby has its own placenta
- The babies can be the same sex or different sexes

SIAMESE TWINS

- These occur when a fertilised egg partially divides into two babies
- Most siamese twins are still births or die shortly after birth

Features of siamese twins

- The babies are born physically connected to each other
- The babies may share some organs

Factors that increase the chances of having twins

- Use of fertility drugs
- Heredity
- High number of previous pregnancies
- Old age of the mother

Problems faced by families with many children

- Poor feeding (lack of balanced diet)
- Lack of parental care towards children
- Poor education for children
- Lack of proper medical care
- Lack of clothes for children

Reasons why some families have many children (causes of frequent births)

- Desire for a certain sex of a child
- To provide labour in the family
- Ignorance about family planning methods
- High death rate of infants (high infant mortality rate)
- For prestige
- For security

Problems faced by the mother due to frequent births

- Maternal anaemia
- Miscarriage
- Premature births
- Underweight babies
- Rapture of the uterus during birth

INFANT MORTALITY

- This is the death of a child under one year of age

Causes of high infant mortality rate

- Childhood immunisable diseases
- Malnutrition
- Malaria
- Birth defects
- Premature births

Ways of reducing infant mortality rate

- Immunize infants
- Get antenatal and postnatal care
- Practise family planning
- Provide ORS to prevent dehydration in infants
- Practise exclusive breastfeeding
- Participate in health education

CHILD SPACING

- This is the giving of enough time between the births of children in a family.

Advantages of child spacing

- It helps a child to get enough parental care and love
- It enables the child to get enough basic needs
- It allows the mother's uterus to rest and recover after birth
- It helps the mother to keep healthy

FAMILY PLANNING

- This is the use of birth control methods to decide when to have or not to have a child in a family
- It depends on birth control (contraceptive) methods

Birth control (contraception)

- This is the way of preventing pregnancy or conception

ADVANTAGES OF FAMILY PLANNING (REASONS WHY PEOPLE PRACTISE FAMILY PLANNING)

To the family

- It enables a family to have a limited number of children
- It promotes saving in the family
- It promotes child spacing

To the mother

- It prevents frequent births
- It reduces risks of maternal death

- It allows the mother's uterus to rest and recover after birth
- It reduces the risks of miscarriages and abortion

To the baby/child
- It enables the child to get enough parental care and love
- It enables the child to get enough basic needs

To the country
- It controls rapid population growth

CHALLENGES FACED BY FAMILY PLANNING IN UGANDA
- Poverty
- Myths and misconceptions about family planning
- Ignorance about family planning methods
- Religious teachings against family planning

Write "FPAU" in full
- Family Planning Association of Uganda

Functions of FPAU
- It educates people about family planning
- It distributes contraceptives/birth control devices
- It performs legal abortions at free of charge (incase a woman has Rubella)

FAMILY PLANNING METHODS (METHODS OF BIRTH CONTROL)
- Natural Methods
- Artificial methods

NATURAL BIRTH CONTROL METHODS (NATURAL METHODS OF FAMILY PLANNING)
- Withdrawal method (coitus interrupts)
- Exclusive (prolonged) breast feeding/Lactational Amenorrhoea Method(LAM)
- Rhythm method (calendar method)
- Cervical mucus method
- Basal body temperature method

} Periodic abstinence methods

Advantages of natural family planning methods
- They are cheap to use
- They have no side effects

Disadvantages of natural family planning methods
- They are unreliable (they are less effective)
- They need complete cooperation of the husband and wife
- They are difficult for women with irregular menstrual cycle
- Only skilled women can use some of the natural methods

How does breastfeeding prevent pregnancy?
- By delaying ovulation

Rhythm method (calendar method)
- This is the use of ovulation calendar to predict the fertile days of a woman
- Ovulation occurs at about 14 days from the first day of the last menstrual cycle

A diagram showing ovulation calendar



Of what importance is an ovulation calendar to a married woman?

- It helps a woman to predict her fertile days

ARTIFICIAL BIRTH CONTROL METHODS (ARTIFICIAL METHODS OF FAMILY PLANNING)

ARTIFICIAL BIRTH CONTROL METHODS	HOW IT PREVENTS PREGNANCY
Use of condom (male and female condoms)	It traps sperms from reaching the vagina
Use of birth control/contraceptive pills	They prevent ovulation
Use of birth control/contraceptive injections	
Use of IUD or **IUCD** or **loop** or **coil** IUDs are often T-shaped	It prevents implantation It prevents fertilization
Use of diaphragm	It prevents sperms from entering the uterus
Use of cervical cap	It prevents sperms from entering the uterus
Use of implant	It produces a hormone which prevents sperms from reaching the egg
Use of spermicides (foams, gels and creams)	They kill sperms
Use of vaginal ring	It produces hormones which prevents ovulation It thickens cervical mucus to prevent sperms from reaching an egg
Permanent birth control methods	
Vasectomy This is when the sperm ducts are cut and tied	It blocks the passage of sperms through the sperm ducts
Tubal ligation This is when the oviducts are cut and tied	It blocks the passage of sperms and eggs through the oviducts

Which artificial family planning method prevents both pregnancy and STDs when used correctly?

