TERM I P.6 SCIENCE LESSON NOTES

THE WORLD OF LIVINGTHINGS.

What living things are made up of:

1. All living things are made up of cells.
2. A cell is a basic (smallest) unit of a living organism.
3. Some living organisms are made up of one **cell** (unicellular)
4. Other living things are made up of **many cells** (multicellular).

Characteristics of living things.

1. The feed
2. They grow
3. The respire
4. They reproduce
5. They excrete – (get rid of body wastes)
6. They move
7. They respond to stimuli

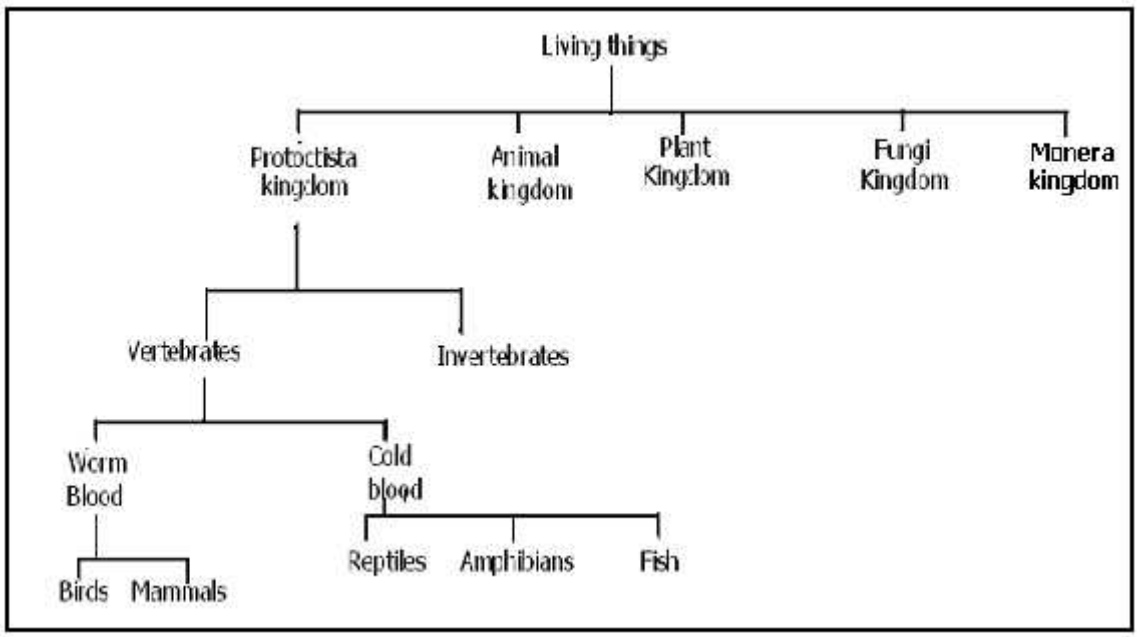
Classification of living things.

1. Classification means grouping of living things.
2. Living things have been classified into different kingdoms.

Namely;

a). Protoctista kingdom
b). Animal kingdom
c). Plant kingdom
d). Fungi kingdom
e). Monera Kingdom

3. These kingdoms can be further divided into smaller classes.



PROTOCTISTA KINGDOM

1. This kingdom contains single celled (unicellular) organisms.
2. Some of these organisms are plants and others are animals.

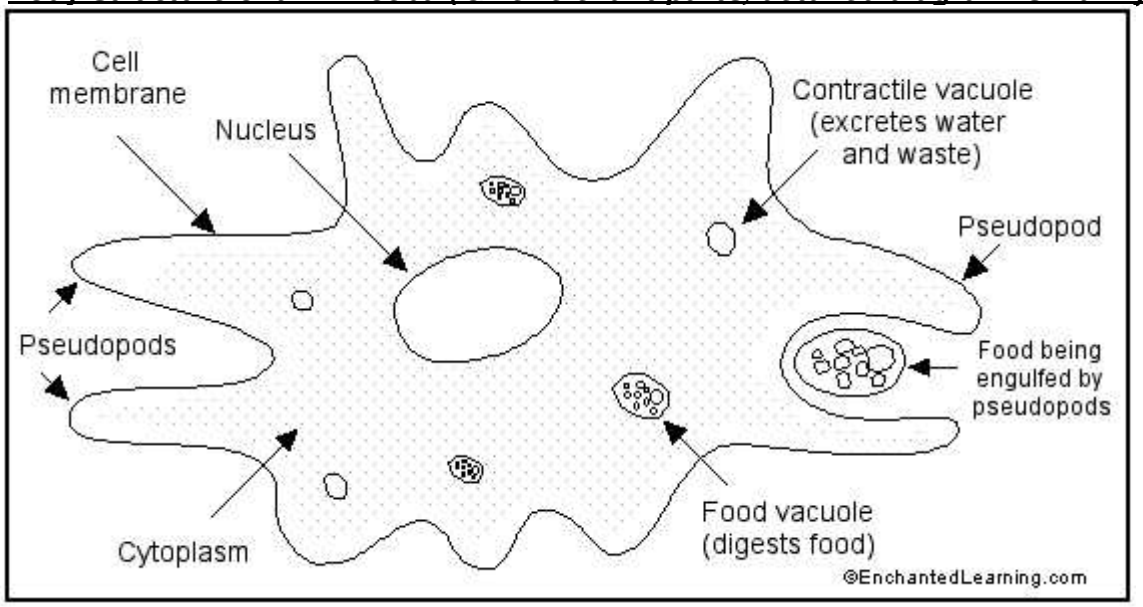
Unicellular animals (Protozoan)

Unicellular (single celled) animals are called **Protozoan**

Examples of protozoa

a) The amoeba
b) Paramecium.
c) Plasmodia.
d) Trypanosome

Body Structure of an Amoeba *(Give relevant parts, detailed diagram is mainly for tr's use)*



Characteristics of an Amoeba

It has an irregular body shape.(The body shape keeps changing)

Reproduction of an Amoeba.

It reproduces through binary fission (cell division).

Feeding in Amoeba

It feeds by engulfing and ingesting the food.

Where it lives.

Amoeba lives in ponds, ditches and other moist places.

Effects of protozoa.

a) Trypanosome causes sleeping sickness (Trypanosomiasis) in humans.
b) Trypanosome causes nagana in livestock.
c) Plasmodia causes malaria in humans.
d) Protozoa cause East coast fever, red water, heart water in cattle.
e) Amoeba causes amoebic dysentery.
f) Protozoa causes coccidiosis in goats, poultry, rabbits, etc.

ANIMAL KINGDOM.

Characteristics of animals.

a). They are multicellular.
b). The do not make their own food because the do not have chlorophyll.
c). They feed on other living organisms like plants and other animals.
d). Their cells have a cell membrane.

Classification of animals

The Animal kingdom is divided into two major groups namely:

a). Vertebrates
b). Invertebrates

VERTEBRATES.

1. Vertebrates are animals with a backbone (vertebral column)

Groups of vertebrates.

a) Mammals
b) Birds
c) Reptiles
d) Amphibians
e) Fish

2. Vertebrates are also classified into two:
   a) Warm blooded animals
   b) Cold blooded animals.

Warm blooded animals (homoeothermic)

These are animals with a constant body temperature.

Examples of warm-blooded animals.

a) Mammals
b) Birds.

Cold blooded animals(Poikilothermic)

These are animals whose body temperature changes according to the temperature of the surrounding.

Examples of cold-blooded animals.

a) Reptiles
b) Amphibians
c) Fish

Mammals.

Mammals are animals with mammary glands.

Characteristics of mammals.

a) Feed on young ones on milk from the mammary glands.
b) Their bodies are covered with hair (fur)
c) Most mammals produce live young ones.
d) They are warm blooded (hamoithermic)
e) They undergo internal fertilisation.
f) They breathe by means of lungs.
g) The heart is of four chambers.
h) They are warm blooded.
i) They have sweat glands

Characteristics that differentiate mammals from other vertebrates.

a). Feed their young ones on milk from the mammary glands.
b). Their bodies are covered with hair (fur)
c) Their hearts are divided into four chambers.

Groups of mammals.

a). Flesh eating mammals (carnivorous)
b). Hoofed mammals (ungulates)
c). Insect eating mammals (insectivous)
d). Gnawing mammals (Rodents)
e). Flying mammals (Chiroptera)
f). Sea mammals (Cetaceans)
g). Pouched mammals (Marsupials)
h). Egg-laying mammals (Monotremes)
i). Primates

Flesh eating mammals (Carnivores)

1. These are mammals that eat meat.
2. They are divided into cat and dog family.

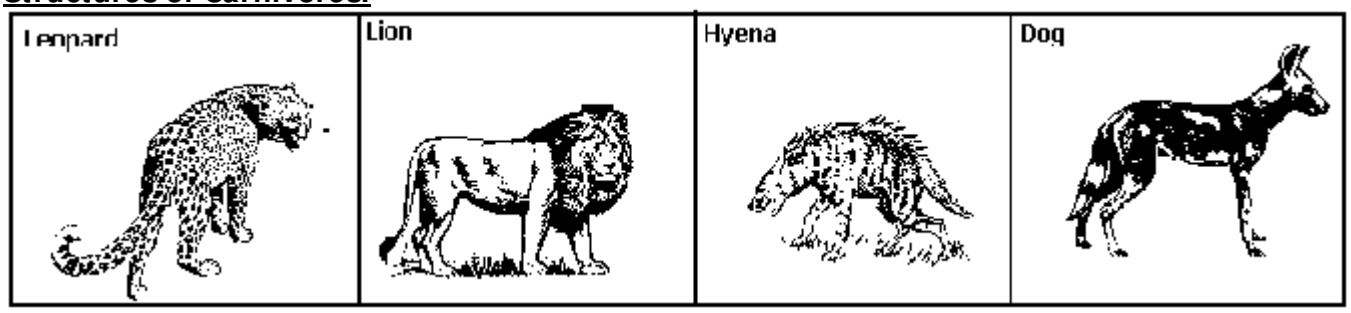
Examples of dog family

a) Hyena
b) Dog
c) Fox
d) Jackal

Examples of cat family

a) Leopard
b) Cheetah
c) Lion
d) Tiger
e) Domestic cat

Structures of Carnivores.



Adaptation of flesh eating mammals.

a). Have well developed canine teeth for tearing the flesh.
b). Have long sharp claws for gripping their prey.
c). Have a very good sense of smell and keen eye sight to enable them find their prey.

Advantages of carnivorous animals

a) They help us to hunt and kill pests.
b) Dogs are used to detect law breakers.
c) Dogs are used for security.

Disadvantages of carnivorous animals

a) some are predators to man and other animals.
b) Some can spread diseases to man. Eg. Rabid dog.

3. Fleshing eating mammals that do not hunt for their prey are called scavengers.

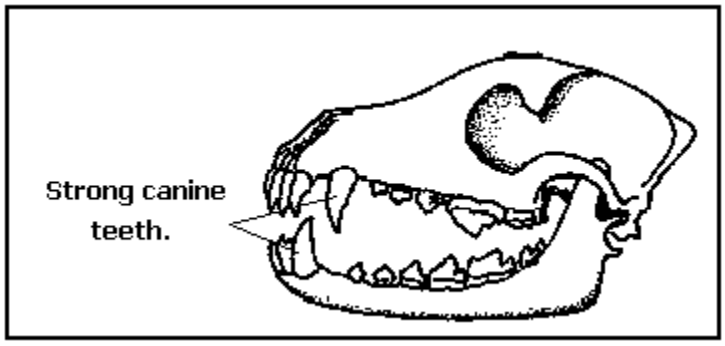
Examples of scavenging mammals.

a). Jackals
b). Hyena

Importance of scavengers.

They keep the surroundings clean by eating the remains of dead animals.

Jaw bone of a carnivore.



Hoofed mammals (Ungulates)

1. These are mammals with hooves.
2. Many ungulates are herbivores i.e feed on plant matter or vegetations.
3. Others feed on both grass and meat i.e omnivores e.g pig and man
4. They have broad and flat teeth for grinding leaves and grass.
5. Ungulates are divided into two groups.
   a). Ruminants

b). Non-ruminants

Characteristics of Ruminants
a) They chew cud.
b) They have four stomachs.

Examples of Ruminants.
a) Cows
b) Sheep
c) Bufallo
d) Camel
e) Goats

Non-Ruminants
These are animals that do not chew cud.

Characteristics of Non-Ruminants
a) They have only one stomach.
b) They do not chew cud.

Examples of Non-Ruminants
a) Elephants
b) Zebra
c) Horses.
d) Hippopotamus.

Hooves of ungulates.
a) Some are even toed and others are odd toed.

Even toed ungulates.
They have two toes on their feet.

Examples of even toed ungulates.
a). Cows
b). Goats
c). Sheep
d). Pigs

Odd toed ungulates.
1. They have an odd number of toes on their feet.

Examples of Odd toed ungulates.
a). Horses with one hoof
b). Elephants with three toes
c). Rhinos

Structures of Hooves of ungulates.

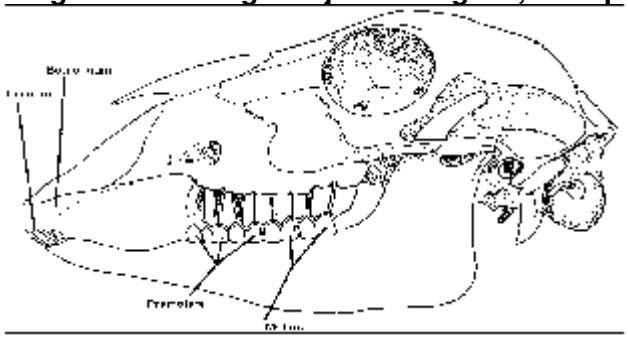
Importance of ungulates.

a) Ungulates are source of food.
b) Some are source of imcome and emplouyment.
c) Their dung is a source of biogas.
d) Some are used for transport.
e) Some are used for ploughing.
f) Their dung is used for manure.

Disadvantages of Ungulates.

Some are pests.
Some are dangerous to mar when mishandled.

Diagram showing the jaw of a goat, sheep and cow.



Insect eaters (insectivores)

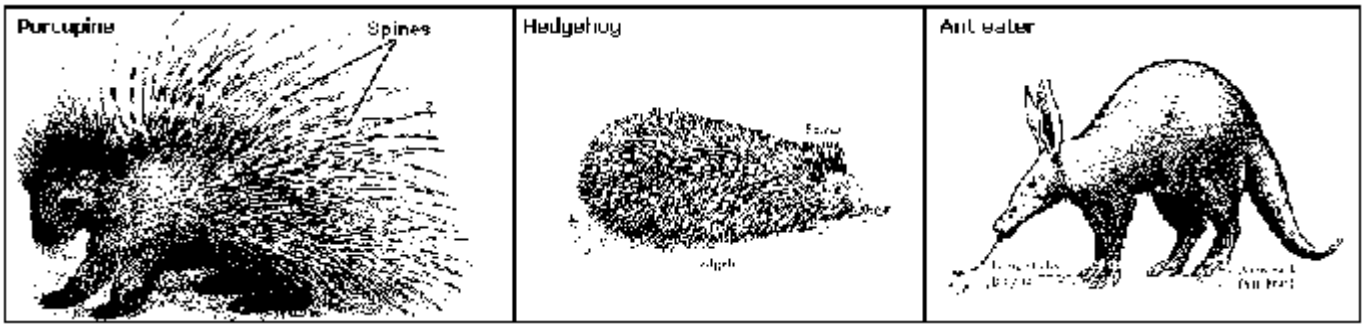
1. These mammals feed on insects.
2. The do not have teeth.
3. They have a sensitive snout to detect food.
4. They have strong blunt claws for digging the soil looking for food.
5. These mammals are nocturnal ie they hunt at night and not active during the day.

Examples of insectivores:

a). Ant bear (Aardvark)
b). Hedge hogs
c). Moles
d). Spiny ant eaters / porcupines
e) Pangolin

6. Hedge hogs and Porcupines are protected by the sharp spines on their backs.
7. An ant bear has a long sticky tongue for catching the insects.

Structures of insectivores



Advantages of Insectivores

a) They eat up disease vectors.
b) They control pests bby eating them.

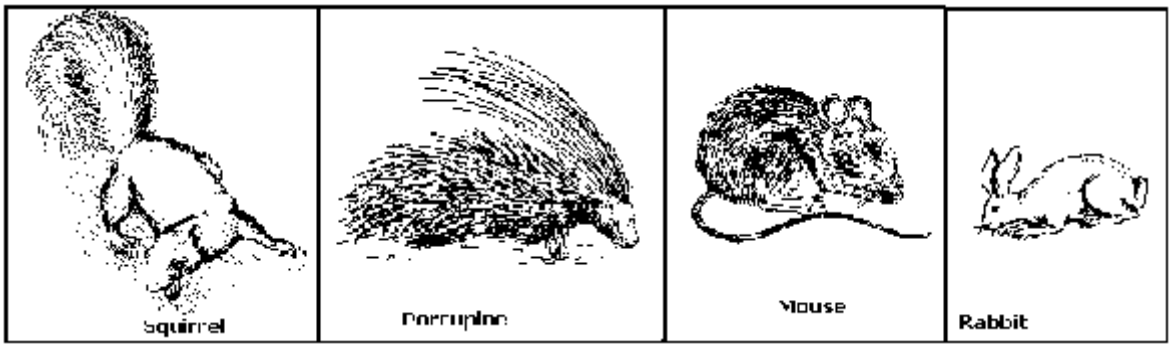
Gnawing mammals (Rodents).

1. These are mammals with well-developed incisors.
2. They have four sharp chisel-like teeth, which they use to chew rapidly.

Examples of gnawing mammals.

a). Rats / mouse
b). Rabbits
c). Mice
d). Squirrels
e). Hare
f). Guinea pig
g). Porcupine

Structures of Rodents.



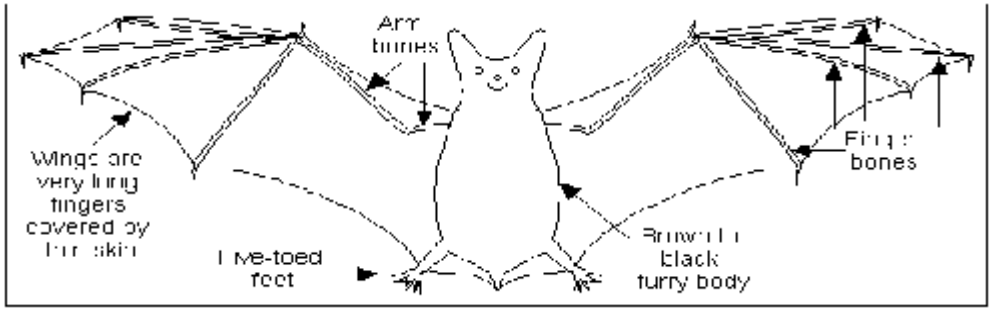
Chiroptera (flying mammals)

1. These are flying mammals.
2. Bats are the only true flying mammals.
3. They have a fold of skin attached to their fore limb which acts as a wing.
4. Bats are divided into three groups.
   a). Insect eating bats
   b). Fruit eating bats
   c) Vampire bats (blood sucking bats).
5. Bats are nocturnal.

Adaptations.

a) They have well-developed external ears to help them trap echoes.
b) They have a well-developed sense of smell to help them find insects at night.
c) The bodies of bats are very sensitive to sound whose echoes they use at night to find their way and food.

Structure of a bat.



Importance of bats.

a) They control diseases by eating the disease vectors.
b) They help in seed dispersal.

Disadvantages of bats.

a) They habour vectors like mites and fleas.
b) Their urine and droppings pollute the air.
c) They case damage to the roofs of hopuses.

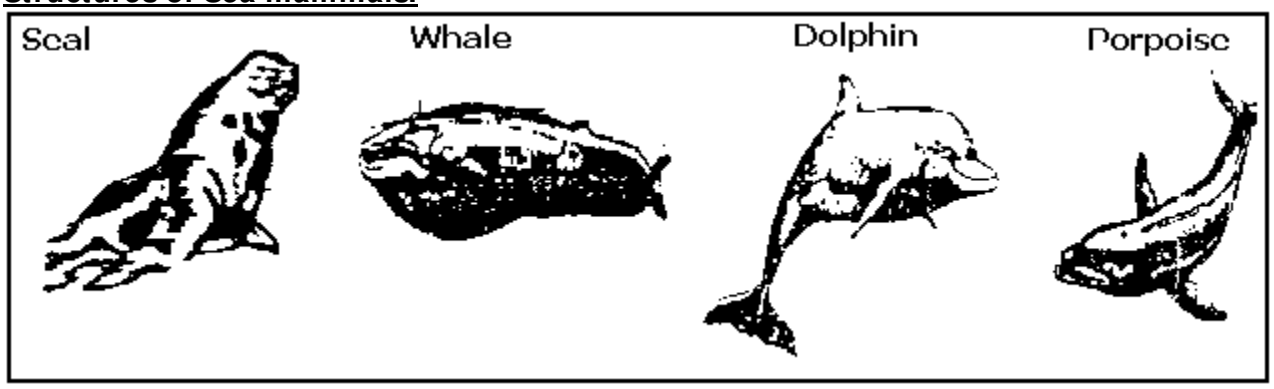
Sea mammals (Cetaceans)

1. They live in water but they do not have gills.
2. They breathe air by means of lungs.
3. Their fore limbs are modified into flippers.
4. They have a layer of fats (blubber) under their skin to keep them warm.
5. They have the blubber that keeps them warm by preventing heat loss.

Examples of sea-mammals.

a). Whales
b). Dolphins
c). Seal
d). Porpoises

Structures of Sea mammals.



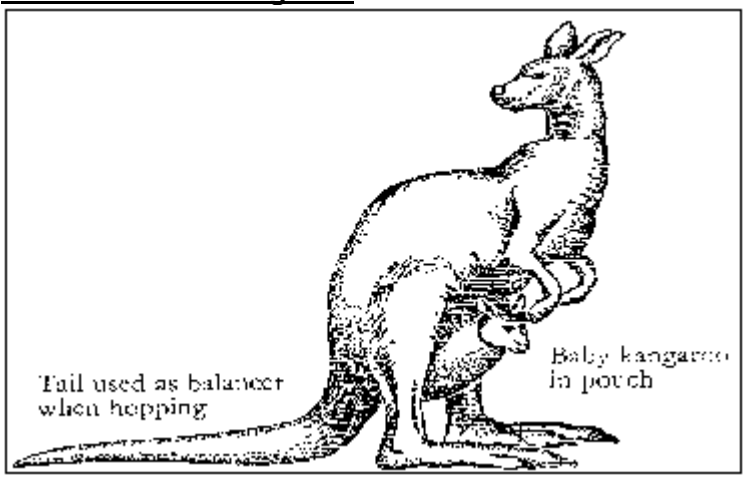
Marsupials (Pouched mammals).

1. They have a pouch (pocket) in which they carry their young ones for the first ten months.
2. They move by hopping.

Examples of pouched mammals.

a). Kangaroos
b). Koala bear
c). Wallabies

Structure of a Kangaroo



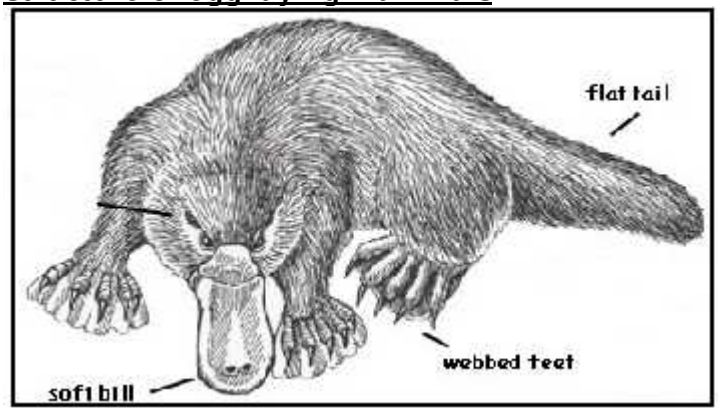
Egg-laying mammals (Monotremes)

1. They are egg-laying mammals.
2. They have beaks instead of a mouth.
3. They bear characteristics of birds, reptiles and mammals.
4. They are grouped as mammals because they feed their young ones on milk from mammary glands.

Examples Egg-laying mammals (Monotremes)

a). Duck billed platypus
b). Spiny anteater.

Structure of egg laying mammals



Primates.

1. They are the most advanced group of mammals with a well developed brain.
2. They have four limbs. The front pair is used for holding items while the hind pair is for walking.
3. They are omnivores i.e feeds on both meat and vegetables.
4. They have a complete dentition – four types of teeth namely: incisors , canines, molars and premolars

Examples of Primates.

a). Man
b). Monkeys
c). Apes
d). Gorillas
e). Chimps
f). Bush baby

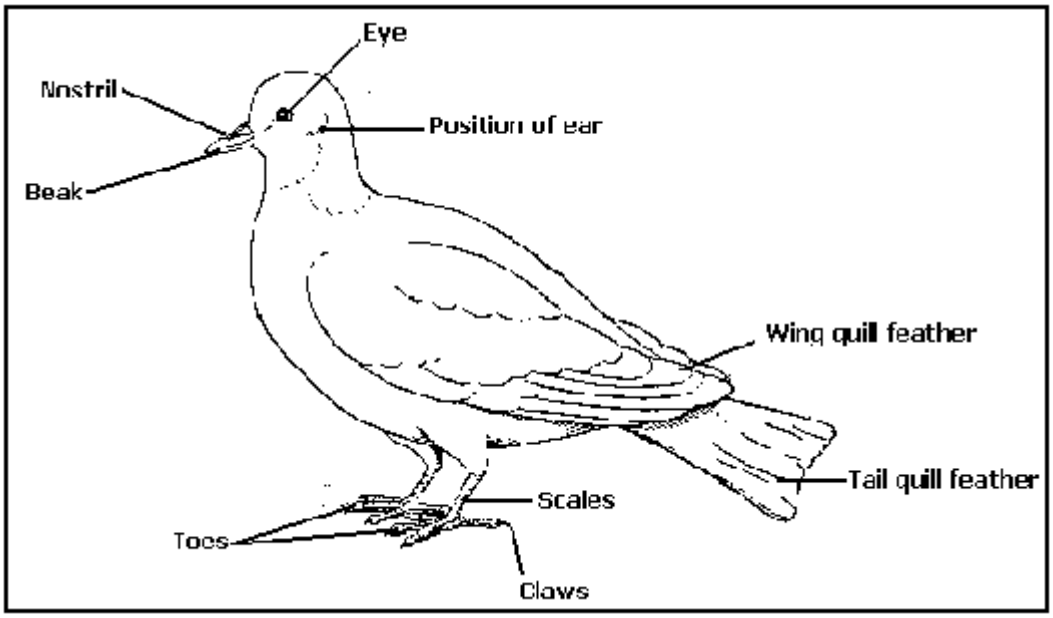
BIRDS.

1. **General characteristics of birds.**
   a). Their bodies are covered with feathers.
   b). They have a horny beak instead of teeth.
   c). Birds use lungs for breathing.
   d). Their legs are covered with scales.
   e). Their fore limbs are modified into wings.
   f). They lay eggs with hard shells.
   g). Have hollow bones.
   h). They undergo internal fertilization.

Characteristics that differentiate birds from the vertebrates.

a). Their bodies are covered with feathers.
b). They have beaks for feeding.

External parts of a bird and their functions.



Beak

1. The beak help birds to feed.
2. Some birds use beaks to defend themselves.
3. For cleaning itself.

Eyes

1. Help birds to see.

Comb.

1. Help birds to scare away enemies.
2. Help birds to attract mates.

Feathers

1. Help birds to fly.
2. Controls body temperature through preventing heat loss or gain ie keep birds warm.

Claws

1. Help birds to find food.
2. Help birds to defend themselves.

Legs / wings

1. Help birds in movement.
2. Help to balance the body in movement.

Types of feathers.

1. Quill or flight feathers.
2. The down feather
3. Covert (body feather)
4. Filoplume

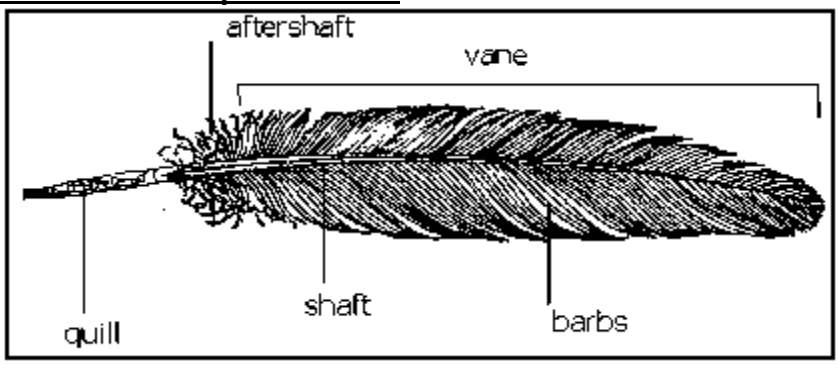
Quill or Flight feathers.

1. They are divided into two namely;
   a). Primary
   b). Secondary

Primary feathers.

1. They are longer and larger than secondary feathers.
2. They are help birds to fly.
3. They are found towards the outer end of the tail and wings.
4. Quill feathers on the tail help birds to steer, brake and balance during movement.

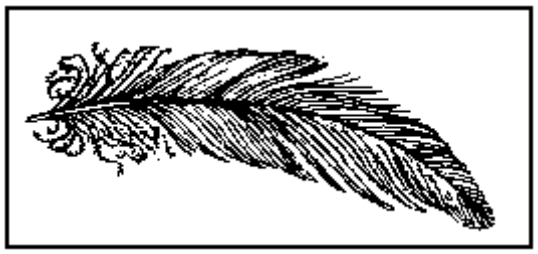
Structure of a quill feather.



Covert (body feathers.)

1. Covert feathers are the second type of feathers to develop on the body of a bird.
2. They keep the body of a bird warm by preventing heat loss or gain.
3. They protect the body of a bird from unfavourable weather conditions.
4. They protect the body of a bird from external damage.
5. They help to streamline the body of a bird.

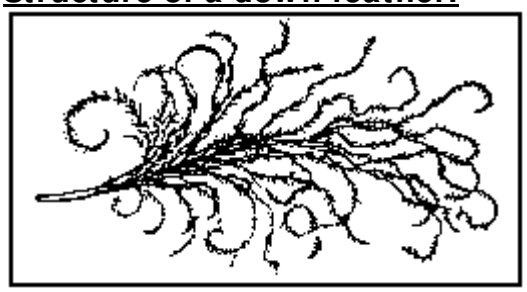
Structure of a body feather.



Down feathers.

1. These are the ones a chick hatches with i.e they are the ones that develop first.
2. They insulate the bird and keep it warm.

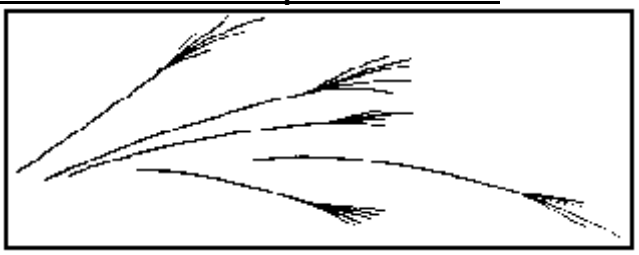
Structure of a down feather.



Filoplume

1. They are the closes feathers to the body of a bird.

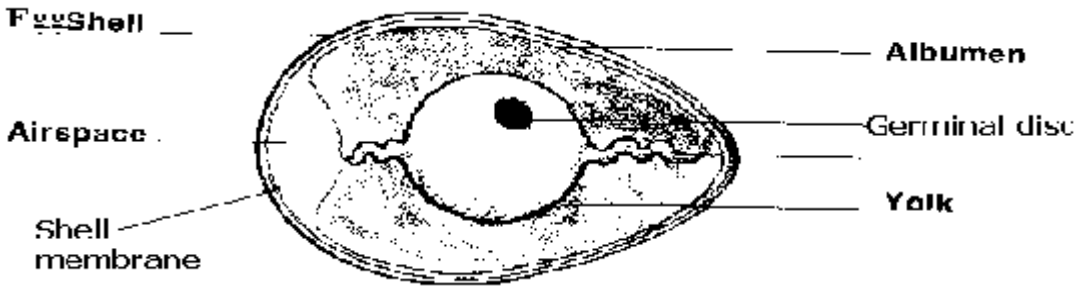
Structure of the filoplume feather.



Reproduction in birds.

1. The female bird lays eggs after they have been fertilized internally.
2. The eggs are incubated and hatched into young ones.
3. Different birds have different incubation period.
4. Eggs of birds can only hatch if they are fertilized and have been provided with the required incubation requirements.
5. Incubation requirements include;
   a). Good aeration
   b). Enough supply of heat
   c). Dry condition in the place

Structure of an egg.



Functions of each part of an egg.

Egg shell

a). It protects the inner parts of the egg.
b). It helps in the exchange of gases.

Germinal disc / Embryo

Develops into a chick after fertilization.

Albumen / Egg white

a). It provides water and protein to the developing embryo.

Chalaza

a). Holds the yolk in central positions
b). Transports air and food nutrients to the growing embryo.

Air space

Stores fresh air for the growing embryo.

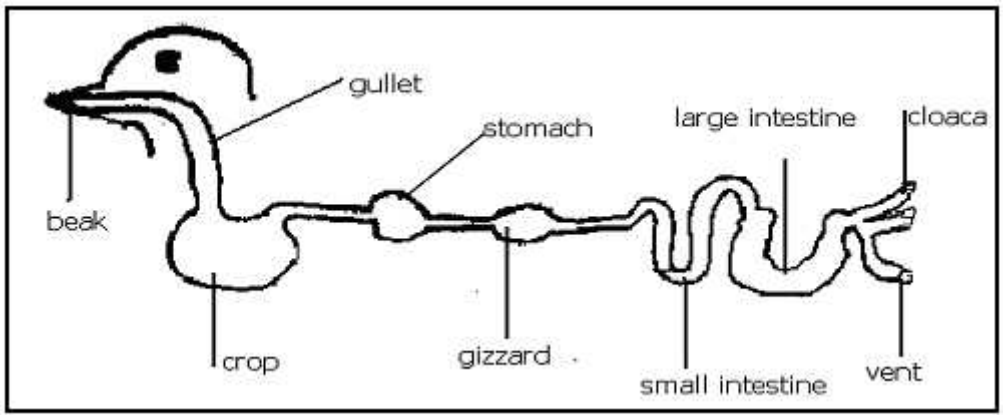
Shell membrane.

Holds the liquid part of the egg.

Yolk
It provides proteins and fats to the embryo

DIGESTIVE SYSTEM OF A BIRD.

Alimentary canal of a bird.



Functions of each part.

Beak
To pick up food.

Gullet
Passage of food to the crop.

Crop
Stores, moistens and softens the food.

Gizzard
Contains small stones called grits which crush food into small particles.

Small intestine
Digested food is absorbed into the blood stream

Large intestine
Absorption of water takes place.

Vent / cloaca
It lets out undigested food in form of waste products.

CLASSIFICATION OF BIRDS.
Birds are classified according to;
a). Way of feeding
b). Shapes of the beak
c). Shape of the claws
d). Arrangement of toes
e). Nature of the feet

Classes of birds
a). Birds of prey
b). perching birds
c). swimming birds

d). wading birds.
e). flightless birds
f). scavenger birds
g). scratching birds
h). climbing birds

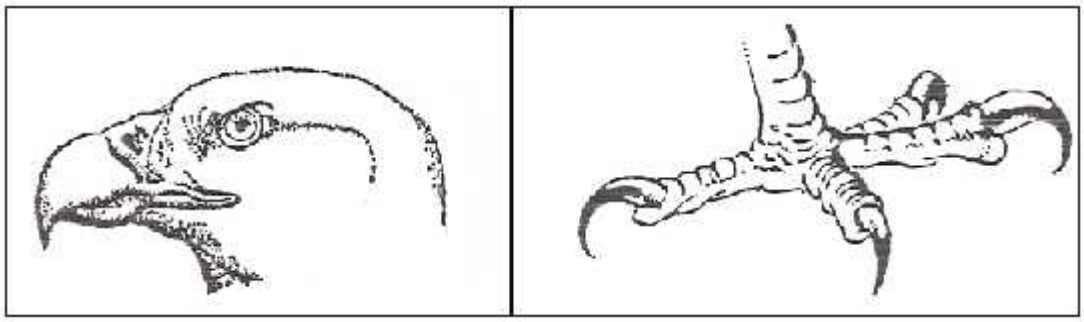
Birds of prey.

1. These birds hunt for their foods
2. They are carnivorous (feed on meat)
3. They catch and eat fish, rats, mice, chicken
4. They have a very powerful eye sight to enable them to spot their prey.
5. They have sharp and hooked beaks for tearing flesh.
6. They have long, strong, curved claws for dripping their prey.

Examples of Birds of prey.:

a). Eagles
b). Hawks
c). Kites
d). Owls

Toes and beaks of preying birds.



9. **Importance of preying birds.**
They control pests e.g rats and mice

Disadvantages.
They are predators that kill and eat domestic animals.

Scavengers

1. They feed on dead and decaying animals flesh.(carrion)
2. Their beaks with exception of a marabou stork are similar to those of birds of prey.
3. They clean the environment by eating most of the decaying animals matter.
4. They don't hunt and kill their prey

Examples of Scavengers.

a). crow
b). vultures
c). Marabou storks

Perching birds
These are birds that stand or rest on tree branches or wires.

Adaptation of perching birds

1. They have one toe pointing backwards and three toes pointing forward for gripping the perch.

2. They are grouped into three.
   a). Seed eaters
   b). Insect eaters
   c). Nectar (juice) sucking birds

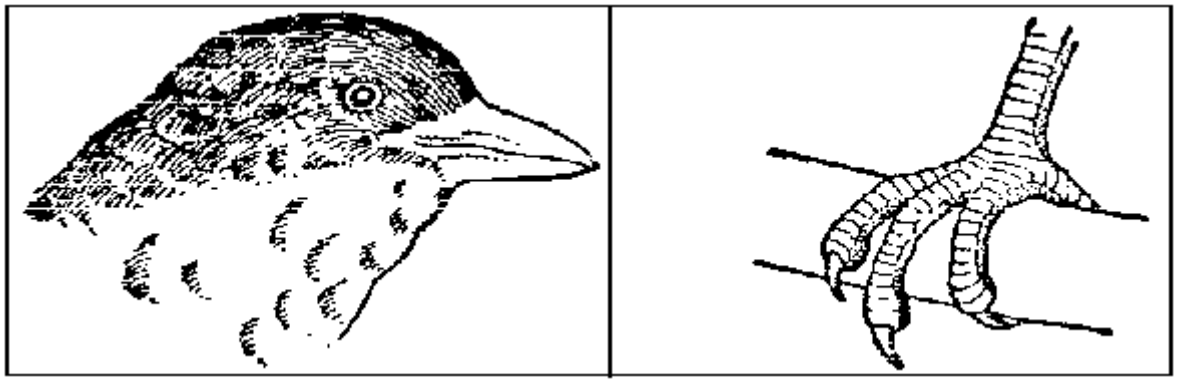
Seed eating birds.

1. They feed on seeds and fruits.
2. They have short strong conical beaks suitable for breaking up seeds.

Examples include;

a). Weaver birds
b). Sparrow
c). Pigeons
d). Dives
e). Guinea fowl

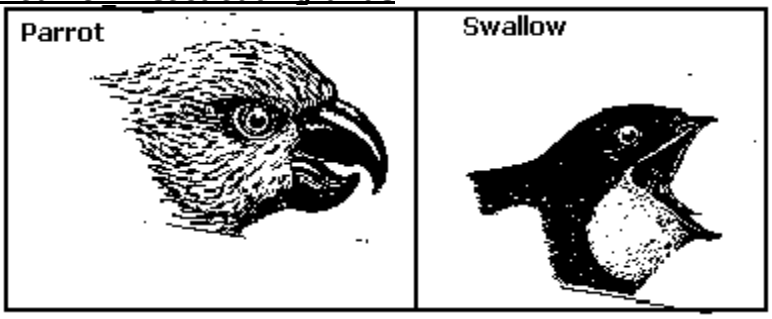
Toes and beaks of perching birds.



Insect eaters.

1. They have wide beaks for picking insects from the back of trees.
2. They catch insects even while flying.
3. **Examples include;**
   a). Robins
   b). Swallows
   c). Swifts

Beak of Insect eating birds



Nectar/ Juice sucking birds.

They feed by sucking nectar from flowers.

Adaptation

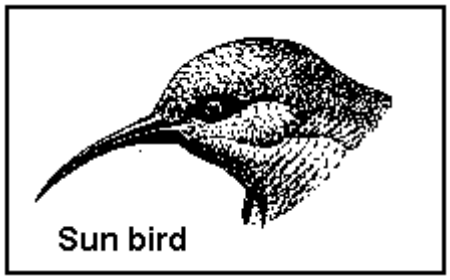
a) They have thin long and slightly curved beaks for sucking nectar from flowers and honey from beehives.

b) They are usually small in size to enable them stand on small branches without breaking them while feeding.

Examples.

a) Sun bird
b) Humming bird.

Mouth part of sucking birds.



Thin long and slightly curved beak for sucking nectar

Scratching birds.

They feed on seed and insects while they find by scratching the ground.

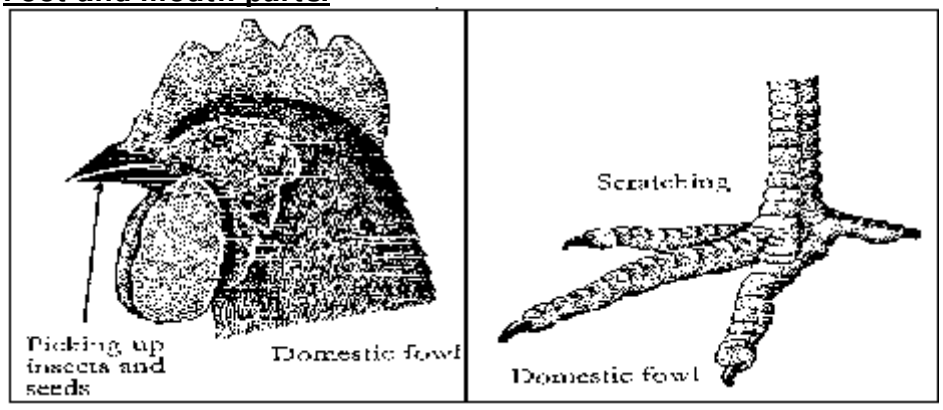
Adaptation.

a) They have strong, pointed beaks for picking up things from the ground.
b) Their claws are strong and blunt for digging.