- Use of condoms

Why should the male and female condoms not be used at the same time?

- They can break due to friction

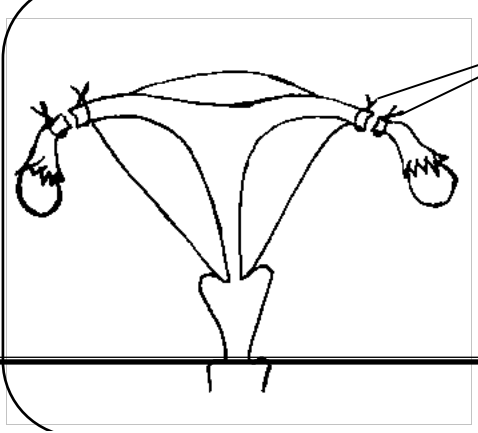
ADVANTAGES OF ARTIFICIAL FAMILY PLANNING METHODS

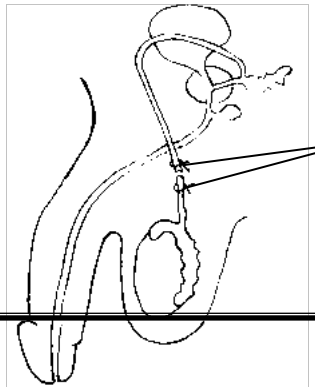
- They are very effective
- They are easy to use
- They are commonly available

DISADVANTAGES OF ARTIFICIAL PLANNING METHODS

- They have side effects e.g amenorrhoea (absence of periods)
- They are expensive to use
- Some of them need supervision of health worker
- Permanent birth control methods are irreversible (cannot be reversed)
- Permanent birth control methods are painful

DIAGRAMS SHOWING TUBAL LIGATION AND VESECTOMY

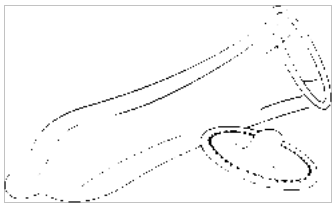
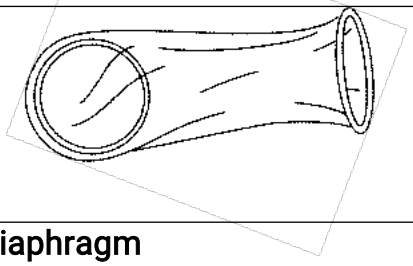
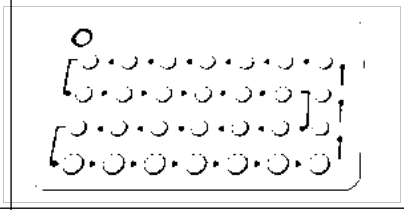
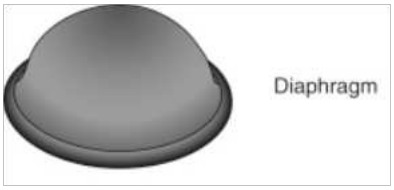
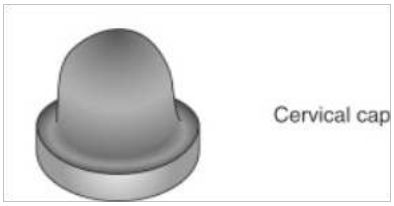
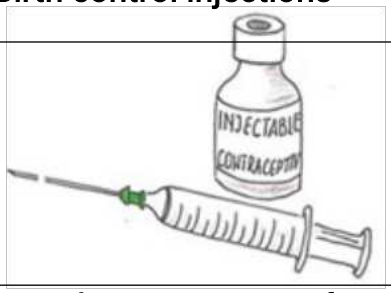




EXAMPLES OF CONTRACEPTIVE/BIRTH CONTROL DEVICES

- Condom
- Contraceptive injection (birth control injection)
- Intrauterine device (IUD)/Intra uterine contraceptive device (IUCD)
- Contraceptive pill (birth control pill)
- Implant