Examples of scratching birds.include:

a). Chicken
b). Turkey
c). Guinea fowl

Foot and mouth parts.



Wadding birds.

1. They live around shallow water environment where they get food.
2. They feed on frogs, snails, fish e.t.c

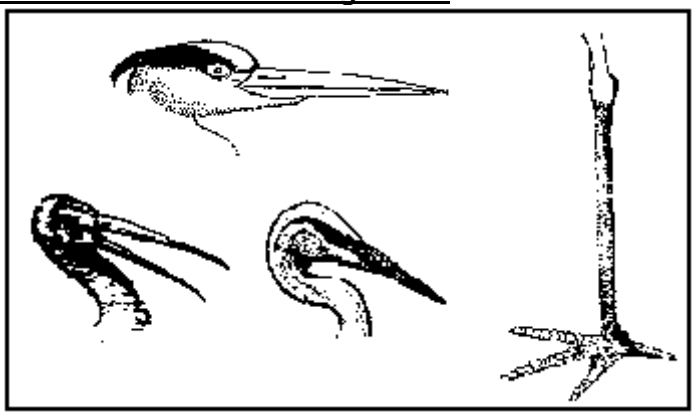
Adaptations of wading birds.

a) They have long legs with semi-webbed toes to help them move in water.
b) Some have long sharp pointed beaks used to catch fish and small animals from under water.

Examples of wading birds.

a). Flamingo
b). Storks
c). Heron
d). Crested crane

Beak and foot of wading birds.



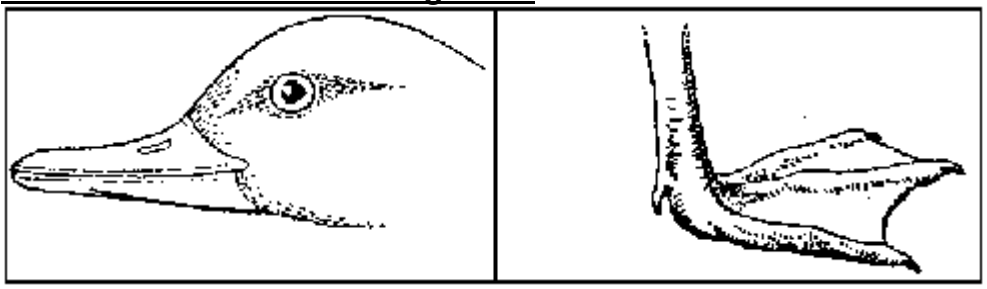
Swimming birds.

1. They have webbed feet to help them to swim in water.
2. They have spoon shaped beaks with saw-like edges to help them separate food from muddy water.
3. Their skins have many oil glands, which produce oil to protect their bodies against the effect of cold water.
4. They feed on small animals like frogs, fish, worms and small water plants.

Examples of Swimming birds

a). Ducks
b). Pelicans
c). Swans
d). Seal gull
e). Geese

Foot and beak of swimming birds



Climbing birds.

1. They have two toes pointing forward and two backward to help their climb.
2. The woodpeckers have long, pointed beaks for obtaining insects from cracks and holes in the bark of trees.
3. Climbing birds like parrots that feed on seeds have cracking hard beaks.

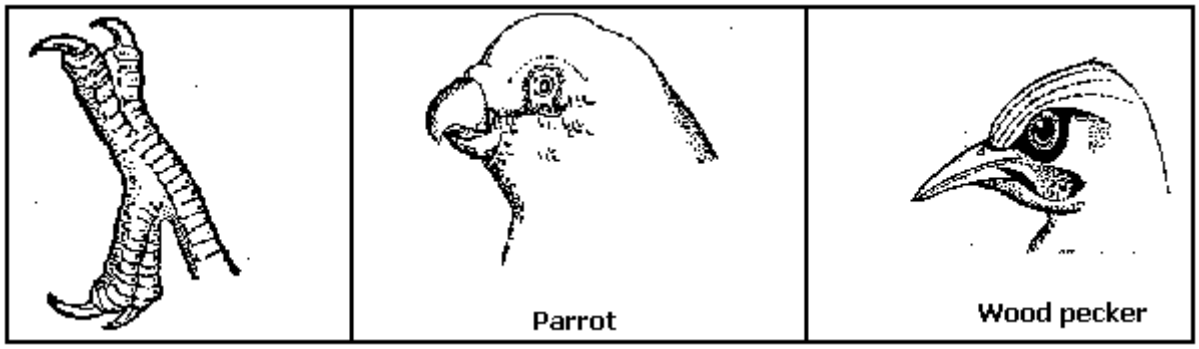
Adaptation

They have two toes pointing forward and two backward to help their climb.

Example of climbing birds:

a). Parrot
b). Wood pecker
c). Horn bills

Foot and beak of climbing birds



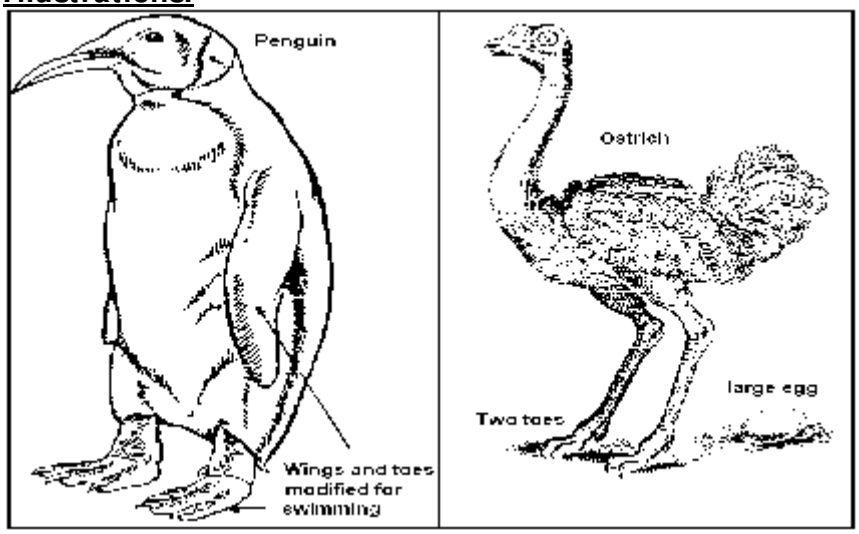
Flightless birds.

1. These are birds which do not fly.
2. Their wings are too small and weak.
2. They move by walking, running or hopping.
3. Some like an ostrich are very fast runners.
4. Penguins have their legs and wings modified for swimming.

Examples of flightless birds.

a). Kiwi
b). Penguins
c). Ostrich
d). Emu

Illustrations.



Adaptation of birds to flying.

1. They have a stream lined body which reduces air resistance.
2. They have hollow bones which reduce their weight.
3. Have well developed pectoral muscles that enable them to fly.
4. Have a rigid skeleton giving a firm attachment of muscles concerned with flying.

5. They have hollow air sacs starting from the lungs. This makes breathing efficient and also makes their bodies higher.
6. Their fore limbs are modified to form wings for flight.

REPTILES.

1. General characteristics.
   a). They are cold-blooded animals (their body temperature changes with the temperature of their surrounding)
   b). They lay eggs, which are fertilized internally.
   c). Their bodies are covered with scales
   d). They breathe by means of lungs.
   e). Their hearts have three chambers i.e two auricles and one ventricle.
   f). Most reptiles except snakes have two pairs of limbs.
   g). They usually do not look after their young ones.

Note:

a) Reptiles lay their eggs on land.
b) Reptiles grow by moulting (removing the old skin to get a new one)

Groups of Reptiles.

a). Snakes
b). Lizards
c). Crocodiles and alligators
d). Turtles, tortoises and terrapins

Snakes.

1. Snakes have no limbs.
2. snakes move by gliding.
2. They are divided into three groups.
   a). Poisonous snakes
   b). non-poisonous snakes
   c). constrictors

Poisonous snakes.

1. These are snakes that use poison to defend themselves and to paralyse their prey.
2. They have a pair of long hollow teeth connected to a poison gland. These teeth are called **fangs**.
3. When the snake bites, its poison is injected into the bitten animal through the fangs. Snake poison is called **venom**.
4. Poisonous snakes kill their prey before eating it and then swallow it whole.

Examples of poisonous snakes.

The cobra

It either bites or spits venom to its enemy.

The puff adder

It attacks only when disturbed.

The viper

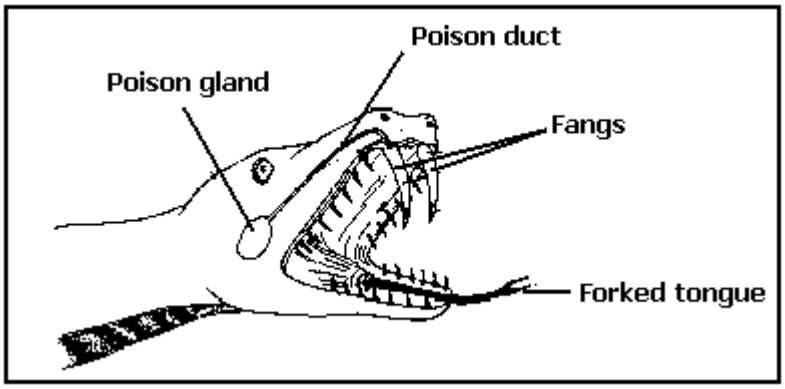
It is sluggish because of the thick body.
It is very dangerous because the victim dies a few minutes after a bite.

The mamba

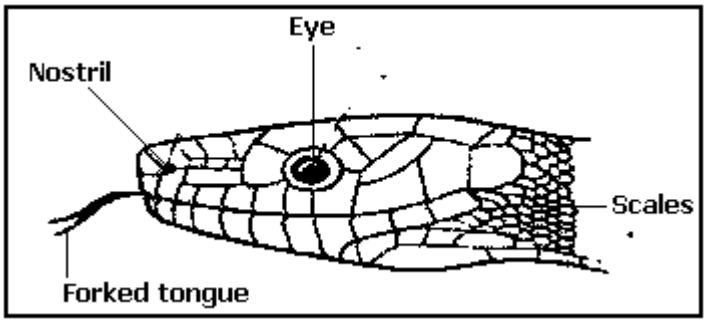
Green mamba is about 2m long.

Black mamba
Can be 4m in length. It attacks even when not disturbed.

Mouth part of a poisonous snake.



Side view of a snake's head.



Functions of each part

Fangs
The snake uses them for defence against enemies by injecting poison.
The teeth are pointing backward to prevent prey from escaping during feeding..

Forked tongue.
a) a snake uses it to smell and detect food.
b) It is also used to detect temperature changes.

Scales.
a) The scales protect the skin from drying up.
b) They also protect the snake from external damage.

Nostril
a) The snake uses them to breathe.
b) Some snakes use it to detect food.

First aid for snake bite.
a) Keep the victim calm to avoid increase in the rate of blood flow.
b) Tie the pulse point between the heart and the bitten part.
c) Prevent the injured person from doing exercises as they may increase the rate of blood flow.
d) Carry the injured person to the nearest medical worker.
Note: Do not allow the victim to walk to hospital because walking increases the rate of blood flow.

Non-poisonous snakes.

1. They do not have poison.
2. They swallow their prey alive.

Examples of Non-poisonous snakes

a). Green grass snake
b). House snakes

Constrictors.

1. They are not poisonous but dangerous.
2. Kill their prey before swallowing by crushing it to death using their strong body muscles.
3. They lick their prey to make it smooth.
4. They have a slow digestion that is why they take long to feed again.
5.

Examples of constrictors

a). Python
b). Boa
c). Anaconda (found in South America)

Lizards.

1. They have two pairs of limbs and clawed feet.
2. They move by crawling.
3. They have sticky forked tongues for catching insects.
4. Some lizards protect themselves by breaking off their tails to confuse their enemies.
5. others protesct them selves by poisoning.

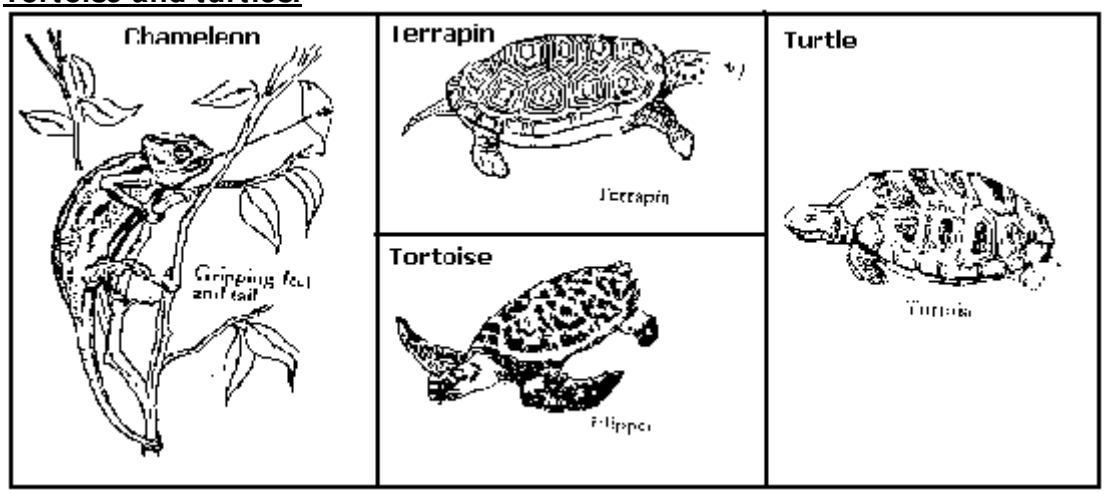
Examples of lizards

a). Chameleon
b). A common lizard
c). Tortoise and turtles
d). Gecko

Chameleon

1. Camouflages (changes colour according to the surrounding to protect itself from enemies)
2. Has a long sticky tongue for catching insects.
3. Its feet and tail are adapted for catching and gripping on small branches.

Tortoise and turtles.



1. They are enclosed in a complete case called a shell made of bony plates.
2. They have no teeth but have sharp cutting edges.
3. They protect themselves by with drawing into their shells.
4. They live both on land and water.
5. Turtles live in water and only come to land to lay eggs.
6. Turtles forelimbs are modified to act as flippers to help in swimming.
7. They breathe by means of lungs.

Gecko

1. They are found in houses.
2. They have suction pads on their feet which enable them to walk even on smooth wall and ceilings.

Crocodiles and Alligators.

1. They are the largest reptiles.
2. They spend most of its time in water but comes to land to lay eggs.
3. They have long powerful tail for swimming and attacking enemies.
4. They eat fish and other animals in water.
5. They have long jaws for catching prey.
6. The female lays hard-shelled eggs and covers it in mad or sand.
7. Alligators are similar to crocodiles.

Structure of a crocodile



Importance of reptiles.

a) They act as tourist attraction.
b) Their skin is used for making leather products.
c) Snake venom is used for making serum for treatment of snake bites.
d) They are predators to vectors and pests.
e) Some reptiles are a source of food.

Disadvantages of reptiles.

a) Some reptiles are poisonous.
b) Some are predators.

Amphibians.

1. They are vertebrates that live both on land and in water.
1. They lay their eggs in water and move to land in later stages.

Examples of amphibians:

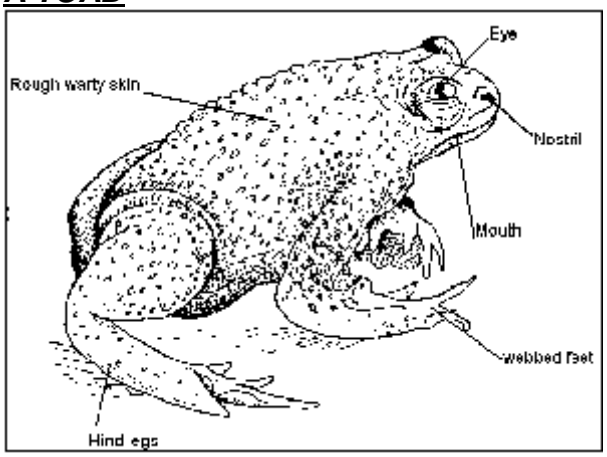
a). Frogs
b). Toads
c). Newts
d). Salamanders

Characteristics of amphibians

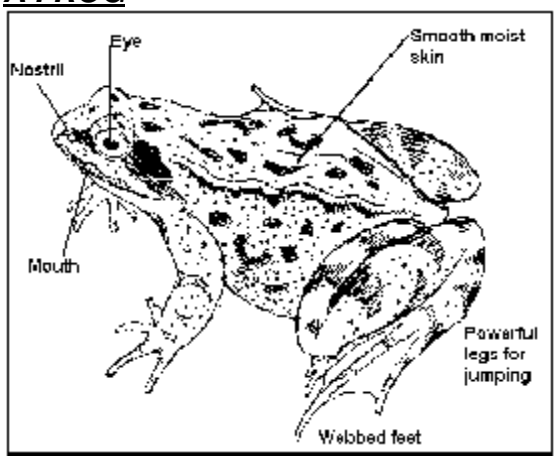
a) They are cold blooded.
b) Spend their early life in water and later on land.
c) They reproduce by laying eggs.
d) Their eggs are externally fertilised.
e) Their hearts have three chambers.
f) Young ones breath through the gills while the adults through the lungs.

DI AGRAM OF A TOAD AND A FROG.

A TOAD



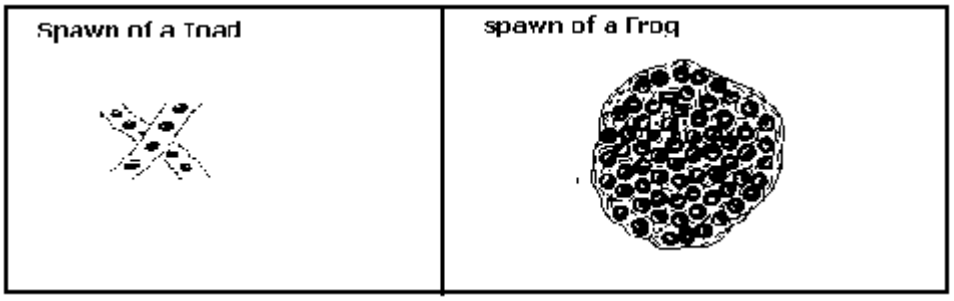
A FROG



Difference between toads and frogs.

TOADS	FROGS
- Have a rough warty skin.	- Have a smooth skin.
- Have poison glands.	- Do not have poison glands.
- Lay eggs in double ribbon strings.	- Lay eggs in mass spawns.
- Hind feet partly webbed.	- Hind feet are webbed.
- Have no teeth	- Have teeth in upper jaw.
- Cannot breathe through their skin.	- Can breath through their moist skin.
- Adults live mostly on land.	- Adults live in water.

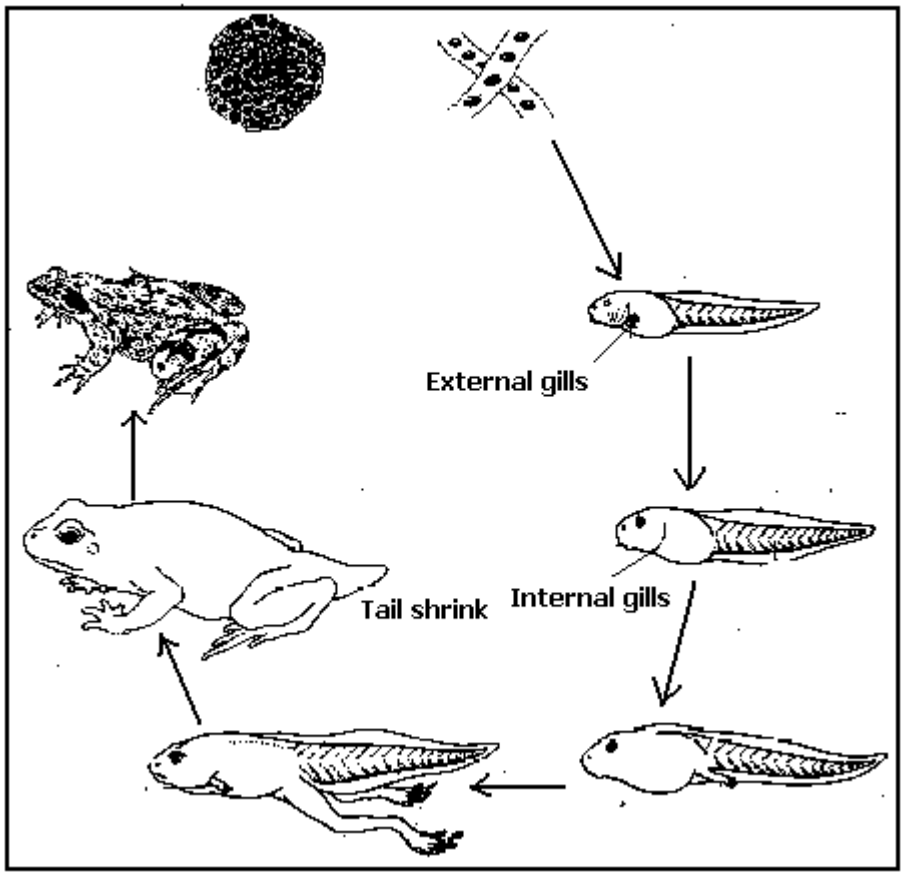
Diagram of spawns of a toad and frog



Life history of a frog / toad.

a). Female adult lays eggs in water.
b). The mature male then fertilizes them by shedding sperms over them.
c). The eggs (spawn) are protected from other animals by a jelly-like covering which has unpleasant smell.
d). After some time the eggs hatch into young tadpole which breathe by means of **external gills.**
e). In two months limbs appear with hind limbs first then fore limbs.
f). The tail shrinks and the lungs come into use.
g). The tadpole is now a young toad.

Life cycle.



Ways in which frogs are adapted to life in water.

a). Hind feet are strong and w ebbed for swimming.
b). When in water, it can obtain oxygen for respiration through the skin.
c). They are capable of hibernating (going to rest period during a dry season where all the body process almost come to stand still.)

Importance of amphibians.

They control diseases by eating vectors.

FI SH

They live in water.

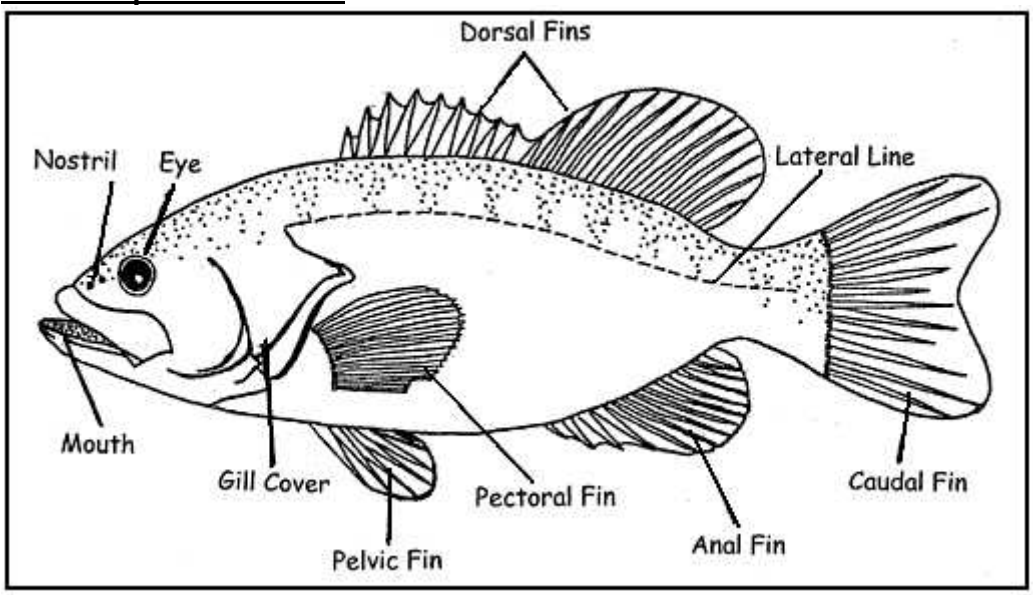
Examples of Fish:

a). Tilapia
b). Nile perch
c). Mudfish
d). Lungfish
e). Catfish
f). Starfish
g). Silver fish
h). Shark fish

Characteristics of Fish.

a) They reproduce by laying eggs.
b) They have a stream lined body to reduce on water resistance.
c) Breath by means of gills except lung fish.
d) They are cold blooded.
e) Have nostrils which are used for smelling.
f) Their eggs are fertilized externally.
g) Have fins that control their movement.
h) They lay eggs in water.

External parts of a fish.



5. **Functions of some parts of a Fish.**

Eyes
The eyes help a fish to see in water.

Nostrils
They are for smelling

Mouth
a) A fish uses it to feed.
b) A fish uses it to take in water during breathing.

Scales
They protect the skin.

Gill cover(Operculum)
They protect the gills

Gills
They absorb dissolved oxygen from water.

Lateral line
It is used for detecting vibrations in water

Fins
Fins provide stability and controls direction of movement.

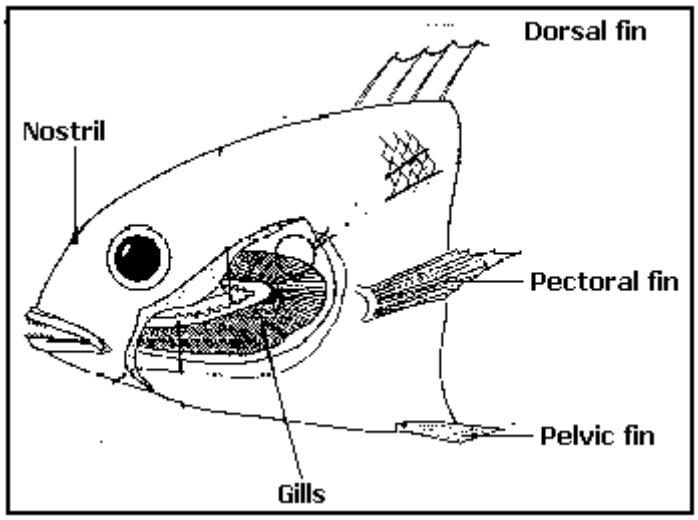
Caudal fin –
Change direct (propulsion and steering)

Median fins (dorsal, ventral fin) –
Prevent fish from rolling.

Paired fins e.g pectoral and pelvic fin
a) Help a fish to slow down and stop (brakes)
b) Help a fish to swim down wards and upwards.

Breathing

1. Fish take in dissolved oxygen by the help of gills.
2. They obtain oxygen as they drink water through the mouth and come out through the gill cover.



Note:

A fish dies when you put it on land because on land there is dry oxygen.

Reproduction.

1. The female lays eggs in water.
2. The male shades sperms over them externally.
3. Newly hatched fish (fry) have a yolk sac on which depend as they develop.
4. Fish feed on water plants, others depend on small water animals such as worms.

How different fish protect themselves.

1. Some use scales and dorsal fins, spines and teeth.
2. Some fish have electric organs which give out electric shocks to their enemies. e.g. an electric eel fish.
3. Some fish inject poison into the enemy through the dorsal fin.
4. Fish are slippery.

How small fish survive in water away from their predators.

a) they move in groups.
b) They are very fast in swimming.
c) They stay in shallow water.
d) They lay a large number of eggs.

Ways in which fish is adapted to live in water.

1. Have stream lined body which help to move easily in water.
2. Have a swim bladder which keep them buoyant (help them to float on water)
3. Have gills which enable them to take in dissolved oxygen from water.
4. Have fins which give stability and controls direct of movement during swimming.
5. Have backward overlapping scales which reduce friction and offer protection.
6. Have lateral line which help the fish to detect sound vibration in water.

Uses of fish.

1. They are a source of food (protein)
2. The bones of fish are used to produce glue and animal feeds.
3. Selling of fish provides income.

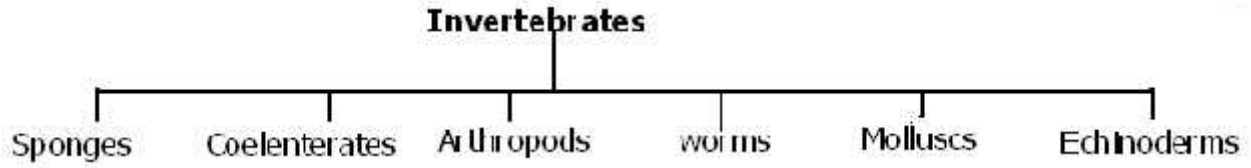
4. Fish feed on mosquitoes' larvae, which help to reduce the spread of malaria.

Invertebrates.

1. These are animals without backbones (vertebral column)

Classes of invertebrates:

a). Worms
b). Arthropods
c). molluscs
d). Coelenterates
e). Echino derms
f). sponges



Sponges.

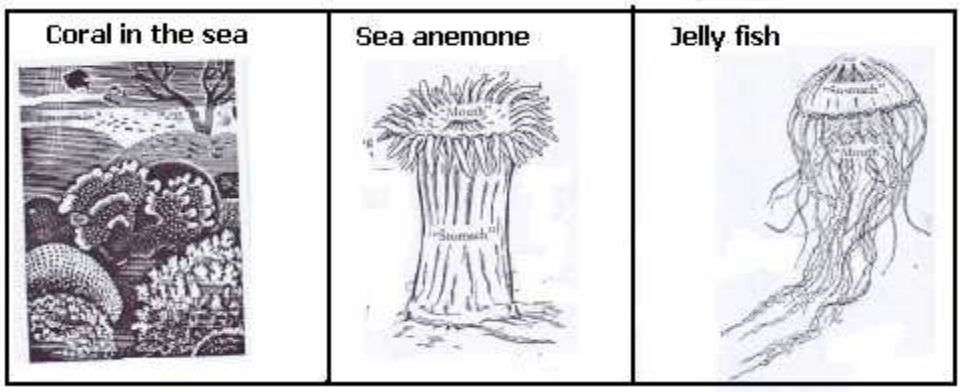
1. The look like plants but are really animals.
2. They absorb food and oxygen as water current flows through them.
3. They have an internal framework which help them to be strong (skeleton).

Coelenterates.

1. They have one opening into their bodies which acts as the mouth.
2. They have a flat transparent body with stinging arms called tentacles.

Example of Coelenterates.

a). Jelly fish
b). Coral
c). Hydra
d). Sea anemone



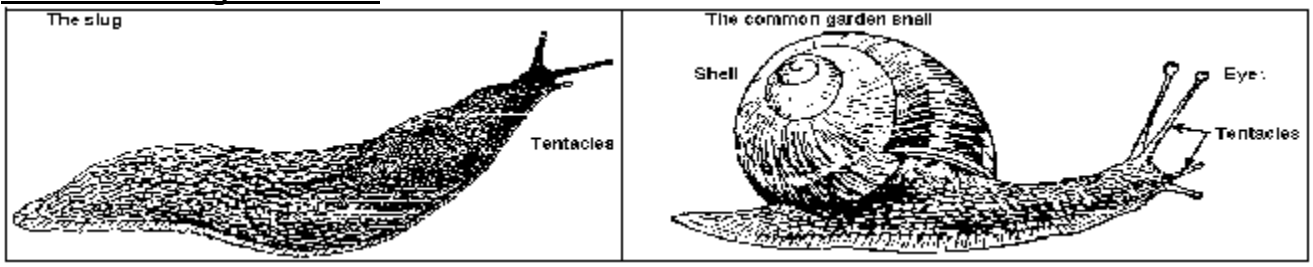
Molluscs.

1. These are animals with soft bodies.
2. Molluscs have a hydrostatic skeleton.
3. Molluscs that live on land breath through the lungs and those that live in water breath through gills.
4. Some have shells for proteins e.g snails.
5. They reproduce by laying eggs.
6. Snails are Hermaphrodites. I.e. They have both male and female reproductive organs.
5. The snail leaves a trail of slim wherever it goes.

Examples of Molluscs:

a). Slugs
b). Octopus
c). Oysters
d). Winkles
e). Snails
f) Squids
g) cowries
h) Whelk Turret
I)

A common Slug and snail.



Importance of Molluscs.

a). Shells of cowries are used to perform cultural rites.
b). Shells are rich in calcium are used to make animal feeds.
c). Molluscs such as squids are used to make dyes
d). They are a source of food.

Disadvantages of Molluscs.

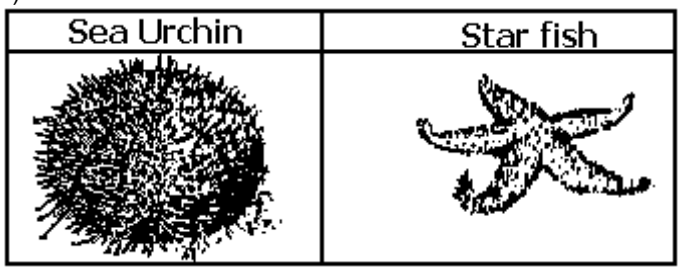
a). They are crop pests e.g land snails.
b). The spread diseases e.g Bilharzia

Echinoderms.

1. They are sea animals.
2. Their bodies have spines for stinging.

Examples of Echinoderms.

a). Sea urchins
b). Sea cucumber
c). Star fish



WORMS.

Characteristics of worms

1. They breathe through the skin that is why they live in a moist environment.
2. They have a hydrostatic skeleton.
3. They reproduce by laying eggs.

Groups of worms:

a). Round worms (Nematodes)
b). Flat worms (Platy-helminthes)
c). Segmented worms (Annelids)

Round worms (Nematodes)

a) They have round and smooth body shape.
b) They have no segmented.

Illustration of a round worm



They are parasites to plants and animals

Examples of Round worms

a). Hook worms
b). Thread worms(Filarial worms)
c). Guinea worms
d). Askari worms C)common round worms

Hook worms

1. They enter our bodies by boring through the skin.
2. They also enter our bodies through drinking water containing worms.
2. They live in the small intestines where they attach themselves by hooks.
3. Hook worms feed on blood.

Effects of hook worms.

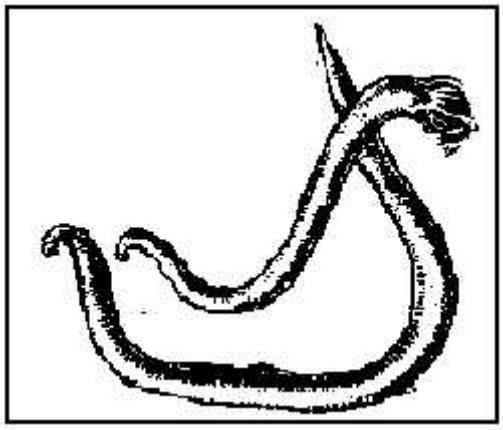
Severe hookworm infection leads to anaemia

Note: Eel worms are pests.

Control of Hook worms

a) Wearing shoes wherever you are walking in muddy or moist disposal.
b) Proper disposal of feaces.
c) Regular deworming.
d) Disinfecting the latrine floors.
e) Boiling drinking water.

Illustration of a hookworm



Askaris (Common round worm)

1. They enter the body orally through eating food contaminated with eggs of round worms.
2. They live in the small intestines and feed on digested food

Effects of round worms

They can lead to malnutrition.

Control opf round worms.

a) Proper disposal of feaces.
b) Washing hands after visiting the toilet.
c) Washing hands before touching food.
d) Washing vegetables and fruits before eating them.
f) Regular deworming.
g) Boiling drinking water.

Filarial worms(thread worms)

1. They live in the lymph vessels of human host.
2. They live in culex mosquitoes or black flies as their secondary host.
3. They spread through bites of a culex mosquito or a black fly.
4. Filarial worms in culex mosquitoes cause elephantiasis s(filariasis) in human beings.
5. Elephantiasis causes legs to swell due to accumulation of fluids in the lower parts of the legs.
6. filarial worms in black flies cause River blindness.

Flat worms

1. They have a flat body.
2. All flat worms are parasites

Examples of flat worms:

a) Liver fluke.
b) Bilharzia fluke (Schistosome)
c) Tape worms

Bilharzias fluke

1. They live in the small and large intestines where they lay their eggs.
2. Bilharzia fluke causes bilharzia in man.
3. Bilharzia in man affects both the digestive and urinary system.

Symptoms of Bilharzia.

a) Passing out blood stained urine.
b) Passing out faeces containing mucus like membrane.

Diagram of a bilharzia fluke:



Tape worms

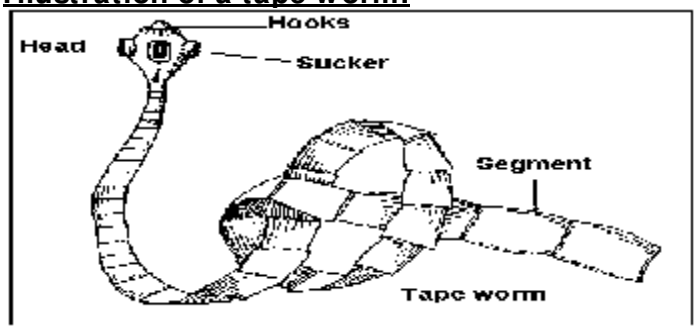
1. They live in the bodies of animals as parasites
2. Tape worms enter our bodies through eating under cooked meat.

3. They live in the small intestines of man..
4. Tape worm feed on digested food.
5. Severe tape worm infection results into **malnutrition**.
6.

Control of Tape worms.

a). Proper disposal of human feaces.
b). Eating properly cooked food especially beef, pork or fish.
c). Regular deworming

Illustration of a tape worm.



Uses of each part.

Hooks

They help the worm to attach itself to the walls of the intestines.

Suckers.

They absorb digested food from the walls of the intestines.

Segments

They store eggs and when mature, it falls off.

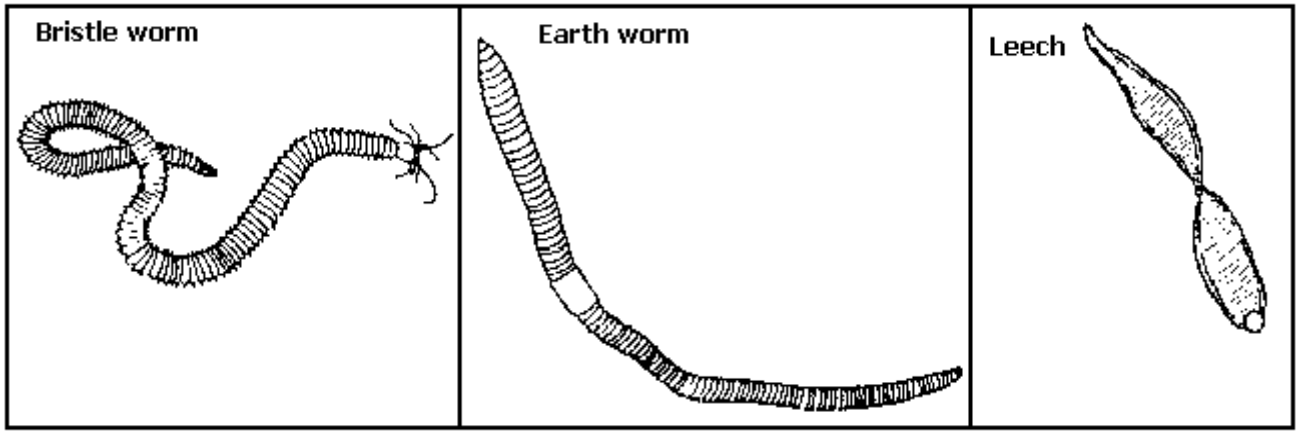
Segmented worms (Annelids)

1. They have segments on their bodies.
2. They have soft bodies.
3. They breathe through their skin and have two reproductive organs (hermaphrodites)

Examples of segmented worms:

a) Earth worms
b) Bristle worm
c) Leech

Illustration of Segmented worms (earth worm)



Advantages of earthworms.

a) They aerate soil by making tunnels in the soil.
b) They speed up decomposition of matter.
c) They are used as baits in fishing.
d) They make soil loose.

Arthropods

1. These form the largest group of invertebrates.

Characteristics of Arthropods.

a) Have jointed legs.
b) Have segmented bodies.
c) Have an exo-skeleton.

Note: They increase in size by moulting

Groups of arthropods

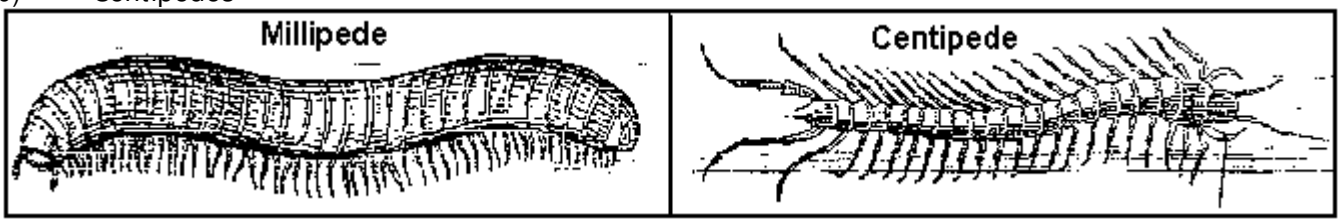
a) Myriapods
b) Crustaceans
c) Arachnids
d) Insects

Myriapods.

1. They have a segmented body.

Examples of myriapods

a) Millipedes
b) Centipedes



Millipedes.

1. Millipedes have four legs on each segment.
2. Millipedes feed on decaying matter.
3. Millipedes protect themselves by curling (coiling).
4. Millipedes live in soil or decaying matter.

Importance of millipedes.

They aerate soil.

Centipedes

1. Centipedes have two legs on each segment.
2. Centipedes feed on small organisms e.g worms, insects and spiders.
3. Centipedes live in the soil.

Protection

a) Some centipedes protect themselves by producing a bad smell.
b) Others protect themselves by biting using poisonous claws.

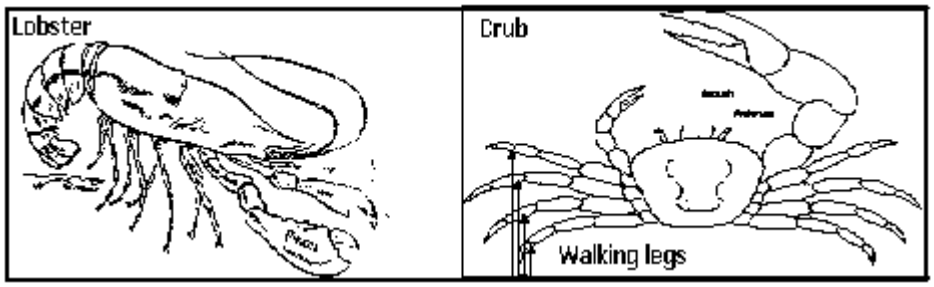
Crustaceans.

1. They have a hard crusty skin.
2. Most of them live in water.
3. Those that live in water breathe through gills and those that live on land breathe through book lungs.
4. They undergo an incomplete metamorphosis.

Examples of Crustaceans:

a). Crabs
b). Lobsters
c). Prawns
d). Wood lice
e) Shrimps
f) Cray fish
g) Sand hoppers

5. Crabs and lobsters have pincers for grasping.



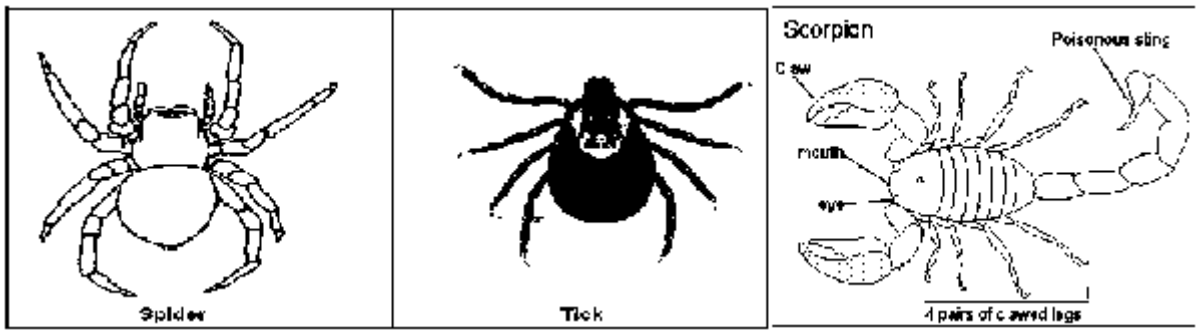
Arachnids.

Characteristics of arachnids.

a) Have four pairs of walking legs.
b) Have two main body parts i.e (cephalo thorax and abdomen)
c) Have simple eyes.
d) Breathe by means of book lungs.

Examples of arachnids:

a). Spiders
b). Scorpions
c). Ticks
d). Mites



6. Some spiders have specialized organs on the abdomen which enables them to spin silk. Most spiders spin a web of sticky silk thread.

Importance of a spider web to a spider.

a). It uses a web as a home.
b). It uses it to trap prey.
c). It uses it as a walkway.

7. Scorpions hide under stones, holes etc. They have a sting at the tail.
8. Ticks are parasitic in nature. They live on bodies of their hosts and feeds on their blood.

Advantages of arachnids.

Scorpions and spiders eat up vectors and crop pests.

Disadvantages of arachnids.

a) Mites and ticks eat disease vectors.
b) Spiders and scorpions are poisonous

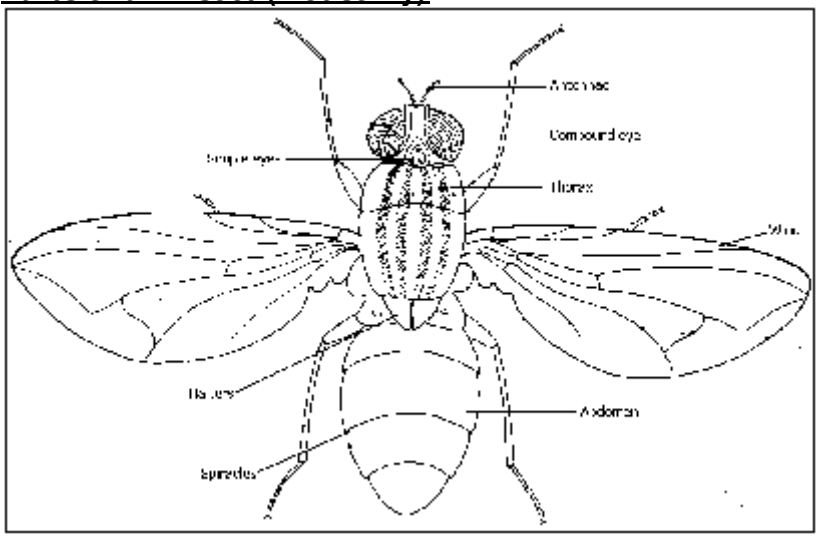
INSECTS.

1. **Characteristics of insects**.
   a). Have three main body parts i.e head, thorax, abdomen.
   b). Have three pairs of jointed legs.
   c). Have compound eyes.

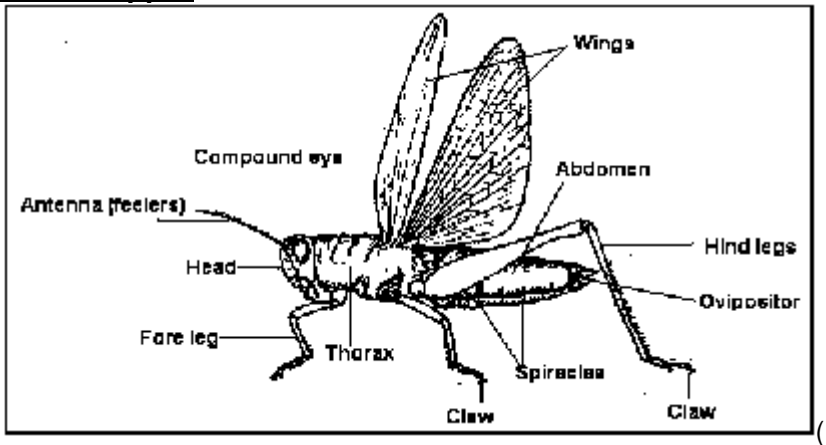
Example of Insects

a).	house fly	d).	mosquitoes
b).	butter fly	e).	wasps
c).	bees	f).	grasshoppers

Parts of an insect.(House fly)



Grass hopper



(***Choose one***)

Functions of each part.

Antenna (feelers)

a) They help an insect to smell.
b) They help an insect to detect sound.
c) They help an insect to detect enemies.
d) They help an insect to detect temperature changes.

Compound eyes.

They help an insect to see.

Proboscis

A proboscis helps an insect to feed.

Thorax.

This is where the legs and wings are attached.

Halters

They help the insect to balance during flight.

Spiracles

They help the insect to breathe.

Ovipositor

It helps the insect to pass out eggs.

LIFE CYCLE OF INSECTS.

The changes in the stages of development of an animal are called **metamorphosis.**

Types of metamorphosis.

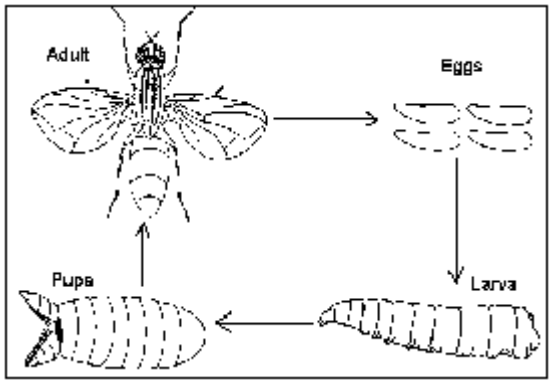
a) Complete metamorphosis
b) Incomplete metamorphosis

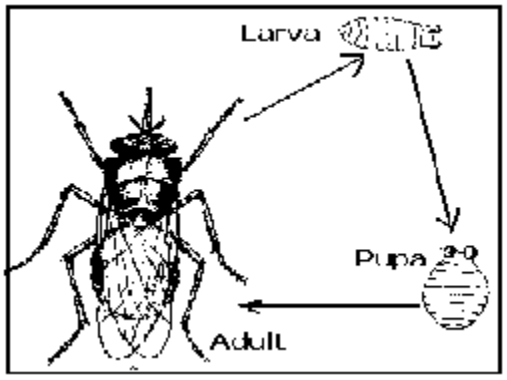
Complete Metamorphosis.

1. Insects undergo all the four stages of development i.e .
2. These stages include: Eggs ____ Larva ____ Pupa ____ Adult

Examples of insects that undergo complete metamorphosis.

a). Housefly
b). Butterfly
c). Bees
d). Wasps
e). Mosquitoes





Note:

a) In tsetse flies, the eggs hatch from inside and they push out the larvae.
b) Tsetse flies are different from other insects because they produce live larvae.

1. The female adult insects lay eggs which are fertilized by the male insect internally.
2. A housefly lays its eggs in decaying matter

Reason

a) For the eggs to get warmth in order to hatch into larvae.
b) The larvae feed on decaying matter.

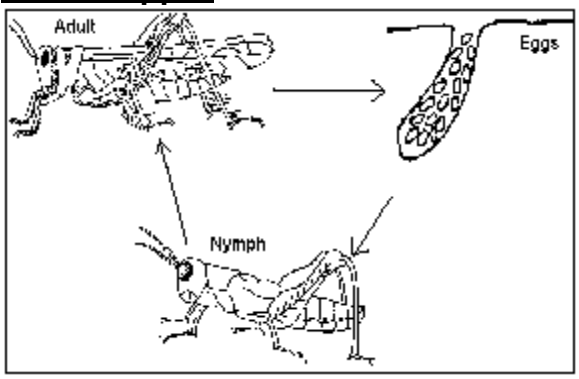
3. The larvae feed continuously that's why it is regarded as the **active stage**.
4. The pupa e do not feed or move that is why it is called the dormant stage.
5. Maggots of houseflies help to reduce volumes of feaces in pit latrines therefore harmful chemicals should not be poured in pit latrines.

Incomplete Metamorphosis.

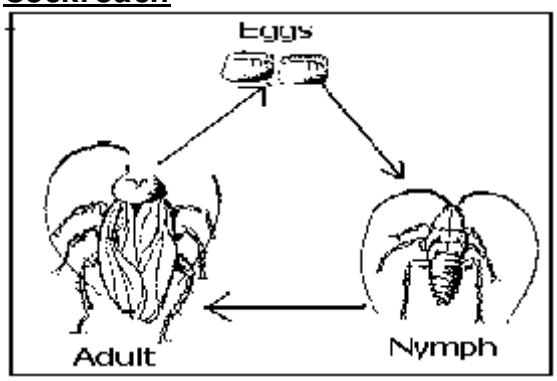
1. This is when an insect undergoes only three stages of development.
2. These stages include: eggs ___ nymph ___ adult

The life stages in an incomplete metamorohosis:

Grass hopper



Cockroach



Examples of insects that undergo incomplete cycle.

a). Cockroaches
b). Grasshoppers
c). Locusts
d). Termites
e). Crickets
f). Praying mantis

Mosquitoes

Types of mosquitoes.

1. Anopheles
2. Culex
3. Aedes (tiger mosquito)

Anopheles mosquito

1. A female anopheles mosquito spreads a protozoa called plasmodium which causes malaria.
2. The male anopheles does not depend on blood but on nectar and juice from plants.

Culex mosquito
Spreads a filarial worm that causes elephantiasis (filariasis)

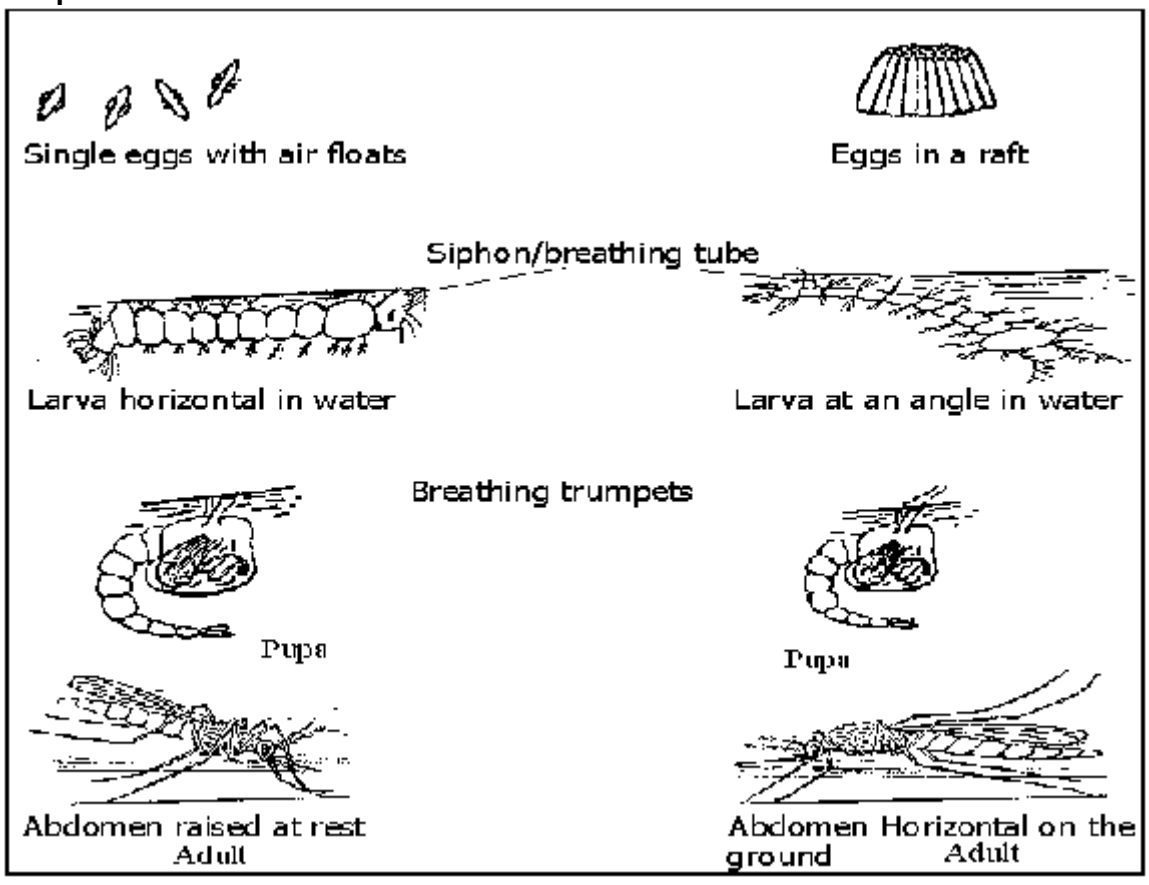
Aedes / Tiger mosquito
Spreads a virus which causes, either yellow/dengue, fever to human.
Note:
All mosquitoes lay their eggs in stagnant water.

<u>Difference between an anopheles mosquito and other types of mosquitoes.</u>

Anopheles	Others
- Lays eggs singly	- Lay eggs in rafts.
- Eggs float horizontally	- Eggs float vertically
- Its adult rests at an angle to the ground with the head at a lower level.	- Adults rest horizontally to the ground.
- Its larvae rest horizontally to the water surface.	- Larvae rest at an angle to the water level.
- Active mainly during night time.	- Active even during day time.

<u>Life history of a mosquito</u>.

Anopheles **Culex**



<u>Larvae of different insects.</u>

Insect larva

Housefly	maggot
Butterfly	caterpillar
Bee	crub
Mosquito	wrigglers

MATTER AND ENERGY

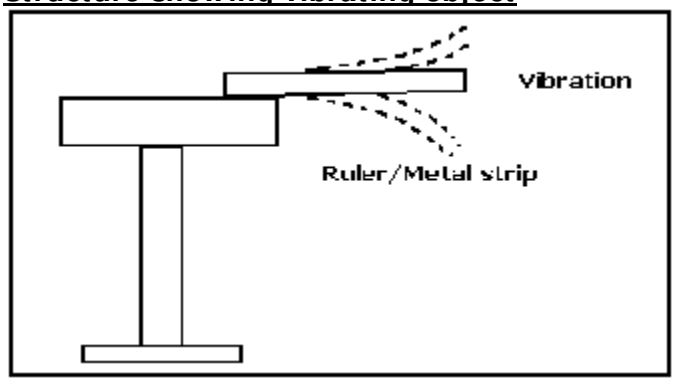
Sound Energy.

1. Sound is a form of energy produced by vibrating objects.
2. Sound is therefore produced when objects vibrate.
   A vibration is a to and from motion which is continually repeated.

Types of Sound

a) Loud and soft sound
b) High and low sound.
c) Musical sound(Regular sound)
d) Noise(irregular sound)

Structure showing vibrating object



3. **Source of sound.**

a). Musical instruments
b). Animals
c). Human beings
d). Insects
e). Birds
f). Cars / machines
g). Thunder

How different organisms produce sound

Man:

a) Sound in human beings is produced by the vibration of vocal cords.
b) This Sound is amplified by the voice box

Grass hoppers:

By rubbing the hind legs against the wings.

Bees, flies and Mosquitoes.

By rapid motion of the wings which cause air to vibrate.

Groups of musical instruments.

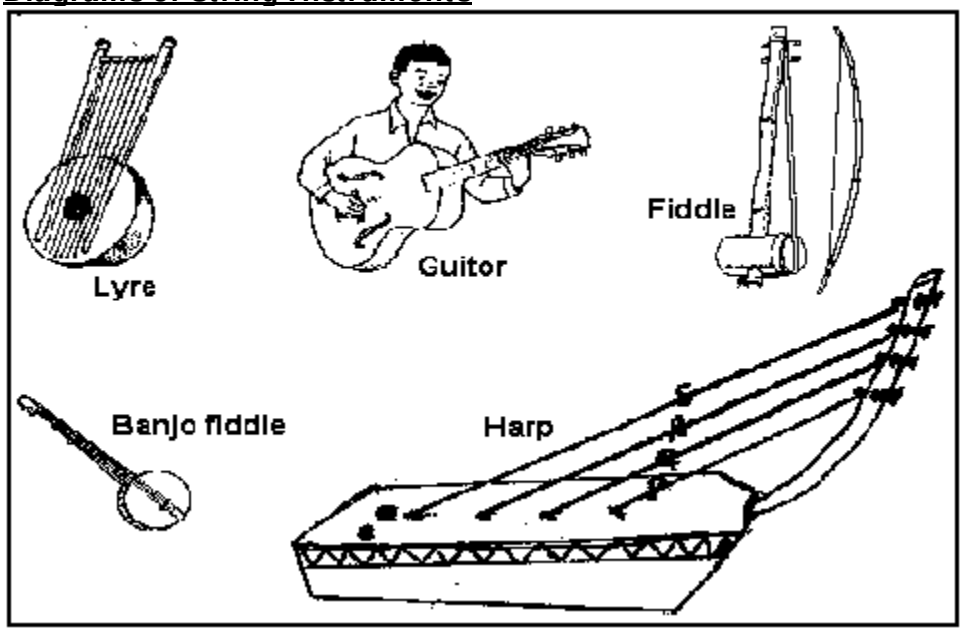
1. **String instruments.**

These produce sound by vibration of the string when plucked.

Examples of String Instruments:

a). Harps
b). Lyres
c). Guitar
d). Tube fiddle

Diagrams of String Instruments



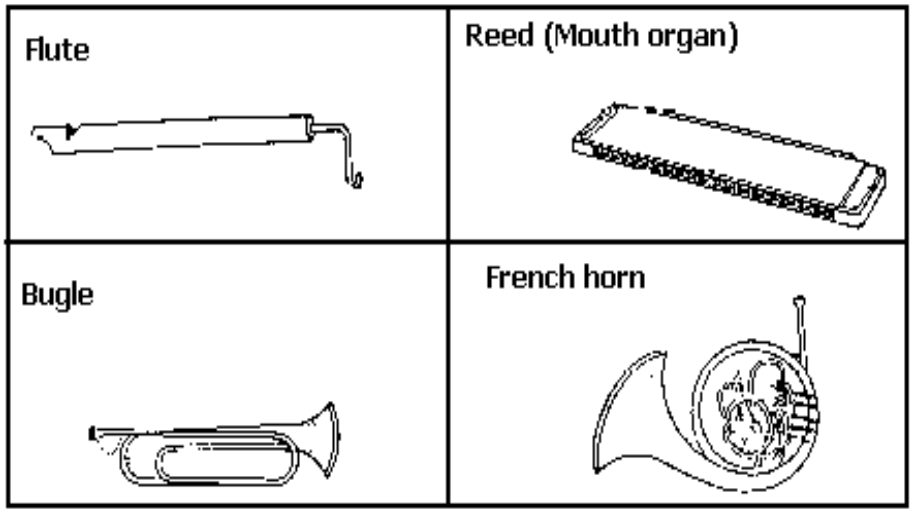
2. **Wind instrument.**

These produce sound by vibration of air inside them.

Examples of Wind instruments:

a) Flute
b) Saxophone
c) Tram bone
d) Bugle
e) Whistle
f) Clarinet
g) French horn
h) Trumpet
e) Read

Diagrams of Wind instruments



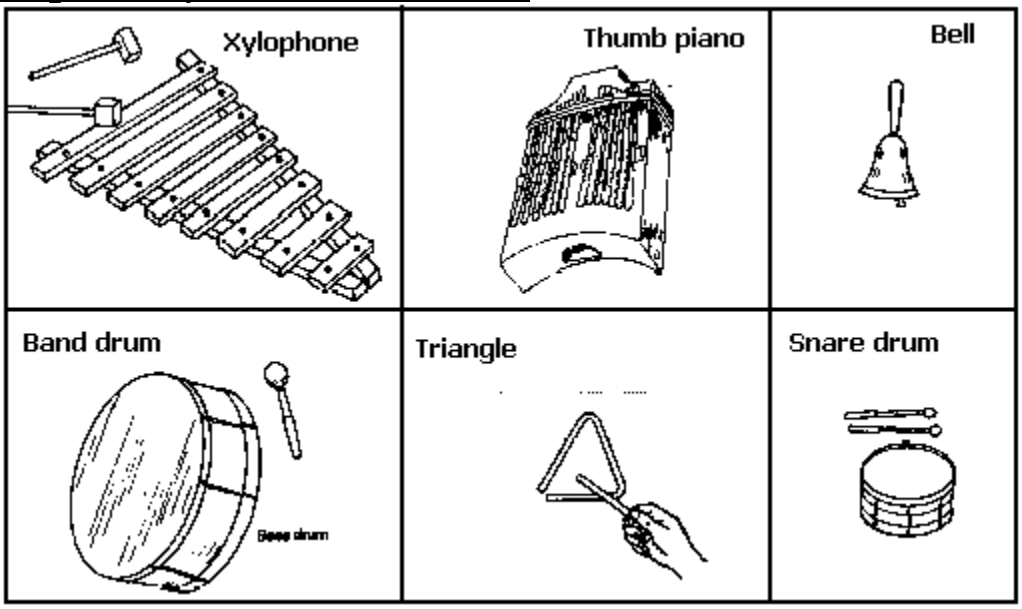
3. **Percussion instruments.**

These produce sound by striking one object on the other.

Examples of percussion instruments

a). Drum
b). Xylophone
c). Thumb piano
d). Rattles / shakes

Diagrams of percussion instruments



Speed of sound.

1. Sound travels in all direction from the vibrating object.
2. Sound travels fastest in solids, faster in liquid and fast in air.
3. The speed of sound is 330m/sec in air, 1500m/sec in water and 4900m/sec in solids.

How sound travels

1. Sound travels through waves from the vibrating object.
2. Sound requires a medium in which to travel.

Illustration of an electric bell in a gas jar.

1. An electric bell suspended inside a bell jar resting on a flat greased metal plate will clearly produce sound when the switch is pressed. If the air is pumped out the bell will get fainter and fainter indicating that sound cannot travel in a vacuum.
2. Sound does not travel through a vacuum because there is no medium of transmission.

Note:
Light travels faster than sound in air that is why we see lightening first before we hear thunder.

Factors that affect sound.

Temperature.

1. We are able to hear clearly in the night than during the day because it is cooler and so the waves are close to the ground.
2. During the day its usually hot and so sound waves rise up making hearing unclear.

Wind.

1. If it blows against the direction of sound, the sound waves are obstructed.

Altitude.

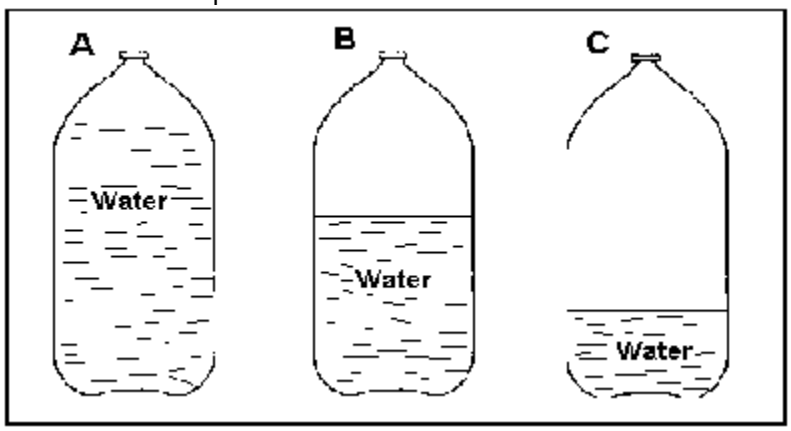
1. Sound waves find it easy to move in a leveled altitude than going uphill.

Pitch of sound.

1. Pitch is the highness or lowness of sound. High notes have a high frequency and low notes have a low frequency.

Factors that affect the pitch of sound.

a). Length of the string
b). Thickness of the string (tension of the string).
c). The volume of air in the vessel.
d). Size of the material used to produce sound.
e). Frequency i.e. when the number of sound vibration per second is high, high pitched sound is produced.



1. Bottle C will produce a low-pitched sound because it contains a large volume of air.
2. Bottle A will produce a high-pitched sound because it contains a small volume of air.

Frequency

1. Frequency is the number of sound vibration per sound.


More vibrations per second, high sound.


Less vibrations per second, low sound,.

Volume.

1. Volume is the loudness or softness of sound.
2. The volume depends on the amplitude of the vibrations.
3. Amplitude means width of vibration.

Note:

The greater the amplitude the louder the sound the smaller the amplitude the softer the sound.

Echoes.

1. An echo is a reflected sound wave.
2. An echo is caused when sound waves are bounced back after hinting a barrier such as a wall, a hill or thick forest.

Illustration of an echo.

Ways of reducing echoes in theatres and cinema halls.

Walls are covered with soft materials e.g soft board and curtains

Advantages of echoes.

1. Bats use echoes to find insects and locate obstacles in darkness during flight.
2. Echoes are used to measure the depth of the sea by echo sounders.

Calculations.

1. If a man heard a gun shot after 4 sec, how far away was the man from the firing point?

   $D = S \times T$

   $= 330 \times 4$

   1,320m
2. It took 3 sec to hear the echo of a man shopping wood. How far was the man from the chopping place?

   $D = \frac{S \times T}{2}$

   We divided by 2 because the sound travels two journeys (i.e to and from)

   $D = \frac{330 \times 3}{2}$

   $= \frac{990}{2}$

   $= 495m.$
3. Amooti was standing across the valley which was 660m away from the cliff. If he shouted how long will it take to hear the echo?

   $Time = \frac{D}{S}$

   But the Distance is traveled twice

   $T = \frac{660 \times 2}{330}$

   $= 2 \times 2$

   4sec.

Storing and reproducing sound energy.

1. Sound can be stored by
   a). Recording
   b). Writing music using solfa and staff notation

Devices for recording and reproducing.

a) Cassette Tape recorder.

b) Compact disc writer

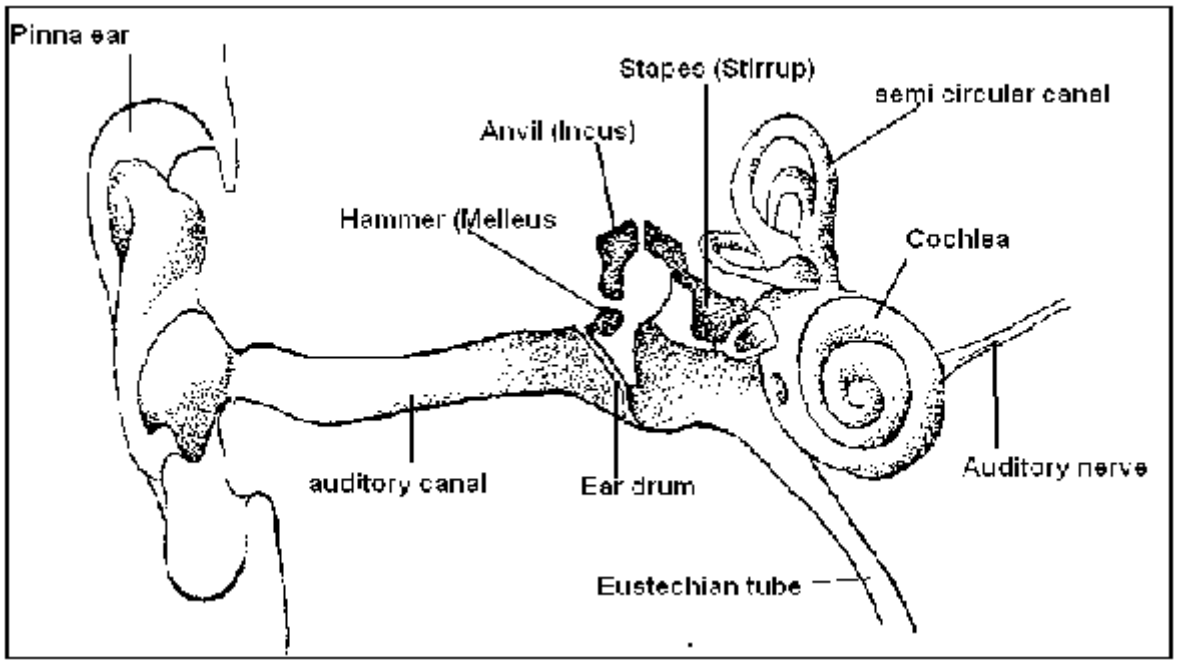
Devises where sound is stored.

a) Compact disc.
b) Cassette tapes.
c) Videotapes.
d) Floppy discs

Devises used to reproduce sound.

a) Compact disc player.
b) Cassette tapes player.
c) Gramophone

The mammalian ear.



1. The ear is divided into three main parts namely:
   a) The outer ear
   b) The middle ear
   c) The inner ear

THE OUTER EAR.

Pinna

Collects and directs sound waves to the eardrum.

Auditory canal.

a) Directs sound waves to the eardrum,.
b) Wax and cilia in the auditory canal traps dust and other foreign bodies.

Ear drum (finely stretched membrane).

It vibrates on receiving sound waves.

THE MIDDLE EAR.

Ossicles.

This is the collective name for the three bones in the middle ear namely;
Hammer, Anvil and Stirrup (HAS) or Malleus, Incus and Stapes (MIS)

Use

They transmit vibrations from the eardrum to the inner ear.

2. **Eustachian tube.**
   Equalizes pressure in the ear.

The inner ear.

1. **Semi-circular canal.**
   For body balance.

2. **Cochlea**
   Transforms sound waves into nerve impulses.

3. **Auditory nerve**
   Sends sound impulses from the cochlea to the brain for interpretation.

Functions of the ear in general.

a) For hearing.
b) For body balance.

The hearing process.

1. The pinna collects sound waves and directs them to the ear drum.
2. The waves force the eardrum to vibrate.
3. The vibrations are passed on by the ossicles to the oval window.
4. These vibrations are then passed through the ear fluid to the cochlea where they are transformed into nerve impulses.
5. The nerve impulses are taken by the auditory nerve to the brain for interpretation hence making one able to identify the difference in sounds.

Caring for the ear.

1. Clear the ears properly and regularly using rolled cotton wool, ear puds and handkerchief.
2. If a little insect enters your ear, pour in clean water to make it come out by floating.
3. Never fix seeds into your ear.
4. Avoid too much noise because it can cause deafness by breaking the ear drum if it exceeds the volume which the ear drum can bear.
5. Contact a medical doctor if you have a problem with your ear.

Ear defects.

1. These are abnormalities in the ear.
2. They cause hearing loss or deafness. Some may affect the sense of balance.

Causes of deafness.

a) Head injury.
b) Obstructed labour.
c) Accumulation of wax in the auditory canal.

Examples of ear defects.

a) Temporary deafness.
b) Deformed pinna.

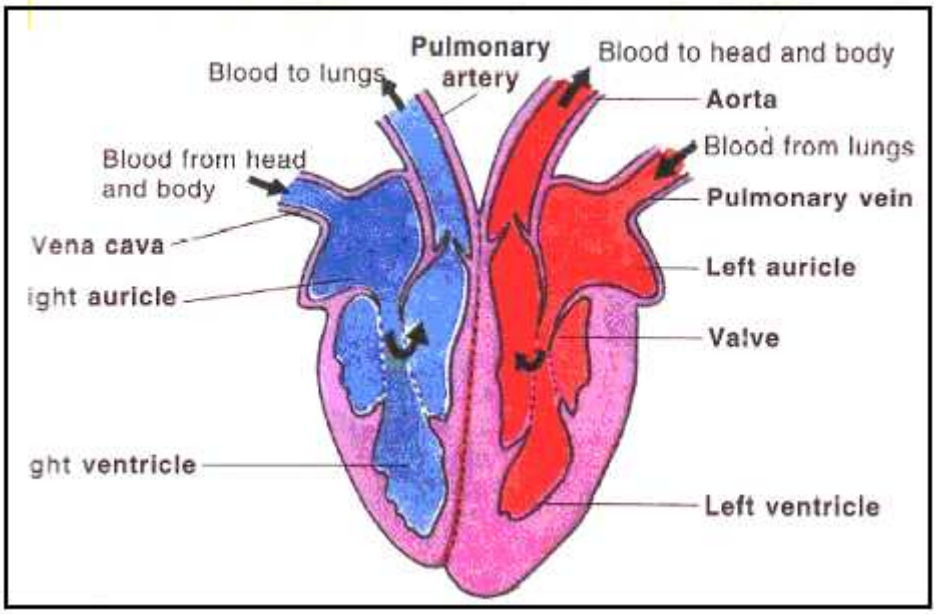
Ear diseases

a) Middle ear infection.
b) Ear inflammation.
c) Presbycusi

THE CIRCULATORY SYSTEM.

1. The circulatory system is made up of three main parts.
   a) Heart
   b) Blood vessels
   c) Blood

The structure of the heart



Function of parts of the heart.

The Vena Cava
It transports deoxygenated blood from all parts of the body into the heart.

Pulmonary vein.
It transports oxygenated blood from the lungs to the heart.

Aorta.
It transports oxygenated blood from the heart to all parts of the body.

Pulmonary Artery.
It transports deoxygenated blood from the heart to the lungs.

Right atrium (auricle).
It receives deoxygenated blood from all parts of the body.

Left atrium (auricle)
It receives oxygenated blood from the lungs.

Right Ventricle
It pumps deoxygenated blood to the lungs through the pulmonary artery.

Left Ventricle

a) It pumps oxygenated blood to all parts of the body through the aorta.
b) Its walls are thicker than those of the right ventricle because it pumps to all parts of the body.

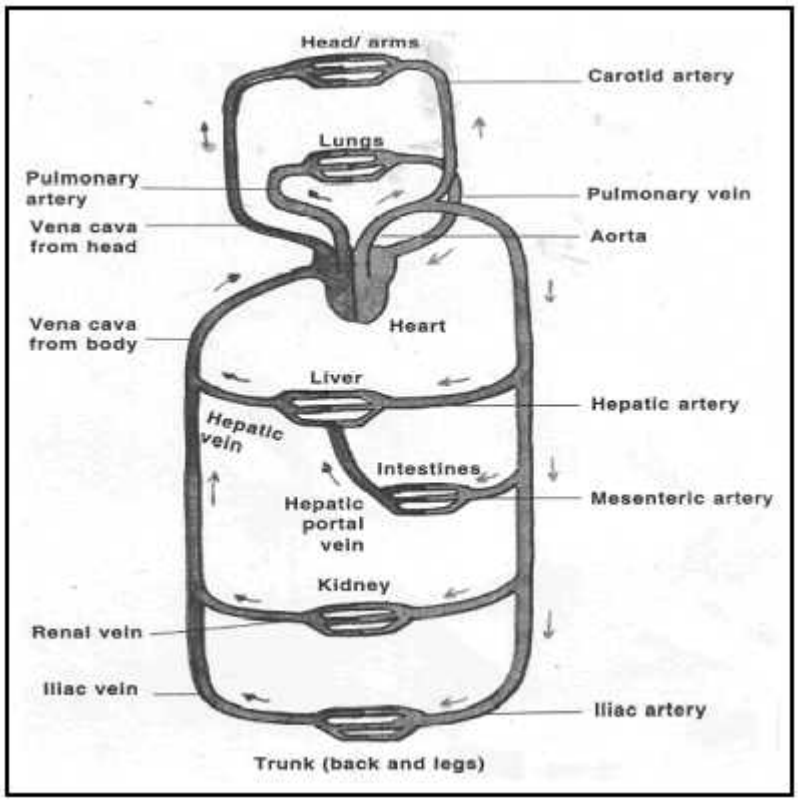
Valves:

They prevent back flow of blood.

How the Heart functions.

a) The main function of the heart is to pump blood to all parts of the body.
b) The heart muscles pump blood when they contract and relax forcing blood in and out of the heart.
c) The heart muscles contract when blood is being pumped out to other body parts and relax when blood is flowing into the heart from other body parts.
d) The contraction and relaxation of the heart muscles produces the heart beat.
e) The heartbeat of a normal adult is supposed to be 72 times per minute.
f) The heart is made up of cardiac muscles that can operate without being controlled by the brain.

Blood Circulation in the body.



Summary

Blood vessel	From	To	Type of blood
Pulmonary vein	lung	Left atrium	Oxygenated blood
Pulmonary artery	Right auricle	lungs	Deoxygenated blood
Venacava	body	Right atrium	Deoxygenated blood
aorta	Left ventricle	body	Oxygenated blood

1. Deoxygenated blood from all parts of the body enters the heart through the venacava into the right atrium.

2. The relaxation of the right ventricle allows it to expand and fill with blood that flow in it from the right atrium.
3. The contraction of the right ventricle pumps deoxygenated blood to the lungs through the pulmonary artery.
4. In the lungs carbondioxide diffuses out and oxygen diffuses in (gaseous exchange). This process takes place in the **alveoli.**
5. Oxygenated blood from the lungs returns to the heart through the pulmonary vein.
6. The left atrium contracts and forces oxygenated blood to flow into the left ventricle.
7. The left ventricle then contracts and pumps oxygenated blood to all parts of the body through the aorta.

Circulation in different body organs.

Lungs

a) Blood that goes to the lungs contains much carbondioxide gas than that leaving the lungs.
b) In the lungs blood loses carbondioxide and gains oxygen i.e becomes oxygenated.
c) The oxygen is carried by the red blood cells.
d) The lungs are served by the pulmonary artery and pulmonary vein.

Intestines

a) Absorption of digested food takes place in the ileum.
b) The inside of the ileum has many tiny finger like projections called villi.
c) The villi have many blood capillaries surrounding them.
d) Dissolved digested food passed through the walls of the villi into the blood.
e) The intestines are supplied by the mesenter artery and drained by the hepatic patal vein.

The liver

a) All the blood coming from the intestines with digested food passes through the liver.
b) The blood is carried by the hepatic portal vein.
c) The liver helps to control the level of sugar in blood.
d) It does this by changing extra glucose to glycogen or glycogen back to glucose.

Other functions of the liver are;

a) It manufactures the bile.
b) It stores iron and vitamins.
c) It detoxicates poisonous substances in the blood e.g alcohol and poison
d) It generates heat in the body

Kidney

a) They are excretory organs
b) As blood passes through the kidney it is filtered and waste products such as urea, excess salts and excess water is eliminated from the body in form of urine.

Skin

a) There is a large network of blood capillaries under the skin surface.
b) As blood circulate through these capillaries, it loses excess heat and this helps to cool the body. (sweating)
c) When the weather is cold, the blood flow to the skin is reduced in order to prevent too much heat loss from the body.

Blood Vessels

a) Arteries
b) Veins

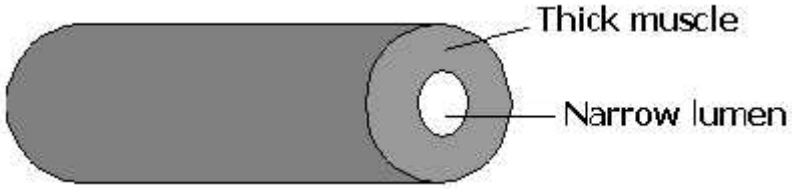
c) Capillaries

Arteries:

1. The Aorta is the main artery.
2. Other arteries:
   a) Pulmonary artery
   b) Renal artery
   c) Mesenteric artery
   d) Hepatic artery

3. **Characteristics of arteries.**
   a) They carry blood away from the heart.
   b) They are thick walled in order to with stand the high pressure of the flowing blood.
   c) They are located deep in the skin.
   d) Carry blood under high pressure.
   e) They have a narrow lumen.

Structure of an artery.



NB: All arteries carry oxygenated blood except the pulmonary artery (this artery carries deoxygenated blood from the heart to the lungs).

The main artery is called the aorta.

The blood pressure in arteries is measured using a sphygmomanometer (BP machine)

Veins

1. Venacava is the main vein.

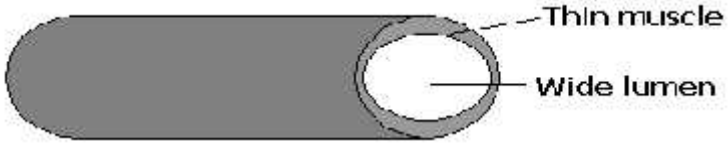
Other veins.

a) Pulmonary vein
b) Hepatic portal vein
c) Renal vein

Characteristics of veins.

a) They carry blood towards the heart
b) They have thin walls.
c) They have a wider lumen to allow smooth flow of blood.
d) They have valves which prevent back flow of blood.
e) They are located at the surface of the skin.
f) Carry blood under low pressure.

Structure of a vein.



NB: All veins carry deoxygenated blood except the pulmonary vein. This vein carries oxygenate blood from the lungs to the left part of the heart.

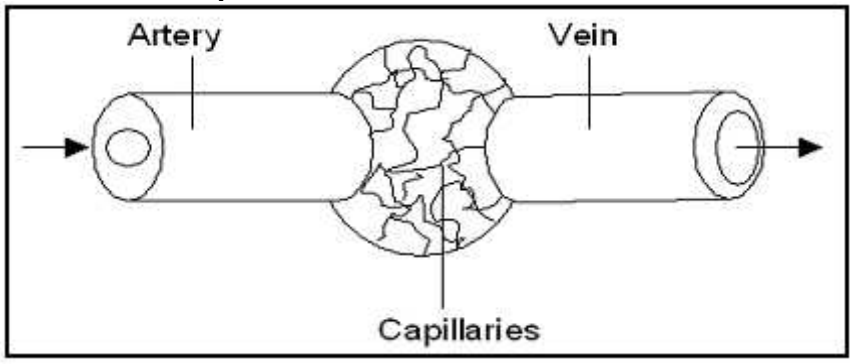
Difference between arteries and veins.

Arteries	Veins
1. Have thick walls.	1. Have thin walls.
2. Have narrow rumen.	2. Have a wider rumen.
3. No values.	3. Have values
4. Carry away from the heart.	4. Carry blood towards the heart.