Diagrams showing contraceptive devices

Male condom	Female condom	Birth control pills
		
Vaginal ring	**Diaphragm**	**Cervical cap**
		
Birth control injections	**Intrauterine device (IUD)**	**Spermicides**
		

State the importance of Emergency contraception pill

- It is used to prevent pregnancy after sex

Factors that can lead to use of Emergency contraception pill

- Playing sex without any contraception
- Breaking of the condom when playing sex

MYTHS AND MISCONCEPTION ON CONTRACEPTIVES AND FAMILY PLANNING

- **Misconception** is a wrong idea
- **Myth** is a commonly held false belief

MYTH: Birth control is 100% effective
Fact: IUDs are the most effective with 99.8%

MYTH: A woman cannot get pregnant when breastfeeding
Fact: Breastfeeding is between 75% - 88% effective and so you can get pregnant

MYTH: Birth control pills increase the risk of cancer
Fact: They reduce the risk of ovarian cancer
MYTH: Birth control pills cause infertility
Fact: They don't cause infertility but preserve fertility by preventing PID

MYTH: Emergency contraception pill is the same as abortion pill

Fact: It only stops pregnancy before it starts but cannot end pregnancy which has already started

MYTH: A male condom can get lost in the vagina or uterus and move through a woman's body
Fact: If a condom slips, it will go no further than the vagina and is easily removed without surgery

MYTH: Condoms are not effective in preventing pregnancy and STIs
Fact: They prevent pregnancy and STIs when used correctly

MYTH: Vasectomy makes a person impotent
Fact: It does not affect your ability to erect

MYTH: IUDs prevent pregnancy by causing abortions.
Fact: They work by preventing fertilization

MYTH: A woman cannot get pregnant if she doesn't have orgasm
Fact: Ovulation occurs whether a woman has orgasm or not and so she can get pregnant

MYTH: A woman cannot get pregnant if she plays sex during her periods
Fact: Ovulation can occur earlier than expected and fertilization takes place

MYTH: A woman cannot become pregnant on her first time to have sex
Fact: A woman can get pregnant any time ovulation occurs

MYTH: A woman cannot get pregnant if she douches/bathes/urinates after sex
Fact: Urinating/bathing/douching does not stop sperms that have already entered the uterus

MYTH: A woman cannot get pregnant if she plays sex while standing up or when she is on top
Fact: Positions during sex don't affect fertilization and so she can get pregnant

MYTH: Birth control pills make women to grow beards
Fact: Women grow beards due to high levels of androgen

MYTH: All contraceptive methods are appropriate for all women
Fact: Some factors must be considered to choose an appropriate contraceptive method

SEXUALLY TRANSMITTED DISEASES (STDs)/SEXUALLY TRANSMITTED INFECTIONS (STIs)/VENEREAL DISEASES (VDs)

- These are diseases/infections that spread through playing unprotected sex with an infected person

Examples of STDs/STIs/VDs (DISEASES THAT AFFECT THE REPRODUCTIVE ORGANS)

Bacterial STDs	Viral STDs
▪ Gonorrhoea ▪ Syphilis ▪ Chancroid ▪ Chlamydia ▪ Lymphogranuloma venereum (LGV)	▪ AIDS ▪ Cervical cancer ▪ Genital warts ▪ Genital herpes ▪ Hepatitis B
Fungal STD	**Protozoan STD**
▪ Candidiasis	▪ Trichomoniasis

INCUBATION PERIOD OF A DISEASE

- This is the time taken from exposure to germs until the first signs and symptoms

appear

GONORRHOEA

- It is caused by the bacterium called **Neisseria gonorrhoeae**
- It mainly affects the **urethra**
- Its incubation period is **1 to 14 days**
- Most men become symptomatic within **2 to 5 days** after exposure
- Most women are asymptomatic (have no symptoms)

How does gonorrhoea spread?

- Through playing unprotected sex intercourse with an infected person
- From the infected mother to the baby during childbirth

SIGNS AND SYMPTOMS OF GONORRHOEA

Signs in men

- Pus-like discharge from the penis
- Swollen testicles
- Swollen foreskin

Symptoms in men

- Painful urination
- Pain in the testicle

Signs in women

- Pus-like discharge from the vagina
- Vaginal bleeding between periods

Symptoms in women

- Painful urination
- Abdominal pain

Effects/dangers of untreated gonorrhoea

- It leads to infertility
- It causes blindness in newborn babies
- It causes PID (pelvic inflammatory disease)

How does untreated gonorrhoea cause sterility in males and females?