Capillaries.

a) They are the smallest blood vessel in the body.
b) Their walls are one cell thick.
c) They connect arteries to veins.
d) They allow exchange of materials between the blood and its surrounding to take place.
e) They take food, oxygen and mineral salts to all body cells.

Structure of capillaries.



BLOOD.

Functions of blood.

a) It transports oxygen from the lungs to all body tissues.
b) It transports carbondioxide from body tissues to the lungs.
c) It transports digested food from the ileum to all body tissues.
d) It transports waste products such as urea from the liver to the kidney.
e) It distributes hormones from the glands where they are produced to body parts that need them.
f) The blood platelets help in blood clotting.
g) Blood protects our body from disease infections through h white blood cells.
h) Distribute body heat.

Composition of blood.

1. In an adult there are about 5 to 6 litres of blood.
2. The blood is made up of the liquid and solid parts.

Composition of Solid part

a) Red blood cells.
b) Platelets
c) White blood cells

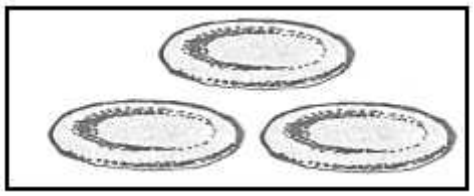
Liquid part

Plasma

Red Blood Cells :

1. They carry oxygen in the body.
2. They are able to carry oxygen by use of haemoglobin (a red pigment) that combines with oxygen to form oxyhaemoglobin.
3. When oxyhaemoglobin reaches the cell lacking oxygen the oxygen on it (breaks off) is released to the cell.
4. They do not have a nucleus.
5. They are thin, round and disc shaped.
6. They are made in the red bone marrow.

Diagram of red blood cells.

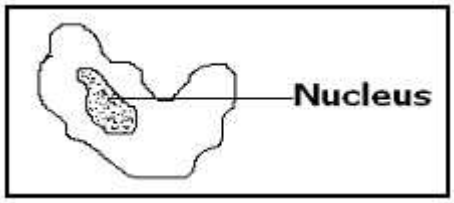


NB: They are the most numerous cells in blood.

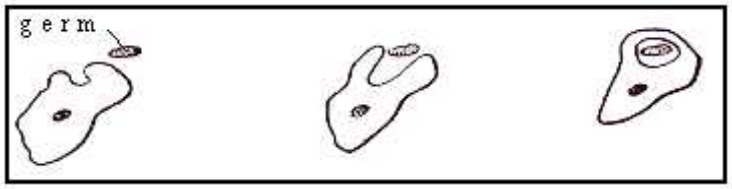
White Blood Cells (Leucocytes)

1. They do not have a definite shape.
2. They have a nucleus.
3. They defend the body against diseases by fighting against disease germs.
4. They produce antitoxins that neutralise poison produced by germs in the body.
5. They fight germs in the body by engulfing them.
6. White blood cells are made in the bone marrow.

Diagram of white blood cells.



How white blood cells engulf germs



Therefore the white blood cells defend the body in two ways.

a. By engulfing and digesting the germs.

b. By producing antibodies against the germs.

Differences between red and white blood cells

White blood cells	Red blood cells
Have nucleus	Don't have nucleus
Have no definite shape	Disc shaped
Defend the body	Carry oxygen

Platelets.

1. They are tiny cells found in blood.
2. They help in the clotting action of the blood when there is bleeding.
3. When blood clots at the place of injury it closes the wound and stops further bleeding.

Diagram of platelets.



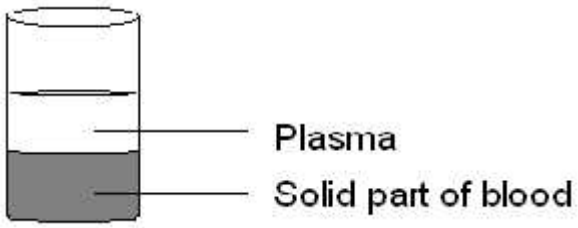
1. Platelets are made in the red bone marrow.
2. They don't have nuclei.
3. They are responsible for clotting action of blood.

Blood clot formation:

1. When the skin is cut and blood starts oozing out.
2. The platelets come and form a network of fibers to prevent further loss of blood.
3. Food rich in vitamin K e.g. Cabbages help in formation of platelets.
4. White blood cells sense danger and collect around the wound to engulf and fight germs (pathogens).
5. During the fight the white blood cells and germs die forming pus.

Plasma.

1. It is the liquid part of the blood.



2. Plasma is responsible for transporting the following:
   a. Water
   b. Blood protein
   c. Dissolved food
   d. Mineral salts
   e. Urea
   f. Carbon dioxide
   g. Hormones

Types of blood

a. Oxygenated blood.
b. Deoxygenated blood.

1. Oxygenated blood is the type blood which contains a lot of oxygen.

2. Deoxygenated blood is the type of blood from which oxygen has been utilized.

Differences between oxygenated and deoxygenated blood

Oxygenated blood	Deoxygenated blood
Bright red	Dark red.
A lot of oxygen	Has little oxygen
Has little carbondioxide	Has a lot of carbondioxide

BLOOD GROUPS

1. The amount of blood in the body of the health adult person ranges between 5litres to 6 litres.
2. If blood falls below this normal, then the person becomes anaemic or becomes sick of anaemia.
3. Anaemia is a condition where a body lacks enough blood.
4. A person with anaemia can be given blood through blood transfusion.
5. The four blood groups include the following:
   a. Group A
   b. Group B
   c. Group AB
   d. Group O

BLOOD TRANSFUSION

1. Blood transfusion is the process of introducing blood into the body of an anemic person.
2. A person who gives blood is called **donor.**
3. A person who receives blood is called a receiver or recipient.

Recipient	Donor
A	A and O
B	B and O
AB	A, B, AB and O
O	O

1. From the table above a person whose blood group is AB can receive blood from any person, therefore, he is called a **universal recipient.**
2. A person whose blood group is O can give blood to any group therefore, he is called a **universal donor.**

DISEASES AND DISORDERS OF CIRCULATORY SYSTEM.

1. **Anaemia.**
   a) It is caused by lack of enough iron in the diet.
   b) When the body lacks iron it cannot make red blood cells.
   c) The patient with anaemia feels short of breath, weak and gets tired very easily.

Conditions that may lead to anaemia.

a) Destruction of red blood cells due to malaria
b) Excessive bleeding
c) Lack of iron in the diet

Prevention and control of anaemia.

a) Feed on foods rich in iron.
b) Give the patient tablets containing iron minerals.
c) Treat malaria early enough
d) Blood transfusion.

2. **Leukaemia**

It is a type of blood cancer where there is uncontrollable increase in the number of white blood cells.

3. **Sickle cell disease.**

a. It is a hereditary disease that make red blood cells to be sickle shaped.
b. The sickle shaped red blood cell are unable to carry enough oxygen in the body.
c. The sickle shaped cells prevent easy flow of blood through the blood vessels.
d. Sickle cell disease causes fingers, legs and arms to smell and become very painful.
e. Most children who suffer from this disease die at an early age.

4. **Haemophilia**

a) It is a condition where one's blood is not able to clot easily.
b) A small cut on the body can lead to a lot of bleeding.
c) It is a hereditary disease.

5. **Malaria**

a) It is caused by the plasmodia germs and spread by a female anopheles mosquito.
b) Plasmodia parasites attack the red blood cells and destroys many of them.
c) It can lead to anaemia.
d) Malaria reduces the ability of blood to carry oxygen.

6. **Coronary heart disease (Heart attack)**

a) It is a condition where the heart muscles fail to get enough blood supply.
b) This condition is brought about by a blockage in the coronary arteries.
c) If fatty deposits (atheroma) form on the inside of these arteries, they become narrower and later get blocked by blood clots called thrombus.
d) The blood clot block the artery and blood flow is reduced or stopped.
e) The heart becomes weak and this leads to heart attack that result into death.

Prevention

a) Do regular physical exercises
b) Avoid being overweight
c) Avoid smoking because nicotine and carbondioxide increases chances of formation of blood clots.

7. **AIDS.**

a) The AIDS causing virus is called by HIV (Human Immune Deficiency Virus)
b) The HIV-virus attacks the white blood cells and destroys the defense system of the body **i.e** The AIDS sufferer is unable to protect himself against various diseases.
c) HIV-virus can be spread through:
   - Having un protected sexual intercourse with an infected person.
   - Transfusion with infected blood

- Infected mothers to their unborn babies during birth
- Sharing skin piercing instruments with an infected person.

Traditional practices that encourage spread of HIV-virus.

a) Inheritance of widows
b) Carrying out circumcision using one cutting instrument on several people
c) Body tattooing

Prevention and control

a. Be faithful to your partner
b) Abstain from sex
c) Use a condom
d) Screening blood before transfusion

A , B , C

e) Avoid sharing skin piercing instruments with other persons.

HUMAN HEALTH.

ALCOHOL IN SOCIETY.

1. Alcohol is a colourless liquid drug contained in alcoholic drinks which once taken in excess makes a person drunk.

Examples of alcoholic drink:

a) Beer
b) Wine
c) Whisky
d) Spirits

Types of alcohol

a) Methyl alcohol
b) Ethyl alcohol

Methyl Alcohol (Methanol)

1. It is poisonous if taken.
2. Causes death or blindness.
3. It is used for medical and industrial purposes.

Ethyl Alcohol (Ethanol)

1. It is mostly found in alcoholic drinks.
2. It can make a person drunk if taken in excess.

Uses of alcohol.

1. It is a source of income to both the government and individuals.
2. It is used as fuel in car engines (Gasohol)
3. It is used to mix cosmetics and drugs.
4. It is used as a disinfectant to prevent wounds from getting septic.
5. It is used as a food preservative.
6. It is used as an ingredient in some medical drugs.
7. Doctors use alcohol to sterilise medical instruments (clinical thermometer)
8. It is used in thermometers (sixth thermometer because it can't freeze easily).
9. It is used in social ceremonies (party e.t.c)

Production of alcohol.

1. Fermentation method
2. Distillation method

Fermentation method.

1. It is a method of producing alcohol by turning sugar and water into alcohol and carbondioxide by the help of yeast.
2. Yeast is a fungi that grows on germinating millet grains or sorghum.
3. Sugar for fermentation can be got from fruits and cereals.
4. Examples of fruits include; paws, grapes, and sweet bananas.
5. Cereals include; maize, millet, sorghum and barley
6. The yeast help to make the fermentation process faster but remains unchanged.

Examples of locally fermented alcoholic drink;

a). Tonto – banana juice
b). Malwa
c). Kwete
d). Munanansi
e). Mulamba
f). Ajan

NB: Alcohol produced through fermentation has a low content of alcohol (ethanol)

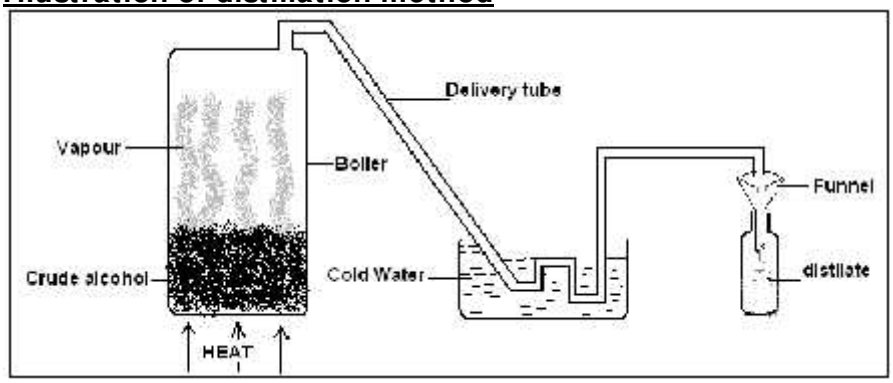
Distillation method.

1. This is a method of obtaining pure alcohol from an impure one (crude)
2. This method involves boiling the crude beer until it evaporate and the vapour is condensed to form pure alcohol.
3. The pure alcohol collected is called a **distillate**.
4. In this case, fermented alcohol is boiled to vapour which is then condensed to produce alcohol.
5. When distilling, pure alcohol comes out first because alcohol has a low boiling point than water.
6. Alcohol boils at 78oC which water boils at 100oC at sea level.

Examples of distilled alcohol.

Locally made	Industrially made
waragi	Dollar
kasese	Vodka
liralira	Tyson waragi
	All spirits

Illustration of distillation method



Why people take alcohol.

a) To entertain themselves (happiness)
b) To forget their problems (frustration)
c) Peer pressure (associate with friends)
d) To quench thirst.
e) To spread their leisure.
f) To become courageous and confident.
g) To get strength.
h) To show that they are rich.
i) To improve mental performance.

Effects of alcohol to the body.

1. When alcohol is taken, it is absorbed through the stomach into the blood stream.
2. The blood takes it to the liver where it is broken into water, carbondioxide and sometimes fats.
3. If it is too much it continues to the brain and slows down its functioning.

Myths about alcohol

A myth is false belief. They include

a) Alcohol quenches thirst.
b) Alcohol helps you to forget problems.
c) Alcohol improves on mental performance.
d) Those who do not take alcohol are weak.

How alcohol affects the brain.

a) It loses balance (staggering)
b) Speech becomes slowed.
c) Frequent urination
d) Vision becomes blurred (double vision)
e) Loss of judgment.

Alcoholism:

1. It is a condition where a person becomes dependant on alcohol.
2. Alcohol dependence is a condition where one's body cannot function normally before taking alcohol.
3. Tolerance to alcohol is a state where a person needs large quantities of alcohol in order to feel an effect.

Effects of alcoholism to individuals

a) It causes liver diseases. Cells in the litter are slowly damaged and replaced by non-functional cells (cirrhosis or liver cancer)
b) It causes stomach ulcers.
c) It causes malnutrition (negligence to eat)
d) It causes self neglect
e) It leads to loss of employment
f) It leads to loss of income.
g) Loss of respect
h) Pregnant women who drink may give birth to under weight babies and mentally retarded babies.
i) It causes brain damage.

Signs of brain damage ;

a. Forgetfulness
b. Inability to concentrate in a task.
c. Body tremours
d. Inability to sleep (insomnia)
e. Mental confusion (madness)

Effects of alcoholism to families.

a) Alcoholism causes family neglect.
b) Loss of family income.
c) Child and spouse abuse.
d) It can lead to family breakage.
e) Children from an alcoholic family may copy a bad example from their parents (parents show a bad example to their children).

Effects of alcoholism to community.

a) Job neglect.
b) It leads to poverty.
c) Alcoholism leads to Road accident.
d) Alcoholism can lead to high crimes rate.
e) Alcoholism leads to easy spread of AIDS.
f) Many alcoholics are aggressive and violent in society.
g) Many alcoholics are not low abiding.

Safety measure against alcoholism (control)

1. Do not start drinking alcohol (say no)
2. Avoid friends who drink alcohol.
3. Find something to do during your leisure time.
4. Learn more about the dangers of alcohol and its effects.
5. Parents should not give children alcohol or take children with them to drinking places.
6. Discourage friend who talk about starting to drink alcohol.

The Uganda laws on alcohol.

1. All forms of home distillation, possession, transportation and sale of distilled alcohol are not allowed by law.
2. Bars where alcohol is sold should maintain standards as laid down in the public health law.
3. Bars should observe the time of opening and closing.
4. Persons under 18 years are not allowed to drink alcoholic drinks in public places.
5. Driving motor vehicles under the influence of alcohol is prohibited.

TOBACCO SMOKING

Uses of tobacco:

1. People grow tobacco for the following reasons:
   a) Tobacco growing is a source of income and employment.
   b) Tobacco is a repellant to pests and snakes.
   c) Tobacco leaves are used for smoking.

SMOKING:

Ways of smoking:

1. Smoking is the process inhaling tobacco or smoke from it into the body.
2. Smoking can be done by inhaling tobacco smoke from a pipe or cigarette.
3. Smoking can be done by sniffing tobacco powder.
4. Smoking can be done by chewing tobacco leaves.

Forms of smoking:

1. Smoking can be done through passive or active smoking.
2. Active smoking is the practice of drawing and inhaling smoke from a pipe or a burning cigarette.
3. Passive smoking is inhaling smoke from an active smoker.
4. An active smoker is the person who draws and inhales smoke from a pipe or burning cigarette.

5. A passive smoker is a person who inhales smoke from an active smoker.

Reasons why people smoke:

1. Some people smoke to pass time.
2. Some people smoke to fit in a group of smokers.
3. Some people smoke because they are addicted to nicotine or tar.
4. Nicotine is the addictive drugs in tobacco.
5. Some people smoke to show that they are mature.

Effects of smoking on our health:

1. Regular smoking causes lung cancer.
2. Regular smoking causes heart coronary diseases.
3. Regular smoking causes peptic ulcers.
4. Regular smoking can cause throat cancer.
5. Regular smoking can cause lip cancer.
6. Regular smoking can cause staining of teeth with tar.
7. Regular smoking increases the risk of catching chronic bronchitis.
8. Regular smoking increases the risk of catching Emphysema.
9. Regular smoking increases the effects of Asthma on the respiratory system.

Effects of smoking on an individual:

1. Regular smoking causes self-neglect.
2. Smoking can cause job neglect.
3. Regular smoking can cause antisocial behaviour.

Effects of smoking on a community:

1. Active smoking causes passive smoking.
2. Regular smoking causes poverty.

Controlling tobacco smoking in a community:

1. Educating the public about the dangers of smoking.
2. Prohibiting tobacco advertisements in print and electronic media.
3. Forming sports clubs and drama groups to control idleness among people.
4. Canselling and rehabilitating tobacco addicts.

DRUGS.

Medical drugs:

1. Drugs are chemicals that affect the way the body or the mind works.
2. Medical drugs are chemical substances that are used to treat or prevent diseases.

Uses of medical drugs:

1. Drugs can be used to treat diseases.
2. Vaccines are used to immunize the body against diseases.
3. Drugs are used relieve pain.
4. Drugs can used to prevent germ infection.

Types of medical drugs:

1. Medical drugs are grouped essential drugs and restricted drugs.
2. Restricted drugs are drugs that can only be administered under the supervision of a trained medical worker. i.e. Penicillin, Ampicillin, T.B drugs,etc...
3. Essential drugs are those used to treat common diseases.

Characteristics of essential drugs:

1. Essential drugs are easy to use without the involvement trained health workers.
2. Essential drugs are cheap and affordable.
3. Essential drugs have a proven curative value.
4. Essential drugs should be easily available in the community.

Types of essential drugs:

1. Essential drugs are grouped into factory made drugs and local drugs.
2. Factory-made drugs are those produced in industries. i.e. panadol, aspirin, chroloquine, etc...

Advantages of using factory made drugs:

1. Factory-made drugs are pure and clean.
2. Factory-made drugs are properly packed.
3. Factory-made drugs are produced under hygienic conditions.
4. Factory-made drugs take a long time to expire.
5. Factory-made drugs are easy to prescribe because the chemical composition can easily be established.
6. Factory-made drugs have production and expiry dates.

Disadvantages of factory made drugs:

1. Factory-made drugs are expensive.
2. Factory-made drugs can easily lead to body poisoning through over dosage.

Local drugs:

1. Local drugs are those drugs available in the environment.
2. Local drugs include leaves from plants, roots, barks of trees, seeds, etc...

Advantages of local drugs:

1. Local drugs are cheap.
2. Local drugs contain both medical and nutritional benefits.

Disadvantages:

1. Local drugs are sometimes prepared under in hygienic conditions.
2. Local drugs take a short time to expire.
3. Local drugs are not easy to prescribe because their chemical composition cannot be easily determined.

Drug misuse:

1. Drug misuse the use of drugs without following the prescription.
2. Prescriptions are instructions under which a particular drug should be used.
3. Drug prescriptions help to prevent overdose, underdose, poisoning.

Ways in which drugs are misused:

1. Sharing drugs prescribed for one person can cause drug misuse.
2. Wrong route application of the drug.
3. Self-medication can cause drug misuse.
4. Failure to complete the prescribed dose.
5. Using many types of drugs to treat the same sickness.

Effects of drug misuse:

1. Over dosage.
2. Under dosage.
3. Germ resistance to treatment.
4. Miscarriages in pregnant women.
5. Injection abscess.

Drug abuse:

1. Drug abuse is the use of un prescribed drugs. OR Drug abuse is the use of drugs in a way that is harmful to the body.
2. Drug abuse involves both legal and illegal drugs.
3. Legal drugs commonly abused include tobacco, alcohol, pain killing drugs
4. Illegal drugs commonly abused include opium, heroin, cocaine, Mira, gum, jet fuel, etc...
5. A narcotic drug is a drug that relieves and brings about sleep.
6. A stimulant is a drug that can increase physical ability beyond the normal operational levels.

Reasons why people abuse drugs:

1. People abuse drugs to reduce chronic pain.
2. People abuse drugs to enhance body performance.
3. People abuse drugs to fit in a group of drug addicts.
4. People abuse drugs because they are dependent or addicted to the drugs.
5. People use drugs to enhance pleasure.

Effects of drug abuse:

1. Abuse of narcotic drugs can cause mental disorders. i.e. insomnia. Insomnia is the inability to sleep.
2. Drug abuse can cause mouth and stomach ulcers.
3. Drug abuse causes heart coronary diseases.
4. Drug abuse causes poverty.
5. Drug abuse can cause body poisoning.
6. Drug abuse causes self and family neglect.
7. Use of narcotic drugs causes criminal behaviour.
8. Drugs can cause job neglect and unemployment.

Control of drug abuse:

1. Community members should be educated on the dangers of drug abuse and drug misuse.
2. Community members addicted and who are dependent on drug should be rehabilitated and counselled.
3. Avoid the company of people who are already on drugs.
4. Enforcement of laws prohibiting the use and trafficking of narcotic drugs.
5. Engage in drama or sports activities to avoid idleness.

Term II

THEME: WORLD OF LIVING THINGS.

TOPIC: FLOWERING AND NO-FLOWERING PLANTS.

CONTENTS: NON-FLOWERING PLANTS.

1. Plants are grouped into flowering and non-flowering plants.
2. Non-flowering plants are plants that do not develop flowers.
3. Groups of non-flowering plants include mosses, algae, ferns, lichens, liverworts and conifers.

MOSSES:

1. Mosses are tiny green plants that commonly grow on bricks, walls, barks of trees, where enough moisture can enable them to grow.
2. Mosses grow in a tuft (group) because they use their interwoven roots to keep water for future use.
3. Mosses reproduce by spores.
4. The spores of mosses are produced and stored in a capsule (spore case).

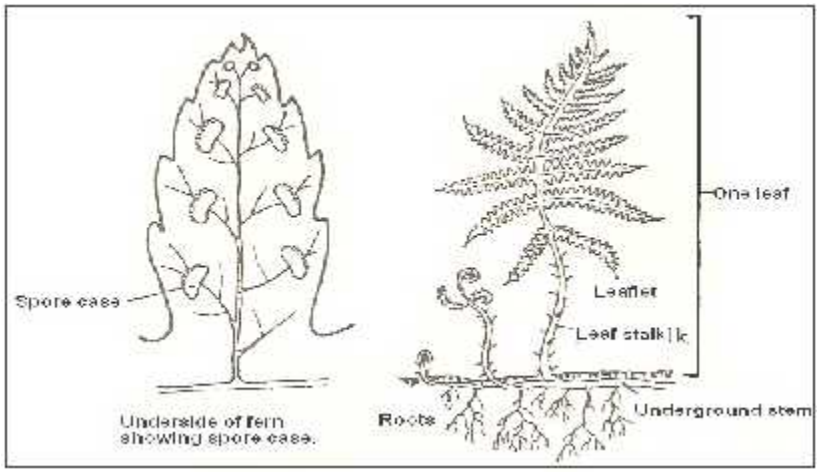
A MOSS PLANT:



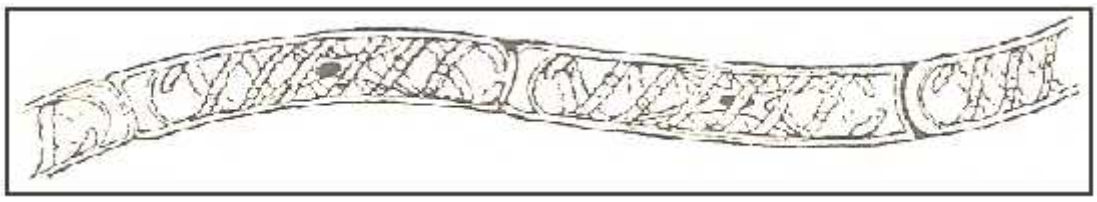
FERNS:

1. Ferns have underground stems with adventitious roots.
2. Ferns reproduce by spores that grow in special spore cases on the back of the leaves.
3. Ferns are used for decoration in some communities.

A FERN:



ALGAE:



1. Algae grow in a water environment.
2. Algae do not have proper leaves, stems or roots.
3. Algae breathe oxygen dissolved in water.
4. Algae include the spirogyra, sea- weeds, etc...
5. Sea- weeds reproduce by spores.
6. A spirogyra reproduces by cell division (fragmentation).
7. Water animals feed on some types of algae.
8. Algae make our water containers dirty.
9. Algae block drainage channels and water pipes.

LICHENS:

1. Lichens commonly grow on rocks, barks of trees, walls, etc...
2. Lichens are formed from a symbiotic relationship between a fungus and alga.
3. Lichens reproduce by spores.
4. LIVERWORTS:
5. Liverworts grow in water and commonly appear as floating leaves.
6. Liverworts reproduce through spores.

CONIFERS:

1. Conifers have proper roots, up right stems and small needlelike leaves.
2. The needlelike leaves help conifers in reducing the rate of transpiration in dry conditions.
3. Conifers reproduce by special seeds found in cones. Cones do not develop from flowers.
4. Conifers include pines, Cyprus, cedar, etc.…
5. Conifers provide people with softwood for making soft boards and wood pulp. Wood pulp is used to make paper.
6. Conifers are used for firewood.
7. Conifers are used for building materials.

FLOWERING PLANTS:

6. Flowering plants are plants that bear flowers.
7. A flowering plant consists of two systems; namely:
   a) Shoot system.
   b) Root system

<u>Shoot system.</u>

3. The shoot system is the part of the plant which grows above the ground level.
   The shoot system consists of :
   a) A stem
   b) Leaves
   c) Auxillary bud
   d) Terminal bud
   e) Fruits
   f) Flowers
   g) Nodes and internodes

The root system

1. This system is part of the plant that grows below the ground level.
2. the root system consists of the following;
   a) The taproot/fibrous roots
   b) The root hairs.
   c) Root cap
   d) Lateral roots.

2. Flowering plants are divided into two groups:
   a) Monocotyledonous plants
   b) Dicotyledonous plants.

MONOCOTYLEDONOUS PLANTS

1. These are plants that produce seeds with one cotyledon.

Examples of monocotyledonous plants:

a) All cereals eg. Rice, Maize, Sorghum, Millet, wheat etc.
b) Grasses.

Characteristics of monocotyledonous plants

1. They develop a fibrous root system.
2. They undergo hypogeal germination. In hypogeal germination, the cotyledon of the germinating seed remains under the ground.
3. They have leaves with parallel veined.
4. They develop seeds with one cotyledon.

DICOTYLEDONOUS PLANTS

These are plants which develop seeds with two cotyledons.

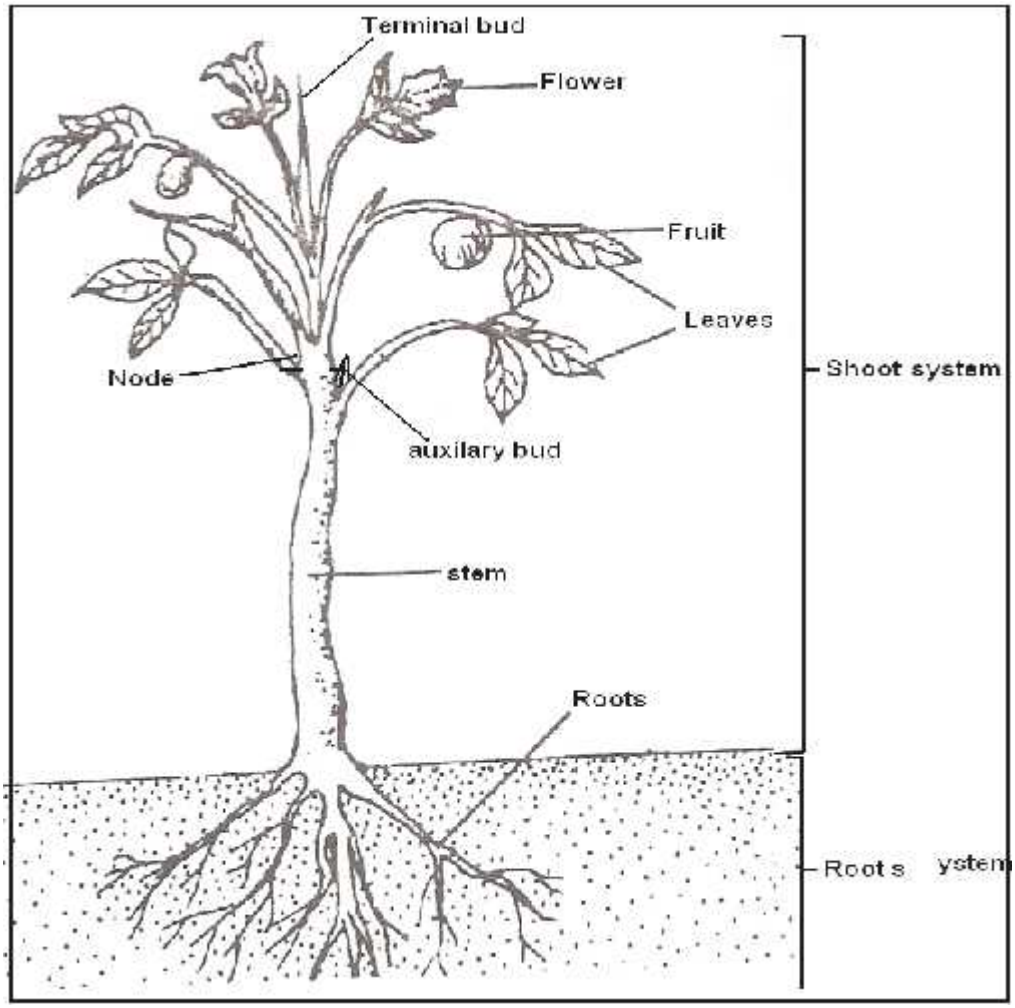
Examples of dicotyledonous plants.

a) All leguminous plants eg. Beans, ground nuts, peas, Soya beans etc
b) Most of the trees.

Characteristics of dicotyledonous plants

1. They develop a tap root system.
2. They develop net veined leaves.
3. They undergo epigeal germination.
4. They develop seeds with two dicotyledons.

STRUCTURE OF A FLOWERI NG PLANT:



Functions of each part:

Roots:

A root is a part of a plant which grows in the soil.

Functions of roots to the plant.

a) Roots hold the plant firmly in the ground.
b) Roots absorb water and mineral salts from the soil.
c) Some roots store food for the plant. Eg Root tubers.
d) Some roots help to give plants extra support.
e) Air roots help plants to breathe.
f) Roots transport water and mineral salts to the stem(shoot)

Uses of roots to man.

a) Some are used as food to man. e.g. Cassava., Sweet potatoes, carrots etc.
b) Some are used as local medicine.
c) Roots from wood trees can be used as fuel.
d) Roots of leguminous plants store nitrogen-fixing bacteria that add nitrates in the soil.

ROOT SYSTEMS:

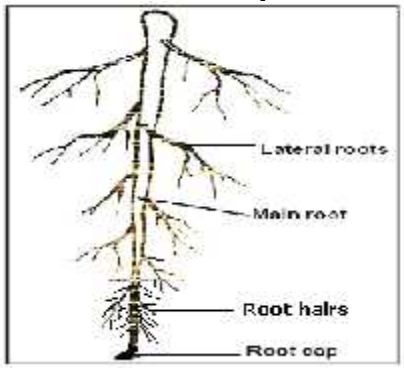
There are two types of root systems namely:

a) Tap root system
b) Fibrous root system.

Tap root system

1. This is the main root that develops from the radical at the time of germination and grows vertically into the soil.
2. The taproot develops lateral roots as the plant grows.
3. Most dicotyledonous plants have the tap root system.
4. The end of a taproot is called a root cap.
5. A root cap helps to protect the taproot as it grows down wards.
6. A root cap also helps to break the ground for the root during growth.

Structure of a taproot.



Note:

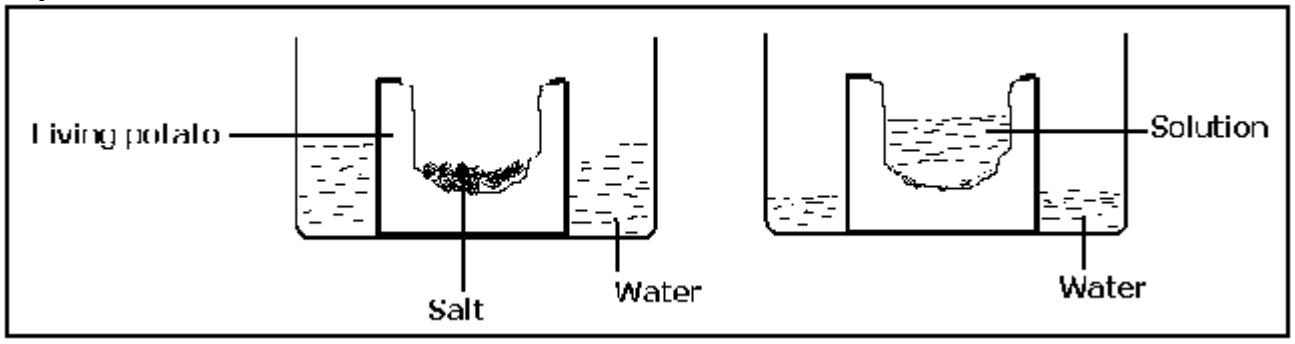
Root hair

a) They are small hair like growth of lateral roots.
b) They absorb water and mineral salts from the ground by the process of **osmosis.**

OSMOSIS

1. Osmosis is the movement of water molecules from a region of low solute concentration to a region of high solute concentration through a semi permeable membrane.
2. Osmosis enables plants to absorb water and mineral salts from the soil.
3. The sup in the root hair has a high solute concentration than the surrounding soil particles such that water is able to move from the soil top the roots.
4. Water is able to move up to the leaves by capillary attraction and transpiration pull.
   Note: plant roots need oxygen for respiration.

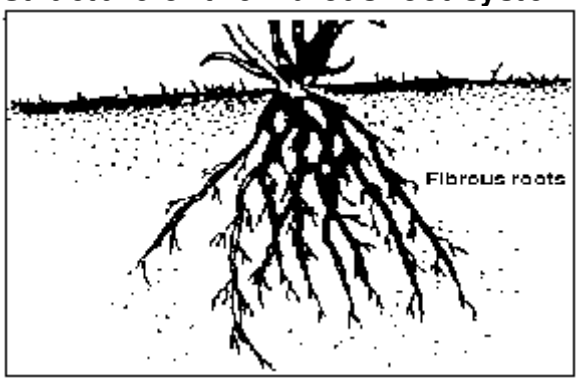
Experiment about osmosis.



Fibrous root system:

1. These are several roots that grow randomly from the radicle.
2. This type of root system has no main root.
3. Most monocotyledonous plants develop fibrous roots.

Structure of the fibrous root system.



TYPES OF ROOTS:

ADVENTI TI OUS ROOTS:

a) These are roots that develop from other parts of the plant which is not the radicle. E.g the stem and the leaves.
b) This type of roots is common with underground and creeping (running) stems.

<u>Examples of adventitious roots</u>

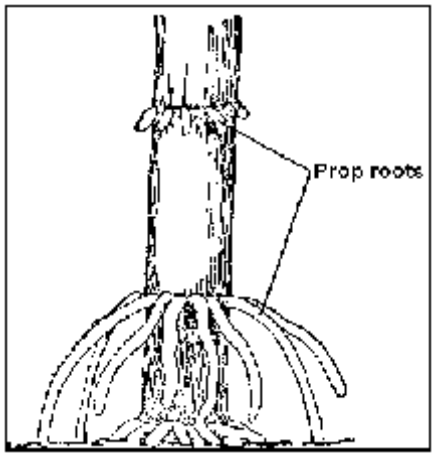
a) Prop roots
b) Clasping roots.
c) Buttress roots.
d) Breathing roots.
e) Storage roots.
f) Stilt roots.

PROP ROOTS:

1. These roots develop from the nodes of some plants.
2. Their main function is to provide more support to the plants.

<u>Examples of plants with prop roots.</u>

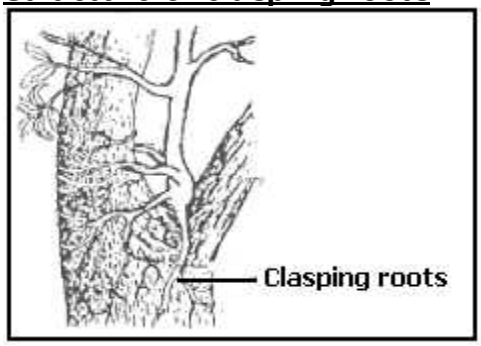
a) Maize
b) Sorghum
c) Sugar cane.
d) Reeds
e) Bamboo etc



CLASPI NG ROOTS

1. These roots are found on climbing plants growing around for its support.
2. They enable plants to attach themselves on other plants.
3. Many parasitic plant have such roots.

Structure of clasping roots



BUTTRESS ROOTS:

1. Buttress roots commonly grow on very big trees such as Mvule tree, jack fruit tree etc..
2. Buttress roots are triangular in shape to strengthen the base of the tree.
3. They give extra support to big trees to withstand strong winds.

Structure of the buttress roots:



BREATHI NG ROOTS:

1. These roots are common in plants that grow bin swampy places. E.g mangroves.
2. They take in air for the respiration of roots because soil with a lot of water does not have air.
3. These roots branch off from other roots and grow upwards.

Structure of breathing roots

Stilt roots.

1. They are found on plants that grow in muddy areas of the swamps.
2. They give extra support to the plant.

Structure of stilt roots

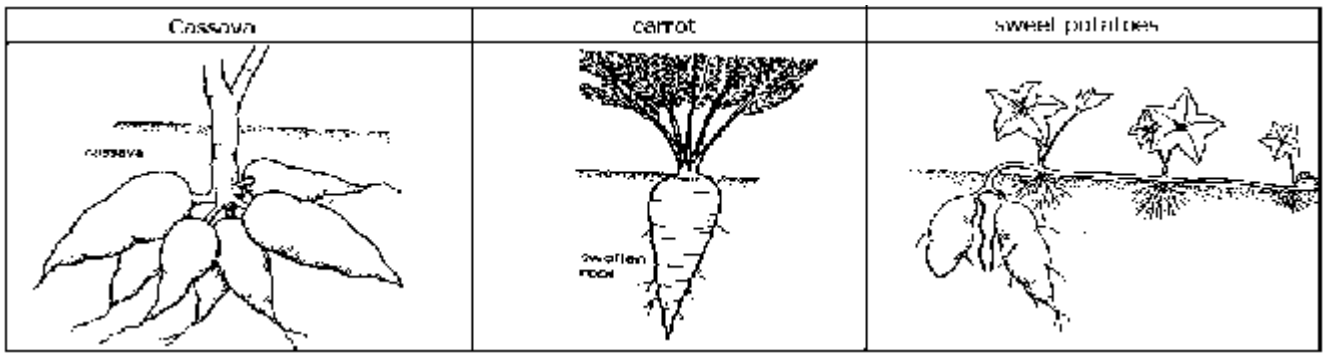
Root tubers/ Storage roots:

These are roots that store food mainly starch.

Examples of root tubers

a) Cassava tubers
b) Sweet potatoes
c) Carrots
d) Sugar beet,
e) Turnips, etc.…

EXAMPLES:



STEMS:

1. A stem is a part of a plant with buds on it.
2. A plant develops three types of buds namely: flower buds, auxiliary buds and terminal buds.
3. Flower buds develop into flowers.
4. Terminal buds develop into leaves and the stem.
5. Auxiliary buds develop into leaves and branches.

Functions of a stem to a plant:

a) It spaces leaves so that they can receive adequate air and sunlight.
b) It holds the flowers and fruits for proper pollination and dispersal
c) It conducts water and mineral salts from the roots to the leaves.
d) It transports food from the leaves to other parts of the plant.
e) Some stems store food for the plant e.g. coco yams, sugar cane, Irish potatoes etc
f) Some stems with chlorophyll make food for the plant.

g) Some stems are used for propagation

Uses of stems to man/ animals:

1. Stems can used as building materials.
2. Stems can be used for fuel such as firewood and charcoal.
3. some stems are used as medicine
4. Some stems are used as food for the animals
5. Some stems are used as human food e.g. Irish potatoes

Parts of a stem:

a) Terminal bud-This is the growing tip of the plant.
b) Axil This is the angle between each leaf and the stem.
c) Auxiliary bud-This can grow into a branch or a leaves.
d) Anode-This a part of the stem where a leaf is fixed
e) Internode- This is the distance between the two nodes.

TYPES OF STEMS:

a) Upright or erect stem
b) Creeping stems/ Runners
c) Underground stem
d) Climbing stems

.

Upright stems (erect stems):

c) This are common stems found on either dicotyledonous or monocotyledonous plants.
d) Upright stems grow upwards vertically to the ground.

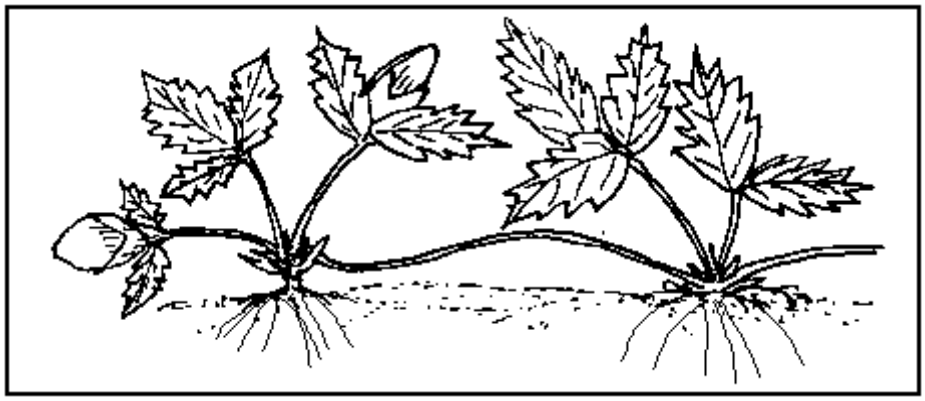
Examples include:

a) Woody plants e.g. Trees
b) Sorghum
c) Beans
d) Maize

Creeping stems (runners):

(i) Creeping stems are the stems that grow horizontally along the ground.
(ii) Creeping stems develop adventitious roots.
(iii) Their stems are weak
(iv) They include:
    a) Sweet potatoes,
    b) Pumpkin,
    c) Straw berry
    d) Carpet grass

DI AGRAM OF A CREEPI NG STEMS:

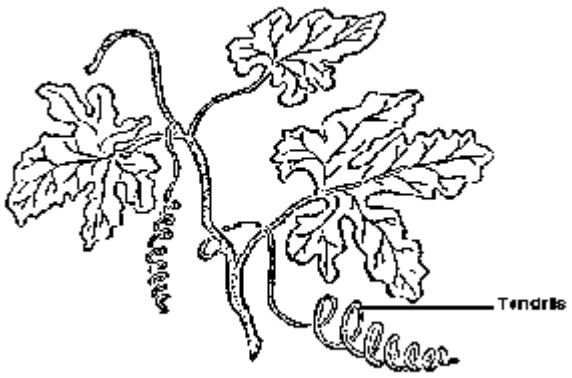
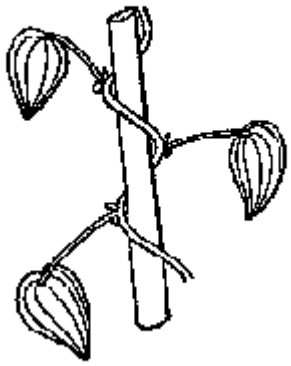


CLIMBING STEMS:

(i) These are weak stems which cannot support themselves up right so they others plants.
(ii) Climbing stems are the stems that climb other plants for support.
(iii) Plants climb others to get enough sunlight.
(i) Plants climb others to expose their flowers to agents of pollination.
(ii) Plants climb others to expose their fruits or seeds to agents of seed dispersal.

Methods used by climbing stems:

(a) Twisting (twinning)
(b) Hooking using thorns.
-Some plants climb by using hooks
-Hooks are down ward pointing structures which prevent the climber from slipping off the other plant.
(c) Using tendrils to grasp the other plants.
(d) Using clasping roots.

Climbing by Tendrils	Climbing by Twinning
	

UNDERGROUND STEMS:

a) Underground stems are the stems that commonly grow under the ground.
b) They have lateral/axillary buds, which grow into shoots
c) They have scaly leaves at nodes.

Examples of Underground stems

a) Corms
b) Rhizomes
c) Stem tubers
d) Bulbs.

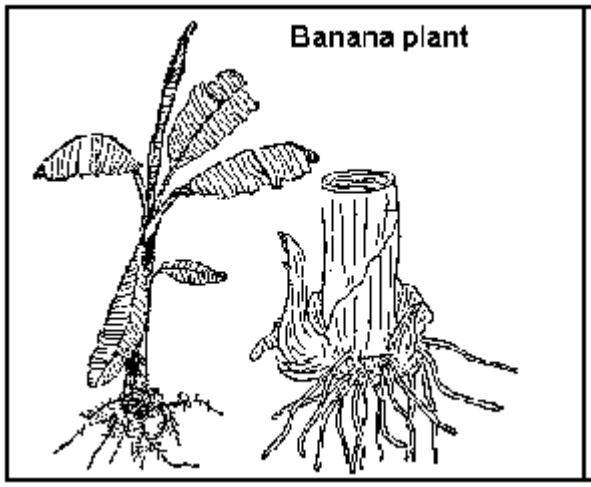
CORMS:

a) A comb is a short vertical underground stem swollen with stored food
b) Corms develop scale leaves.
c) Corms develop adventitious leaves.
d) Corms grow upwards from under the ground and produce a pseudo stems that has leaves. The leaves manufacture food and store it in the stem under the ground.
e) Corms reproduce through suckers.
f) Corms store their excess food in the stems.

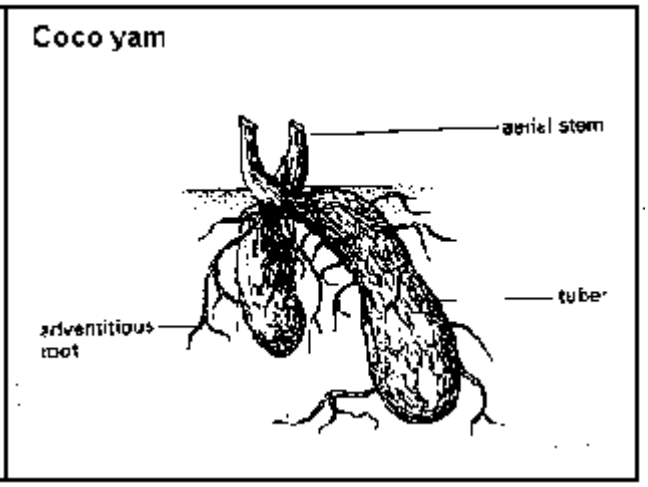
Examples of Corms

a) The coco yam,
b) The banana plant,
c) The crocus, etc….

DI AGRAM OF A BANANA



DI AGRAM OF A COCOYAM:



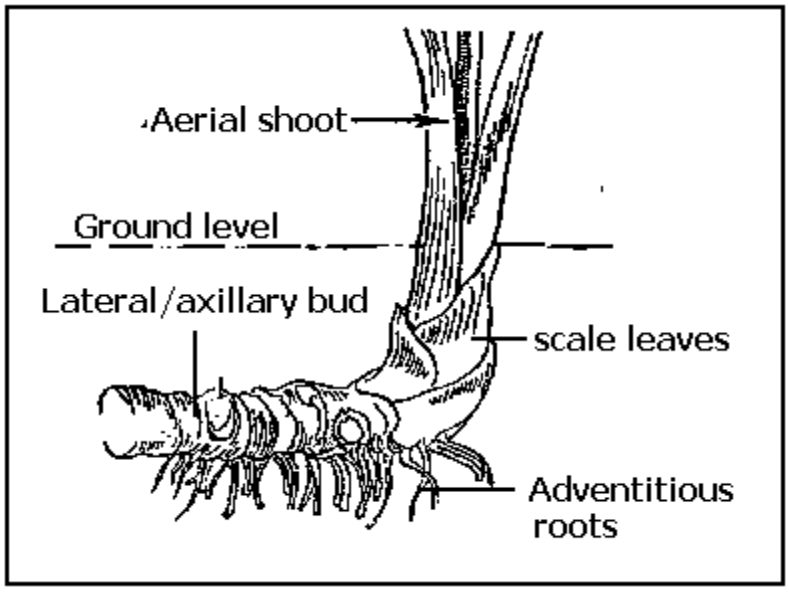
RHI ZOMES:

a) A Rhizomes is a horizontal underground stem.
b) Rhizomes reproduce by budding.
c) They swell due to the stored food
d) They have adventitious roots.

Examples of Rhizomes

a) The Canalily
b) The ginger lily
c) Coach grass
d) Spear grass,
e) Zoysia
f) Turmeric

A DIAGRAM OF A GINGER LILY:



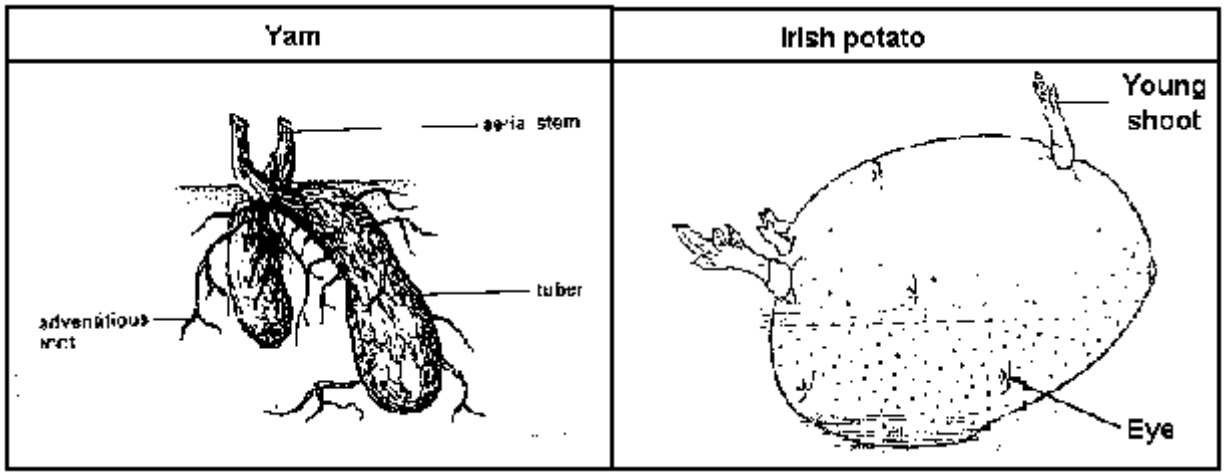
STEM TUBERS:

a) Stem tubers are the swollen underground stems.
b) Stem tubers reproduce by budding. The adventitious roots and lateral shoots develop from special buds called the eye.

Examples of Stem tubers

a) Irish potatoes
b) yams, etc…

THE YAM TUBER: **THE IRISH POTATO TUBER:**

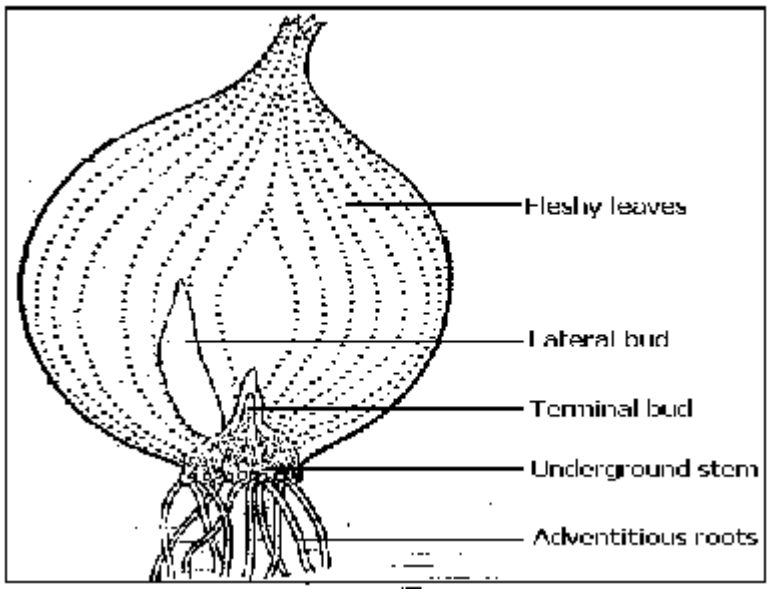


BULBS:

A bulb is condensed shoot with fleshy leaves.

a) Bulbs are underground stems that keep their excess food in the swollen scale leaves.
b) Bulbs reproduce by budding.
c) They have adventitious roots
d) When used as food, bulbs are rich in iodine.
e) Bulbs include onions, tulips, garlic, etc…

STRUCTURE OF AN ONION:



Functions of each part.

a) Foliage leaves manufacture food for the plant
b) Storage leaves/ fleshy leaves store food for the plant.
c) Scale leaves protect the fleshy leaves.
d) The stem provides attachment to the leaves.

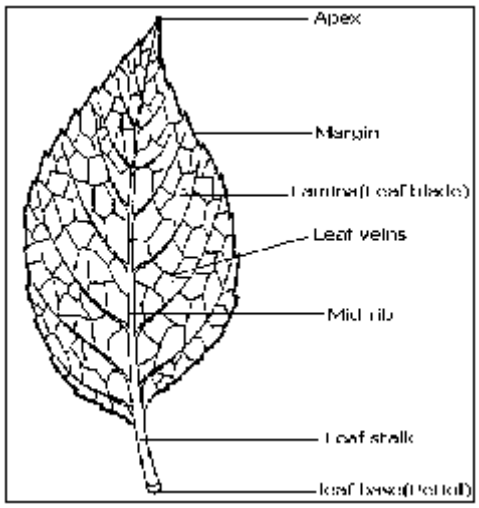
LEAVES:

Leaves develop from auxiliary and terminal buds.

<u>Importance of leaves to a plant</u>:

a) Leaves make food for the plant.
b) Leaves allow plants to breathe.
c) Leaves carry out transpiration.
d) Some leaves store food.
e) Some leaves help plants to reproduce through vegetative propagation.

STRUCTURE OF THE LEAF:



FUNTIONS OF THE PARTS:

Leaf stalk

a) The leaf stalk connects the leaf to the stem.
b) The leaf stalk helps to transport water and mineral salts from the stem to the leaf blade.
c) The leaf stalk helps to transport food from the leaf to the stem.

Lamina (leaf blade)

a) The lamina is the flat part of the leaf. It contains chloroplasts, stomata and veins.
b) Chloroplasts are the bags that contain chlorophyll. Chlorophyll helps to trap sunlight during photosynthesis.
c) Stomata help a plant to breathe and release excess water into the atmosphere.

Mid-rib:

a) The mid-rib helps in transport food from the leaf blade to the petiole.
b) The mid-rib helps to transport water and mineral salts from the petiole to the leaf blade.
c) The mid-rib helps to hold the lamina in the proper position for easy trapping of sunlight.

Veins:

Veins help in transportation of water to the leaf.

Leaf venation.

Leaf venation is the arrangement of veins in a leaf.

Types of leaf venation.

a) Net work venation.
b) Parallel leaf venation.

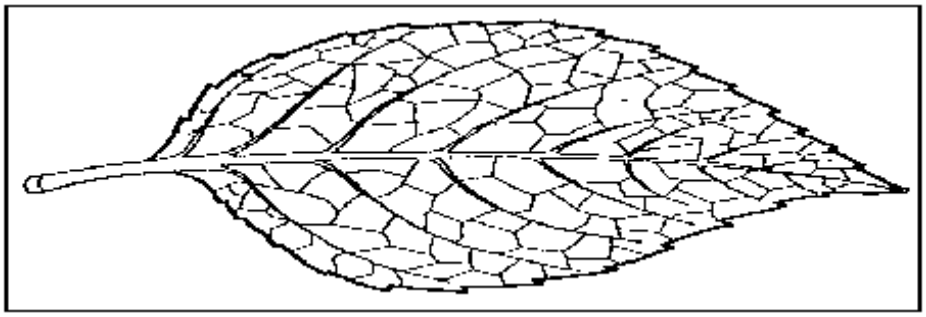
Net work leaf venation:

1. This is an arrangement in which the veins on a leaf are spread up and across to appear like a net.
2. Net work venation is a characteristic of dicotyledonous plants.
3.

TYPES OF LEAVES:

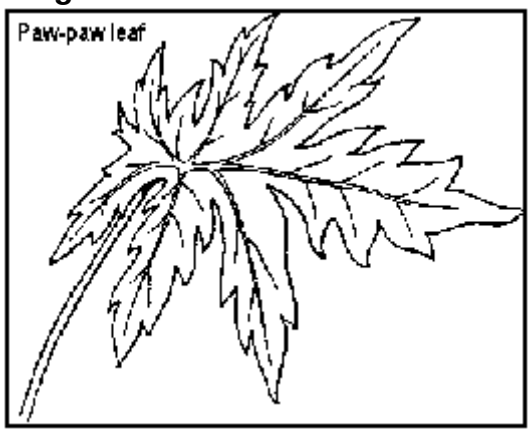
1. Leaves are grouped into simple and compound leaves.
2. Simple leaves are those leaves with one leaflet on the stalk.
3. Compound leaves are those leaves with many leaflets on the stalk.
4. Simple leaves are divided into simple serrated leaves, simple divided leaves, simple-lobbed leaves.
5. Simple serrated leaves have edges like that of a saw.

Diagram:



1. Simple divided (simple palmate) leaves have their lamina divided in many parts but with one stalk. Paw paws, sweet potatoes and cassava grow simple divided leaves.

Diagram:

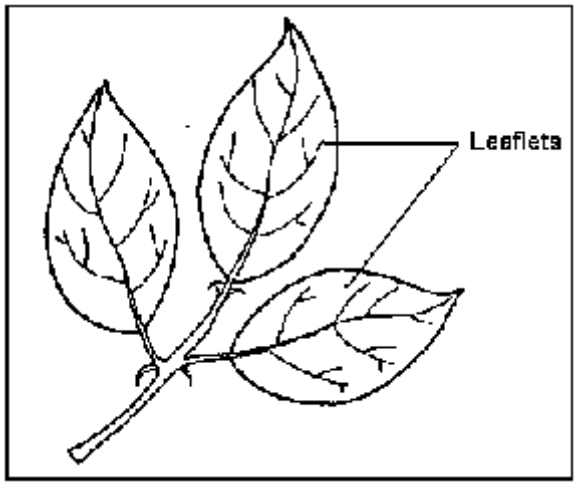


2. Simple lobbed leaves have folded edges.
Diagram:

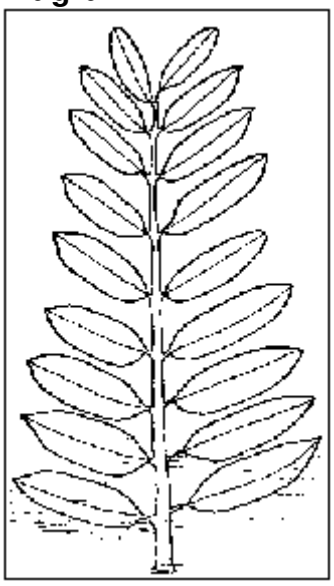
COMPOUND LEAVES:

19. Compound leaves are the leaves with more than one leaflet on the stalk.
20. Compound leaves are divided into compound trifoliate leaves, compound pinnate , compound bi-pinnate, and compound digitate leaves.

21. Compound trifoliate leaves have three leaf lets on the stalk.
Diagram:



22. Compound pinnate has leaflets arranged in pairs on each side of the stalk.
Diagram:



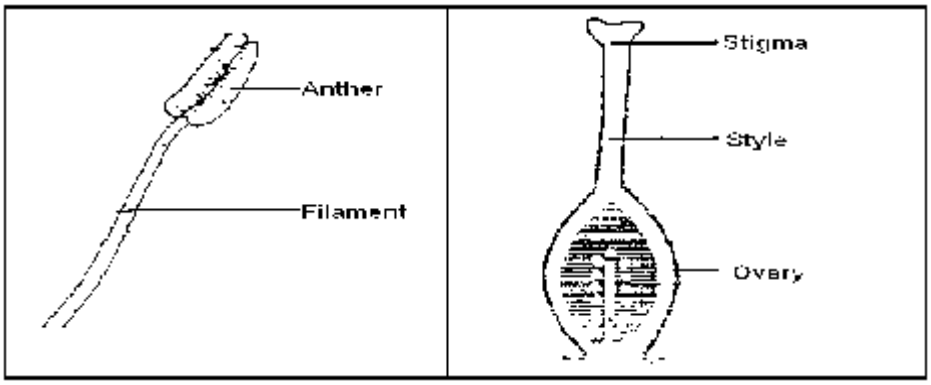
23. Compound bi-pinnate has more than two leaflets on each side of the stalk.
Diagram:

FLOWERS:

1. Flowers are the reproductive parts of a plant.
2. Flowers develop from the flower bud.
3. Flowers are divided into unisexual flowers and bisexual flowers.
4. Unisexual flowers have only one sexual part; either the stamen or the pistil.
5. The stamen is the male part of a flower.
6. The pistil is the female part of a flower.

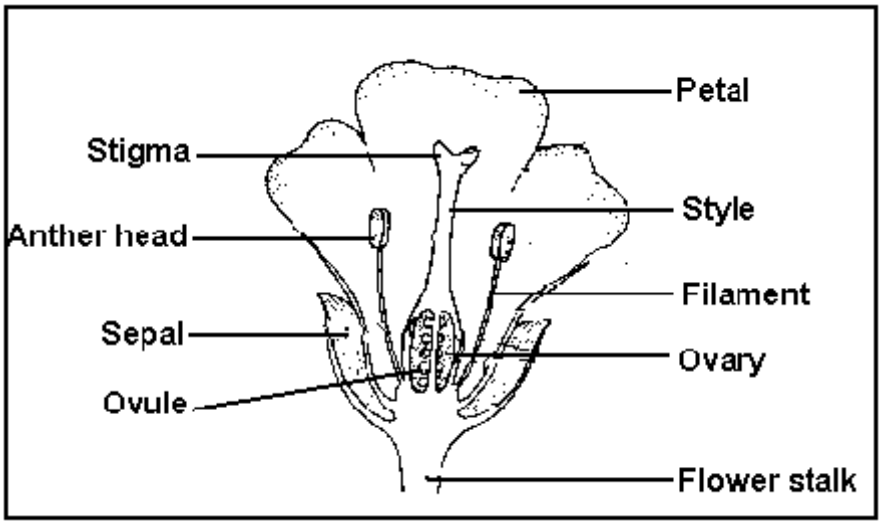
7. Plants that develop unisexual flowers include the paw paw, the pumpkin, the rose, the watermelon, etc.…

STAMEN **PISTIL**



8. Bisexual flower is a flower with both a pistil and a stamen.

PARTS OF A BISEXUAL FLOWER:



FUNCTIONS OF THE PARTS OF A FLOWER:

ANTHER HEADS:

(i) The anther heads produce and store pollen grains.
(ii) Pollen grains are the male reproductive gametes of a flower.
(iii) Pollen grains help to fertilize ovules so that seeds are formed.

FILAMENTS:

(i) Filaments help to hold the anther heads to the flower.
(ii) Filaments hold anther heads a good position for pollination to take place.

STIGMA:

(i) The stigma helps to trap pollen grains.
(ii) The stigma has a sticky head for trapping pollen grains from the bodies of insects.
(iii) The stigma has a hairy head for easy trapping of pollen grains from wind.

STYLE:

(i) The style connects the stigma to the ovary.
(ii) After pollination, nuclei from pollen grains bore holes in the style. The holes are called pollen tubes. The pollen tubes help to transport the nuclei of pollen grains to the ovules.

OVARY:
(i) The ovary produces and protects ovules.
(ii) After fertilization, the ovary develops into a fruit.

OVULES:
(i) Ovules are the female reproductive gametes of a flower.
(ii) After fertilization, the ovules develop into seeds.
(iii) Seeds help in the reproduction of new plants.

PETALS (COROLLA)
(i) Petals help to attract pollinators by being brightly coloured or by producing a sweet scent.
(ii) Petals are to protect the inner parts of a flower.

SEPALS (CALYX)
(i) The calyx helps to protect the flower bud before it opens.

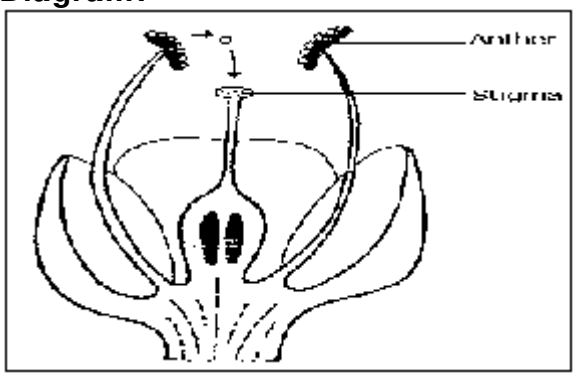
POLLINATION:
Pollination is the transfer of pollen grains from the answer to the stigma of a flower or flowers of the same kind.

CONDITIONS THAT FAVOUR POLLINATION:
1. For pollination to take place, the flowers must be of the same species or kind.
2. There must be a mature pistil.
3. There must be a mature stamen.

TYPES OF POLLINATION:

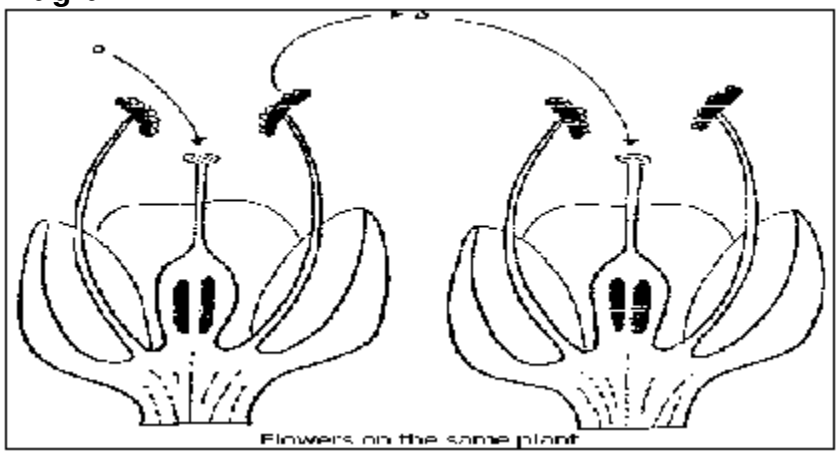
SELF-POLLINATION:
1. Self-pollination occurs when pollen grains are transferred from anther heads to the stigma of the same flower.

Diagram:



2. Self-pollination can take place in two flowers if both of them are growing on the same plant.

Diagram:



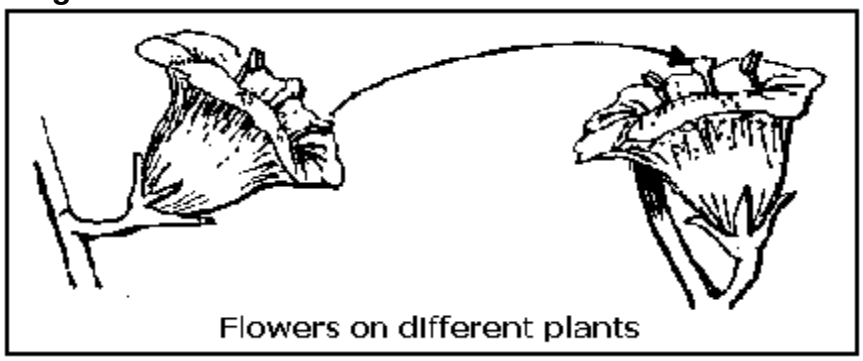
4. Self-pollination commonly occurs in roses, maize, pumpkins, watermelons, etc.…

ADVANTAGES OF SELF POLLINATION:
Self-pollination helps to maintain pure breeds.

DISADVANTAGES:
Flowers that undergo self-pollination are difficult to pollinate because stamen sometimes do not mature at the same time as the pistil.

CROSS-POLLINATION:
Cross-pollination occurs when pollen grains are transported from anthers of one flower to the stigma of another flower but of the same kind.

Diagram:



ADVANTAGES OF CROSS-POLLINATION:
1. Cross-pollination can result into new varieties of plants.
2. Cross-pollination can take place even if stamens do not mature at the same time as pistils.

DISADVANTAGES:
Cross-pollination can result into undesirable plant breeds.

AGENTS OF POLLINATION:
There are two major agents of pollination namely insects and wind.

CHARACTERISTICS OF INSECT POLLINATED FLOWERS:

1. Insect pollinated flowers have brightly coloured petals.
2. Insect pollinated flowers have sweet scented petals.
3. Insect pollinated flowers develop nectar buds.
4. Insect pollinated flowers produce spiky pollen grains for easy sticking on the stigma.
5. Insect pollinated flowers have sticky stigmas.
6. The anther heads insect pollinated flowers develop within the petals for easy pollination when insects visit flowers.

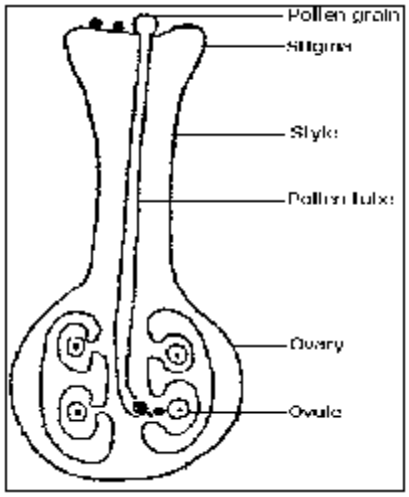
CHARACTERISTICS OF WIND-POLLINATED FLOWERS:

1. Wind-pollinated flowers are small with dull coloured petals. The petals do not have a sweet scent.
2. Wind-pollinated flowers produce a lot of pollen grains. The pollen grains are light and have air bladders for easy floating in the wind.
3. Wind-pollinated flowers have hairy stigmas for easy trapping of pollen grains.
4. The stigma of a wind-pollinated flower is above the petals and the anther heads.

FERTILIZATION OF A FLOWER:

1. Fertilization in flowers is the union of the ovule and the pollen grain.
2. Fertilization takes place in the ovary.

DIAGRAM OF THE PISTIL SHOWING POLLEN TUBES:



CHANGES AFTER FERTILIZATION:

3. When fertilization happens, the ovules become seeds.
4. When fertilization takes place, the ovary becomes the fruit.
5. When fertilization takes place, the petals, the sepal, style and stamens whither and fall off.

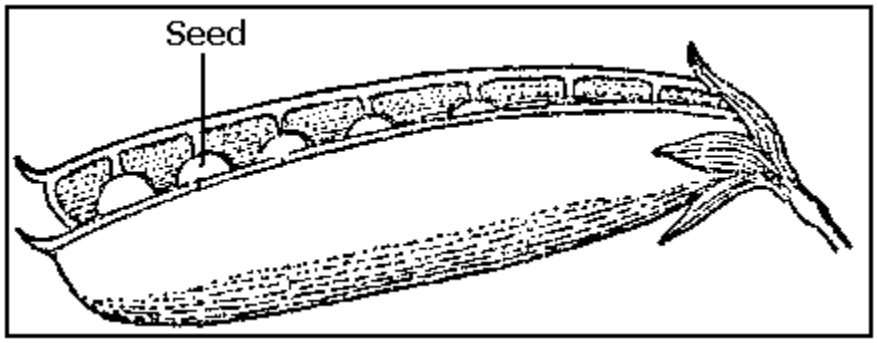
FRUITS:

1. A fruit is the mature ovary after fertilization.
2. A fruit has two scars one left by the style after falling off and the other left by the stalk.
3. Fruits are grouped into simple, multiple, aggregate and pomes.

SIMPLE FRUITS:

1. A simple fruit is the fruit that has developed from a single ovary after fertilization.
2. Simple fruits are divided into dry dehiscent, dry indehiscent and succulent fruits.
3. Dry dehiscent fruits have hard ovaries that can split to release the seeds.
4. Dry dehiscent fruits include legumes (pods), capsule i.e. castor seeds, acacia seeds, etc.…

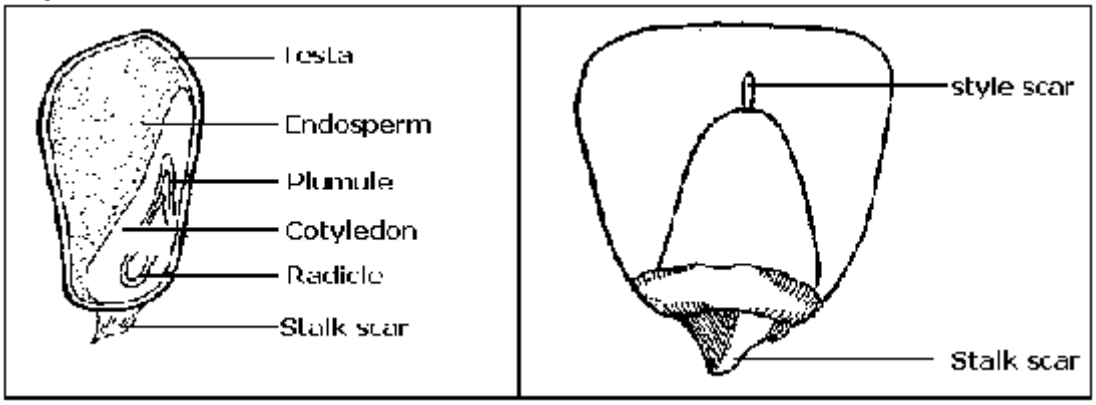
Diagram of a pod



Dry indehiscent fruits do not spilt to release the seeds.

4. Dry indehiscent fruits include maize-seeds cottonseeds, sunflower seeds, etc...
5. Seeds of maize, cotton and sunflower are regarded as fruits because they have two scars.

Diagram of a maize seed:



6. Succulent fruits are the simple fruits with fleshy, juicy fruits. The ovary of a succulent fruit is divided into three layers namely the epicarp, the mesocarp and the endocarp.
7. Succulent fruits are divided into berries and drupes.

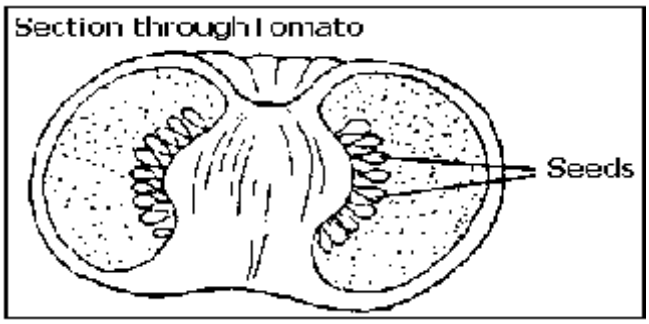
BERRIES:

1. A berry is a fruit with many seeds. The epicarp and the mesocarp are soft.

Examples of Berries.

a) Bananas
b) Tomatoes
c) Oranges,
d) Grapes, etc….

Diagram of a berry fruit:



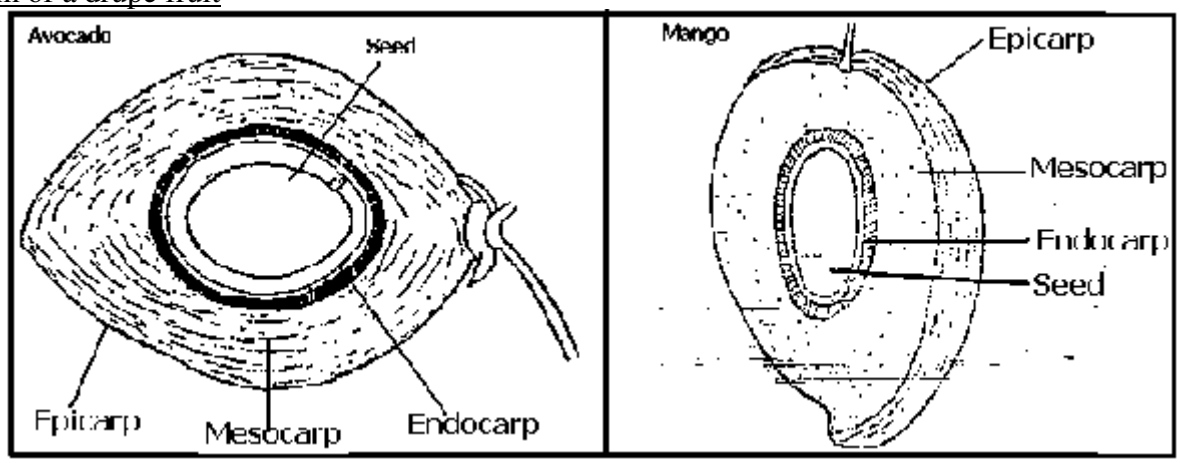
DRUPES:

2. Drupes are succulent fruits with a single seed.

Examples of drupes

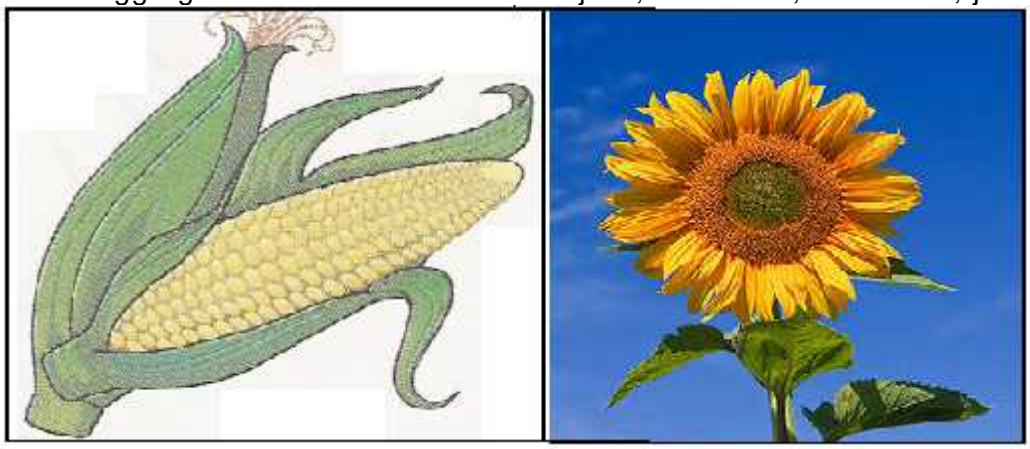
a) The mango fruit
b) Avocado fruit,
c) Coconut fruit, etc.…

Diagram of a drupe fruit



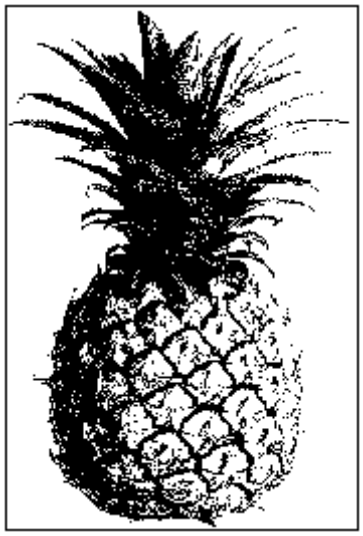
AGGREGATE FRUI TS:

1. Aggregate fruits are the fruits made up of many fruits joined at the same base.
2. Aggregate fruits develop from a single flower with many ovaries fused together.
3. Aggregate fruits include the black jack, sunflower, maize cob, jack-fruit, etc.…



MULTI PLE FRUI TS:

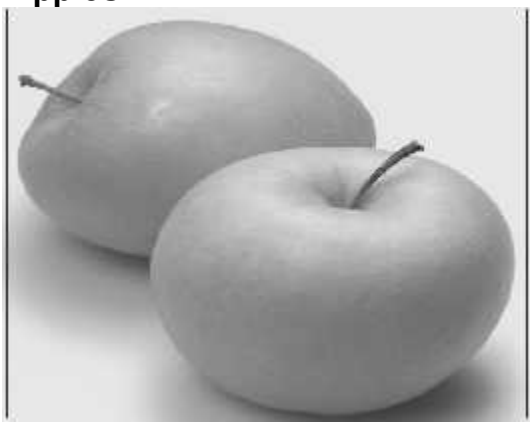
3. Multiple fruits are fruits made up of many flowers fused together.
4. The common example of a multiple fruit is the pineapple.
   Diagram:



POMES:

5. Pomes are the fruits that do not form from ovaries.
6. Pomes usually form from receptacles that swell and cover the ovaries.
7. Pomes include the apples, the pears, etc.…

Apples



Pears



FRUIT/ SEED DISPERSAL:

Seed/ fruit dispersal is transfer of seeds or fruits from the parent plant to any other place.

<u>IMPORTANCE OF SEED DISPERSAL:</u>

1. Seed dispersal helps to control the struggle for resources between plants by developing new colonies of plants somewhere else.
2. Seed dispersal helps to form new colonies of plants where they have never existed before.
3. Seed dispersal helps to prevent the extinction of plant species.
4. Disadvantages of seed dispersal.
5. Agents of dispersal sometimes deposit seeds in places where the conditions are not favourable.
6. Seed dispersal transports weeds to our grdens.

AGENTS OF SEED DISPERSAL:

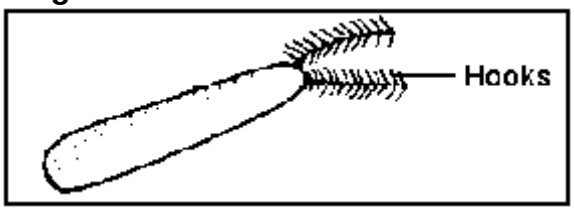
a) Animals
b) Wind
c) Running water

d) Self dispersal (explosive mechanism.)

DISPERSAL BY ANIMALS:

1. Seeds dispersed by animals are found in juicy and fleshy fruits. Animals eat the fruits as food and in so doing transport the seeds from the plant to another place. Plants whose seeds are dispersed in this way include the mango, the apple, the oranges, etc...
2. Seeds dispersed by animals have hooks or barbs that help them to stick to the bodies of animals. Such seeds include those of a blackjack, etc...

Diagram of a black Jack



3. Seeds dispersed by animals are sticky so that they can hold on the bodies of animals during dispersal. Such seeds include those of the love-grass, etc...

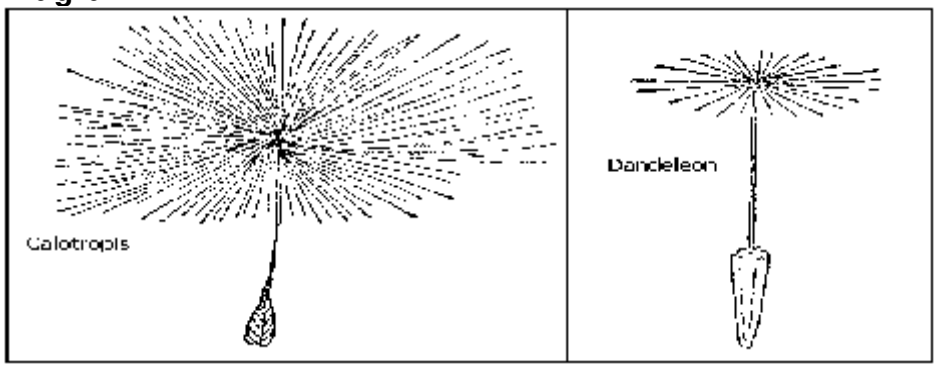
DISPERSAL BY WIND:

4. Seeds dispersed by wind are small and light for easy floating in wind during dispersal.
5. Seeds dispersed by wind have tufts of hair on top called pappus. The pappus helps a seed to float in wind during dispersal.

Diagram:

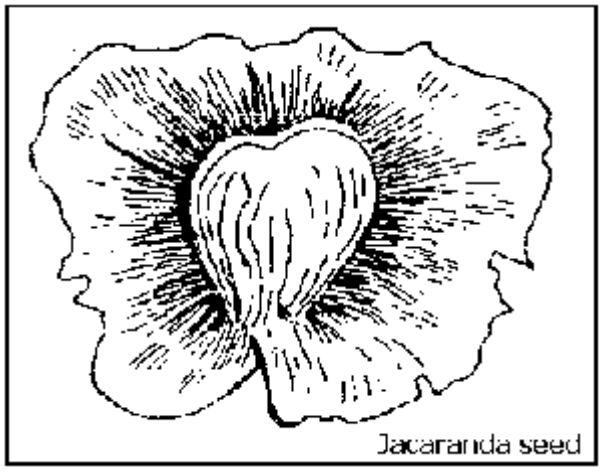
6. Seeds dispersed by wind have parachutes on top to help them float in the wind during dispersal.