- **Males:** It blocks the epididymis
- **Females:** It blocks the oviducts

Prevention and control of gonorrhea

- Abstain from sex
- Be faithful to your sexual partner
- Condoms use when playing sex
- Early treatment of infected ones

Why should a husband and his wife go together for treatment when gonorrhoea is detected?

- To prevent re-infection

SYPHILIS

- It is caused by the bacterium called **Treponema pallidum**
- Its incubation period is **14 to 21 days** after exposure

How does syphilis spread?

- Through playing unprotected sex with an infected person
- Through infected blood transfusion
- From the infected mother to her unborn baby

SIGNS AND SYMPTOMS OF SYPHILIS AT VARIOUS STAGES

Primary stage

- Chancre on the penis, vagina, or mouth

Chancre is a painless sore formed during the primary stage of syphilis

Secondary stage

- Sore throat
- Swollen lymph nodes
- Skin rash on palm of hands and soles of feet
- Patchy hair loss

Latent stage

- Syphilis remains active but with no signs and symptoms
- It can only be detected with a blood test

- If syphilis is untreated at this stage, a person continues to have it for years

Tertiary stage

It occurs when a person spends 10 to 30 years with untreated syphilis

It starts to affect the internal organs

- Brain damage
- Deafness
- Numbness
- Heart diseases
- Stroke

Effects of untreated syphilis

- It leads to madness/insanity
- It leads to deafness
- It causes paralysis
- It leads to heart diseases
- It leads to stillbirths
- It leads to loss of body feeling

Prevention and control of syphilis

- Abstain from sex
- Be faithful to your sexual partner
- Condoms use when playing sex
- Early treatment of infected ones

CHLAMYDIA

- It is caused by a bacterium called **Chlamydia trachomatis**
- Its incubation period is **7 to 21 days** after exposure

How does chlamydia spread?

- Through playing unprotected sex intercourse with an infected person
- From the infected mother to the baby during childbirth

Signs of chlamydia

- Discharge from vagina or penis
- Swollen testicles
- Vaginal bleeding between periods

Symptom of chlamydia

- Painful urination
- Pain in the testicles
- Painful sex

Effects/dangers of untreated chlamydia

- It leads to infertility
- It causes blindness in newborn babies
- It increases the risks of ectopic pregnancy

Prevention and control of chlamydia

- Abstain from sex
- Be faithful to your sexual partner
- Condoms use when playing sex
- Early treatment of infected ones

CHANCROID

- It is caused by bacteria
- Its incubation period is **3 to 7 days** after exposure

How does chancroid spread?

- Through playing unprotected sex intercourse with an infected person
- Through contact with pus from the genital ulcer of an infected person

Signs of chancroid

- Genital ulcer (bubo)
- Swollen lymph nodes

Symptoms of chancroid

- Painful genital ulcer
- Painful lymph nodes
- Painful sex

Effects of untreated chancroid

- It leads to nonhealing genital ulcer
- It causes permanent scars on the genitals

Prevention and control of chancroid

- Abstain from sex
- Be faithful to your sexual partner

- Condoms use when playing sex
- Early treatment of infected ones

TRICHOMONIASIS
- It is caused by protozoan parasite called **Trichomonas vaginalis**
- Its incubation period is **5 to 28 days** after exposure

How does trichomoniasis spread?
- Through playing unprotected sex intercourse with an infected person

Signs of trichomoniasis
- Vaginal discharge with fishy smell
- Redness of the genitals
- Discharge from penis

Symptoms of trichomoniasis
- Itching in the vagina or penis
- Painful urination
- Abdominal pain
- Painful sex

Effect of untreated trichomoniasis
- It increases the risks of getting HIV

Prevention and control of trichomoniasis
- Abstain from sex
- Condoms use when playing sex
- Be faithful to your sexual partner
- Early treatment of infected ones

HEPATITIS B
- It is caused by a virus called **hepatitis B virus (HBV)**
- Its incubation period is **75 days** on average
- It affects the liver

How does hepatitis B spread?
- Through playing unprotected sex with infected person
- Through sharing contaminated needles with an infected person
- Through body contact with infected body fluids
- From the mother to her baby during birth

Signs of hepatitis B
- Dark urine
- Vomiting
- Jaundice (the skin and white of the eye turn yellow)

Prevention and control of hepatitis B
- Immunize with Hep B vaccine
- Use condoms during sex
- Never share needles with an infected person
- Use latex gloves during fisting or fingering

CERVICAL CANCER
- It is caused by a virus called **human papillomavirus (HPV)**
- It attacks the cervix
- Its incubation period is **15 to 20 years** after exposure

How does cervical cancer?
- Through playing unprotected sex intercourse with an infected person