Diagram:



7. Seeds dispersed by wind have wings to help them float in wind during dispersal.

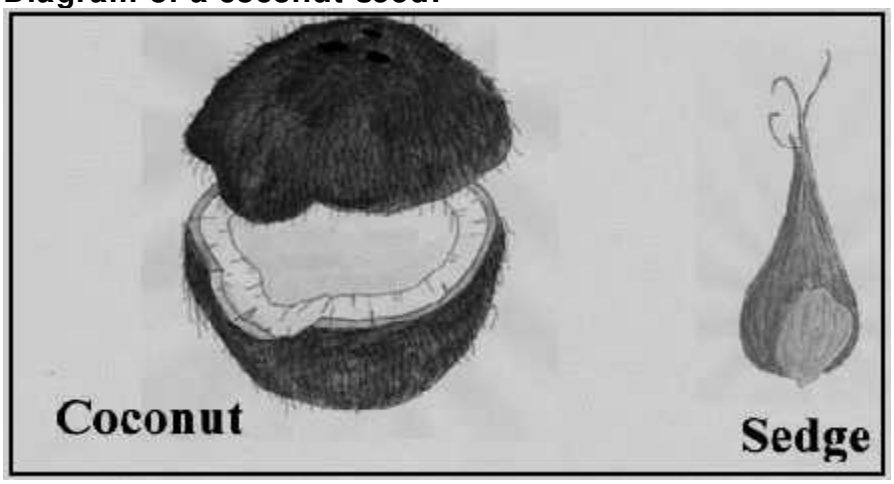
Diagram:



WATER DISPERSAL:

8. Seeds dispersed by water are commonly found in fruits that have the following characteristics:
   (i) The fruits have husks in the mesocarp with air spaces. The air helps the fruit to float on water as the seed is being dispersed.
   (ii) The seeds are surrounded by a stony endocarp that helps to prevent them from germinating while they are being dispersed.
9. A coconut is dispersed by running water.

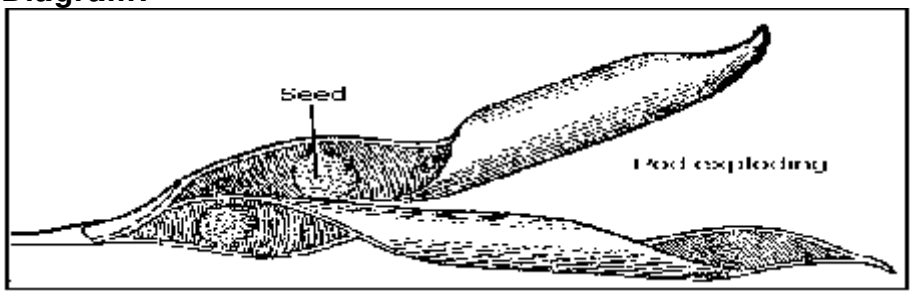
Diagram of a coconut seed:



SELF-DISPERSAL (EXPLOSIVE MECHANISM)

10. Ovary walls of dehiscent fruits burst (explode) and release the seeds. This method of dispersal is called explosive mechanism or self-dispersal.
11. Plants that undergo self-dispersal include legumes, capsules such as in puppies.

Diagram:



PROPAGATION OF PLANTS BY SEEDS:

1. Propagation is the reproduction of plants.
2. Plants can be propagated by planting seeds and through vegetative propagation.
3. Seeds are grouped into monocotyledonous seeds and dicotyledonous seeds.

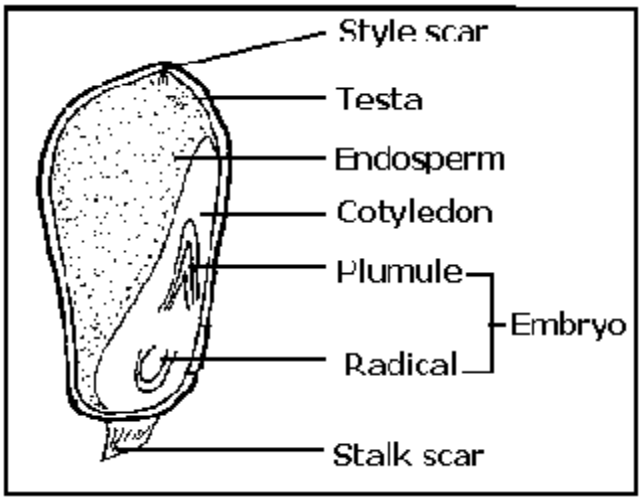
MONOCOTYLEDONOUS:

1. Monocotyledonous seeds are the seeds that have one cotyledon.
2. Most monocotyledonous seeds are considered to be fruits because they have two scars.
3. Monocotyledonous seeds are rich in carbohydrates.
4. Monocotyledonous seeds undergo hypogeal germination.
5. The seedling from a monocotyledonous seed develops one leaflet at a time after germination.
6. Plants from monocotyledonous seeds develop parallel veined leaves.
7. Radicals from monocotyledonous seeds develop a fibrous root system.

Examples of Monocotyledonous seeds

a) Maize grain,
b) Wheat,
c) Barley,
d) Oats,
e) Millet
f) Sorghum,
g) Rice etc…

PARTS OF A MONOCOTYLEDONOUS SEED:



Functions of parts of a maize grain:

Seed coat (testa):

(i) The testa (seed coat) helps to protect the inner parts of a seed from germs and pests.

Endosperm:

(i) The endosperm is the biggest part of a monocotyledonous seed.
(ii) The endosperm store food.
(iii) During the process of germination, it ceases to store food but supplies food to the embryo..

Cotyledon:

(i) The cotyledon in a monocotyledonous seed is the part surrounding the embryo.
(ii) The cotyledon passes starch from the endosperm to the embryo.
(iii) The cotyledon helps to protect the embryo.

Embryo:

(i) The embryo comprises of the plumule and the radicle.
(ii) The embryo is the part of seed that develops into a seedling.
(iii) The plumule develops into the shoot system. The stem, leaves, buds and leaves of a plant develop from the shoot system.
(iv) The radicle develops into the root system.
(v) The radicle develops before the plumule during germination to help the embryo to absorb water.

Stalk scar

(i) The stalk scar is the part that connects the grain to the cob.
(ii) When a seed is mature, it comes off from the cob leaving a scar.
(iii) At the time of germination, the hilum plays no part in the germination process.

Micropyle:

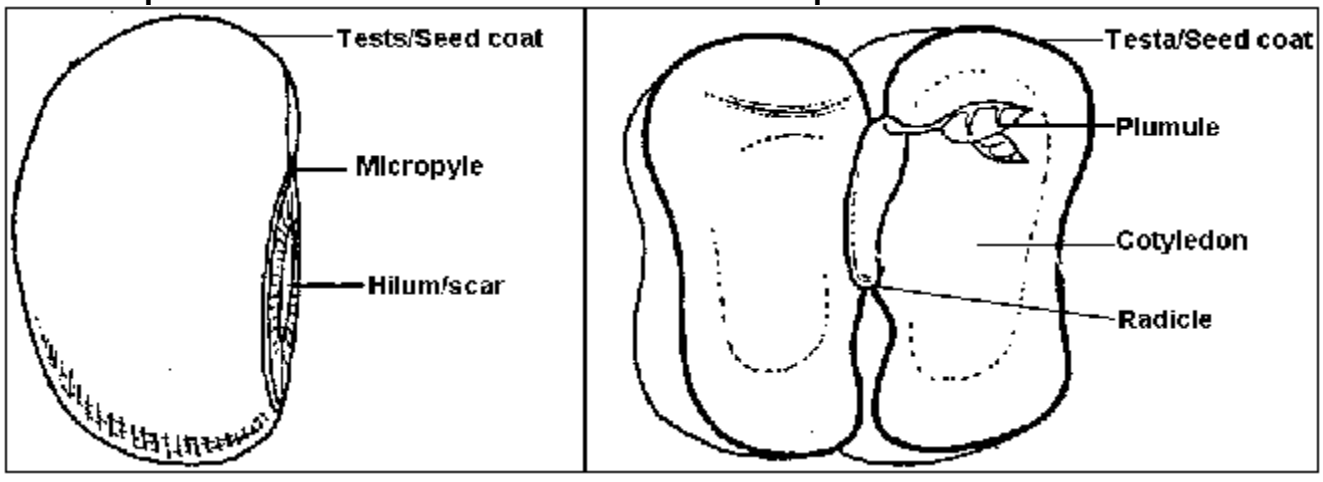
(i) The micropyle is small hole left by the pollen tube after fertilzation.
(ii) The micropyle helps to let in water and air during germination.

DI COTYLEDONOUS SEEDS:

1. Dicotyledonous seeds have two cotyledons.
2. Dicotyledonous seeds undergo epigeal germination.
3. The seedling from a dicotyledonous plant develops a taproot system.
4. The seedling from a dicotyledonous plant develops net veined leaves.

PARTS OF A DI COTYLEDONOUS SEED:

External parts **Internal parts**



<u>Functions of each part of a bean seed</u>:

<u>Cotyledons</u>:

Cotyledons help to store food for the embryo to be used during germination.

<u>Embryo</u>:

(i) The embryo comprises of the plumule and the radicle.

(ii) The embryo is the part of seed that develops into a seedling.
(iii) The plumule develops into the shoot system. The stem, leaves, buds and leaves of a plant develop from the shoot system.
(iv) The radicle develops into the root system.
(v) The radicle develops before the plumule during germination to help the embryo to absorb water.

Seed coat (testa):

The testa (seed coat) helps to protect the inner parts of a seed from germs and pests.

Hilum (scar)

(i) The hilum is the part that connects the ovule to the ovary.
(ii) When a seed is mature, it comes off leaving a scar.
(iii) At the time of germination, the hilum plays no part in the germination process.

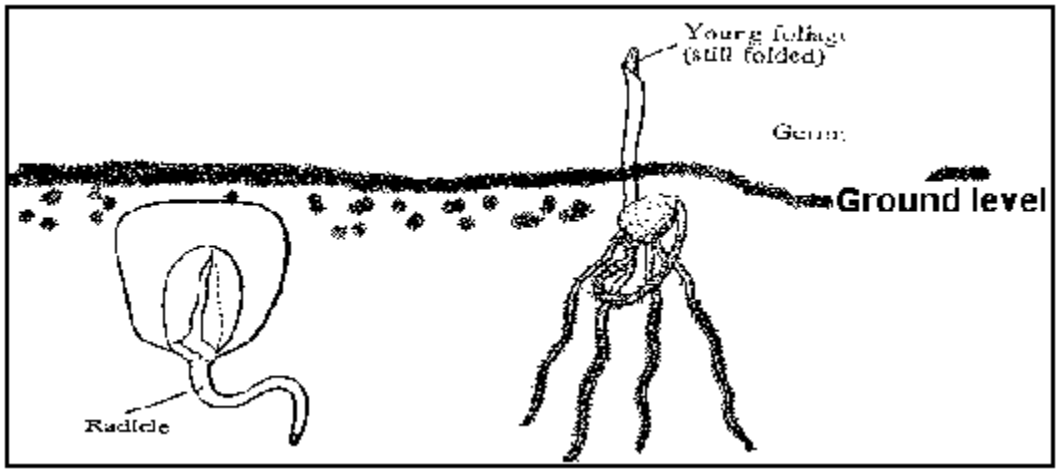
Micropyle:

(i) The micropyle is small hole left by the pollen tube after fertilzation.
(ii) The micropyle helps to let in water and air during germination.

GERMINATION:

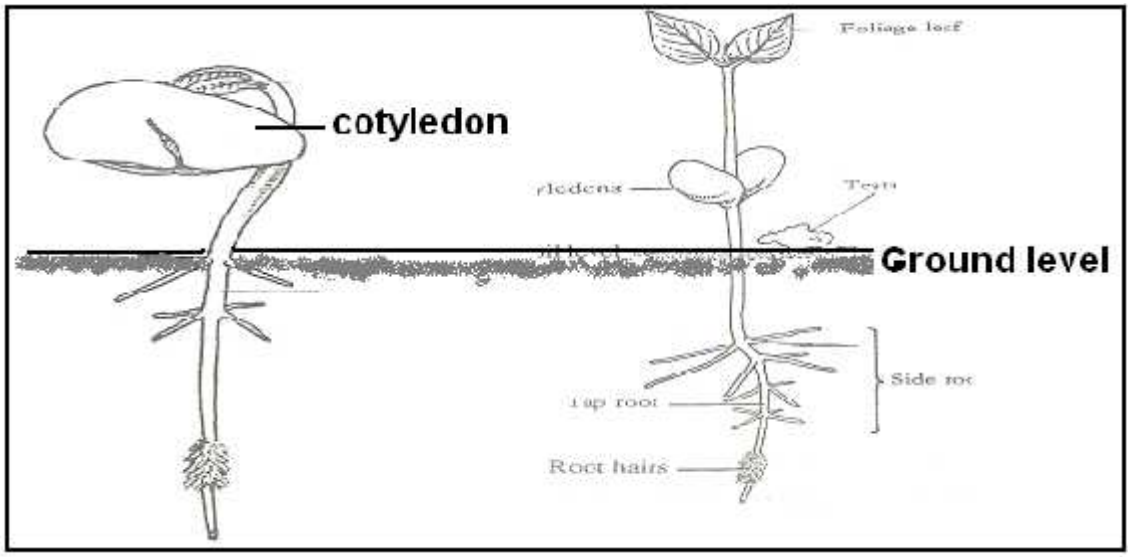
1. Germination is the development of the embryo into a seedling.
2. There are two types of germination namely hypogeal and epigeal germination.
3. Hypogeal germination takes place in monocotyledonous seeds.
4. The cotyledon in hypogeal germination remains under the ground.
5. Seedlings developing under hypogeal germination develop a fibrous root system.

HYPOGEAL GERMINATION:



1. The cotyledons come out of the ground in epigeal germination.
2. Seedlings developing from epigeal germination develop a fibrous root system.

EPIGEAL GERMINATION:



CONDITIONS NECESSARY FOR GERMINATION:

1. Germination is the process through which a seed develops into a plant.
2. Water helps to soften the cotyledons and testa so that the embryo can come out.
3. Water helps to dissolve food nutrients in the cotyledon so that the embryo can be able to absorb them for its needs.
4. Oxygen helps the embryo of a germinating seed to burn food in order generate energy for growth.
5. Warmth helps a germinating seed to have the right conditions for the enzymes to digest food for the developing embryo.

<u>EXPERIMENT SHOWING THAT WATER, OXYGEN AND WARMTH ARE NECESSARY FOR GERMINATION TO TAKE PLACE:</u>

(***Teacher will demonstrate this***)

VEGETATIVE PROPAGATION:

1. Vegetative propagation is the process of reproducing new plants without using seeds.
2. Plants can reproduced by using leaves, stems, buds, etc.…

ADVANTAGES OF VEGETATIVE PROPAGATION:

3. Crops produced through vegetative propagation mature quickly.
4. Crops produced through vegetative propagation are more resistant against diseases and pests.
5. Vegetative propagation helps to preserve pure varieties of plants.

METHODS USED TO REPRODUCE PLANTS USING VEGETATIVE PROPAGATION:

STEM CUTTINGS:

(i) Stem cuttings are used to carry out vegetative propagation of plants such as cassava, sweet potatoes, sugar can, etc… In this method, a part of the stem having a bud is cut and planted to produce a new plant.

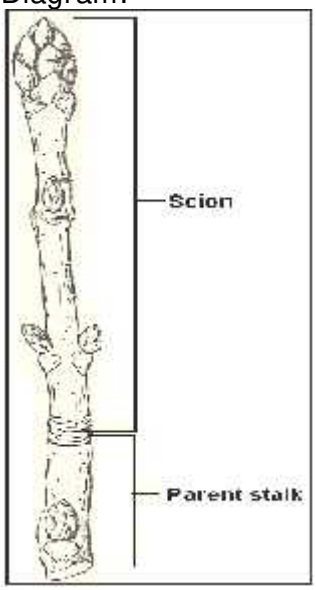
(ii) Stem cuttings develop adventitious roots.

GRAFTI NG:

(i) In grafting, a part stem with a bud (scion) is cut and fixed to another part of plant with a stem with roots (stock) of the same family.

(ii) Grafting is mostly used in growing oranges, lemon, grapes, apples, etc.…

Diagram:



Budding:

(i) In budding, a part of a plant containing a bud (scion) is removed and either planted or grafted.

(ii) Budding is used in reproducing Irish potatoes, yams, onions, etc…

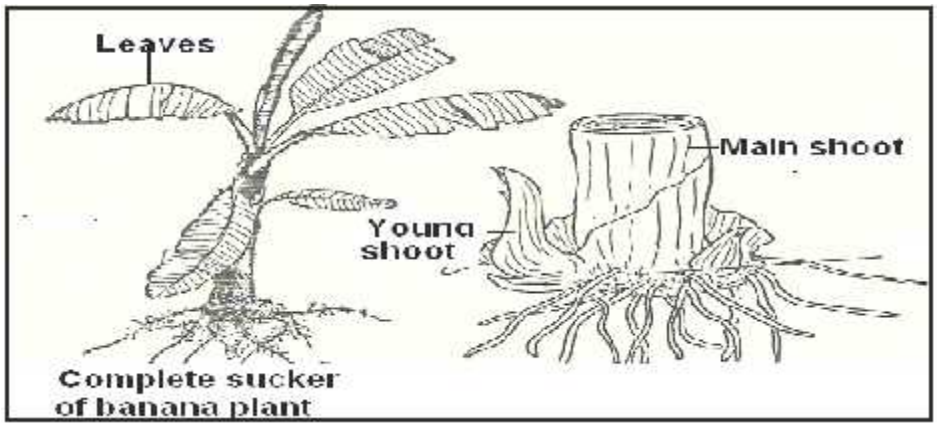
Diagram:

Using suckers:

(i) Suckers develop on underground stems.

(ii) Crops such as bananas, coco yams, sisal, etc… are reproduced using suckers.

Diagram:



Layering:'

(i) In layering, a stem is bent so as to grow along the ground, produce roots and buds.
(ii) The buds later grow as separate plants.
(iii) Layering is mostly common in running stems.

Propagation using leaves:

(i) Some leaves store food and germinate into new plants.

CATTLE KEEPI NG

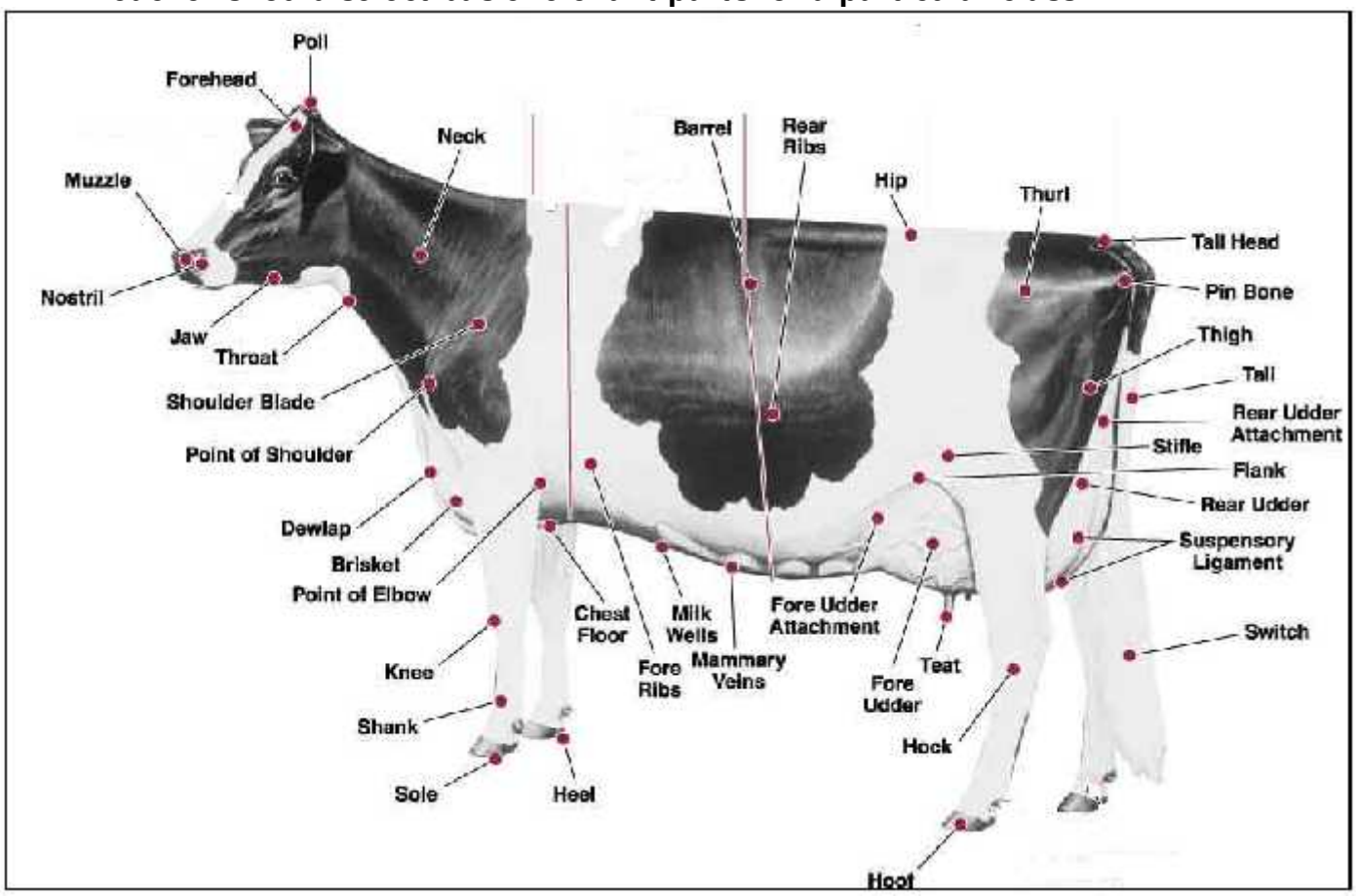
Cattle keeping is the rearing and management of cattle.

Importance of keeping cattle.

a) a source of milk.
b) A source of beef.
c) Cattle can be used a sbride price.
d) Cattle are a source of income.
e) Dung from cattle can be used as manure(farm yard manure).
f) Dung from cattle can be used to make biogas.
g) Hides and skins are used to make leather.
h) Cattle keeping is a source of employment to peasant farmers.

Parts of a cow.

NB Teacher should select basic relevant parts for a particular class.



Breeds of cattle.

a) Local (indigenous) breed.
b) Exotic (foreign) breed
c) Cross breed.

Comparison between Local and exotic breeds

Indigenous/ Local breed	Foreign/ Exotic breeds
a) Take time to mature.	a) They mature very fast.
b) They are resistant to diseases.	b) They are not resistant to diseases.
c) can survive poor management conditions	c) They can't survive poor management conditions
d) they are of different colours.	d) They have specific colours.
e) Can survive on poor pasture and little water.	e) Can't survive on poor pasture and little water.

Examples of Local breeds of cattle

a) Ankole long horned cattle
b) The zebu
c) The Nganda cattle.

Types of cattle.

a) Dairy cattle
b) Beef cattle.
c) Dual-purpose cattle.

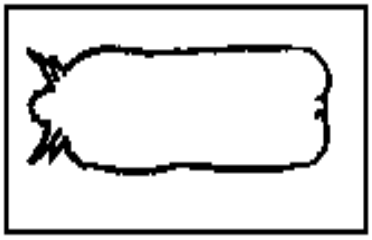
BEEF CATTLE

These are mainly reared for meat production.

Characteristics of beef cattle

a) Have block shape.
b) Have long broad backs.
c) Have short legs.
d) Have thick muscles. Ie their bodies are covered with flesh
e) They breed regularly.

Shapes of beef cattle.



Examples of beef cattle.

a) Hereford
b) Aberdeen Angus
c) Charolis.
d) American Brahman.
e) Santa Getrudis.
f) Short horn
g) Galloway.

Illustrations of beef cattle

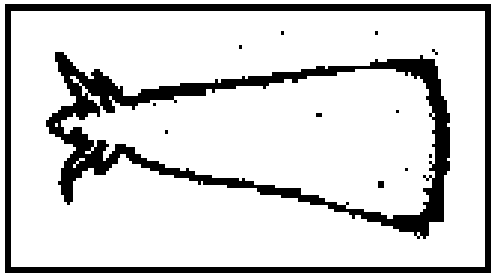
DAIRY CATTLE.

These are mainly reared for milk production.

Characteristics of Dairy cattle.

a) They have a wedge shape
b) They have big spongy udder.
c) They have short, well set hind quarters.
d) They do not have a lot of flesh.
e) They produce a lot of milk.
f) They are docile with mild temperatures.

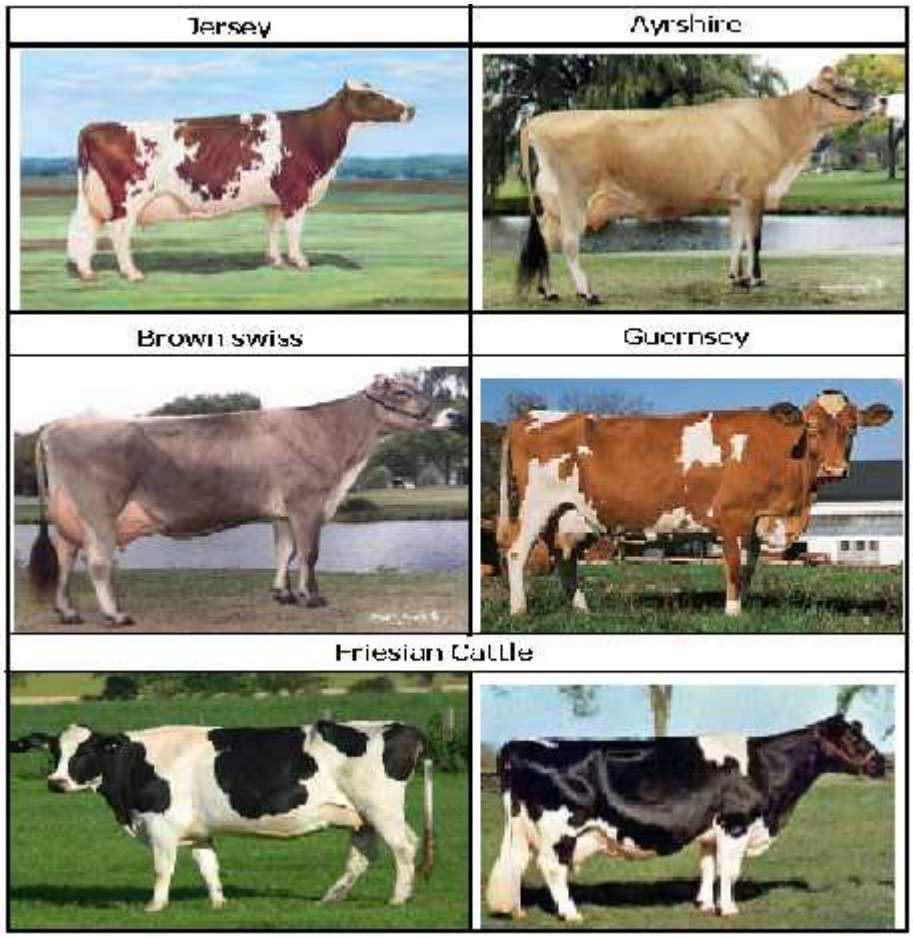
Shape of the dairy cattle



Examples of Dairy cattle.

a) Friesian.
b) Guernsey
c) Jersey.
d) Jamaican Hope.
e) Ayrshire.
f) Brown Swiss

ILLUSTRATIONS

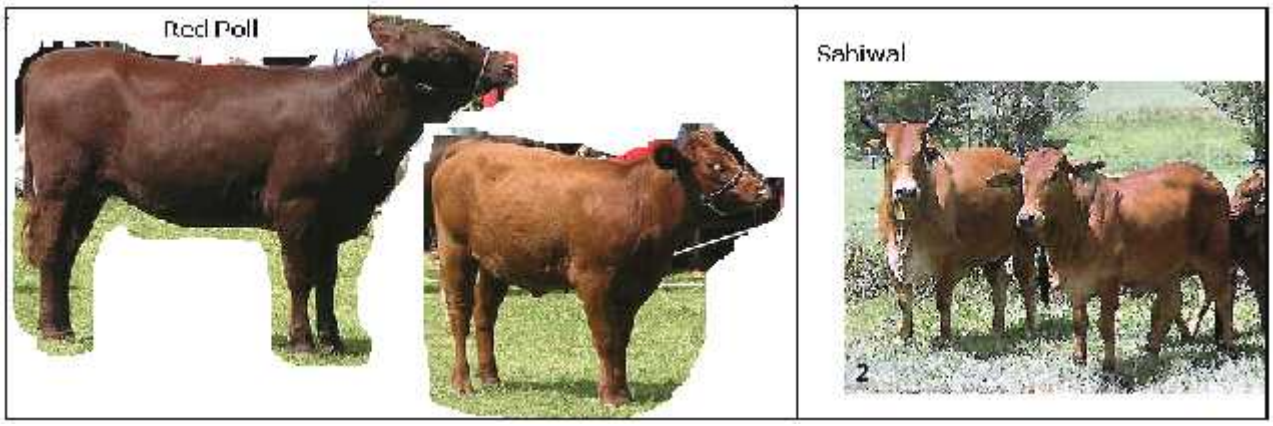


DUAL PURPOSE CATTLE

They are kept purposely for beef and meat.

Examples of Dual purpose cattle.

a) Sahiwal.
b) Red Poll
c) Milking short horn.



BREEDING

Breeding is the rearing of animals in order to realize young ones.

Types of breeding.

a) In-breeding

b) Cross breeding
c) Out breeding.
d) Line breeding.
e) Upgrading.

In-breeding.

1. In breeding is the mating of closely related animals like sister and brother.
2. In-breeding usually results in breeds with low resistance to disease and low productivity.

Line breeding.

Line breeding is the mating of animals in the same lineage like cousins.

Out breeding

Out breeding is the mating of un related animals that are of the same pure groups.

Upgrading

This is an advanced type of cross breeding where a bull with superior qualities is allowed to mate a selected cow to better the quality.

Cross breeding.

Cross breeding is the mating of different breeds of animals.

Purpose of cross-breeding.

a) To improve on resistance to diseases.
b) To improve on milk or beef production.

INSEMINATION

Insemination is the act of depositing semen into the vagina of an animal.

Types of insemination.

a) Artificial insemination(A.I.)
b) Natural insemination.

Natural Insemination.

This is a type of insemination where a bull deposits semen into the vagina of an animal.

Advantages of natural insemination.

a) The bull can easily notice signs of heat in cases where they are not shown clearly by a cow.
b) It does not deny the animal its sexual pleasure.
c) It increases chances of conception.
d) It does not over burden a farmer to look for an artificial insemination.

Disadvantages of natural insemination.

a) A heavy big bull can injure a small cow or heifer.
b) Natural insemination encourages in breeding.
c) Natural insemination encourages the spread of venereal diseases.
d) It is expensive to look after the bull.
e) Natural insemination wastes semen.
f) Once the good bull is dead, lame the semen cant be used.

Artificial insemination.

This is a method where a trained inseminator uses an insemination gun to deposit semen into the vagina of a female animal.

Advantages of artificial insemination.

a) It helps in the control of venereal diseases.
b) It prevents in breeding.
c) In case the bull dies, grows old and becomes lame, the semen is made available.
d) It is cheap to pay for a service than keeping a bull.
e) The money that would be used to buy and maintain a bull can be used to buy more cows.
f) It prevents big, heavy bulls from injuring small cows.
g) Many cows can be serviced from a single ejaculation.

Disadvantages of artificial insemination.

a) Semen is delicate during storage and can easily expire.
b) It requires a trained person to administer the semen.
c) It is difficult to detect cows with mild heat periods.

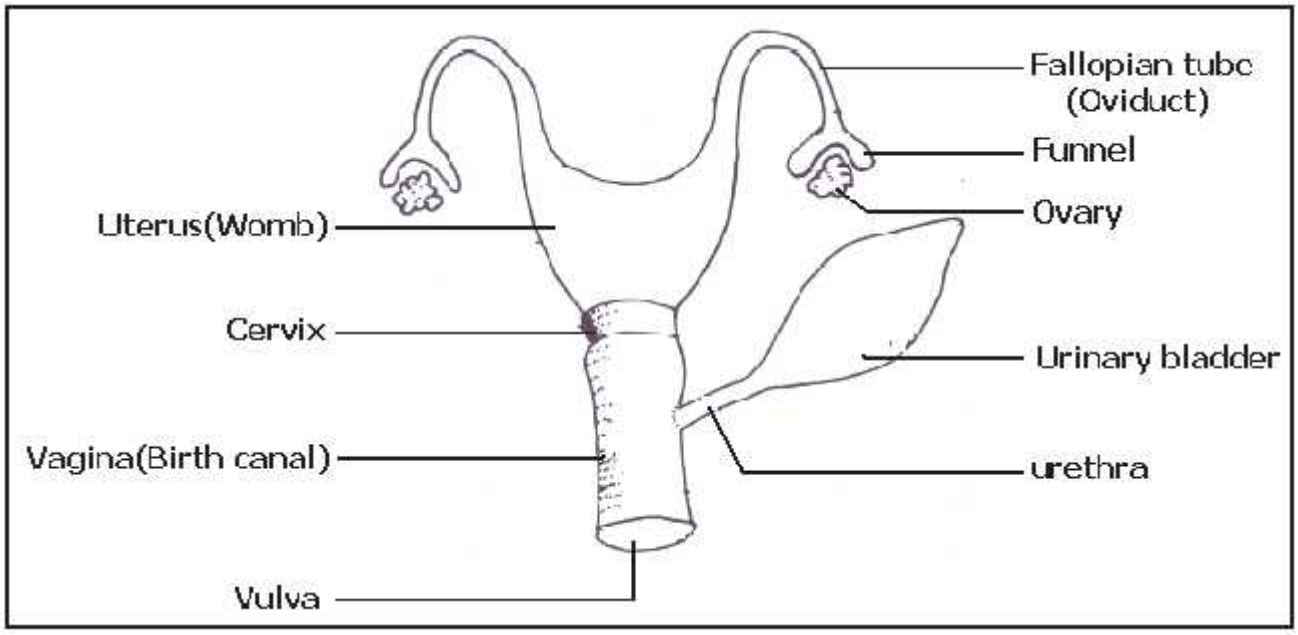
HEAT PERIODS:

1. Heat period is when a cow is ready for mating.
2. During heat periods, a cow shows signs of heat.
3. Signs of heat are indicators of readiness to mate.

Signs of heat

a) The cow mounts objects.
b) Allows others to mount it.
c) The cow will be restless.
d) The vulva swells and turns red.
e) The cow will have frequent urination.
f) In case of lactating cow, there will be a drop in milk yield.

THE REPRODUCTIVE SYSTEM OF A COW.



Functions of different parts:

Vulva:

a) Receives and directs the penis inside the vagina.
b) Discharges urine.

Vagina:

It is where the semen are deposited.

Cervix:

Closes during gestation (pregnant)

Uterus:

It is where conception takes place. Accommodates the foetus.

Oviduct:

it is where fertilization takes place.

Ovary:

a) Produces ova.
b) Produces female hormones

Ova Are the female reproductive cells.

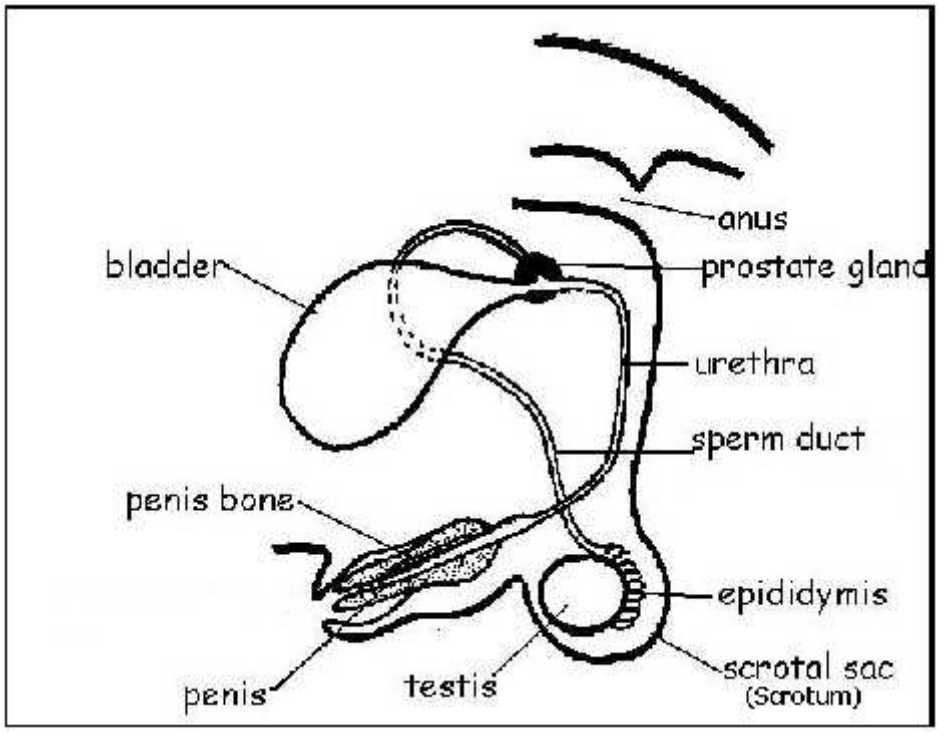
Urinary Bladder:

Stores urine.

Urethra

Conducts urine out of the urinary bladder.

Reproductive system of A bull



Functions of different Parts:

Testes:

a) Produce sperms.
b) Produce the male hormones.

Urethra:

Conducts urine and semen.

Penis:

Used penetrating and depositing semen into the vagina.

Prostate gland and seminal vesicle:

Produce a slippery fluid in which sperms swim.

Epididymis:

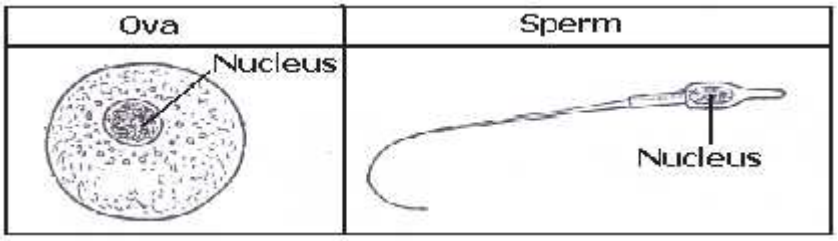
It is a long tube where manufactured sperms are stored.

Scrotum:

Holds the tests and regulates the temperature around.

FERTILIZATION:

1. It is the fusion/union of male and female gamut nuclei to form a zygote.
2. A male gamete is called a sperm
3. A female gamete is called an Ovum.



4. Fertilization takes place in the oviduct.
5. After fertilization a cow enters gestation period.

GESTATION PERIOD

1. Gestation period is the duration of pregnancy.
2. A gestation period of a cow is about nine months(270-280)days.
3. A cow that is under gestation (pregnant) is called an in-calf cow.

Signs of a cow under gestation:

a) The udder fills with milk.
b) The belly enlarges.
c) The cervix closes.
d) The cow does not go on heat 21 days after the service.

Developing fetus in a cow's uterus.

Steaming up:

This is the feeding of a pregnant cow with food rich in proteins.

Importance of steaming up:

a) A cow builds up its body in preparation for calving.
b) It enables the fetus to grow well
c) Leads to increased milk yield.

d) Prevents low birth rate.

Note: a) Calving is the act of giving birth to a calf.
b) Lactation period is a time where a cow is able to produce milk.

Colostrum:
This is the milk produced by a cow in the first four days of calving.

Importance of colostrum:
a) It opens the calf's digestive tract
b) It contains antibodies that boost the calf's immune system.
c) It is highly nutritious so, it provides all food values required by the calf.

Milking:
Milking is the act of squeezing milk from the udder of a lactating cow.

Methods of milking:
a) Hand milking
b) Machine milking.

Preparation for milking:
a) Sterilize all the milking tools with steam.
b) Wash the udder with warm water to stimulate milk let down.
c) Draw milk from each teat into a strip cup to test for mastitis
d) Apply the milking cream on to the teats to prevent the cracking of the teats during milking.
e) Give the cow some feeds to keep it busy and relaxed during the milking.
f) After milking, the milking shade and the equipments should be washed.
g) Milk must be filtered to remove foreign particles like hair, houseflies, grass etc.

Note: Rough handling (beating) of the cow during milking can make it withdraw milk

Lactometer:
1. It is a machine that detects the amount of water in the milk. i.e. It detects whether water has been added into the milk.
2. Detects whether fats have been removed from milk.

Factors that can make milk go bad:
a) Bacterial infection
b) Plants with odour like garlic, onions, tick berry, oranges, thorny apple etc.
c) Poor storage
d) Dirty utensils.

Methods of preserving milk:

Pasteurization:
1. Is a process of killing germs from the milk heating under controlled temperature that does not change the natural characteristic of milk.
2. Luis Pasteur discovered this method.

Freezing/ refrigeration:

a) This is a method where milk is kept under very low temperatures below 0^0C
b) Freezing does not kill germs but only reduces the rate at which germs multiply.

Sterilization:
a) It is a process of obtaining milk free from germs by boiling.
b) Boiling destroys nutrients like vitamins and proteins.

Drying by evaporation:
a) This method leaves milk the milk in powder form.
b) Powdered milk stays longer without going bad.

Products of milk:
a) Cheese
b) Ghee
c) Yoghurt
d) Cream
e) Butter
f) Whey

Other products of cattle:
a) Skin
b) Hides
c) Beef
d) Cow dung
e) Horns and hooves.

Preparation, storage and marketing of cattle products:
a) Most of the milk in Uganda is collected from local and modern farmers.
b) This milk is processed, packed and sold to consumers.
c) Besides selling milk as it is, other products such as yogurt, cheese, butter etc are manufactured and sold to consumers.

Some firms (factories) involved in the milk business:
a) Sameer Agric. And livestock Ltd
b) GBK owned privately by Mulwana.

NB: The milk sold by farmers directly to consumers should be boiled before use to prevent diseases like tuberculosis and anthrax.

Hides:
a) The practice of removing skin or hide from an animal is called **flaying**
b) After flaying, hides are washed to remove blood, soil, grass and dung.
c) It is then preserved by:
   (i) Wet salting to enable salt absorb most of the moisture from it.
   (ii) Suspension drying is usually done in frames with ropes or wires.
d) It is then taken to the leather tanning industry
e) Tanning involves socking hides in chemicals such as tannic acid, which softens, preserves and turns it into leather.

NB: Uganda leather tanning industry (ULATI) is located in Jinja.

Importance of Leather:

a) Leather is a source of both local and foreign revenue.
b) Leather is used in the making commodities like belts, bags, shoes etc.

Beef:

a) Most of the beef in Uganda is eaten by local consumers.
b) There is no tinning or canning industry in Uganda today.(2011)
c) All the tinned meat in Uganda is imported.

Preservation of beef:

a) Beef can be minced, salted, boiled and then tinned.
b) It can be smoked or sun dried.
c) Freezing method can also be used.

Pasture:

Pasture is an open grassland where animals grazed ie It is food for animals.

Types of pasture:

a) Natural pasture
b) Prepared pasture.

Natural pasture:

It is one on its own and usually eaten directly from the field by the animals

Examples of grasses in a natural pasture land.

a) Kikuyu grass
b) Rhodes grass
c) Alfalfa grass
d) Nandi grass
e) Elephant grass
f) Guatemalan grqass

Note: Besides grass pasture, legumes should also be included in the pastureland to:

(i) Improve the soil fertility.
(ii) As a source of plant protein for the animals.

Examples of legume pasture:

a) Centro
b) Green leaf desmodium
c) Silver leaf desmodium
d) Lucerne
e) Seratro.

Prepared pasture:

a) Prepared pasture in most cases is made from fodder crops.

b) Fodder crop is a crop grown mainly for feeding animals.

Examples of fodder crops:

a)	Maize	c)	Sorghum	e)	Clover
b)	Millet	d)	Sweet potatoes.	F)	Napier grass

Example of prepared pasture:

a) Silage
b) Hay
c) Concentrates
d) Mineral supplements

Hay:

a) It is grass cut and dried for use as animal fed
b) It is tied in bundles(bales) and stored in special places called barns.

Silage:

a) Silage is herbage(grass and other field plants) cut and converted into succulent feed by fermentation.
b) Fermentation removes the air that would make the herbage to rot.

Concentrates:

a) These are factory made animal feed
b) They have a low moisture and fibre content.
c) They give the animals to boost production.

Examples of concentrates for different animals:

Concentrate	Animal;
Dairy meal	Lactating cows to boost milk production
Finishers meal	Pigs to fatten them ready for sale.
Rabbit palates	Feeds to rabbits
Chick and duck mash	Feeds to the chicks.
Weaner's meal	Feeds to weaning sows.
Layers mash	Feeds to the laying birds.
Broiler's mash	Feeds to table birds (broilers)

Mineral Supplements:

Mineral salts are good for the healthy growth and reproduction of animals.

Some important minerals for the body of an animal:

Calcium and phosphates:

For proper growth of bones and prevention of milk fever.

Cobalt:

Its deficiency makes the animal thin and weak (emaciation)

Iodine:

Good for proper functioning of the thyroid gland. Its deficiency leads to goiter

Iron:

Important for the manufacture of the red blood cells. Its deficiency leads to anemia

Magnesium:

Its deficiency leads to tetany

Nitrogen:

For the manufacture of proteins.

Sulphur:
Its deficiency leads to low wool production

Sodium:
Regulates the acidity of the blood.

Ruminant animals:
a) These are the animals that chew the cud.
b) They have four stomachs

Examples of ruminant animals:

a)	Cows	d)	Camel
b)	Goats	e)	Buffalo
c)	Sheep	f)	Giraffe

Non Ruminants:
a) They do not chew the cud.
b) They have only one stomach.

Examples on non-ruminants.

a)	Man	d)	Rabbit
b)	Pig	e)	Baboon
c)	Monkey	f)	Gorilla

Comparison between ruminants and non-ruminant animals.

Ruminants	Non-ruminants
Chew the cud	Do not chew the cud
Have four stomachs	Have only one stomach
Can digest cellulose	Can not digest cellulose
Salivary amylase(ptyalin) missing in saliva	Salivary amylase (ptyalin) present in saliva.
Most digestion and absorption takes in the four stomachs	Most digestion and absorption place in the small intestine.

The Digestive system of a ruminant (Cow)

Rumen(Pourch):
Is the largest of the four stomachs and looks like a towel.

Reticulum (Honeycomb):
This is the second apartment and has structures shape like a hornet comb.

Omasum (many piles):
Has many parallel rough surfaces.

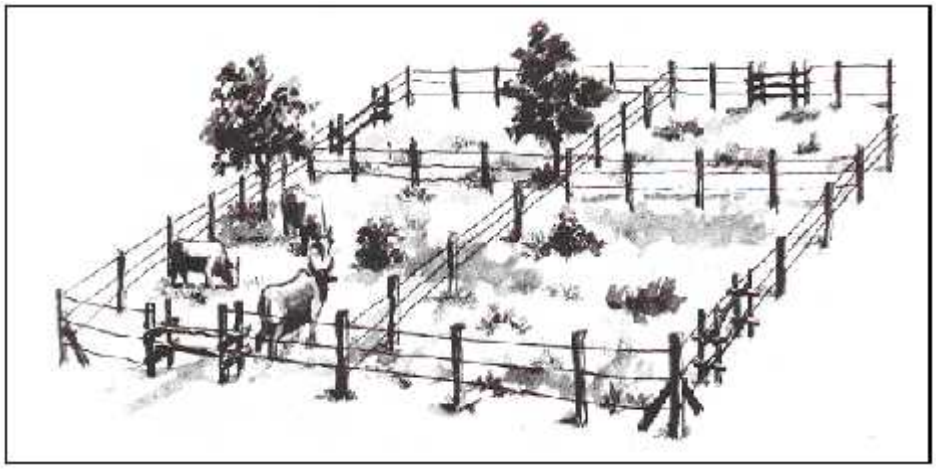
Abomasum:
The true stomach

Grazing:
It is the act of eating grass by livestock.

Methods of grazing:
a) Zero grazing
b) Paddock grazing
c) Tethering
d) Strip Grazing
e) Herding (Free grazing)

Paddock grazing:
This is the method where land is divided into smaller sections called paddocks and the animals graze in the rotational system.

Diagram of paddocks



Advantages of paddock system:

a) Ensures proper use of the grass
b) Gives a farmer a chance to do other things.
c) Manure is evenly distributed in paddocks as animals drop their dung as they graze
d) It controls parasites and diseases by breaking their life circle.
e) Grass is given time to grow.
f) Controls over grazing and so it helps in the control of soil erosion.

Disadvantages of Paddock grazing:

a) It is expensive to set up paddocks.
b) It is not possible where land is limited
c) Animals may not get enough exercise.

Tethering:

This is a method where animals are tied to pegs as they graze.
Water is provided and the animals is moved to another place when necessary

Advantages of tethering:

a) It is cheaper when handling a small number of livestock.
b) No fence is required.
c) Gives a farmer a chance to do other activities.

Disadvantages of tethering:

a) The animals are limited to a specific area ie radius of the rope.
b) It is expensive in terms of replacing ropes.
c) Cannot be used when rearing a large number of livestock.
d) Livestock can easily be attacked by wild animals such as snakes, hyenas etc.

Strip Grazing:

This is the method where land is divided into smaller portions called strips with a temporary or movable fence(some times electrified) to control animal movement.

(Teacher should draw this on the chart).

Advantages of Strip Grazing

a) Ensures proper use of the grass.
b) Gives the farmer chance to do other activities.
c) Manure is evenly distributed in strips as animals drop their dung as they graze.
d) Grass is given time to grow.
e) It controls parasites and diseases by breaking their life cycle.
f) Controls over grazing and so, it helps in the control of soil erosion.

Diadvantages of strip grazing.

a) It is expensive to set up strips
b) It is not possible where land is limited.
c) The animals may not get enough exercise.

Zero Grazing

1. This is a method where animals are hosed and pasture brought to them.
2. In this method, animals do not move, so yhey are confined in a specially constructed structure.

Requirements for zero grazing.

a) a well constructed shade.
b) Water trough.
c) Feeding trough.
d) Fodder fields.
e) Workers to feed the animals.
f) A store.

Advantages of zero grazing.

a) The animals do not move for a long distances, they produce more.
b) Chances of infection are reduced.
c) Dung for manure is easily collected.
d) A sick animal can easily be spotted.

Disadvantages of zero grazing.

a) Diseases are easily spread to other animals in case of an outbreak.
b) More labour force is required to feed the animals.
c) Animals do not get enough physical exercise.
d) It is expensive to start.

Herding.

This is a method where animals graze freely with the guidance of a herdsman.

Advantages of Herding.

a) Animals are closely watched by the herdsman.
b) Sick animals are immediately identified by the herdsman.
c) The herdsman directs animals to good pasture.
d) Animals get enough physical exercises.
e) Animals get a variety of pasture.

Disadvantages of herding.

a) Animals are exposed to infection.
b) Animals are likely to stray and get lost.
c) Animals are likely to destroy people's crops.
d) Herding may lead to over grazing.

FENCING:

A fence is a barrier of live or dead materials designed on a piece of land.

Types of fences:

a) Live fences
b) Barbed wire fence
c) Post and Rail fence.
d) Wire netting fence.
e) Electric fence.

Live fence:

This is usually built from living thorny plants.
Some examples of thorny plants used.

a) Kei apple.
b) Sisal
c) Euphorbia species.
d) Mauritius thorny hedges.

Post and rail fence:

This consists of wooden posts and wooded nails attached to them.
This type of fence is used in animal handling structures such as a crush, a dip, a spray, race, collection yard, etc
Dia.

Wire netting fence:

It is usually built from a mesh.
This type of fence is used in poultry runs.

Dia.

Barbed wire fence.
Usually built from wires containing barbs
This is the most commonly used fence because barbed wire is cheaper.

Electric fence:
Constructed from wires with appropriate current voltage connected to them.
This type of fence is not effective in sheep rearing because sheep have thick layer of wool that a bad conductor of electricity.

Importance of a fence:
a) Helps in controlling animal movement.(Natural soil fertility)
b) Prevent damage to crops by livestock.(Allow proper use of pasture.)
c) Ensure controlled grazing
d) A fence helps to separate animals according to breed, sex, age,and health.
e) A live fence acts as a wind breaker.

A Crush.
It is a narrow structure of timber or steel with an entrance and exit.
Dia.

Purpose of a crush:
a) To be used when currying out vaccination
b) To be used when making animal identification marks e.g branding, tattooing etc.
c) To be used when spraying animals.
d) To be used when deworming animals.
e) To be used when taking blood samples from animals.
f) To be used when carrying out artificial insemination.

Spray race.
1. A spray race is confined space in which animals are sprayed.
2. In a spay race, the spray is under pressure and it is delivered through a number of taps.

A dip tank.
A dip tank consists of an entrance a swim bath and exit.

Purpose of a dip tank.
a) Appropriate when handling a large number of animals.
b) Acaricides in the dip can be used again.

c) No labour is required.
d) There is proper coverage of the animal with acaricides.

Disadvantages of a dip.
a) It is expensive to construct.
b) It requires skilled person to apply a correct quantity of acaricide into the water.

Animal identification marks.
The purpose of identification marks is to enable a farmer to locate his animal from a big herd.

Ways of making animal identification marks.
a) Branding.
b) Ear tattooing.
c) Ear notching.
d) No. Lace.
e) Tail bobbing.

Branding:
1. Is where a hot iron is used to make a amark or symbol on the animal's skin.
2. This method lowers the quality of the skin.

Ear notching:
Is where marks are cut on the edge of the ear.

Ear Tagging:
Is where a tag with a number is fixed on the animal's ear.

Ear tattooing.
Is where a number or symbol is permanently cut into the animal's ear.

Number tag.
Is where a wooden, metallic, or plastic or rubber plate is put on the animal's neck.

Tail bobbing.
Is where the tail hair (switch) is trimmed.

Dehorning.
Dehorning(disbudding) is the practice of removing horn buds from the animal's head.

Methods of Dehorning.

Method	When to use.
a) Using chemicals like Sodium or portassium hydroxide	Calf between 3 – 14 days
b) Hot iron	Calf between 7 – 14 days.
c) Using a spoon dehorner	2 months old calf

Reasons for dehorning
a) To prevent animals from injuring other animals.
b) Dehorning reduces the space an animal covers.
c) Dehorning makes it easy to handler the animal.

ANIMAL DISEASE AND PARASITES.

Signs of good healthy animals.
a) The eyes of a healthy animal are bright and clear.
b) Its fur is smooth and shinny.
c) The body temperature is normal.
d) A healthy animal has good appetite.
e) It has a normal heart beat at rest.
f) The dung is fairly loose but not hard or watery.
g) In the case of lactating cows, the cow may give less amount of milk.

Signs of bad health in cattle.
a) Rough fur.
b) Watery/runny eyes.
c) Abnormal salivation.
d) Loss of appetite
e) Dulness.

Categories of cattle diseases.

a) Contageous diseases.
b) Infectious diseases.
c) Notifiable diseases.

Contageous diseases.

These are diseases that spread easily from an infected animal to a healthy one.

Infectious diseases

These are diseases caused by germs.

Notifiable diseases

These are diseases whose presence in an area should be reported to the veterinary officer.

Common causes of diseases.

a) Bacteria.
b) Viruses.
c) Protozoa.

Common bacterial diseases.

a) Mastitis.
b) Foot rot.
c) Pneumonia (Contagious bovine pleuro)
d) Anthrax.
e) Black quarter.
f) Contagious abortion (brucellosis)

MASTITIS

1. It is caused by bacteria.
2. It can be detected in milk using a **Strip cup**.

Signs and symptoms Mastitis.

a) Swollen painful udder.
b) Milk is stained with blood and pus.
c) The cow rejects being milked.

Prevention of mastitis.

a) Wash the udder with warm water so that milk with the germ is milked out and poured.
b) Milk the infected cow last.

Treatment of Mastitis.

Treat the infected cow with antibiotics.

ANTHRAX

1. It is caused by bacteria,.
2. It is fatal to both animals and man.

Signs and symptoms of Anthrax.

a) Fever accompanied by high temperature.

b) Blood does not clot.
c) Sudden death.
d) Dysentery (blood stained dung).
e) Loss of appetite.
f) Dullness.

Prevention of Anthrax

a) Annual vaccination.
b) Impose quarantine in case iof an out break.
c) The carcass should be completely burnt or buried.
d) Cull the infected animal.

Note: Anthrax has no effective treatment.

CONTAGIOUS ABORTION (BRUCELLOSIS)

1. It is caused by bacteria.
2. The infection is nor venereal but oral.

Signs and symptoms of Contagious abortion.

a) Abortion usually occurs between the 5^{th} and 7^{th} month of pregnancy.
b) Following an abortion, the afterbirth (placenta) may not come out.

Prevention and control of Contagious abortion.

a) Vaccinate the animals.
b) Identify the infected animals and isolate them.
c) Do not drink raw milk.

BLACK QUARTER

1. It's caused by bacteria.
2. Attacks cattle and sheep before the age of 2 years.

Signs and symptoms of black quarter.

a) In severe cases, when the animal dies, the meat becomes black.
b) Lameness.
c) High temperature.
d) Shoulder and the rear legs swell.
e) Loss of appetite.

Prevention and control of black qurter

Vaccinate animals.

CALF PNEUMONIA.

It is caused by bacteria.

Signs and symptoms of calf pneumonia.

a) Nasal discharge.
b) Difficulty in breathing.
c) Watery eye discharge.
d) Coughing.
e) High temperature.

Prevention and control of Pneumonia.

Animal house should have adequate ventilation.

Treatment of pneumonia.

Treat the infected animals with antibiotics.

VIRAL DISEASES

a) Foot and mouth disease.
b) Rinder pest.

FOOT AND MOUTH DISEASE

1. It is caused by a virus.
2. It attaches hoofed animals.

Signs and symptoms of Foot and mouth disease.

a) Sharp rise in temperature.
b) Painful blisters around the mouth and the hoofs.
c) Excessive salivation.
d) Lameness due to blisters between the hoofs.

Prevention of foot and mouth disease.

a) Regular vaccination of animals.
b) Impose quarantine.
c) Cull the infected animals.

RINDER PEST

It is caused by a virus.

Signs and symptoms of rinder pest

a) Nosal and eye discharge.
b) Bloody diarrhoea.
c) Difficult breathing.
d) Usually the animal dies within 6-7days.

Prevention and control of Rinderpest.

a) Rinderpest has no treatment.
b) Vaccinate animals with anti rinder pest vaccines.
c) Cull the infected animals.
d) Impose quarantine.

PROTOZOAN DISEASES

a) East coast fever.
b) Nagana.
c) Heart water.
d) Red water.
e) Coccidiosi.

COCCIDIOSIS.

1. It is caused by protozoa.
2. It attacks calves, lambs, rabbits and poultry.

Common signs and symptoms of coccidiosis.

a) Ruffled hair or feathers.
b) Bloody diarrhoea.

Control of cocciodiosis.

Add coccidiostats in the feeds or water.

NAGANA.

1. Nagana is caused by protozoa called trypanosomes.
2. A tsetse fly spreads nagana.

Signs and symptoms of nagana.

a) High temperature.
b) General emaciation.
c) Anaemia.

Control of Nagana

a) Spray forests where tsetse flies breed and hide.
b) Trap the tsetse flies using the tsetse fly traps.

Note: Some protozoan diseases are spread by ticks so, they are called **tick borne diseases**.

TICK BORNE DISEASES

a) East Coast fever.
b) Heart water.
c) Red water.

EAST COAST FEVER.

1. A very serious disease among calves in East Africa.
2. It is caused by protozoan.
3. It is transmitted by a brown tick.

Signs and symptoms of East Coast fever.

a) Dip animals in acaricides.
b) Remove ticks from the animal's body by hands.
c) Smear animals with acaricides.
d) Fence the land to prevent your animals from mixing with tick infested animals.

Treatment

Antibiotics and sulphur drugs are normally used to keep down the secondary infection.

HEART WATER

1. It is caused by protozoa.
2. It is transmitted by ticks.
3. It affects livestock.

Signs and symptoms of heart water.

a) Rise in temperature.
b) Uncontrolled movement of muscles (twitching)
c) Comma before death.
d) After postmortem, a yellowish fluid can be seen in the heart and the abdominal cavity.

Prevention and control of heart water.

Good tick control.

RED WATER

1. It attacks cattle, goats and sheep.
2. It is caused by protozoa.
3. It is spread by ticks.

Signs and symptoms of Red water.

a) Rise in temperature.
b) The animal becomes anaemic.
c) Its urine turns to reddish brown.

Prevention and control.

Good tick control.

Treatment

Inject infected animals with anti babecia drugs.

ANIMAL PARASITES

A parasite is an organism that depends on another organism (host) for food and shelter.

Types of parasites.

a) Endo-parasites.(internal parasites)
b) Ecto-parasites (external parasite)

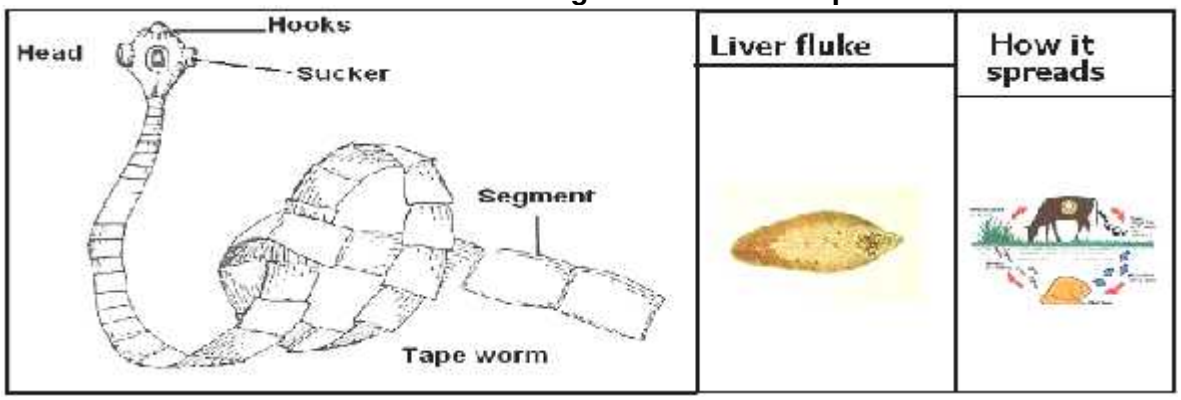
ENDO-PARASITES

These are parasites fount in the body of an animal.

Examples of internal parasites.

a) Tape worm
b) Round worm.
c) Liver fluke.

Diagrams of internal parasites



Control of internal parasites

Deworm the animals.

Deworming is a practice of giving an animal an oral drug to kill or expel the parasite.

Methods of deworming.

a) Drenching.
b) Dozing.

Drenching

1. Drenching is giving a liquid drug to an animal.
2. A drenching gun is used to administer the liquid drug.

Diagram of a drenching gun



Dozing

1. Dozing is giving a solid drug (tablets) to an animal.
2. A dozing gun is used to administer the solid drug.

Diagram of a drenching gun



EXTERNAL PARASITES

These are parasites found on the body of the animal.

Examples of external parasites.

a) Ticks.
b) Mites.
c) Lice.
d) Fleas.
e) Tsetse flies.

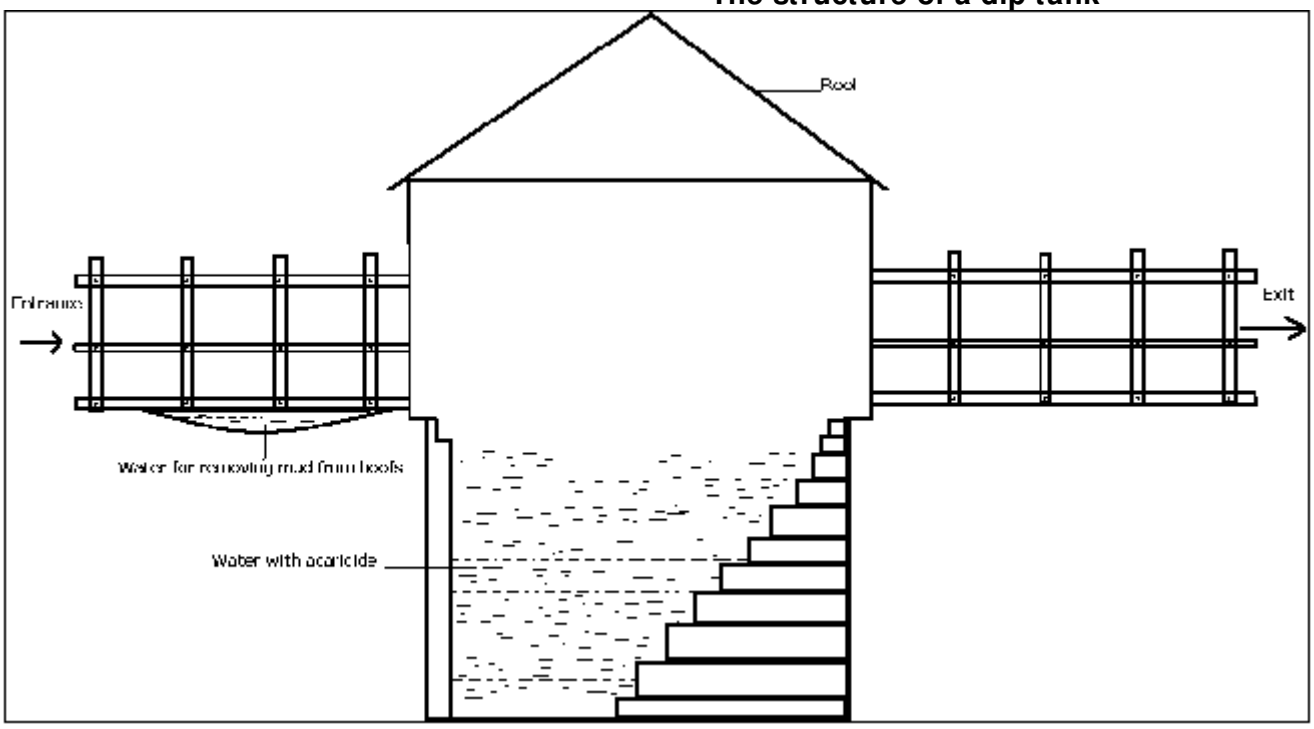
Diagrams of external parasites.

Tick	Tsetse fly	Flea
		

Control of external parasites

a) spraying tsetsefly infested forests.
b) Deticking(hand picking)
c) Spraying animals with acaricides.
d) Dipping the animal in a dip tank

The structure of a dip tank



Factors to consider when starting a farm.

a) Land.
b) Capital
c) Labour.
d) Water.

e) Market.
f) Road network

RESOURCES IN OUR ENVIRONMENT.

Environment.

1. Environment means all things that surround man.
2. Components of the environment include;
   a). Land
   b). Water
   c). Animals
   d). Air
   e). Plants

Land.

1. Land is made up of soil, rocks and minerals.
2. Many activities of human beings are done on land.
3. Such activities include;
   a). Crop growing
   b). Rearing animals
   c). Construction of building and roads
   d). Recreation
   e). Mining of minerals

Water.

1. This includes surface and underground water.
2. Surface water include lakes, rivers, streams, wells and ponds.
3. Areas with a lot of water in the soil (water logged) are called wet lands (swamps).

Animals and plants.

1. Animals and plants can be found on land and in water.
2. Animals include vertebrates and invertebrates.
3. Plants make up the vegetation cover on land.

Air.

1. Air surrounds the earth and make up the atmosphere.
2. Components of air include;

a). Nitrogen
b). Oxygen
c). Carbon dioxide
d). Rare gases

RESOURCES.

Resources are things that are needed by man to satisfy his needs. (wants)

Classification of resources.

Common resources: (global resources)

a). These are resources that are used by everyone and belong to nobody.

b). They exist in plenty and extend beyond boundaries.
c). They include;
- Water
- Air
- Sun

Renewable resources:

a). These are resources that can be replaced by natural process of reproduction and growth.
b) Plants and animals are renewable.

Non-renewable:

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

Examples of Non-renewable:

a). Oil
b). Coal
c). Mineral
d). Natural gas

Characteristics of non-renewable resources.

a). They exist in limited amounts.
b). Once used, they totally change their nature forever.
c). They take millions of years to form i.e their rate of formation is slower than the rate of resources utilization.

Inexhaustile resources:

These are resources that will not be exhausted.

Examples of Inexhaustile resources

a) Wind
b) Rain fall
c) Tidal power
d) Atomic energy
e) Solar energy

Exhaustible resources:

These resources include all materials which people use and can be exhausted.

Recyclable resources:

a). These are resources that do not get destroyed or lose value through use.
b). They can be reprocessed and then reused many times.

Examples of Recyclable resources

a) Metallic scrap
b) Polythene papers
c) Plastic scrap materials

Types of resources.

1. The natural non-living things.

Soil

It is a natural medium in which plant grows.

Importance of soil.

1. It provides plants with nutrients for growth.
2. It provides raw materials for building.
3. Clay soil is used for making models and pottery materials.
4. Soil is used in decorating houses as it has different colours and texture.

Soil Conservation.

1. It is the maintaining of soil fertility and its structure.
2. Soil can be conserved through;
   a). Practicing crop rotation.
   b). Adding manure to the soil.
   c). Bush fallowing.
   d). Mulching the land.

Rocks and minerals.

1. The mineral may be of metallic or non-metallic substances.
2. Metallic minerals include: gold, silver, platinum, iron, copper, zinc and lead.
3. Non-metallic minerals may contain: calcium carbonate, sodium, chloride, silicate e.t.c
4.

Importance of rocks and minerals:

a). Provide raw materials for making industrial and domestic equipment as well as tools.
b). Provide raw materials for building houses and roads.
c). Metallic minerals are used in the manufacturing of machines used in factories.

Fossils fuel:

1. Fuel is anything that can burn to produce energy.
2. Fossils are animal or plant remains that have turned into fuel sources.
3. Fossil fuel include:
   a). Coal
   b). Petroleum

Coal

1. It is a product of plant remains.
2. It provides thermal electricity when burnt.
3. It is used to make dyes.

Petroleum or crude oil.

1. It is a liquid fossil fuel from animal remains.
2. It is a common energy resource for power to run engines and electric generators.

Products from crude oil.

a). petrol
b). diesel
c). paraffin
d). lubricating oils

e). grease
f). tar used on roads
g). plastics

Physical features.

1. These include all land forms.
2. Examples include;
   a). water bodies i.e lakes and rivers
   b). mountains
   c). rift valleys

Importance of water bodies.

1. They attract tourists
2. They act as recreation centres e.g falls, beaches etc)
3. They are fishing grounds.
4. They are used as means of transport e.g canoes, boats and ships.
5. Rivers are used to generate H.E.P.
6. They modify climate.

Importance of mountains.

1. They act as tourist attractions.
2. They help in the formation of relief rainfall.
3. They are a source of most minerals.
4. They are a source of rivers.

Air and wind.

1. Air is a mixture of gases.
2. Wind is air in motion.

Uses of wind.

1. It dries clothes.
2. It is used in winnowing seeds.
3. For running dhows and other boats which use sails.
4. Wind energy runs wind mills to generate electricity.

Uses of air.

1. Oxygen is used during germination.
2. Oxygen is used for respiration.
3. Carbondioxide is used in photosynthesis by green plants to make starch.
4. It is a raw material in industries to make liquefied Carbondioxide used to extinguish fire.
5. Carbondioxide is used in the preserve bottle drinks e.g soda.
6. Nitrogen is used in the formation of proteins by plants.
7. Nitrogen helps to make the soil fertile in form of nitrates.
8. Rare gases (argon, neons, krypton) are used in the making of electric bulbs.

How man affects air.

1. Burning produces smoke and carbondioxide that cause air pollution.
2. Heavy industrialization causes air pollution.
3. Spraying dangerous chemicals causes air pollution.

Water.

1. It is made of two hydrogen atoms and one oxygen atom (H_2O)
2. The main source of water is rain.
3. Wetlands such as lakes, rives, swamps, springs, underground water tables are also sources of water.

4. **Importance of water.**
   a). Running water can be used in the generation of hydro-electricity.
   b). Water bodies are a means of transport.
   c). Water is used to mix soft drinks.
   d). Water is used for irrigation of crops.
   e). Water sources are a source of fish.
   f). Water is used by plants in the process of photosynthesis.
   g). It is used domestically for cooking and washing.

5. **How water can be affected.**
   a). Silting: it is the erosion of soil particles in water sources.
   b). dumping of industrial waste in water.
   c). building of latrines near water sources can cause water contamination.
   d). dumping of household refuse in water sources.

6. **How water can be conserved.**
   a). avoid dumping industrial wastes in rivers, lakes and wetlands.
   b). avoid farming along river banks to reduce siltation of rivers and lakes.
   c). avoid using poison to catch fish.
   d). avoid reclaiming wetlands.

Sun:

1. It is the single largest natural source of energy. It provides light and heat energy.

Importance of the sun light.

a). it is used by plants to carry out photosynthesis.
Photosynthesis is the process by which plants make their own food.
During this process, sun light is trapped by the help of chlorophyll. The food made by plants is called starch.
b). Sun light helps to dry crop after harvesting.
c). Heat from the sun is used for preserving food e.g fish, meat.
d). Heat from the sun is used to generate solar electricity.

Solar energy.

1. It is energy radiated by the sun.
2. Solar energy can be trapped and converted into electricity.

Devices use to tap solar energy include

a). solar cooker
b). solar drier
c). solar heater
d). solar cell

Solar water heater.

1. It is used for heating water in homes.

How it is made.

a). The flat plate collector made of blackened metal plate is placed on the roof of the house.
b). Pipes that carry water are welded on the plate.
c). A transparent plastic or glass plate is placed over them.
d). The blackened metal plate absorbs heat energy from the sun light.
e). This heats water in the pipes.

Solar panels.

1. It reflects sun rays towards a black hot plate.
2. The reflector is kept at angle to receive the sun light rays.
3. The sun light rays are reflected towards a blackened plate that absorbs and radiates the heat out of it.
4. When water in a container is placed on this plate it begins to boil.

Solar drier.

1. It helps to dry crops e.g maize, beans, tea etc.
2. Heat from the sun goes in through the top glass but it is not radiated out.
3. Ventilator pumps are used to blow air over the crops.

Diagram of a solar water heater, a solar cooker and a solar drier shall be drawn.

LIVING THINGS AS RESOURCES.

1. These include plants and animals in our environment.

Plants.

1. Some plants give us plant fibres e.g cotton, sisal, jute and linen.
   Cotton and linen are used to make cloth while sisal and jute are used to make ropes and sacks.
2. Some plants are used as herbal medicine to cure certain diseases.
3. Some plants are used as food.
4. A certain group of fungi called penicillium is used to get an antibiotic called penicillin.

Animals.

1. Merino sheep gives us wool used to make cloth, blankets, carpets, bed sheets.
2. Silk worms give us silk.
3. The skin and hides from domestic animals are for making bags, shoes, belts etc.
4. Horns from cattle are used to make glue.
5. Bees give us honey and wax.

Synthetic fibre: (artificial fibre)

1. They include : rayon, nylon, terylene, acrilon, cashmilon and orlon.
   Rayon is silk made from wood pulp or crushed wood and cellulose from cells of plants.
   Nylon fibres are made from plastics.
   Nylon can be used for making clothes, ropes, fishing nets and fishing lines.

Wild life:

1. Wild life refers to plants and animals that live and grow on their own.
2. Some of these animals and plants have been extincted or are endangered because of their increasing demand for their products e.g crocodiles for their skin, elephant for their tusks and rhinos for their horns.

Importance of wild life.

a). Some mammals and birds are a source of food.
b). Some animals and birds are used for cultural heritage by some countries and tribes.
c). Plants provide wood for fuel and timber.
d). Plants provide shade.
e). Forests help in the formation of rain.
f). Earn foreign exchange for the government through tourist attraction.

How to conserve and protect wild life.

a). Take care of animals in national game parks and game reserves.
b). Banning of poaching
c). Control fishing
d). some rare animals should be caught and let to breed in the wild life education centres (200)

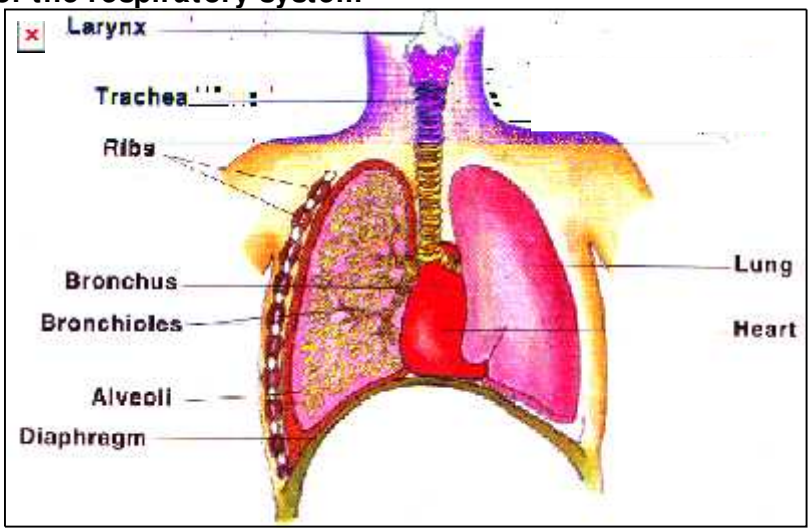
RESPIRATORY SYSTEM

1. Respiration is the process by which the body uses food and oxygen to produce energy, water and carbondioxide.
2. The equation for respiration is
   Food + Oxygen = Energy + Water + Carbondioxide.
   Note: Water and Carbondioxide are byproducts of respiration.

Organs of the respiratory system

a. Nose
b. Trachea (wind pipe)
c. Bronchi
d. Alveoli (air sac)
e. Lungs

Parts of the respiratory system



Functions of different parts of the respiratory system

1. **The nose**

   It contains mucus and cilia which help to trap dust and bacteria.

   Note: Air is warmed and moistened in the nose.

2. **Epiglottis**

   It prevents foreign bodies from entering the trachea.

   Note: If food enters the trachea, choking and coughing will occur to clear the passage.

3. **Trachea (wind pipe)**

   It conducts air into the lungs

   Note: A trachea is made up of cartilages to keep it open.

4. **Alveoli (air sacs)**

   a. It is where gaseous exchange takes place.

   b. Air sacs are adapted to this function by being surrounded by many blood capillaries and having thin walls.

5. **The pleural cavity**

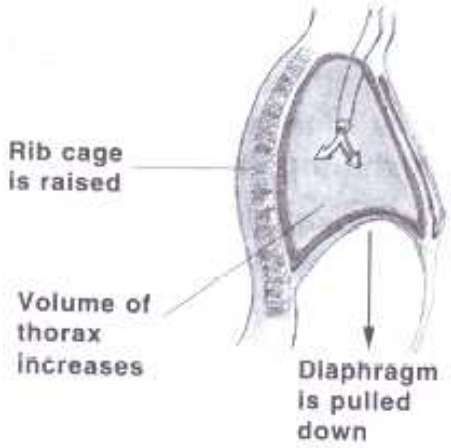
   It produces pleural fluid.

   Note: The pleural fluid cushions the lungs and reduces friction between the lungs and the ribs.

BREATHING

1. Breathing is the act of taking in and out of air.
2. There are two types of breathing:
   a. Inspiration (inhalation) – breathing-in.
   b. Expiration (exhalation) – breathing-out.

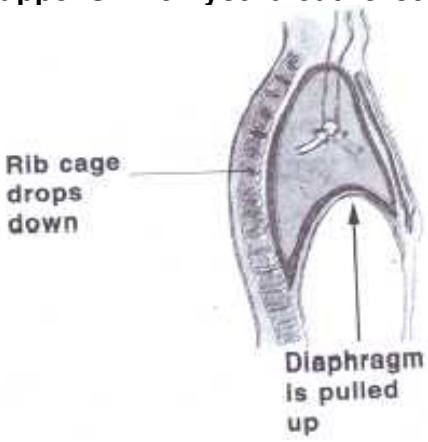
What happens when you breathe-in (during inspiration)



1. The ribs move up and outwards.
2. The diaphragm flattens to create space for the in coming air.
3. The volume of the lungs increases.
4. Air is drawn-in.

   Note: Inspiration is also known as inhalation.

What happens when you breathe-out (during expiration)



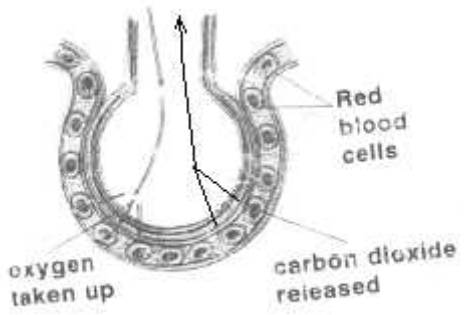
1. The ribs move to their original position.
2. The diaphragm becomes dome shaped.
3. The lungs go back to their original volume.
4. Air is expelled.

   Note: Expiration is also known as exhalation.

GASEOUS EXCHANGE

1. Gaseous exchange takes place in the alveoli.
2. The air we breathe-in contains more oxygen than the one we breathe-out.
3. The air we breathe out contains more carbondioxide than the one we breathe-in.
4. When air reaches air sacs, oxygen diffuses through the walls of the air sacs.
5. Carbondioxide in the blood also diffuses into the air sacs and it is eventually expelled through the trachea and the nose.

An alveoli



An air sac

6. Diffusion is the process by which molecules move from areas of high concentration to areas of low concentration.

Table showing approximate composition of inspired and the expired air

	Inspired air	Expired air
Oxygen	21%	16%
Nitrogen	78%	78%
Carbondioxide	0.03%	4%

Note: The concentration of nitrogen we breathe in and out does not change because it is not used in our bodies.

Rate of breathing

1. Under normal conditions, the rate of breathing is always between 10 to 16 times per minute.
2. The breathing rate increases because there is need for more oxygen for respiration to meet the energy demand of the body.
3. **Factors that can increase the rate of breathing**
   a. Physical activity.
   b. Fear
   c. Fright

Diseases related to the respiratory system

1. Lung cancer
2. Tuberculosis
3. Whooping cough
4. Asthma
5. Bronchitis
6. Pneumonia

Lung cancer

1. This disease destroys the cells of the lungs.
2. Lung cancer commonly affects smoker and people who work in factories which produce a lot of smoke.

Tuberculosis(TB)

1. It destroys the lungs especially air sacs.
2. A person with TB coughs a lot, becomes very thin, sweats a lot and has continuous chest pain.

Whooping cough(pertussis)

Bacteria cause whooping cough.

Asthma

1. A person with asthma finds it difficult to breathe.
2. The air passage is blocked by over production of mucus.

Bronchitis

1. Caused by a virus but worsened by smoking.
2. This is a disease that affects the air passage.
3. A person with bronchitis coughs continuously and experiences breathing problems.
4. This disease is common to people who smoke.

P.6 SCIENCE LESSON NOTES TERM III

SCIENCE AT HOME AND IN OUR COMMUNITY.

Water cleaning and purification.

Water on the earth's surface is affected by its surroundings which can make it dirty, polluted or contaminated.

How water can get contaminated.

a) Poor disposal of garbage and human body wastes.
b) Discharging industrial waste into water sources.
c) Dumping poisonous chemicals into a water source.
d) Salutation of soil particles into water sources.
e) Allowing animals to drink water from water sources.

Hard water.

1. Hard water is water that does not readily form lather with soap.
2. Water is said to be hard if It contains a lot of mineral salts dissolved in it especially calcium salts.

Disadvantages of hard water.

a) it wastes soap.
b) stains kettles (water container)
c) blocking of hot water metallic pipes.

Advantages of hard water.

a) Provides mineral salts to the body.
b) Best for beer brewing.
c) Protect us from lead poisoning.

How hardness of water can be removed.

a) Boil the water.
b) Distillation of water.
c) Adding a calculated amount of lime.

1. **Preparing of safe drinking water.**
   a) Decanting
   b) Filtering
   c) Boiling
   d) Treatment using Chlorine.
   e)

Decanting:

1. This is a method where solid particles in the water are allowed to settle at the bottom of a container and water is then poured into another clean container.
2. Allow the water to stand still for several hours. So most of the suspended dirt settle at the bottom.
3. Carefully pour off the clean water leaving the settled dir t at the bottom of the container.

Note: The clear water collected is not yet safe for drinking because it may contain germs. It needs to be boiled.

Filtering:

1. Filtration is a method of obtaining clear water by removing dirt particles from it.
2. The filter paper is folded into a cone and fitted into the funnel.
3. The dirty water is now poured into the funnel so that clear water passes and the dirt particles are held back by the filter papers as residues.
4. Filtering can also be done by using a clean piece of cloth.