Signs of cervical cancer
- Smelly vaginal discharge
- Frequent urination
- Bleeding between periods

Symptom of cervical cancer
- Painful urination
- Pain in the pelvis

Effects of untreated genital warts
- It increases the risk of getting HIV
- It causes abnormal urine flow in men

Why do health workers carry out “Pap smear” test?
- To diagnose cervical cancer

Prevention and control of cervical cancer

- Immunize girls with HPV vaccine
- Abstain from sex
- Be faithful to your sexual partner
- Condoms use when playing sex
- Through surgery
- Through radiation therapy

GENITAL WARTS

- It is caused by a virus called **human papillomavirus (HPV)**
- Its incubation period is **2 to 3 months** after exposure

How does genital warts spread?

- Through playing unprotected sex intercourse with an infected person
- Through direct skin to skin contact (handshakes or hugs) with an infected person

Signs of genital warts

- Bumps around the penis or vagina
- Bleeding from the penis or vagina

Symptom of genital warts

- Itching of the vagina or penis
- Itchy anus

Effects of untreated genital warts

- It increases the risk of getting HIV
- It causes abnormal urine flow in men

Prevention and control of genital warts

- Abstain from sex
- Be faithful to your sexual partner
- Condoms use when playing sex
- Early treatment of infected ones
- Immunisation with HPV vaccine

GENITAL HERPES

- It is caused by a virus called **herpes simplex virus (HSV)**
- Its incubation period is **2 to 12 days** after exposure
- Genital herpes **has no cure**

How does genital warts spread?

- Through playing unprotected sex intercourse with an infected person
- Through direct skin to skin contact with an infected person

Signs of genital herpes

- Sores on the penis or vagina

Symptom of genital herpes

- Itching of the penis or vagina
- Painful urination

Prevention and control of genital herpes

- Abstain from sex
- Be faithful to your sexual partner
- Do not play sex during herpes outbreak, even with a condom. Some sores may not be covered by the condom

CANDIDIASIS

- It is caused by a yeast/fungus called **Candida**
- Its incubation period is **2 to 5 days** after exposure

How does candidiasis spread?

- Through playing unprotected sex with an infected person
- When we fail to clean our genitals after playing sex

Signs of candidiasis

- Swelling of the penis or vagina
- A thick white vaginal discharge
- Sores on the penis or vagina

Symptoms of candidiasis

- Itching of penis or vagina
- Painful urination
- Painful sex

Prevention and control of candidiasis

- Abstain from sex
- Be faithful to your sexual partner

- Avoid extra marital sex
- Keep the vagina clean and dry
- Don't douche
- Avoid tight underwear
- Observe proper personal hygiene
- Wash the vagina with lemon leaves put in warm water
- Wipe from front to back after using a toilet
- Avoid sharing underwear with an infected person

Mention the two STIs prevented by HPV vaccine

- Cervical cancer
- Genital warts

Mention the two STIs that can cause infertility if untreated

- Gonorrhoea
- Chlamydia

Mention the two STIs that can cause blindness in newborn babies

- Gonorrhoea
- Chlamydia

AIDS

- It is caused by a virus called **human immunodeficiency virus (HIV)**
- HIV affects the circulatory system, mainly the white blood cells
- HIV can only survive in the human body
- The incubation period of HIV is **1 to 4 weeks**

Write AIDS in full

- Acquired Immune Deficiency Syndrome

Give the meaning of each word in the full form of AIDS

- **Acquired:** got from (A person gets infected with it)
- **Immune Deficiency**: lack/weakness of immune system
- **Syndrome**: group/collection of signs and symptoms

OR

- **Acquired:** Got from
- **Immune**: Protected against
- **Deficiency**: Lack of
- **Syndrome**: group of signs and symptoms

Why can't HIV (AIDS virus) spread through mosquito bites?

- HIV is destroyed in the digestive system of a mosquito
- HIV is destroyed by the enzymes in the digestive system of a mosquito

Mode of transmission of HIV (how does AIDS spread?)

- Through playing unprotected sex with an infected person
- Through sharing sharp objects (e.g needles) with an infected person
- Through infected blood transfusion
- From an infected mother to the baby during birth or breastfeeding
- Through artificial insemination with semen from infected person
- Through a donated body organ from an infected donor

HIV STATUS

- A persons HIV status can either be **negative** or **positive**
- Antibody tests detect HIV in 3 months while rapid HIV tests detect HIV in about 20 minutes

HIV negative

- This means that a person does not have HIV

HIV positive

- This means that a person has HIV

How long does it take for most HIV tests to detect HIV?