Boiling water.

1. Boiling water helps to kill germs in water.
2. Boiling water makes it safe for drinking
3. To kill the germs the actual boiling should continue for at least 10 to 15 minutes.
4. The water should be allowed to cool but be covered to prevent dust and other dir t from entering it.
5. The boiled and cooled water should then be kept in clean containers so as to avoid any contamination.

Treatment.

1. Water needed in large quantities for use by many people in urban areas can not easily be boiled but it is purified by treatment.
2. Stages involved in water treatment.
   i. Screening – removing weeds and other floating materials at the water intake from the source.
   ii. Sedimentation – removing impurities by letting water to settle.
   iii. Filtration – suspended dirt is removed from the water.
   iv. Chlorination – germs are killed by addition of chlorine chemical to the correct amount of water.
   v. Storage – water passes to big reservoirs. It should be well covered to prevent contamination again.

(***Teacher should demonstrate and draw the diagram***)

ACCI DENT AND FI RST AI D.

1. An accident is any occurrence that may result into injury.
2. First Aid is the first treatment an injured person gets before he is taken to hospital.
3. An injured person is also referred to as the casualty.

Importance of giving first aid:

1. First Aid help to save the life of the injured person.
2. First Aid is given to prevent germ infection through wounds and cuts.
3. First Aid is given to prevent over-bleeding.
4. First Aid is given to promote quick recovery.
5. First Aid is given to prevent further injuries.
6. First Aid is given to reduce pain.

BURNS AND SCALDS

Scalds:

1. A scald is an injury caused by wet heat.
2. Scalds can be caused by body contact with hot liquids.
3. Scalds can be caused by body contact with steam or vapour.

First aid for scalds:

Dip the effected body part in cold clean water where applicable and where not, pour clean cold water on the affected part.

Effects of scalds:

Scalds develop into wounds or body inflammations.

Burns

1. A burn is a injury caused by dry heat or by the reaction of chemicals on the body.

Causes of burns:

1. Burns can be caused by body contact with burning charcoal.
2. Burns can be caused by body contact with a hot metallic object.
3. Burns can be caused by body exposure to too much sunlight.
4. Burns can be caused by body contact with acid.
5. Burns can be caused by exposure of the body to X-ray radiation.
6. Burns can be caused by exposure of the body to radio-active materials.
7. Burns can be caused by exposure of the body to electric short circuits.

Degrees of burns:

Burns are categorized into First Degree burns, Second Degree burns and Third Degree burns.

First degree burns:

1. A burn is considered to be in First Degree if it affects only the first layer of the skin.
2. First Degree burns only cause a painful feeling in the effected part without causing any tissue damage. In extreme cases of First-Degree burns, the affected part may become inflamed.

First aid of first degree-burns:

1. Dip the affected part in clean cold water where applicable. Where it is not applicable, pour clean cold water on the affected part.
2. Cold water helps to reduce pain.

Second degree-burns:

1. Second Degree-burns affect the first and second layers of the skin causing minor damage to body tissues.
2. Second degree-burns cause blisters. Blisters are swellings filled with water. This water collects from body tissues during the accident.
3. Blisters should not be burst because bursting them opens the skin to germ infection.

First aid to second degree burns:

1. Dip the affected part in clean cold water where it is applicable. Where it is not applicable, pour clean cold water on the affected part.
2. Frequently give cold water to the casualty to replace the body fluids lost during the accident.
3. The drinks also help the kidney to quicken the process of removing toxins from the body in form of urine.

Third degree burns:

1. Third degree-burns destroy the entire skin and may destroy the surrounding body tissues.
2. In some cases, third degree burns may not show on the surface of the skin, but affect internal body organs. These are mostly caused by electric shock, drinking acids and in - halation of air with radioactive properties.

First aid to third degree-burns:

1. Prevent shock by lying the casualty in a reclining position with the slightly raised higher than other body parts to improve on blood circulation.
2. Frequently give the casualty cold drinks to replace body fluids lost during the accidents.
3. Cover wounds with a bandage or a clean piece of cloth to avoid germ infection.
4. Rush the patient to the nearest health unit for medical attention.

Control and prevention of burns and scalds:

1. Avoid sunburns by wearing white clothes covering the entire body whenever one is exposed to too much sunshine.
2. Cook in raised places to prevent accidental contacts with hot materials.
3. Acids and radioactive materials should be properly labeled and kept away from accidental contact.

FEVER AND CONVULSIONS

5. Fever is the condition caused by rise of body temperature above the normal.
6. The normal human body temperature is 37^0 C or 98.7^0 F.

Possible causes of fever:

1. Malaria infection can cause fever.
2. Viral infection such as influenza infection, small pox infection, chicken pox infection etc... cause fever.
3. Inflammations on the body cause fever.
4. High external temperatures above those that can be regulated by body mechanisms cause fever.
5. Severe body dehydration among infants can result into fever.

Effects of fever:

1. High fever can cause shock.
2. Fever beyond 41^0 C causes death.
3. High fever can result into failure of body organs.
4. Fever causes nausea, fainting and vomiting.
5. High fever in infants causes convulsions.

First aid to fever:

1. Apply frequent tepid sponging to cool down the body temperature.
2. Remove clothes to improve on air circulation around the body.
3. CONVULSIONS:
4. Convulsions are uncotrollable movements of body muscles due to disturbances in the cortex of the brain. OR: Convulsions is where body muscles contract and relax violently.

Causes of convulsions:

1. High fever in infants can result into convulsions.
2. Tetanus infection can cause convulsions.
3. Meningitis infection can cause convulsions.
4. An epilepsy attack causes convulsions.
5. Inadequate levels of blood sugar and calcium cause convulsions.
6. Cerebral malaria can cause convulsions.
7. Severe injuries on the head cause convulsions.
8. Too high levels of alcohol in the body can cause convulsions.

First aid for convulsions:

1. Place the patient on the ground where there is enough space so that he does not knock himself against objects during convulsions. This can result into further injuries.
2. Remove the patient from the bed or raised place to prevent them from fall and hurting them during the convulsions.
3. Remove all loose clothing to prevent the patient from strangling himself during the convulsions.
4. Place a hard blunt object like a spoon between the upper and lower jaw to prevent the convulsing person from biting his tongue.
5. Lie the patient on his side to prevent him from choking on his vomitus in case vomiting.

6. If convulsions are caused by fever, apply frequent sponging to cool down body temperature.

FAINTING:

1. Fainting is the temporary loss of consciousness
2. Fainting is mostly caused by lack of oxygen in the upper part of the body especially the brain.

Possible causes of fainting:

1. Subjecting the body to too much heat or pressure can cause fainting.
2. Shock can cause fainting.
3. A sudden blow on the head can cause fainting.
4. Lack of glucose in blood can cause fainting.
5. Obstruction of the flow of blood in the upper part of the body.
6. High alcoholic levels in blood.

Effects of fainting:

1. Fainting can result into a coma.
2. Coma is the condition where the brain becomes dormant.
3. Coma may result into death.

First aid for fainting:

1. Lay the patient in a reclining position with legs raised above other body parts to increase on blood circulation.
2. Loosen tight clothes to improve on air circulation.

NEAR DROWING:

1. Drowning to die from lungs being filled with water.
2. Near drowning is the condition when lungs fail to carry out breathing due lungs being filled water.

Places where drowning is likely to happen:

1. Water bodies such as ponds, wells, rivers, lakes, oceans, etc.…
2. Swimming pools.
3. Bathing tabs.
4. Water containers such as drums, pails, basins, etc.…
5. Water reservoirs.

How to help a person at risk of drowning:

1. Call for help immediately.
2. If the victim is far inside the water body, extend a pole or oar for him to grasp as you row him ashore. Do not hold him because he may pull you into the water. Do not try to pull the drowning person into the boat because he may capsize it during the struggle.
3. If the drowning person is near the shore, extend a pole or throw him a line to pull him ashore.
4. Where you cannot move the drowning person because of injuries, use a floater to buoy him until more help arrives.

First aid given for near drowning:

1. If the casualty has stopped breathing, lay him face up and apply pressure between the abdominal and chest cavities to push out the water from the lungs.
2. Administer artificial respiration by doing mouth-to-mouth breathing (Kiss of life).

Prevention drowning accidents:

1. Cover all pits and holes where water may collect.
2. Avoid playing in water especially without qualified instructors.

3. Keep containers filled with water out of reach of children.
4. Wear life saving jackets whenever travelling by water.

POISONS:

A poison is any chemical that can harm the body.

Common causes of body poisoning:

1. Eating food contaminated with Salmonella bacteria.
2. Drug over dosage.
3. Too much alcohol in the body.
4. Intentional or accident drinking or eating poisonous substances.
5. Snake bites.
6. Scorpion stings.
7. The organ of the body mostly affected by poison is the liver. The liver helps to remove or neutralize poisons in the body. Too much poisoning causes liver failure.

First aid for poisoning:

1. In case of snake and scorpion stings, rush the casualty to nearest health center.
2. In case of poisoning from over dosage, give the casualty a lot of milk or water to drink to dilute the drug.
3. In case of orally taking in any poison, give the affected person a lot of milk to drink to dilute the poison.
4. Give the patient water mixed with charcoal powder. The water helps to dilute the poison and the charcoal powder helps to absorb poison along the digestive lining.
5. Induce vomiting after giving the patient milk or water to remove some of the poison.
6. Where possible, give the patient juice rich in pectins. Pectins are chemicals in citrus fruits that have the ability to absorb toxins.

ACIDS AND PETROLEUM PRODUCTS:

1. Acid and petroleum products such as paraffin, benzene, petrol, etc… are accidentally taken into the body when they are mistaken for water.
2. Acids are corrosive and cause burns along the digestive tract.
3. Poisoning by petroleum products mostly affects the brain and the lungs.
4. Petroleum products damage the lungs and abstract movement of air through the windpipe.

First aid acids and petroleum products:

1. Where a casualty has taken acid, give him a lot of water to drink to dilute the poison. Do not induce vomiting as it may result into double tissue damage.
2. Where a casualty has taken a petroleum product, give him a lot of milk to drink to dilute the poison. Do not induce vomiting as it may lead to the products into the respiratory tract.

FOREIGN BODIES:

A foreign is any object in any part of the body where it does not belong.

Foreign bodies in the eye:

Foreign bodies in the eye may include metal pieces, dust, insects, etc.…

First aid Foreign bodies in the eye:

1. If the foreign object is a metal, use a magnet to pull the metals out. Do not attempt to remove the pieces with a finger or a handkerchief as it may lead to the damage of the cornea.
2. In case of dust or an insect, rinse the eyes with water or use a handkerchief to remove the object.

Foreign bodies in the nose:

Children sometimes force objects such as seeds, stones, food, etc... into their nostrils. This can result into the blocking of air to the lungs.

First aid Foreign bodies in the nose:

1. Where the object is visible, use a pointed end of a handkerchief to remove the object.
2. Where the object cannot easily be moved, take the patient to qualified medical worker.

Foreign bodies in the throat:

1. Foreign bodies in the throat include chunks of food, coins, bones, etc... swallowed accidentally during feeding.
2. These objects often stick into the throat or enter the wind pipe causing choking.
3. Choking can result into suffocation.

Acts that can result into chocking:

1. Talking while eating.
2. Swallowing food that has not been chewed properly.
3. Swallowing big chunks of food.

People most affected by chocking:

1. Elderly people who have lost some of their teeth.
2. Young children with underdeveloped teeth.
3. Drunkards who misjudge the size of chunks of food they swallow.

First aid for chocking:

1. Administer the epigastric thrust by standing behind the casualty and pressing the area between the abdominal and the chest cavities to force air out of the lungs. The air helps to push out the object from the windpipe or the throat.
2. Deliver gentle blows at the back while supporting the chest with the flat of your palm. This helps to push air upwards so that it pushes out the foreign object.
3. Use the finger to probe the object in the throat and remove it. This should only be done by doctors to avoid further injury.

SANITATION:

1. Sanitation is the general cleanliness to promote public health.

Sanitation involves:

a) Provision of good housing
b) Proper disposal of human wastes
c) Supply and use of safe water
d) Vector control
e) Safe guarding of food

f) Prevention of pollution of air and water.

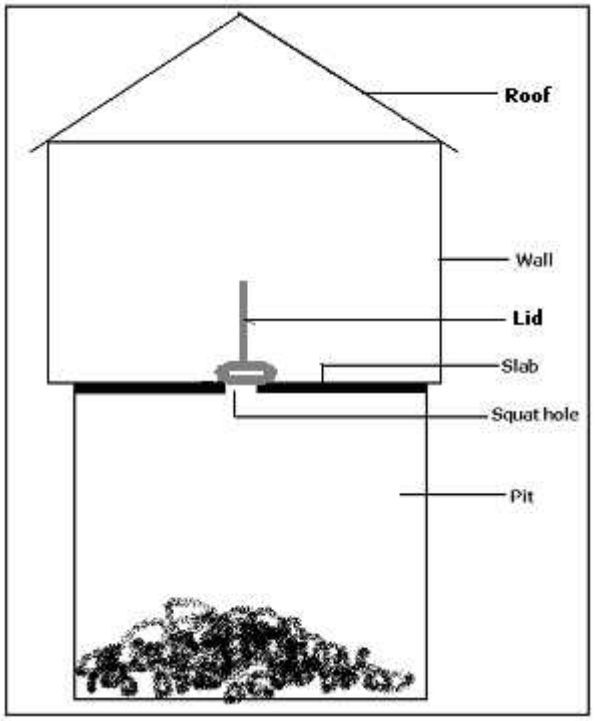
LATRINES.

1. A latrine is a place for urination and defecation.
2. Latrines and toilets are very important because they keep feaces and urine in places where flies or other insects cannot bring them to our food and water.

Types of latrines commonly used in Uganda.

1. Traditional pit latrine
2. Ventilated improved pit latrines (V.I.P)
3. Toilets
4. Pottees

Traditional Pit Latrines



Parts of a traditional pit latrine

A pit

It should be deep enough to hold feaces of the user to many years. (usually 5 to 7 metres deep)

A floor

Strong enough to stand on and smooth enough to sweep and clean easily.

A squat hole

Big enough to allow feaces and urine to pass through but small enough to prevent children from falling through.

A lid

To cover the hole so as to control bad smell and movement of flies.

Walls and a door

For privacy.

A roof

To protect the floor and people from rain and sun heat.

Disadvantages of a traditional pit latrine.

It usually produces a bad smell.

How to maintain a pit latrine.

a) Smoke it regularly to control the bad smell.
b) The floor should be cleaned regularly.
c) Cockroaches in the pit should be sprayed.

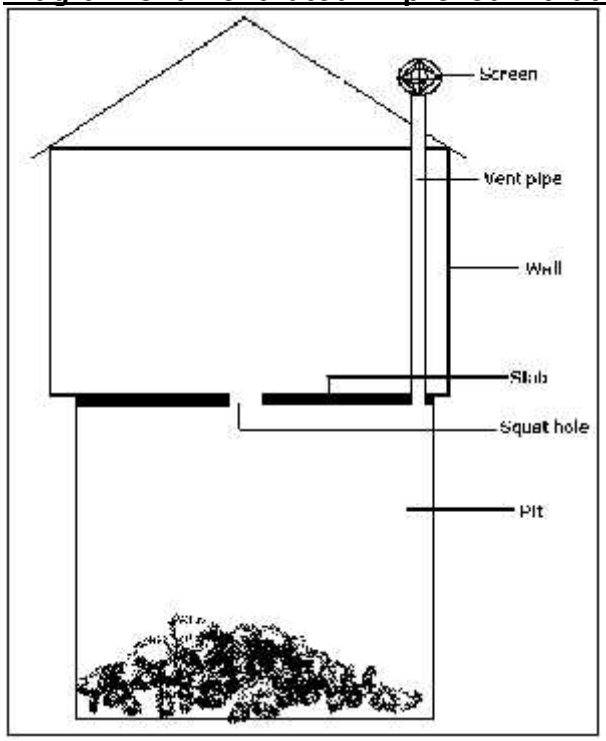
VENTILATED IMPROVED PIT LATRINE (V.I.P)

Features that makes it different from an ordinary pit latrine.

a) It has a vent pipe
b) It lets out bad smell from the hole so that the latrine does not smell.
c) It has a screen / wire mesh. It is fitted on the top of the vent pipe to trap flies.
d) It has no lid. This is to allow free movement of air into the pit and up the vent.
e) It has spiral shaped walls with no door so that moving air can come through the pit and up the vent.

Note: **A VIP latrine is called ventilated because it has a vent pipe and improved because it doesn't smell badly and it traps flies.**

Diagram of a Ventilated Improved Pit latrine.



Advantage of a Ventilated Improved Pit latrine.

a) It does not smell
b) It traps flies

The site for a p it latrine.

1. At a lower altitude than a water source to prevent water contamination.
2. At least 30m away from any water source to allow the water which comes in contact with the feaces to filter out into the soil before it comes to a water source.
3. At least 10m away from a school, home , kitchen, hotel so that any bad smell does not r each people.

Toilets (water closet latrine)

1. They are found inside modern houses or buildings in cities, towns and places where there is supply of piped water system.
2. Toilets use water to flash waste matter into a septic tank.

Parts of a toilet.

A bowl
It is a basin containing water where feaces and urine is deposited.

A seat
It has a cover to protect it.

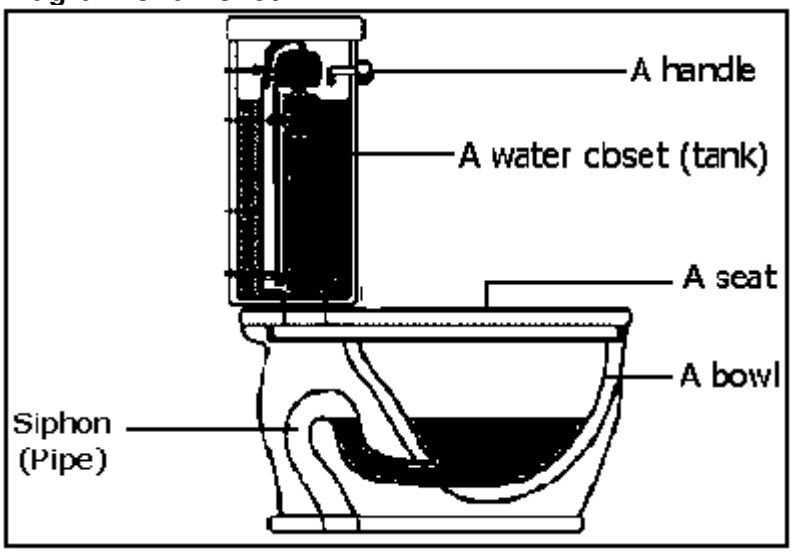
A water closet (tank)
It holds water for flushing.

A handle
We pull it or push it to flush the feaces and urine away down to the septic tank.

Pipe
Carry feaces to the septic tank.

Septic tank
It is where feaces and urine are stored until taken away be a cesspool emptier.

Diagram of a Toilet.



Using a toilet.

1. Flush the toilet always after use.
2. Wash hands after use.
3. Use toilet tissue whenever you visit it.
4. Avoid using hard materials like clothes, stones, hard paper because they block the pipe to septic tank.
5. Do not put any other thing in a toilet apart from feaces, urine, water and toilet tissue.

Problems faced by urban toilet system.

1. lack of water for flushing
2. they often block due to using hard things to clean one-self.
3. septic tanks spill out dirty water containing feaces all over the place.

Maintenance of a toilet.

1. Clean the seat with soap and disinfectants e.g Jik.
2. Scrub the inside part of the bowl using a brush.
3. Sweep and mop the floor.
4. Flash after us.

THE REPRODUCTIVE SYSTEM

PUBERTY AND ADOLESCENCE

PUBERTY

Puberty is the period of time when an adolescent becomes sexually mature.

ADOLESCENCE

a. Adolescence is the transitional period between childhood and adulthood.
b. Adolescence on average begins at the age of 15 to 21 tears in boys and 12 to 21 years in girls.
c. A boy or girl at this age is called an **adolescent**.

Stages of adolescence.

a) Primary sex characteristics
b) Secondary characteristics.
c) Psychological and emotional changes.
d) Out of step adolescent changes.

Primary sex characteristics in adolescents.

These are changes that involve sex organs in preparation for a reproductive function.

In boys:

a) The penis and the testes enlarge
b) Testes begin to produce sperms
c) One begins to experience wet dreams

In girls:

a) Development of the uterus and the ovaries
b) Production of ova by the ovaries
c) Menstrual cycles begin

Secondary sex characteristics in adolescents.

These are changes that are related to physical features that differentiate a mature man from a mature woman.

In boys:

a) Growth of hair on the chest, armpit and on the face.
b) The voice deepens.
c) Sweat glands become active.
d) Development of muscles.

Note: Increased levels of a hormone called testosterone bring about these changes in males.

In girls:

a) Development of breasts.
b) Growth of hair in the pubes and the armpit.
c) Enlargement of hips.
d) Active sweat glands.
e) Development of muscles and beautiful look.

Psychological and emotional changes.

1. These are changes that occur in one's mind and may not be realised by an adolescent.
2. They include:
   a) Adolescents become interested in members of the opposite sex.
   b) They want to look and be recognised as mature.
   c) Move in peer groupings of boys and girls.
   d) Become angry and disappointed quickly.
   e) React quickly to different situations e.g. a boy or girl who was once docile and cooperative, becomes resistant and disobedient.

Out of step changes.

1. These are changes that occur differently to different in the same age group.
2. Some of these changes occur earlier or later than they are expected in some individuals.
3. They include:
   a) A boy who was previously short may find himself taller compared to his age mates.
   b) A girl who was once considered small may find herself too tall and too fat compared to her age mates.
   c) Those who mature later may be influenced by those who mature early.
   d) Anxiety may be created on those who mature later and left behind by their age mates.

Problems of adolescence.

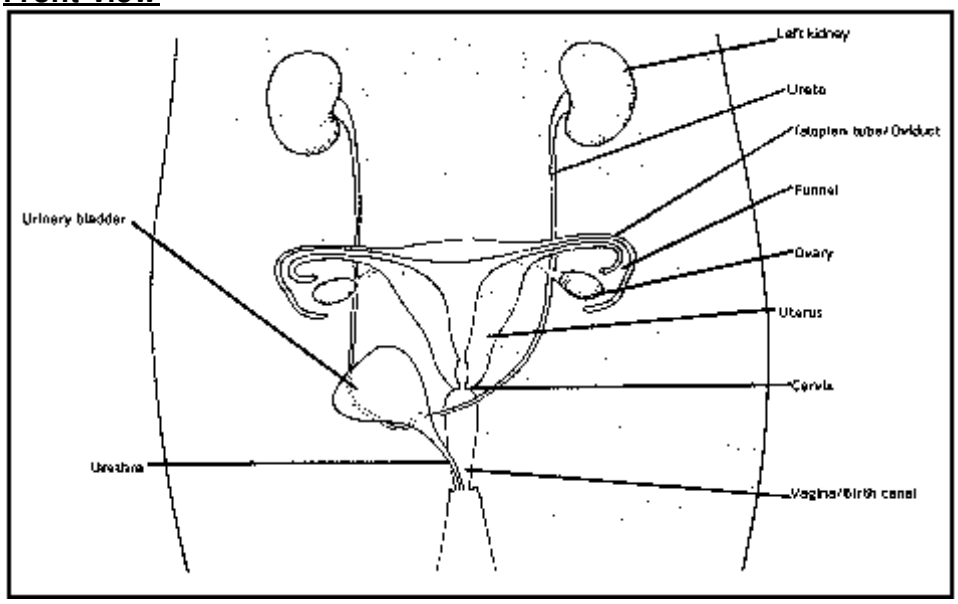
a) This stage brings conflicts between adolescents and culture and religion.
b) This stage brings conflicts by adolescents wanting to experiment situations.
c) Makes adolescent to develop anti-social behaviours such as smoking, alcoholism etc.
d) Makes an adolescent gain forms of wished anxiety.
e) Brings conflicts between adolescents and elders

Reproduction in humans.

1. Reproduction is a process where living things increase in number. Humans undergo sexual reproduction.
2. This involve the union of the male and female reproductive cells.
3. These cells are reproduced by the male and female reproductive organs.

The female reproductive organ.

Front view



Functions of different parts.

Vulva:

Receives and directs the penis in the vagina.

Vagina:

a) It receives semen.

b) It also acts as a birth canal

Cervix:

This is a ring of muscle that closes the womb during pregnancy or when it is not ready to receive sperms.

Uterus:

a) This is where conception or pregnancy takes place.

b) It is where the foetus develops from.

Oviduct/ Fallopian tube:

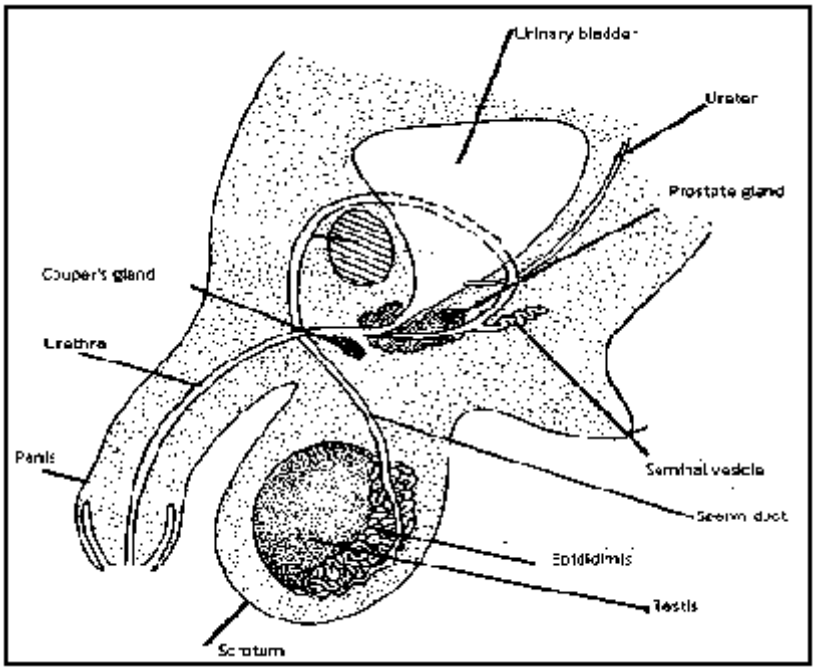
This where fertilization takes place.

Ovary:

a) Produces ova (female reproductive cells).
b) Produces hormones like Oestrogen which controls the secondary characteristics

The male reproductive organ.

Diagram of the side view and front view of the male reproductive parts.



Functions of different parts.

Scrotum:

a) Protects the testes.
b) It hangs outside to prevent the sperms from being destroyed by too much heat.

Testes:

a) Produce sperms (the male reproductive cells).
b) Produce a hormone called testosterone which is responsible for secondary characteristics in boys.

Epididymis:

A coiled tube of about 6m long which stores already manufactured sperms.

Sperm duct:

Conducts sperms from the epididymis to the urethra.

Seminal vesicle, Cowpers and prostate glands:

a) Produce seminal fluid in which sperms swim.
b) A mixture of sperms and seminal fluid is called **semen**.

Urethra:

Conducts semen into the vagina during copulation.

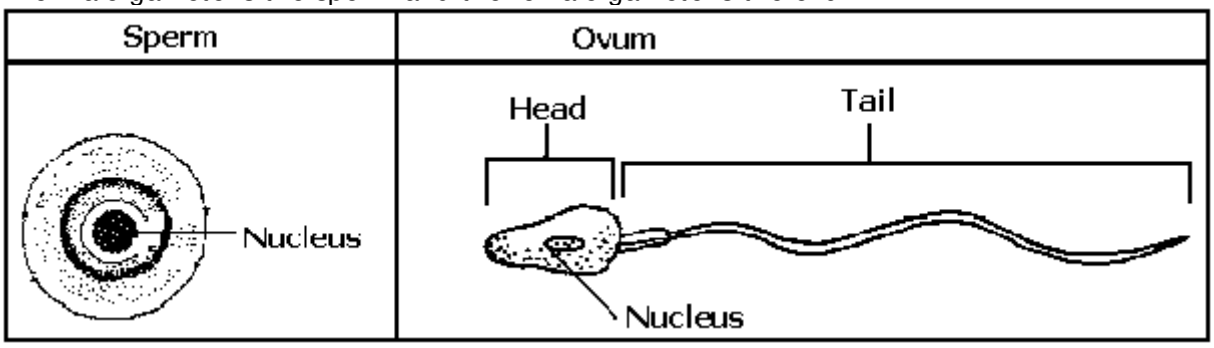
Erectile tissue:
When stimulated, the numerous blood vessels will be filled with blood making the penis large and stiff.

Penis:
Used for penetration and to deposit semen into the vagina.

Sheath/ Fore skin:
Covers the most sensitive part of the penis called the glans.

Fertilization in humans:

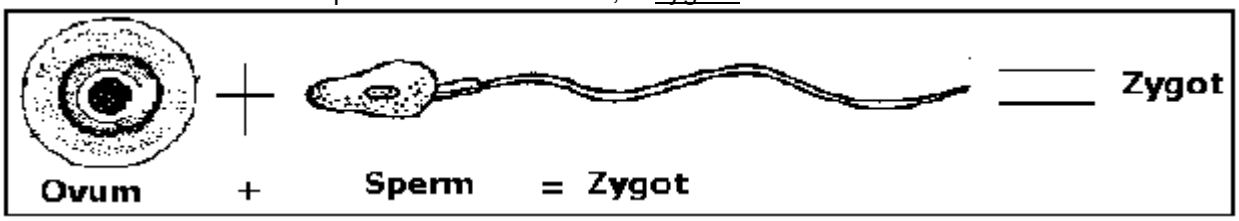
1. Fertilization is the union (fusion) of the male and the female gamete nuclei to form a zygote.
2. The male gamete is the sperm and the female gamete is the ovum



3. Humans undergo internal fertilization.

Internal fertilisaion:

1. This is a type of fertilisation where the nuclei of the female cells unite with that of the male one inside the female's body.
2. This takes place when there introduction of semen in the female organs during the time of ovulation. Ovulation is a process where the ovary releases a mature ovum into the oviduct.
3. Ovulation takes place every 12-14 days from the day of menstruation.
4. 2-3 hundred million sperms are introduced in the vagina in one ejaculation but only one is required to fertilize an ovum.
5. The act of inserting the penis into the vagina which results in the accumulated semen being ejaculated into the vagina is called copulation (mating).
6. A released human ovum is estimated to live for 12- 24 hrs. while a sperm can live in a female reproductive organ for 2-3 days.
7. When the nucleus of the sperm and ovum unite, a zygote is formed.



8. A zygote is a developing embryo between fertilisation to 8 weeks.
9. A foetus is a developing embryo between 8 weeks to birth.
10. In animals like rats, rabbits, dogs, pigs etc. many ova are relesed and are fertilised by a corresponding number of sperms.

Menstruation.

1. This is the monthly shedding of blood by the uterine walls whenever an ovum is not fertilised.
2. Usually, during ovulation, the walls of the uterus are thickened with layers of cells onto which the fertilised ovum attaches.
3. But if the ovum is not fertilised, the uterus walls break and shed off the blood, mucus and unwanted cells.
4. Menstruation occurs once in every 28 days.
5. It lasts about 3-5 days.

Implantation.

1. Implantation is a process where a fertilised ovum attaches itself onto the uterine lining.

2. After implantation, we say conception has taken place and that confirms pregnancy.

Pregnancy/ gestation.

1. This is a period from fertilisation to birth.
2. In man, it lasts 9 months.

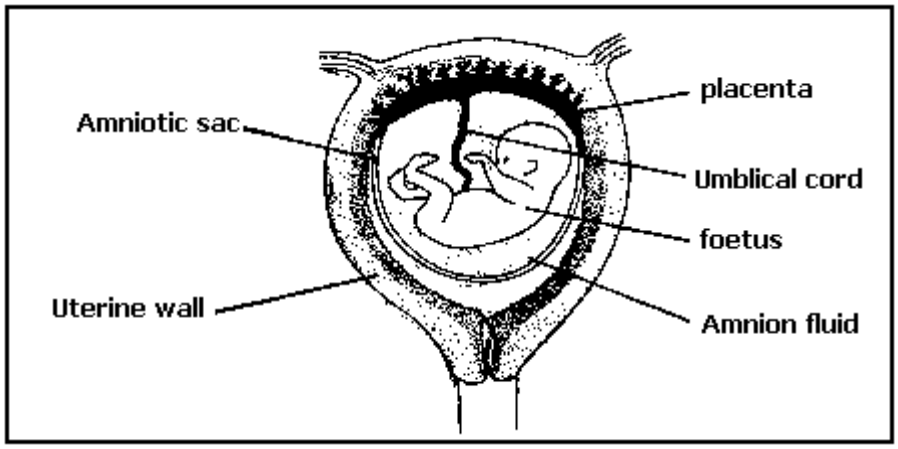
Common indicators of pregnancy.

a) Monthly menstrual periods stop.
b) Breasts enlarge.
c) Morning sickness especially in the 2nd and 3rd month of pregnancy.
d) Enlargement of the belly.
e) Cervix closes.
f) Movement of the baby can be felt.

Events in pregnancy.

a) The fertilised ovum develops finger-like structures (villi) into the uterus.
b) The part with the villi develops into a specialised organ called a placenta.
c) The uterine lining under the influence of Oestrogen and progesterone develop rich supply of blood vessels to facilitate exchange of materials between the mother's and the foetus' blood.
d) Dissolve oxygen, glucose, amino aids and salts from the mothers uterine blood pass to the embryo while the carbondioxide and other nitrogenous wastes pass in the opposite direction through the umbilical cord.
e) A water sack called an amnion, which cushions it from damage, surrounds the embryo.

Human foetus in the uterus.



Functions of different parts.

Umbilical cord:
Contains an artery and a vein through which materials are conducted to and from the foetus

.

An amnion:
Holds the amniotic fluid.

Amniotic fluid:
Cushions the foetus from damage.

1. **The placenta:**
   a) Acts as a food store and wastes.
   b) Prevents the mother's hormones from reaching the foetus.

Requirements by females during pregnancy.

Ante-Natal care:
This is the regular visits to the medical personel by a pregenant woman. During these visits the following take place;

a) Treatment if sick.

b) Immunisation against tetanus.
c) Advice on the nature of the food to eat and the dressing during pregnancy.
d) Advice o doing exercise
e) Checking on the position of the foetus and the way it is developing.

Good nutrition:
Should eat a variety of foods mostly with proteins to ensure proper upkeep, better growth and development of the foetus.

Physical exercise:
Should have regular physical exercise such as walking, simple housework etc. but should not be given heavy work like lifting heavy loads.
Exercise keeps her fit in preparation for birth.

Personal hygiene:
Should ensure cleanliness in herself and the cloths she wears.

Rest and sleep:
Apart from the sleep at night, a pregnant mother requires adequate rest and sleep during the day.

Appropriate dressing:
Should be dressed in a martinet dress (free dress) and a brassier.

Avoid self-medication:
Shouldn't take any drug unless prescribed by a health worker.
Some drugs are harmful to the growing foetus.

Keep off from the patients:
This is simply to prevent infectious and other contagious diseases.

Common problems related to pregnancy.

a) Morning sickness and vomiting.
b) Burning feeling or pain in the chest or stomach.
c) Lower back pain.
d) Swollen veins.
e) Piles and haemorrhoids.
f) Constipation.
g) Anaemia.
h) Swollen feet.

Teenage Pregnancy
Teenage pregnancy is pregnancy in a young woman who has not reached her 20th birthday when the pregnancy ends.
Teenage pregnancy may occur in marrieds or not married.

Problems associated with teenage pregnancy.
1. Dropping out of school.
2. Parental and family rejection.
3. Complication during pregnancy.
4. The cervix is so weak to hold the foetus.
5. Difficulty in delivering.
6. Young mother may not take care of the baby properly.
7. Community discremination.
8. May fail to get married in the future. They are considered second hand.

Family planning.

1. Family planning is a measure taken by parents to have a manageable number of children.
2. This is usually achieved through birth control methods.
3. Birth control methods ensure child spacing.
4. Child spacing is where parents give adequate time between the birth of their family children.

5 **Importance of family planning.**

a) Enables the mother to regain her health in preparation for the next pregnancy.
b) Enables parents to have a manageable number of children in a family.
c) Enables children to have enough basic needs.
d) Checks on the population of a country.
e) Helps in the control of unwanted pregnancies.

6. **Some reasons why some parents produce many children.**

a) Ignorance about family planning methods.
b) High infant mortality rate.
c) Desire for a particular sex of a child.
d) Cultural beliefs and the need to show that one is sexually strong.

Birth control methods.

1. **Natural birth control methods**.

Abstinence:
This is a method where persons do without sex for an agreed period of time. This method is good for school going children and the unmarried.

Breast-feeding: Breast- feeding delays the re- occurrence of ovulation and menstrual periods. It's only effective if the mother breast-feeds frequently and for a longer time.

Rhythm:
This involves studying one's menstrual cycle and having sex only when ovulation is likely not to take place. It is effective in females with regular menstrual cycles. It calls for mutual understanding between the two partners.

Withdrawal method:
This is a method where a man pulls out his penis from the vagina before ejaculation. It's not effective because semen leak ahead of time for ejaculation.

2. **Artificial birth control method**.

Use of contraceptive pills:
Pills contain hormones that suppress (prevent) ovulation. This method is effective if the pills are correctly used as directed by the health worker.

Birth control injections:
This works in the same way as the pills. The also contain hormones that prevent ovulation and menstruation. Here, a dose of an injection is given for along time (3-6 years).

Use of condoms:
A condom is a thin rubber made in different shapes to be used by both men and women.

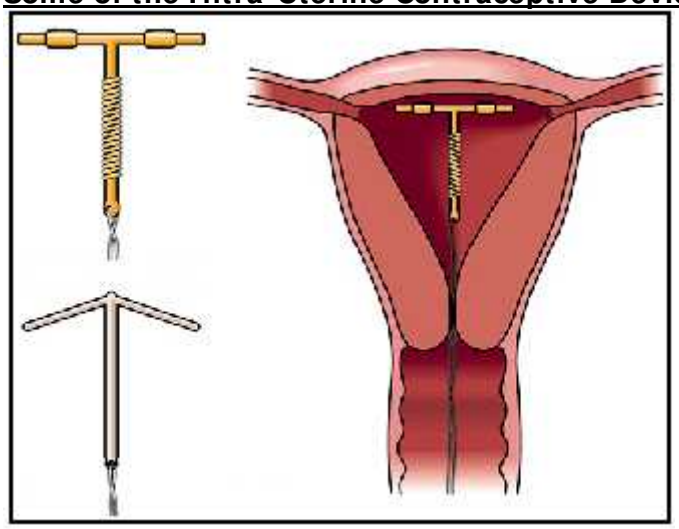
Dia

Use of IUD:

- IUCD= Intra Uterine Contraceptive Device.
- IUD= Intra Uterine Device.

These are specially shaped plastic that are inserte int the uterus. This device prevents implantation of a fertilised ovum thus making conception impossible.

Some of the Intra-Uterine Contraceptive Devices



Use of a diaphragm:

This is a shallow cup made of rubber and worn by women before sexual contact. Unlike condoms, a cup can be used several times. It prevents semen from getting in contact with the female reproductive organ thus preventing fertilisation. The method is effective if it's used together with the contraceptive foam.

dia

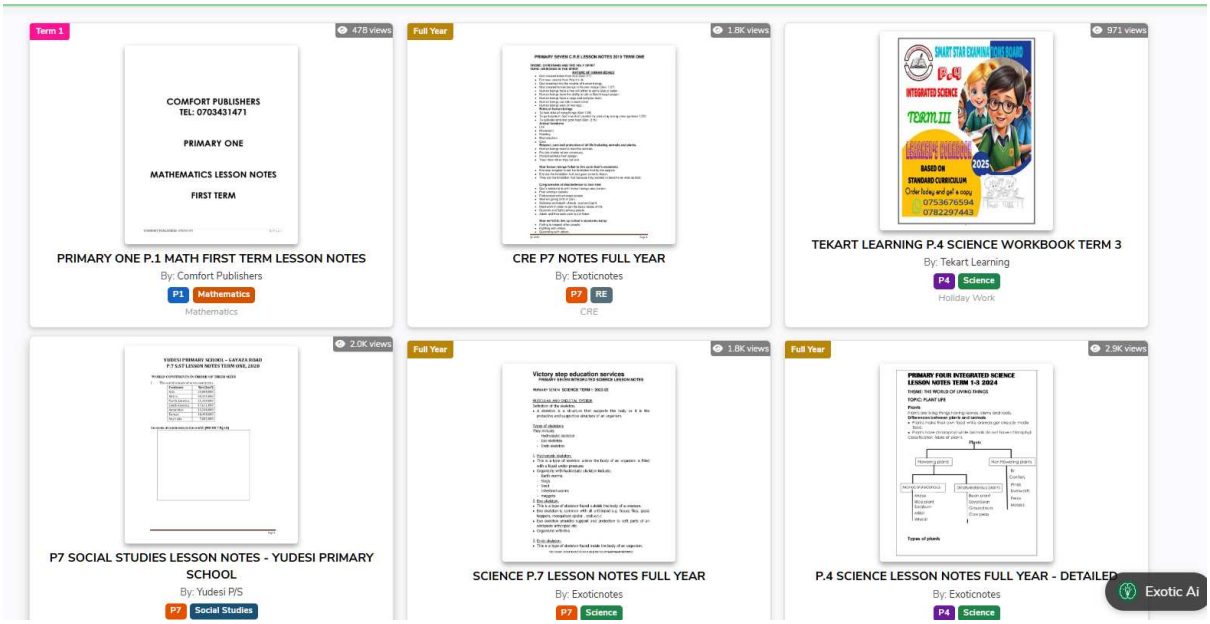
Use of contraceptive foam:

This is a chemical applied into the vagina an hour before sexual intercourse. The chemical kills sperms.

Sterilisation method:

This is a permanent method in which the couple will not have a child in their lifetime. The operation involves cutting and tying the oviduct and the sperm duct in females and males respectively. In males, the operation is called vasectomy and in females, the operation is called tubl- ligation.

This document was downloaded from https://exoticnotes.com



Do you need more LESSON NOTES for Primary (All classes)?

Click
https://exoticnotes.com/notes/primary/

If you need LESSON NOTES for SCIENCE (P.1 – P.7)
Click
https://exoticnotes.com/notes/primary/science/

If you need LESSON NOTES for English (P.1 – P.7)
Click
https://exoticnotes.com/notes/primary/english/

If you need LESSON NOTES for Mathematics (P.1 – P.7)
Click
https://exoticnotes.com/notes/primary/mathematics/