- 3 months (90 days) after exposure

How does AIDS differ from HIV?

- AIDS is a disease while HIV is a germ

What is the difference between HIV positive person and HIV negative person?

- HIV positive person has HIV while HIV negative person does not have HIV

What is the difference between HIV positive person and AIDS patient?

- HIV positive person has not yet developed signs and symptoms while AIDS patient has signs and symptoms

Note

- Both AIDS patients and HIV positive persons can spread HIV

Why do people go for HIV test before marriage?

- To know their HIV status
- To prevent the spread of AIDS
- To prevent marriage in case one person is HIV positive

What does a red ribbon symbol mean about HIV/AIDS?

- For awareness and support to people living with HIV/AIDS (For the solidarity of people living with HIV/AIDS)

CONCORDANT COUPLE

- This is when both partners are HIV infected

DISCORDANT COUPLE

- This is when one partner is HIV infected and the other is not

How to prevent HIV transmission within a discordant couple

- Use condoms during sex
- HIV negative partner should use PrEP
- HIV positive partner must take ARVs daily

BODY FLUIDS IN WHICH HIV CAN SPREAD

- Blood
- Semen
- Vaginal fluids
- Breast milk

BODY FLUIDS IN WHICH HIV CANNOT SPREAD

- Tears
- Saliva
- Urine
- Sweat

SOCIAL PRACTICES THROUGH WHICH AIDS VIRUS (HIV) CANNOT SPREAD

- Hugging AIDS patient
- Shaking hands with AIDS patient
- Sharing latrines with AIDS patient
- Sharing utensils with AIDS patient
- Sharing bedding with AIDS patient
- Touching AIDS patient
- Sitting close to AIDS patients
- Washing clothes of AIDS patient
- Normal kissing AIDS patient

Why can't HIV/AIDS spread through the practices mentioned above?

- There is no mixing of blood

Practices that lead to easy spread of AIDS (habits that increase risks of HIV transmission)

- Sharing wives
- Inheriting widows
- Unscreened/Infected blood transfusion
- Massive circumcision with one knife
- Tribal tattooing
- Blood pacts
- Polygamy
- Prostitution
- Extra marital sex
- Premarital sex
- Unprotected casual sex
- Tribal tooth extraction
- Communal jigger extraction
- Ear and nose piercing

SIGNS AND SYMPTOMS OF AIDS

Signs of AIDS

- Skin rash/herpes zoster
- Rapid weight loss
- Severe night sweats
- Oral thrush (white coating in mouth)
- Chronic dry cough
- Chronic diarrhoea
- Sores on the mouth

Symptoms of AIDS

- General body weakness (tiredness)
- Chronic fever
- Loss of appetite

Conditions mistaken for AIDS

- Alcoholism
- Malnutrition

Diseases mistaken for AIDS

- Tuberculosis
- Typhoid
- Measles
- Skin cancer

EFFECTS OF HIV/AIDS TO;

An Individual

- It leads to loss of immunity
- It leads to loss of jobs (income)
- It leads to restricted movement to some countries
- It leads to much worry
- It leads to death

Family

- It leads to poverty in a family
- It leads to divorce
- It leads to stigma towards family members
- It reduces family labour force
- It increases orphans

Community

- It leads to loss of important people
- It leads to labour force
- It increases child headed families
- It reduces the population

PREVENTION AND CONTROL OF HIV/AIDS

- Abstain from sex
- Avoid sharing sharp objects with an infected person
- Be faithful to your sexual partner
- Use condoms during sex
- Taking PrEP or PEP to prevent getting HIV
- AIDS patients should take ARVs
- HIV positive women should not breastfeed
- Only screened blood should be used for transfusion
- HIV positive person should not donate blood
- Sterilize sharp medical instruments before use
- Consider male circumcision to reduce the risk of getting HIV

Mention two medicines given to HIV negative people to prevent getting HIV

- PrEP (pre-exposure prophylaxis)
- PEP (post-exposure prophylaxis)

PrEP is recommended for people with a high risk of getting HIV before exposure
PEP is recommended within 72 hours after exposure

Why are HIV negative people sometimes given PrEP or PEP?

- To prevent getting HIV

Write the following abbreviations in full

- **EMTCT:** Elimination of mother to Child Transmission of HIV
- **PMTCT**: Prevention of mother to Child Transmission of HIV

- **ARVs**: antiretrovirals
- **ART**: antiretroviral therapy
- **VHT**: Village Health Team
- **VCT**: Voluntary Counselling and Testing
- **HCT**: HIV Counselling and Testing

Why are AIDS patients advised to take ARVs?

- To reduce the risks of HIV transmission(to prevent them from spreading AIDS)
- To enable them live longer

How to prevent mother to child transmission of HIV

- Infected women should take ARVs during pregnancy
- Infected women should give birth from hospitals
- Infected women should practise bottle feeding

Importance of EMTCT and PMTCT program

- It prevents the infected mother from transmitting HIV to her babies
- EMTCT also prevents the transmission of syphilis from infected mother to the baby

GROUPS OF PEOPLE WITH A HIGH RISK OF GETTING HIV/AIDS

GROUP OF PEOPLE	REASON
Commercial sex workers (prostitutes)	They have many sexual partners They use sex to get money They are unable to have regular condom use
Barmaids	They can be forced into sex by drunkards They use sex to get money
Long distance truck drivers	They play casual sex to overcome lust They get female company to reduce stress while travelling
Health workers who care for AIDS patients	They can be stuck with contaminated needles
Alcoholics	They have unplanned and unprotected sex
Injection drug abusers	They share contaminated needles
Adolescent girls	They are sexually attractive They are vulnerable to rape They have peer groups

Why are the groups of people mentioned above recommended to take PrEP?

- To prevent them from getting AIDS

Reason why women are at a high risk of getting AIDS than men?

- They are sexually more attractive than men
- They are more vulnerable to rape than men
- They have more greed for material things (money) than men

WAYS OF CARING FOR AIDS PATIENTS

- Advising them to take ARVs
- Feeding them on a balanced diet
- Advising them to promote personal hygiene
- Counselling them
- Giving them company

HIV COUNSELLING

- This is the advice given to a person before or after HIV test by a trained person

Groups of trained people who provide HIV counselling

- Teachers
- Health workers
- Community leaders
- Religious leaders

Types of HIV counselling

- Pre-test HIV counselling
- Post-test HIV counselling

Importance of HIV counselling (importance of counselling AIDS patients)

- It prevents suicide
- It enables a person to overcome fear
- It enables a person to live longer and useful with HIV
- It enables a person to prevent spreading HIV/AIDS to others

ORGANIZATIONS IN UGANDA THAT HELP AIDS PATIENTS

Organization	Responsibilities
TASO (The AIDS Support Organization)	▪ It provides voluntary counselling and testing (VCT) ▪ It provides food supplements
AIC (AIDS Information Centre)	▪ It provides counselling
ACP (AIDS Control Program)	▪ It provides counselling ▪ It provides HIV testing
Uganda Cares	▪ It provides counselling ▪ It provides HIV testing
National AIDS Control Organization (NACO)	▪ It provides counselling ▪ It provides HIV testing

AIDS does not kill. What kills?

- Opportunistic infections (secondary infections)

SECONDARY INFECTIONS (OPPORTUNISTIC INOFECTIONS)

- These are infections that attack the body due to weak immune system

Examples of opportunistic (secondary) infections associated with HIV/AIDS

- Tuberculosis
- Candidiasis
- Pneumonia
- Meningitis

Ways of controlling opportunistic/secondary infections associated with HIV/AIDS

- Abstain from sex until marriage
- Be faithful to your sexual partner
- Use condoms during sex
- Avoid sharing sharp objects with infected person
- Avoid extra marital sex
- Learning more facts about HIV

URINARY TRACT INFECTIONS (UTIs)

- These are infections of the urinary system
- They are caused by bacteria called E. coli normally found in the intestines
- They usually occur in the urinary bladder and urethra
- They occur when bacteria from anus enter the urethra during sex

Why are UTIs very common in women?

- Their urethra is closer to the anus

Examples of Urinary Tract Infections (UTIs)

- Urethritis
- Cystitis

Signs of UTIs

- Smelly urine
- Frequent urination
- Bloody urine or cloudy urine
- Pus discharge from penis and vagina

Symptoms of UTIs

- Painful urination
- Pain during sex
- Pain in lower abdomen
- Fever

Effect of untreated UTIs

- They cause kidney infections

PELVIC INFLAMMATORY DISEASE (PID)

- This is an infection of the female reproductive organs

Causes of PID

- Untreated bacterial STDs (untreated gonorrhoea or chlamydia)
- Multiple sex partners

Signs of PID

- Abnormal bleeding after sex
- Abnormal menstrual bleeding
- Smelly vaginal discharge

Symptoms of PID

- Pain in lower abdomen
- Painful urination
- Pain during sex
- Fever

Dangers of untreated PID (effects of untreated STDs)

- Ectopic pregnancy
- Painful menstruation
- Infertility (sterility/barrenness)

How does untreated PID lead to infertility?

- It blocks the oviducts

GENERAL PREVENTION AND CONTROL OF STDs/STIs/VDs

- Abstain from sex until marriage
- Keep the genital parts clean
- Be faithful to your sexual partner
- Keep latrines clean
- Condom use during sex
- Immunisation with HPV vaccine
- Avoid sex when under the influence of drugs
- Always have along with your partner before sex

LIFE SKILLS TO SAFEGUARD AGAINST STDS

- Peer resistance
- Assertiveness
- Self-awareness
- Critical and creative thinking
- Self esteem
- Good decision making

PIASCY MESSAGES ABOUT ADOLESCENCE AND REPRODUCTIVE HEALTH

PIASCY

- This is a program that provides information on HIV/AIDS to school children and teachers

What does “PIASCY” stand for?

- Presidential Initiative on AIDS Strategy for Communication to Youth

Who initiated PIASCY program in Uganda?

- H.E Yoweri Kaguta Museveni (in 2002)

Objectives (aims) of PIASCY program

- To prevent the spread of HIV/AIDS
- To promote AIDS awareness

Importance of PIASCY messages

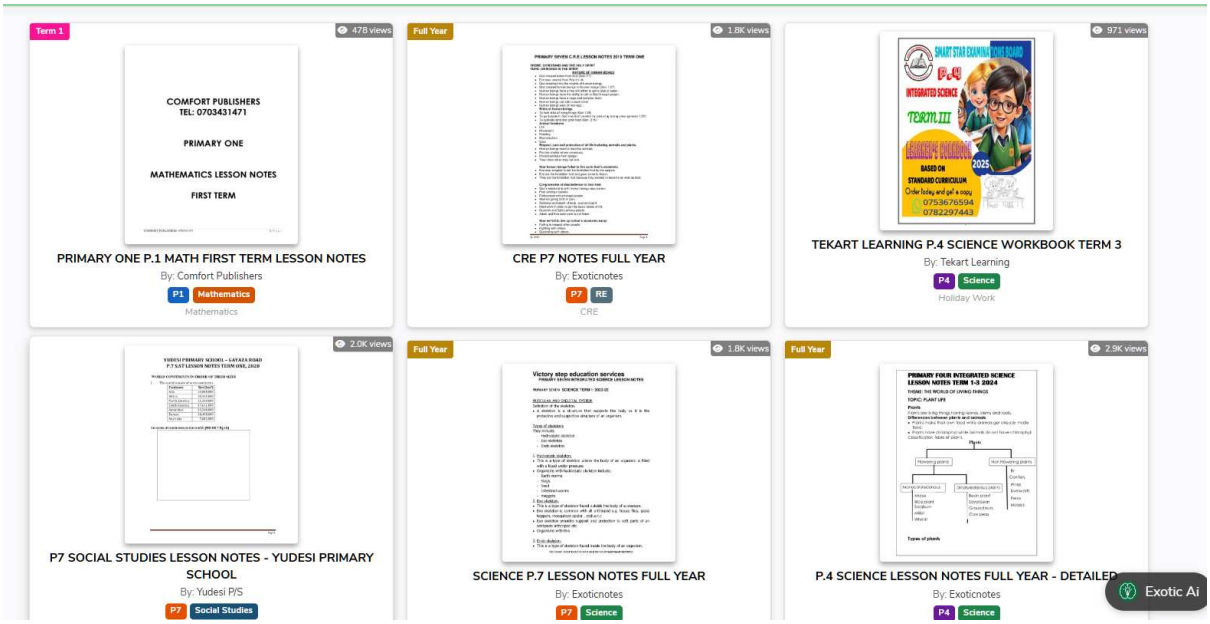
- They promote AIDS awareness
- They prevent the spread of HIV/AIDS
- They promote reproductive health
- They promote care for AIDS patients
- They prevent early pregnancy/teenage pregnancy (adolescent pregnancy)

EXAMPLES OF PIASCY MESSAGES FOR ADOLESCENTS

- Say no to sex (abstain from sex)
- Virginity is healthy
- Say no to early marriage
- Early sex affects reproductive system
- Avoid gifts for sex
- Stay Virgin
- HIV damages the immune system
- AIDS kills
- Avoid risks to stay safe
- AIDS has no cure
- Avoid bad touches
- Choose to delay sex
- Premarital sex is risky

- Follow your religion to stay safe
- Using violence to get sex is wrong
- Body changes at puberty are not signs to start sex
- Learn how AIDS is transmitted
- Avoid dark corners
- AIDS patients need care and support

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